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SOVIET ECONOMY IN A TIME OF CHANGE

A COMPENDIUM OF PAPERS

SUBMITTED TO THE

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CONGRESS OF THE UNITED STATES

Volume 2

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LETTERS OF TRANSMITTAL

OCTOBER 5, 1979.

To the Members of the Joint Economic Committee:

Transmitted herewith for use of the members of the Joint Economic Committee and other Members of Congress and the interested public, is a two-volume compendium on the economy of the Soviet Union entitled "Soviet Economy in a Time of Change." This is a compilation of research papers, prepared at our request by scholars and experts dealing with the recent performance of the Soviet economy. It is the latest in a series of Soviet compendiums which the Joint Economic Committee has published, beginning in 1959. There is understandably a great deal of interest in the Soviet economy, its prospects and problems, and their implications for the United States and Western industrial countries. The submission of the SALT II Treaty to the Senate and the renewed discussion of a trade agreement with the Soviet Union further enhances likely interest in these volumes. The first two volumes, released together, are on Policy Perspectives, Plan and Performance, Soviet Agriculture and the Grain Trade, and Foreign Economic Activities. The third volume, to be released later, is a reconstruction and recomputation of various statistical material by analysts at the Central Intelligence Agency. We believe that these volumes will prove helpful to the Members of Congress in their policy deliberations related to U.S.-Soviet relations, as well as to scholars and interested members of the public. We are indebted to the scholars who have given so generously of their time and their knowledge. They are listed in the Executive Director's letter to me and I would like to express the committee's gratitude for their valued efforts.

Also I wish to express my appreciation to the Congressional Research Service for making available the services of Dr. John P. Hardt, Associate Director for Senior Specialists, who helped to plan the scope of the research, coordinated and edited the contributions, and wrote a summary for the present compendium. Dr. Hardt was assisted by Ronda Bresnick, also of the Library staff.

It should be clearly understood that the views expressed in these papers are those of the individual contributors and do not necessarily represent the position of their respective government, or nongovernment institutions, the Joint Economic Committee, or individual members thereof.

LLOYD BENTSEN,
Chairman, Joint Economic Committee.

OCTOBER 1, 1979.

Hon. LLOYD BENTSEN,
Chairman, Joint Economic Committee, Congress of the United States, Washington, D.C.

DEAR MR. CHAIRMAN: Transmitted herewith is a volume of materials on the economy of the Soviet Union entitled "Soviet Economy in a Time of Change." The compendium contains papers written by scholars and specialists who, as recognized authorities on the Soviet Union, were invited to contribute. The specialists have been drawn from the ranks of various universities here and abroad, private research institutes, several departments of the Federal Government and the Library of Congress. The papers they have submitted, in response to our request, cover the broad range of topics dealing with the recent performance of the Soviet economy. Included among these topics are economic policy, the defense burden, agriculture, politics, computer technology, energy, industry, population, research, science, international trade, and foreign aid.

The Joint Economic Committee has undertaken a number of compendiums on the Soviet economy. Among the earlier compendiums were "Comparisons of the United States and Soviet Economies" (1959); "Dimensions of Soviet Economic Power" (1962); "New Directions in the Soviet Economy" (1966); "Economic Performance and the Military Burden in the Soviet Union" (1969); "Soviet Economic Prospects for the Seventies" (1973); and "Soviet Economy in a New Perspective" (1976). The latest of the committee releases in the triannual series on the Soviet Union, East Europe and the People's Republic of China was "Chinese Economy Post-Mao" (1978).

At a time when the relationships between the United States and the Soviet Union on arms control, commercial, scientific, and technological affairs all are entering a new stage, an assessment of Soviet economic policy appears especially timely.

The contributors to the compendium have been most considerate of our needs and generous in giving of their time and expertise to provide not only basic information, but also an essential analytical perspective. The individual scholars who have participated in the preparation of the present study are:

Catherine P. Ailes
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Herbert Block
Daniel L. Bond
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W. Lee Davis
M. Elizabeth Denton
Padma Desai
Douglas B. Diamond
William Diebold, Jr.
Leslie Dienes
Raimund Dietz
Michael R. Dohan
Imogene Edwards
PAUL G. ERICSON
Murray Feshbach
Carol Fogarty
Dimitri M. Gallik
James W. Gillula

Judith G. Goldich
Marshall I. Goldman
S. E. Goodman
James Grant
Donald W. Green
Gregory Grossman
Gene D. Guill
Damian T. Gullo
Philip Hanson
Joseph F. Havelka
Hertha W. Heiss
Malcolm R. Hill
Franklyn D. Holzman
Margaret Hughes
Holland Hunter
Michael Kaser
Martin J. Kohn
Barry L. Kostinsky
Hedija H. Kravalis
Deborah A. Lamb
James R. Lecky
J. Richard Lee
Allen J. Lenz
Herbert S. Levine
John A. Martens
JeNelle Matheson
Carl H. McMillan
Ronald S. Miller
Henry W. Morton
Louvan E. Nolting
James Noren
Ronald G. Oechsler
Sheldon T. Rabin
Stephen Rapawy
Francis W. Rushing
Henry W. Schaefer
David M. Schoonover
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Theodore Shabad
Martin C. Spechler
Kenneth Tasky
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Department of Management Studies, Loughborough University of Technology, U.K.
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Department of Economics, Queens College, New York.
Department of Political Science, Queens College, New York.
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Russian and East European Research Center, Tel-Aviv University, Israel.
Economics Department, Tufts University.
Institute for Comparative Economic Studies, Vienna, Austria.
Department of Economics, University of Virginia.

It should be clearly understood that the views expressed in these papers are those of the individual contributors and do not necessarily represent the position of their respective government, or nongovernment institutions, the Joint Economic Committee, or individual members thereof.

The Library of Congress made available the services of John P. Hardt, senior specialist in the Congressional Research Service, who helped to plan the scope of the research, coordinated and edited the contributions, and wrote a summary for the present study. Dr. Hardt was assisted by Ronda Bresnick, also of the Library staff. Prof. Holland Hunter of Haverford College assisted in the organization of the volume and wrote an initial overview chapter.

JOHN M. ALBERTINE,
Executive Director, Joint Economic Committee.

CONTENTS

SUMMARY [1]

(By John P. Hardt)

Each of the authors in the sections on *Soviet Agriculture*, the *Grain Trade*, and *Foreign Economic Activities* provide their own professional views herein. The following are some of the major questions raised by their papers with an indication of their responses and where in the volume appropriate analyses in detail may be found.

1. *How do the important agricultural sectors of the United States and Soviet economies compare in priorities and performance? What accounts for the significant differences?*

Of all sectors of the United States and Soviet economies, agriculture offers the greatest contrast in terms of organization and efficiency. Successive Soviet leaderships have had difficulty in: (a) maintaining forward momentum in raising the quality of the diet; and (b) at times, assuring an adequate supply of calories for a growing population. While the U.S.S.R. has been expanding sown acreage in an effort to increase production, the United States has been reducing the area under cultivation and struggling with farm surpluses.

Agriculture in the U.S.S.R. faces severe environmental limitations. Because most of the sown area is climatically comparable to the Northern Great Plains areas in the United States and Prairie Province of Canada, the average productivity of land is lower in the U.S.S.R. than in the United States as a whole. Moreover, as a result of differences in the geoclimatic environment and cropping practices, the year-to-year variation in Soviet farm outputs is three times greater than in the United States.

Since 1950, Soviet farm output has grown by nearly 2½ times. Although progress has been uneven, the average annual rate of growth has been a highly respectable 3½ percent per year, nearly double the growth in the United States and more than the 3-percent average for the rest of the world. As a result of this relatively rapid progress, Soviet output by 1977 was more than 80 percent of U.S. farm production, compared with roughly three-fifths in 1950.

Contrary to popular belief, the Soviet regime in this 27-year period has not neglected agriculture. Since 1950, annual inputs to farms have grown by three-fourths and have included costly programs that required heavy support from industry. The difference between the 145-percent growth in Soviet output since 1950 and the 75-percent growth in inputs is the effect of the increased productivity of the resources devoted to agriculture. In the 1970's, the combined productivity of land, labor, capital, and other conventional inputs in Soviet agriculture has averaged more than a third greater than in 1950. This means that resources used in Soviet agriculture would yield more than a third more output in 1970 than the same resources used in 1950.

In contrast to the impressive growth of resource use in Soviet agriculture, inputs as conventionally measured on U.S. farms remained nearly unchanged between 1950 and 1970. In the 1970's however, rising product prices and farm incomes (in real terms) encouraged U.S. farmers to expand overall resources use by an average of nearly 1 percent per year.

Overall productivity growth in U.S. agriculture has outpaced that of the U.S.S.R.; in the 1970's averaging nearly three-fifths more than in 1950. As a result of the better U.S. productivity record, for the 1950–77 period as a whole, 85 percent of the growth in U.S. farm production can be attributed to a boost in productivity; about one-third of Soviet gains flowed from growth in output per unit of input. . . .

[1] See Volume 1 for summary of Sections on Policy Perspectives and Plans and Performance.

There have been rapid rates of growth in farm labor productivity in both countries. As a result, however, of a much sharper reduction in labor per unit of output in American agriculture during 1951–77—averaging nearly 4½ percent in U.S. agriculture but less than 1 percent on Soviet farms—the release of farm labor to other occupations proceeded at a much faster pace . . . .

The widening of this gap in productivity per man-day on United States and Soviet farms is surprising given the enormous agricultural investments that the U.S.S.R. has made. In 1977, Soviet farm investment was the equivalent of about $79 billion compared with U.S. investment of roughly $12 billion.

In the period 1970–77, total direct farm investments in the Soviet Union were 5.7 times the value of investment in the United States. As a result of the divergent rates of growth in the flow of new, fixed farm investment, capital stock on Soviet farms doubled between 1970 and 1977 but increased only 20 percent in the United States. Hence, despite a considerably more rapid rate of increase in capital per unit of labor input on Soviet farms in 1970–77, the annual growth in labor productivity was markedly slower. (Diamond and Davis, pp. 20–21.)

2. *Given a conscious policy of the Brezhnev administration to improve agricultural performance, what has been the measure of success?*

Since 1965 the Soviet Union's agricultural programs have produced a mixture of success and failure. Success has been achieved in channeling large amounts of machinery, fertilizer, and other inputs to the farms and in producing enough food to meet the basic nutritional needs of the populace. But failure to provide the total inputs necessary to adequately use the materials available has precluded achievement of planned increases in agricultural production and reduction of the major year-to-year swings in output. More importantly, the programs have failed to provide consumers with the amounts of high quality foods, particularly meat, that they now demand.

Part of the farm sector's problems are the result of serious environmental constraints. Even though there are some geoclimatic similarities between parts of the U.S.S.R.'s agricultural regions and parts of the U.S. Great Plains and Canadian Prairie Provinces, there are significant differences. The warmest regions in the U.S.S.R. are too dry, and the growing season in the moist regions is too short. Other constraints are imposed by the institutional setting. Despite an agricultural work force eight times the size of the farm labor force in the United States, skilled labor is in short supply. Moreover, farm managers are given neither the latitude nor the incentive to more productively use the resources give them.

The Brezhnev regime has steadfastly pushed programs intended to offset these constraints, at least those constraints imposed by the physical environment. Plans for the growth in agricultural investment and the supply of industrially produced goods such as machinery and fertilizer have not always been met, but substantial resources have been dedicated to agriculture. The result has been a marked increase in agricultural production. During 1976–78, the first 3 years of the tenth 5-year plan, farm output was, on average, 50 percent greater than the average for 1961–65, and grain production was two-thirds greater. But the demand for key agricultural products such as grain and meat has grown faster, the result of a growing population, the regime's policy to maintain fixed retail prices, and yearly boosts in money incomes. Supply is not only generally short of demand but is still largely dependent on the weather, and fluctuates, often severely, from year to year. At least for the near term, agricultural policy must embrace the ideologically unpalatable private sector in order to bolster supplies of meat and vegetables.

There is growing evidence that the effort to transform the inefficient, labor-intensive, crop-producing agricultural sector into an efficient, capital-intensive, multi-product sector has been more expensive and less rewarding than the Soviets expected. In large part because of its low productivity, agriculture still absorbs a disproportionately large share of the country's resources. Announced plans for the remainder of the 1970s and statements regarding agricultural expectations for the 1980s indicate that, as far as the current regime is concerned, agriculture's relative position will remain largely unchanged. In keeping with an economy wide slowdown in the growth of investment goods, the yearly growth in the flow of resources to agriculture will be reduced. Emphasis is, therefore, applied to achieving productivity gains, and much attention is being focused on the economic indicators used to direct investment funds within the sector and to control waste.

Nevertheless, the overall strategy for growth, stability, and efficiency remains centered on land reclamation, chemicalization, and mechanization. Special attention is being directed to so-called zones of guaranteed moisture, such as the Russian Nonchernozem Zone (RNCZ), where yearly rainfall is relatively high and where increased inputs will presumably have the greatest effect. Those programs will gradually boost agricultural production but at great cost. Moreover, they do not embody the breakthrough in agrotechnology needed to markedly raise yields, to shelter farm output from year-to-year variability in the weather, or to generate, through better breeds and balanced feed rations, the efficiencies needed to accommodate the growing demands of the livestock sector. The most likely result is below plan production of key commodities, particularly grain, and—unless foreign currency spending constraints dictate a change in import policy—continued purchases of foreign grain. Moreover, the boom-to-bust agricultural scenario is likely to go unchanged. (Carey and Havelka, pp. 56–57.)

In spite of the shortcomings of the current Soviet agriculture performance, it represents a significant change and improvement over earlier Soviet periods.

Agricultural policies in the U.S.S.R. during the 60 years of Soviet rule have evolved from ones of exploitation to ones encouraging a massive infusion of resources; from policies with a focus on supporting industrialization to policies with considerable consumer orientation. Further evolution toward a greater emphasis on efficient use of resources is underway, but resource requirements still are great—and growing.

Changes in Soviet leadership typically have brought substantial modification in agricultural policy. The groundwork for Soviet agricultural institutions was laid by Lenin with official land nationalization and the introduction of collective and state farms, which he was only able to implement to a limited extent. It remained for Stalin to impose Soviet-style central planning and carry out collectivization in the rural sector, thus establishing control over the peasant masses. Central planning and control enabled the exploitation of agriculture via unfavorable terms of trade and the very sparing use of government investments to develop agricultural production potential. Even at lower levels of production, more grain was drawn out of the countryside to further industrialization. Residual earnings for farmer incomes were very low.

Khrushchev accomplished a major increase in agricultural production, partially through an extensive plowup of new lands in Siberia and Kazakhstan. He also to some degree decentralized agricultural planning and management and introduced a series of price increases that enabled farms to profitably produce some commodities. Farm and farmer incomes improved and investments in agriculture jumped sharply. After 1958, however, progress was stopped short, as Khrushchev turned more to administrative reorganizations and campaigns and became stingy with additional increases in resources.

Brezhnev's agricultural program introduced at a plenum of the Communist Party Central Committee in March 1965 brought a massive infusion of investment resources with a continuously rising share of total investments in the economy directed into agriculture. Prices were increased to enable profitability in more types of production. A great deal more stability and certainty was introduced which narrowed the differences between collective and state farms and greatly improved the income status of collective farmers. During the last half of the 1960's, agricultural production was boosted upward sharply, and farm and farmer incomes increased rapidly. (Schoonover, pp. 87–88.)

From the standpoint of modern economic planning it is clear that agriculture performance, especially the harvest, plays a central role.

Early in the development of an econometric model of the Soviet Union, it became clear that the agricultural harvest played a fundamental macroeconomic role in the economic system. Not only was there a large direct impact on national income, industrial sectors dependent on agricultural inputs, and personal consumption. Many other macroeconomic variables in the Soviet economy were responsive to the conditions of current and past harvests; among those variables were profits, sector employment, capital investment, and the state budget. Therefore, a model of Soviet agriculture should provide not only a reasonable representation of a complex technology but also generate a macroeconomic signal for use in modeling the behavior of Soviet planners, enterprises and households. (Green, p. 117.)

3. *Has success in raising real income through meat and grain output increases become tied to the world grain market?*

Soviet agricultural trade policy underwent an abrupt shift in the early 1970's when the U.S.S.R. imported substantial quantities of grain and oilseeds while cutting back on its exports of these products. In the seventies, the variability of U.S.S.R. grain and oilseed trade increased, with strong and continuing repercussions for world farm trade, including that of the United States.

The change in grain policy was required by the Soviet Government's program to satisfy internal demand for livestock products, principally meat. Meat output was to jump to an average of 14.3 million tons during the ninth five-year plan (FYP) (1971–75). Grain production was targeted at an average of 195 million tons.

A similar situation prevailed for the 10th 5-year plan (1976–80). Although livestock product goals and feed goals were consistent—chiefly because of relatively low growth in the increase in livestock products was planned—the very poor 1977 grain harvest and disappointing sunflower seed harvests throughout this plan have insured continuance of the digestable protein shortfall.

The deficit between perceived feed requirements and domestic supply provoked a response late in 1971, when large-scale grain and soybean purchases began. Large, but erratic purchases have continued throughout the seventies. The Soviets have continued to export grain although their ability to do so has been curtailed.

The volume of Soviet grain and oilseed trade expanded sharply in the seventies. Five major suppliers—the United States, Canada, Australia, Argentina, and France—accounted for most of the grain supplied, while the United States and Brazil supplied most of the oilseed component in the form of whole soybeans. The countries of the Council for Mutual Economic Assistance (CMEA) account for a large share of Soviet grain exports. Soviet oilseed exports have been very low in the seventies.

The United States is an important supplier of grain and oilseeds to the Soviet Union, and the U.S.S.R. has become an increasingly major market for U.S. agricultural products, ranking in the top five for each of the preceding 3 fiscal years.

The U.S.S.R. will remain as a major agricultural market for the United States in part because of continuously increasing demand for grain and oilseeds, and the Soviet agricultural sector's inability to meet this demand at least in the medium term. The U.S.S.R. will remain an important though variable factor in the world grain and oilseed market in the eighties. (Goldich, pp. 133–134.)

Special importance has been attached to the feed-livestock economy due to its relationship to meat output.

The Soviet feed-livestock economy is a broad multifaceted structure in which grain is but one part. In order to understand the present and future role of the U.S.S.R. in the area of grain utilization, the salient issues of the Soviet feed-livestock economy must be addressed. A presentation of feed use has been made in which grain for feed was placed in perspective with other feed supplies. This general overview is but one step toward offering a more complete picture of the Soviet feed-livestock economy in an effort to improve our understanding of the true breadth of the situation.

Our ability to explain, forecast, and appreciate the significance of future movements by the U.S.S.R. in international grain and oilseed markets may be closely tied to our understanding of the Soviet feed-livestock economy. It is hoped that this overview of feed helps to restore some perspective that may have been lost with the large grain purchases of the early seventies. (Zahn, p. 173.)

4. *What are the prospects for United States-Soviet trade?*

The course of U.S.-Soviet trade for the next several years may well be set by events of 1979.

Key direction-shaping events will include outcomes on SALT and initiatives to provide MFN and official credit privileges to the Soviets. These outcomes, of course, will be very much influenced by Soviet domestic and international political activities and by U.S. perceptions of those activities.

Successful conclusion and Senate approval of a SALT agreement would probably provide a U.S. domestic political environment in which the climate for

extensions of MFN and credits would be greatly improved. Conversely, failure to successfully conclude SALT could provide an environment in which political relations could further deteriorate to the detriment of trade between the two countries.

Trade between the United States and the U.S.S.R. is unlikely to reach its optimum level so long as political conditions are unfavorable. On the other hand, however, favorable political conditions alone are not sufficient to build a major trading relationship, which must be economically based.

Soviet import needs are essentially three-pronged: capital equipment, technology and grain. The United States is well qualified to supply most items of capital equipment and technology and is doubtless a superior source for many Soviet needs, though there are few items or technologies which cannot be purchased from non-U.S. sources in quality and/or state of the art acceptable to Soviet needs....

Soviet foreign trade policy is no longer bound by a narrow bilateralism that requires an annual balancing of accounts with each trading partner. Nevertheless, the fullest development of U.S.-Soviet trade and U.S. exports to the U.S.S.R. probably can occur only after Soviet exports to the U.S. increase significantly and near term sources of large increases in Soviet exports to the United States are not evident at this time. (Heiss, Lenz, and Brougher, pp. 205–206, 207.)

5. *How are Soviet plans and performance affected by their balance of payments with the Western, hard currency nations?*

Moscow was successful in expanding the volume of imports in 1970–1978. The Soviet Union managed substantial grain imports to cover harvest failures in 1973 and again in 1975. More recently the U.S.S.R. has come to rely on the West for the feedgrains necessary to increase its livestock herds. Meanwhile, Soviet equipment deliveries have risen rapidly, from $960 million in 1971 to over $5 billion in 1977; the chemical and automotive industries, in particular, have benefited from Western machinery and technology.

The U.S.S.R. failed to sustain a commensurate growth in hard currency exports. A cumulative hard currency trade deficit of $24 billion was incurred in 1970–1978 even though the price of oil, the U.S.S.R.'s major hard currency export earner, climbed precipitously. Soviet exports grew by only 6 percent per year in real terms as Moscow was (a) unsuccessful in expanding exports of manufactured products and (b) unable (or unwilling) to expand exports of oil, natural gas, and other raw materials to levels required to offset the rapid rise in imports.

The Soviet Union, however, did push up considerably its hard currency sales of arms and gold as well as earnings from its merchant marine. Nonetheless, the U.S.S.R. racked up a cumulative current account deficit in 1970–1978 of $7.7 billion.

The mounting bill for imports was largely financed by heavy borrowing in the West. Gross Soviet debt to the West rose from $1.8 billion at the end of 1970 to approximately $16 billion at the end of 1978. Much of the increase took place in 1975–76 when the U.S.S.R. helped cover a cumulative $12 billion trade deficit with an $8.5 billion increase in net debt to the West. The size and character of the 1975–1976 borrowing provoked Western concern over Soviet external financial management.

Since 1976 the U.S.S.R. has returned to a more cautious and pragmatic approach to its trade and payments. Trade deficits have been cut, and the current account has been brought into balance. In part this turnabout has been the result of a favorable harvest in 1976 and the Soviet decision to allocate additional oil to the hard currency markets. Moscow has also cut back substantially on equipment orders, ostensibly as a result of domestic construction backlogs. Moreover, concern over growing debt has undoubtedly led planners to take a harder look at industry requests for imported equipment. By the end of last year the U.S.S.R. had brought its financial house in order—to the point that Western willingness to lend exceeds Soviet demand. The debt, although large, is manageable; debt service should not constrain import capacity in a significant way in the near term.

The long-term outlook for Soviet trade and payments is much bleaker. Demand for Western equipment, technology, grain, and some intermediate products is expected to mount. At the same time, the U.S.S.R. faces the prospect of having to buy oil for hard currency on a net basis by 1985. The magnitude and duration of

the downturn in oil exports are likely to preclude the use of balance-of-payments financing in lieu of adjustments in the current account. Limited potential for increasing arms and gold sales and earnings from transportation and tourism probably will force the leadership to squeeze the merchandise account to compensate for the expected downturn in oil exports.

The leadership will thus be forced to make hard choices in the conduct of its trade in the 1980's. Moscow is understandably loath to commit more raw materials to the export sector in view of the increasing cost of extracting them and rising internal demand. Soviet ability to expand exports of manufactured goods, on the other hand, depends on the willingness of the U.S.S.R. to allow Western participation, particularly quality control, in Soviet production. Failure to be more forthcoming on either of these areas will likely carry the cost of a diminished import capacity. How the U.S.S.R. will determine the relative cost/benefits of export expansion is uncertain. What is clear is that the decline in oil exports will force a readjustment in the merchandise account either by a reduction in imports or by an expansion of the export sector. (Ericson and Miller, (pp. 209–210.)

As energy exports and grain imports are critical to the Soviet foreign trade balances some more detailed assessment of the "barrels for bushels" question is appropriate. By use of various scenarios as applied to a model of the Soviet economy different results are obtained.

Scenarios A–C have disastrous implications for the Soviet economy. By 1985 the hard currency results in Scenarios A and B are clearly unacceptable: large negative hard currency fuel exports (i.e. imports), drastically low machinery imports from the developed West, very high hard currency trade deficits and debt service ratios of 70–75 percent. Scenario C approaches these levels by the end of the decade. Thus the scenarios where oil output falls to 500–550 million metric tons by the mid-eighties and the one where it levels off at 605 million metric tons through the eighties produce unacceptable results. What the analysis indicates in these scenarios is that if oil production follows these patterns, the Soviet leaders will have to seek counteracting policies.

One such policy would be to increase the intensity of the campaign to expand pipeline capacity to export Soviet gas to the West. Pipeline capacity is currently a constraint on gas exports. This would help in Scenario C, but it would still fall far short in Scenarios A and B.

The energy demand model, which indicated a growth of energy demand in the period 1980–1990 of about 2.5 percent yer year (1.9 percent for oil), was run on a baseline projection of the economy involving a growth of industry of over 4.5 percent per year, and of GNP of 4 percent. One likely consequence of the oil output patterns of these three scenarios would be substantially lower rates of economic growth. Another would be a cutback of oil exports to CMEA (which we assumed would remain constant through the 1980's), with the resulting political strains.

On the other hand, rather interesting and somewhat unexpected result of the analysis is the very favorable hard currency effects for the Soviets in Scenario D: not only growing fuel exports to the West, but also rapid increase in machinery imports, steady low hard currency trade deficits, and a debt service ratio that falls to 20 percent by 1990. What is indicated is that if the Soviets are able to maintain something on the order of 1.5 percent per year growth in oil production throughout the 1980's, they might not be in bad shape in regard to hard currency balances, despite substantial grain imports. And at least one Western specialist on Soviet energy (Leslie Dienes) implies that such a growth of Soviet oil production is not totally out of the question. (Bond and Levine, p. 265.)

In spite of veneration of gold stocks as a treasure to be stored rather than a good to be sold, gold sales have recently been a key increment to the Soviet hard currency balance.

. . . In 1978 it is here estimated that the U.S.S.R., by selling all its year's output earned just enough (almost $3 bn) to pay for its hard-currency deficit in its balance of trade. If the production is estimated at a lower level—as do the U.S. government agencies—the U.S.S.R. must have run down its gold reserves. Related to the same aspect of Soviet economic potential is the Western price of

gold, for the U.S.S.R. was able to earn a record $2.9 bn in 1978 for its second-highest volume of sales (450 tonnes) because the price was so high. The gold price went through the "psychological barrier" of $250 per fine ounce in February 1979, but when Khrushchev's administration was selling (and certainly running down reserves) the price was a mere $35 per ounce. With approximately one-third of world gold production, the Soviet Union notably benefits from the Western currency instability which drives up the price of gold. (Kaser, p. 291.)

Hard currency deficits have been a major factor in Soviet foreign economic policy. Some suggested that they are endemic to the central planning system and will persist.

Centrally planned economies [CPEs] have experienced persistent balance of payments pressures in western markets. These have been expressed partly as deficits and rising debt, but have been partly repressed. To some extent these pressures have resulted from systemic factors inherent in central planning. In terms of the theory of comparative advantage, one might say that the CPEs have a comparative disadvantages in "selling". Among other things, central planning leads the CPEs to overestimate the saleability of their manufactured products which, for systemic reasons, tend to be of relatively low "quality". The term "quality" here stands as a proxy for all non-price dimensions of products, such as: servicing, packaging, style, level of technology, availability of spare parts, etc. A second systematic disadvantage is "inability to devalue" in order to get into balance of payments equilibrium. A third is the endemic practice of "taut" planning which automatically generates external excess demand. Finally, CPE balances of payments have proved very vulnerable to cyclical fluctuations of demand from the West. Since 1974, this has been the major factor behind the rising hard currency debt. (Holzman, p. 297.)

6. *How are the benefits and costs distributed between the United States and the Soviet Union in trade? How do the conclusions relate to issues of national security, leverage and economic stability?*

. . . Despite the Soviet state monopoly of foreign trade, we found little theoretical or empirical support for the claim that the U.S.S.R. is systematically capturing monopoly profits at the expense of U.S. firms and U.S. consumers. In many respects the Soviet Union is not significantly different, in its trade with the West, from many other countries with very small shares of world trade. Although Soviet market power may be significant in some products, in general it is likely to remain negligible for the foreseeable future. . . .

There would appear to be little cause to be concerned about the U.S.S.R. taking away Western markets, although Soviet competitive practices in world shipping markets may be an important exception. Other than the world grain and chemical markets, the world economy would seem to be relatively invulnerable to Soviet-induced economic instability in the near future. . . . We tentatively conclude that while on balance the U.S.S.R. probably derives greater economic gains than does the U.S. from mutual trade and technology transfer, whatever imbalance that does exist it is not so obvious and not so large as to suggest an "inequitable" distribution nor a great potential for the use of economic leverage to obtain non-economic concessions from the Soviet Union. (Wolf, pp. 337 and 338.)

The rate of return on foreign capital inflows may be far less than often assumed by those assessing the comparative advantages of East-West commercial relations.

Our estimates of the returns on foreign capital inflows to the Soviet economy are therefore remarkably low compared to the market terms for credits that typically obtain in the private capital markets of the West. They suggest the following thoughts.

First, they may explain why the Soviet Union is keen to get softer terms and conditions. While soft terms are better than hard terms, by definition, the Soviet keenness to get them may follow from the fact that hard, commercial terms may tend to result in counterproductive borrowing, given the low returns domestically.

Second, it may also explain the Soviet emphasis on getting associated technology rather than pure capital inflows. (Desai, pp. 407–408.)

Export specialization and import dependence have not made the costs of economic interdependence high for the Soviet Union.

More generally, we found that the pattern of export specialization and import demand continues to reflect both natural resource endowment and the unique set of institutional, political, and historical factors peculiar to the centrally-planned Soviet economic system. Where specialization has occurred, it has not necessarily increased vulnerability to pressure from the West. Often, the observed trade specialization has been in trade with Eastern Europe which presumably poses less political risk than trade with the West. In addition, the large scale simultaneous import and reexport of similar or identical products suggests that the growing trade participation ratios overstate underlying specialization and strategic dependence of the Soviet economy on foreign trade. Such simultaneous trade, however, does yield important conventional gains of trade and permits a qualitative upgrading of investment goods and consumer goods otherwise not obtainable within the current economic system. Looking back, we may well conclude that the major contribution of foreign trade to the Soviet economy in the 1970's was that trade enabled the U.S.S.R. to achieve two urgent economic goals—increased productivity of its resources and increased standards of living—without being forced to adopt internal economic reforms necessary to achieve these goals from within. (Dohan, p. 368.)

The empirical record of Soviet exports and potential suggest serious limits and problems in trading with the developed West.

To date, the Soviet Union has not been a significant exporter to the Industrialized West (IW). Only 1.5 percent of the Industrial West's global imports were supplied by the U.S.S.R. in 1977. Although the share of Soviet exports destined for the West has increased somewhat in the 1970's, communist countries still absorb the major portion of commodities exported by the Soviets. In 1977, Soviet exports to the communist world were about 2½ times greater in value than exports to the Industrialized West. . . .

An examination of the commodity profile of Soviet exports to the IW reveals that in recent years three-fourths of these exports have consisted of raw materials and fuels. Oil, wood, coal, gas, diamonds, cotton, and nonferrous metals have been leading hard currency earners. A moderate share of foreign exchange earnings has also been contributed by semi-processed goods such as chemicals and iron and steel.

The Soviet Union's export performance has been weakest in the area of finished manufacturers, which have earned a mere 4 percent of Soviet hard currency from the Industrialized West. Although finished manufactured have accounted for a rising source of hard currency in exports to the LDC's, on Western markets, they have been seriously hampered by what have become characteristic problems of style and quality; poor after sales service and inadequate spare parts have further compounded the problem. Finished manufactured commodities that have achieved some success on Western markets include passenger cars, machine tools, tractors, and some instruments such as watches, clocks and cameras. . . .

We conclude then that Soviet export strength, at least through the medium term, will remain in raw materials, energy products, and to a larger extent in semi-processed goods. . . .

Siberian development will be essential to expansion of energy resources. If and when the Soviets agree to forge ahead with full scale development in this area, they will have to turn to the West for necessary equipment and technology. Judging from the size of some of the projects that have been discussed, the Soviets may have to accept larger debt in the medium term. On the other hand, continued Western willingness to extend credits and willingness to take back product as payment for exported equipment and technology will also be key elements to the future of Soviet-Western trade. Although taking back energy and raw material resources may pose relatively fewer problems than accepting semi-processed and finished manufactured goods, there are indications that the Soviets are intensifying efforts aimed at marketing the semi- and finished manufacturers. This approach is likely to have limited success, not only because of quality problems but also because these goods run the risk of evoking Western import restriction measures.

Future expansion in Soviet-Western trade is likely to rest more on Western participation in development of the products which have a proven market in the West. It implies Western flexibility in extending credit and taking products back as payment. It also requires Soviet flexibility in allowing Western firms access to their Soviet counterparts, a larger role in production of decisions and acceptance of quality control mechanisms. Perhaps then the Soviet Union will expand its export base and mitigate what we see to be the basic constraint to the future expansion of Soviet trade with the West. (Kravalis, Young, Oechsler, and Lamb, pp. 416–419.)

7. Compensation agreements have become a major mechanism to expand Soviet trade with the West without incurring unacceptable increases in debt. What are the prospects for future agreements?

The U.S.S.R. has increasingly looked to compensation agreements with Western firms to repay the costs of buying Western equipment and technology. The exports guaranteed under the more than 45 agreements concluded over the past decade in fact will have a value much larger than the $8 billion worth of agreement-related imports from the West.

Earnings from agreements signed thus far will boost Soviet hard currency exports in the 1980s especially. The rise in earnings from compensation deals—from about $830 million in 1977 to nearly $4 billion in 1985—will soften the impact of the expected decline in oil production in the early 1980s and the resulting fall in oil exports to the West.

Although Soviet interest in compensation agreements with the West has intensified, the rate at which new deals have been concluded has fallen off considerably in the last four years. Internal Soviet problems and Western disenchantment stand in the way of negotiating new agreements. On the Soviet side, the policy of committing Soviet raw materials as the price for Western help in developing Soviet resources has been questioned . . .

On balance, new agreements might add more than $2 billion per year to the estimated $4 billion of compensation exports already contracted for in 1985. The calculation assumes: sales of an additional 5 billion cubic meters of gas to Western Europe ($600 million to $700 million); a third timber agreement with Japan ($300 million to $400 million); oil exports of about 100,000 b/d to Japan from the Sakhalin project ($1 billion); several smaller deals—the chemical plants at Tomsk, the Sayansk aluminum smelter, and a few other plants. (Barclay, pp. 462, 476.)

Another development designed to improve Soviet relations in the Western economies has been the expansion of Soviet owned banks.

The U.S.S.R.'s network of Western-based banks industry branches has more than tripled in size since the early 1960s and now extends from Europe, through the Middle East, into Asia. Wholly-owned by Moscow, the seven banks and three branches are located in major financial centers, where they play an active role in local money markets and facilitate the financing of East-West trade. They also extend their lending activities to the less developed countries and have become very active participants in syndicated Eurocurrency lending in the 1970s. Though the bank's policies are generally dictated by Moscow, their day-to-day operations follow the laws and systems of the country in which they are chartered. The banks are also motivated by institutional growth and, like other "Western" banks, have acquired subsidiary interests—including equipment leasing and trade promotion. At times, they act as agents for the U.S.S.R. and other socialized countries in the sale of gold in the West. Despite some recent setbacks, particularly those of the traditionally conservative Moscow Narodny Bank headquartered in London, the Soviet banks continue to enjoy enviable reputations. Over the years, these banks have cultivated extensive correspondent relationships with Western banks all over the world that have to be counted among their more valuable assets thus giving sustenance to the old Russian proverb—often quoted by Soviet bankers—that "it is better to have a hundred friends than a hundred rubles." (Danylyk and Rabin, pp. 482–483.)

Recent efforts to revise the Soviet foreign trade structure have been designed to improve the effectiveness of Soviet commercial relations with the West.

Soviet planners seem to have chosen two interrelated strategies for intensifying the development of foreign trade:

Further expanding ties to world markets through such measures as compensation agreements, joint-stock companies in the West, special export industries, and increased numbers and activities of Soviet organizations in foreign trade; and

More closely linking and better compensating Soviet organizations—especially FTO's and industrial enterprises—that have responsibilities for producing and marketing Soviet exports, and purchasing and absorbing foreign imports.

Soviet leaders anticipate that the U.S.S.R. will benefit both politically and economically from greater participation in foreign trade and are confident that the "State Monopolies of Foreign Trade and Currency Operations," will shield the U.S.S.R. from disruptive economic disturbances on "capitalist markets.". . . (Bozek, p. 507.)

Soviet trade statistics pose special problems to Western traders and analysts. However comparisons and analysis provides some insights and reconciliation of differences.

The examination of Western and Soviet trade statistics on a bilateral commodity basis for 1970–74 reveals a good many special circumstances. Nonetheless, a few primary factors explain most of the discrepancies between Western and Soviet reporting. Western c.i.f. reporting accounts for most of the difference between Western imports and Soviet imports. This is the case for France, Italy, Japan, the United Kingdom, and West Germany—five of the seven countries that include transport and insurance costs in the value of imports. To some extent, these additional costs are offset in those Western countries—Italy and France—that use the special trade reporting system and therefore do not count as imports the Soviet goods that they buy and then reexport. . . . (Gullo, p. 535.)

8. *How do Soviet economic relations with Cuba, Vietnam, and Mongolia differ from those with the European members of CMEA (Council of Mutual Economic Assistance)?*

The Soviets appear to follow a similar pattern in establishing economic ties with developing country client states. Cuba, Vietnam and Mongolia can be viewed as three countries in different stages of evolution according to this pattern. The three are similar in that investments of Soviet resources yield a disproportionately small current economic return, but both the actual and potential political returns are large.

Although Moscow has willingly incurred the resource drain from its long term support of Cuba and Mongolia, the addition of Vietnam as a client state could raise the costs substantially. Should the pattern be repeated with developing countries elsewhere, especially in Africa, the resource drain could become particularly costly for the already hard pressed Soviet economy to handle. (Theriot and Matheson, p. 581.)

9. *Soviet performance may be improved by assimilation of Western technology. What does the reward to date suggest on the effectiveness of the foreign links?*

The picture of Soviet assimilation of Western technology that comes out of the survey is not one that supports extreme views of any kind about Soviet performance. On the whole, the picture is not very impressive: assimilation takes longer than in Western Europe, in the case of chemical technology, where evidence for a learning process could be assessed, there was no sign of a systematic reduction in lead-times with experience; subsequent manning levels tend to be on the high side and output levels on the low side, at least in the chemical industry; and successful domestic diffusion and modification appear to be limited.

At the same time, the plants in the survey got into production and stayed in production, and in some cases have been operating well by most standards. They, and other Western-supplied plants and machinery, have transformed large parts of the Soviet chemical and motor industries and are the major source (in some cases, the sole source) of current Soviet production of a wide range of important products; and there has at least been some diffusion. (Hanson and Hill. p. 600.)

Science and technology exchange progress at the governmental level have had some impact on transferring technology between the United States and the Soviet Union and provide other benefits.

. . . while gains in the political and economic areas resulting from the exchanges have been minimal, the programs, when judged on their own merit in terms of their cultural and scientific impact, have produced significant benefits to the U.S. in several areas. Continued emphasis on selection of projects from among those areas in which Soviet scientific expertise either surpasses or is on a par with that of the U.S. should ensure that the exchanges are of mutual benefit. (Rushing and Ailes, p. 605.)

10. *The Soviet Union has in recent years invested in the West and developing world. What has been the character and rationale for this development?*

. . . There are now well over one hundred, wholly or partly owned Soviet companies abroad, most established since 1970. These companies are distinguished from Soviet airline, travel and other representative offices abroad by their establishment as juridically independent enterprises within the legal framework of the host countries. They are located in a wide range of countries and industries, in the West and in the South. Apart from the seven Soviet banks and three insurance companies abroad, they range from simple agencies to marketing companies with extensive retail and service networks, and also include engineering-consulting firms, fishing and fish-processing ventures, shipping and even manufacturing companies.

Many Soviet companies abroad are wholly owned; and in most of the remaining cases Soviet majority equity, or the nature of Soviet participation, indicate that the companies are effectively controlled by enterprises in the Soviet Union. They may therefore be regarded as "subsidiary" companies, and Soviet investment in them as "direct foreign investment", entailing operational control as well as ownership of assets abroad. As parents of foreign subsidiaries, organizations in the U.S.S.R. have taken on the character of "multinational enterprises". Twenty-two Soviet foreign trade enterprises, banks or other organizations have been identified as having a majority interest in one or more companies abroad, and thus as falling clearly within the U.N. definition of a multinational enterprise.

The major conclusions to be drawn from an analysis of Soviet direct foreign investment are as follows:

(1) Direct foreign investment by the U.S.S.R., while enjoying some early precedents, is essentially a phenomenon of the 1970s and is an important component of the Soviet Union's new external economic orientation.

(2) The establishment of a network of foreign subsidiaries constitutes one of the more striking institutional changes in the traditional Soviet mechanism for the conduct of external economic relations to have accompanied the new policy orientation.

(3) The principal object of Soviet investment abroad has been the establishment of an effective infrastructure through which to expand exports to the West, especially manufacturers.

(4) Soviet direct foreign investment therefore has important implications for the future growth of East-West trade, especially as some important prior sources of growth (Western credits, oil exports) lose their earlier dynamism.

(5) Soviet investments in the Third World serve primarily to promote sales of Soviet machinery, equipment and technology in these markets. They are also used to gain access to scarce raw materials notably fish. Organized more frequently as joint equity ventures with host country enterprises, they are emphasized as a desirable, new form for Soviet industrial cooperation with the South. As yet, however, the U.S.S.R. lags behind some CMEA countries in the extent of its investments in the developing countries.

(6) An observable, evolutionary trend extends Soviet foreign investment into new areas, especially into production and ancillary activities. This evolution, combined with rising Soviet investment in financial, transport and other service sectors, has resulted in a significant, qualitative change in the Soviet economic "presence" abroad.

(7) Direct foreign investment by the U.S.S.R. represents a pragmatic response, despite ideological objections, to changing international circumstances. It constitutes important evidence to the Soviet Union's commitment to its new external economic strategy. Direct investment by the U.S.S.R. and the other CMEA countries adds a potentially important, new dimension to the already vexed question of the role of multinational enterprise in the world economy.

(8) The evidence presently available does not suggest that most Soviet companies abroad behave significantly differently from Western foreign subsidiary companies. Their activities nevertheless require further study to determine whether they pose problems for host countries which demand special regulatory responses. Meanwhile, their growing importance provides Western governments with a basis for urging more direct access to the Soviet economy for Western firms, according to the principle of commercial reciprocity. (McMillan, pp. 625–627.)

11. *What has been the level and effectiveness of Soviet economic and military aid?*

The U.S.S.R. launched its aid program in the mid-1950's to promote Moscow's foreign policy interests in the Third World. In the 24 years since then, the U.S.S.R. has responded to aid opportunities in target areas throughout the world with nearly $47 billion of economic and military pledges to 73 countries. It has trained 50,000 students from 98 developing countries in academic disciplines and nearly 75,000 LDC nationals in military and technical skills. The record for Soviet personnel serving in LDCs in a single year (1978) was nearly 28,000 economic technicians and 11,000 military technical personnel (not including troops stationed in Egypt in the early 1970s).

Moscow's basic political objectives have remained constant—to erode Western influence and substitute its own; to counteract the Chinese challenge to its "leadership" of national liberation movements; and eventually to persuade Third World countries that Soviet Communism offers the only viable solution to their economic problems. To accomplish these objectives Moscow has provided less developed countries with alternative sources of arms, capital and technical services on attractive terms. Initially the Soviets gave preference to emerging states that followed a "non-capitalist path of development" and were on the road toward becoming "national democratic states." Ideology was overtaken by pragmatism in the mid 1960s, when aid was offered with less concern for the political orientation of potential clients. Curious to assert a big power image in the Third World, the Soviets tried to fill the vacuum left by the withdrawal of colonial powers, while securing a foothold in areas of strategic importance. Moscow found arms its most direct and fastest route to influence in these countries, which often were able to obtain economic assistance from non-Communist sources, but not military aid. The Soviets also provided military personnel and advanced weapons systems to states and nationalist groups ripe for conflict, most recently to the Arab belligerents in the Middle East and for nationalist movements in southern Africa.

Nearly two-thirds of Moscow's $47 billion commitment and three-fourths of its $32 billion of deliveries since 1954 have been military related. In the first years of the program when some developing countries were reluctant to accept large amounts of military assistance from Moscow economic commitments aid has outrun the economic almost 2½ to 1, and for most of those years the Soviets have held second rank, after the United States, as an LDC arms supplier.

Moscow has never been able to compete on a broad scale with the West, either in the size or kind of economic and programs it has offered. Nonetheless, the heavy regional concentration and high visibility of its program often have given Soviet aid an impact beyond its size. . . . (Cooper and Fogarty, pp. 648–649.)

12. *How does the merchant marine relate to the Soviet economic role?*

Since the early 1960s, Moscow has aggressively expanded its maritime assets, quadrupling the size of its merchant fleet and making it one of the 10 largest in the world. With less than 3 percent of world tonnage, the Soviet fleet is overshadowed by those of leading shipowning countries like Japan whose fleet is three and a half times larger. At the same time, it is roughly matched by the

U.S.-flag fleet. Soviet fleet expansion has permitted some penetration of shipping markets formerly monopolized by Western shipowners. Soviet competition has been limited, however, by persistent deficiencies in fleet quality and the large share of tonnage earmarked for Soviet domestic and foreign trade.

Longstanding qualitative deficiencies afflict the fleet's two largest components. In the liner fleet, 95 percent of the tonnage consists of outmoded general purpose freighters. Such ships are not competitive on major international liner routes, where faster and more specialized container and roll-on/roll-off (ro/ro) ships of Western fleets predominate. Because of shallow drafts in most Soviet ports, Soviet tankers average only 20,000 dead weight tons (DWT), less than one third of the world average.

Despite a rapid increase in the carriage of cross trade goods between foreign ports, the Soviet fleet is still predominantly employed in the carriage of Soviet trade. Shipments by the fleet in 1977 were allocated as follows: Soviet exports and imports, 51 percent; Soviet internal trade, 35 percent; and cross trades, 14 percent. In both its own and the cross trades, the fleet's role is predominantly economic. In 1977, the merchant fleet contributed 7 percent of the U.S.S.R.'s gross hard currency income, a figure surpassed only by the oil, timber, and gold mining industries. Of this hard currency, 72 percent was earned in the carriage of Soviet exports and 28 percent in carriage of cross trade cargoes.

Although Soviet ships carry more cross trade cargo as tramp ships under foreign charter than they do as liners, the Soviet fleet's greatest impact on U.S. and other Western shipowners derives from its cross trading activity in the liner trades. This occurs because most Soviet cargo lines (a) operate outside the Western-dominated system of cartels or "conferences" that set rates charged by member lines on the world's key trade routes and (b) charge rates below conference levels and—according to some—below cost. Because of the inferior service it provides most routes due to heavy reliance on general purpose ships, the Soviet fleet probably could not attract cargoes without cutting rates. As it is, Soviet ships managed to win a 4 percent share in liner services linking the United States with Japan and Europe in 1977, at the expense of U.S. and other Western competitors. Low rates for container shipments between Europe and Japan via the Trans-Siberian Landbridge similarly took 5 percent of business away from Western containership operators on that route. With Western governments taking stronger steps to counter Soviet pricing policies, the Soviets have taken limited measures to abate their rate cutting in U.S. and other trades. No progress has been made in convincing them to join conferences.

Soviet cross trade activity on the more competitive tramp charter market, often involving back-haul cargoes carried by ships returning from the delivery of bulk Soviet exports, evokes few complaints from Western owners. The volume of cross trade cargo carried by Soviet tramps in the West is half the volume of Soviet exports and imports carried on chartered foreign ships.

Deliveries to the Soviet merchant fleet under the 1976–1980 Five Year Plan will upgrade a small portion of the Soviet liner fleet with modern ro/ro ships—some of which are up to the highest Western standards—Soviet competition with Western operators on some routes will intensify, but the number of lines affected will be small.

The heaviest deliveries under the Plan will consist of tankers and dry bulk carriers for the Soviet tramp fleet. By permitting Soviet ships to carry a higher percentage of exports and imports, acquisition of these ships will benefit the U.S.S.R.'s hard-currency balance of payments. It will also take an appreciable volume of business away from the non U.S. Western shipowners currently engaged in Soviet trade. The role of U.S. ships in bilateral trade with the U.S.S.R. will presumably not be affected because it is determined by the cargo-sharing provisions of the U.S./Soviet Maritime Agreement. (Carr, pp. 663–664.)

Problems in Measuring and Assessing Soviet Economic Performance

The volume of economic data released from the Soviet Union has been decreasing over the last several years, moreover old problems in completeness, uniformity, and comparability continue.

Some of the problems include:

1. *Restricted availability of data.*—Sharp but uneven curtailment of released statistical information on the economy. Problem areas, such as energy, agriculture, balance of payments, certain regional developments appear to be only a partial list of areas affected by curtailed reporting.

2. *Reduced availability of statistical handbooks.*—Many regional and special handbooks have been released only in limited editions, if at all, and access has been restricted.

3. *Lack of uniformity.*—No standard economic classifications are established as yet to ensure consistency in reporting from section to section or from year to year. Although instructions for reporting are often available, it is not clear what each statistical series published includes.

4. *International comparability.*—Even if statistics released were complete, comparison with performance in other nations would be difficult. It is for this and other, aforementioned, qualitative reasons, that artificial national accounts are still constructed in the West using standard Western methodology and primary Soviet detailed data.

5. *Significance of available data.*—As detailed explanations of Soviet methodology is often not provided, the meaning of such data as prices is unclear and the appropriate use of this data in analysis is often difficult. Scholarly exchanges between East and West have improved the mutual understanding of the utility of the data. More complete release of data based on the Helsinki agreement might in the future provide a broader base for commonly accepted professional analysis. The recent curtailment of data released appears inconsistent with, if not in violation of the Helsinki agreement. Continued joint research between western scholars and their Soviet counterparts may also lead to improvement in the statistical data base and its analytical utilization.

These volumes indicate not only most of the western estimates of economic data, but also a fair sampling of how western analysts assess the utility of this data when estimating current performance and future economic prospects in the Soviet Union. A third volume, to be available later, will provide the statistical and analytic underpinnings of many of the economic estimates of analysts of the Central Intelligence Agency for use of the interested professional analysts.

Options and Prospects

While focusing on the economic problems faced by current Soviet leaders, one should not lose sight of the significant accomplishments to date. Present and projected levels of Soviet economic performance suggest that those goals set for goods and services during the Stalinist era could comfortably be met today. The military and heavy industry took priority during the Stalinist era and were considered constant, while agriculture, light industry and consumption were residual claimants and considered variable. While priorities have now changed, the old institutions of planning and management have shown considerable vitality and persistence. The Soviet leadership—also old—is probably comfortable with the past requirements set during an earlier era, but is also aware of the pressing new needs and the necessity to satisfy the current and future requirements.

The long-term pressures for change grow each year and may become especially evident during the leadership-succession period. Moreover, the opportunities to raise the technological level of the massive Soviet economy to that of the western industrial economies are very attractive. At the same time, short-term crises in energy, agriculture and elsewhere bring home the urgency of improving the quality of industrial and consumer goods and incentives. Changes open to the leadership could make the Soviet economy a technological superpower, thus matching their geopolitical position and satisfying their domestic needs. But to rise to their potential level of performance implies the following:

1. Military claims on material and human resources would need to be reduced and effective transfer of saved resources to civilian production facilitated, especially to permit timely completion of the large modernization projects.
2. Technology transfer from the West would apparently have to be linked to the transfer of resources from military programs to bring about a widespread modernization of their economy.
3. Planning institutions and management mechanisms would need to be geared on a priority basis to effectively shift and utilize resources.
4. Regional problems of a disparity in location of materials, capital infrastructure, and labor would need to be accommodated.
5. Economic relations with the CMEA countries of East Europe might be adjusted to provide a net economic benefit to the U.S.S.R. while retaining political stability.

Significant changes in the short run are not probable. Changes in economic development usually take place on the margin—that is in the allocation of incremental resources. Such may be the extent of likely change in the path of Soviet economic developments. Likely or not, significant change appears to become an increasingly more persuasive option. Compromises, half measures, and muddling through appear to become more expensive and to cause lower productivity over time.

III. SOVIET AGRICULTURE AND THE GRAIN TRADE

COMPARATIVE GROWTH IN OUTPUT AND PRODUCTIVITY IN U.S. AND U.S.S.R. AGRICULTURE

(By Douglas B. Diamond and W. Lee Davis*)

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APPENDIXES

TABLES

*Research Analysts with the Office of Economic Research and the Office of Geographic and Cartographic Research, Central Intelligence Agency, respectively.

FIGURES

SUMMARY

Of all sectors of the United States and Soviet economies, agriculture offers the greatest contrast in terms of organization and efficiency. Successive Soviet leaderships have had difficulty in: (*a*) maintaining forward momentum in raising the quality of the diet; and (*b*) at times, assuring an adequate supply of calories for a growing population. While the U.S.S.R. has been expanding sown acreage in an effort to increase production, the United States has been reducing the area under cultivation and struggling with farm surpluses.

Agriculture in the U.S.S.R. faces severe environmental limitations. Because most of the sown area is climatically comparable to the Northern Great Plains areas in the United States and Prairie Provinces of Canada, the average productivity of land is lower in the U.S.S.R. than in the United States as a whole. Moreover, as a result of differences in the geoclimatic environment and cropping practices, the year-to-year variation in Soviet farm output is three times greater than in the United States.

By 1977, Soviet farm output had reached nearly 2½ times the 1950 level. Although progress has been uneven, the average annual rate of growth has been a highly respectable 3½ percent per year, nearly double the growth in the United States and more than the 3-percent average for the rest of the world. As a result of this relatively rapid progress, Soviet output by 1977 was more than 80 percent of U.S. farm production, compared with roughly three-fifths in 1950.

Contrary to popular belief, the Soviet regime in this 27-year period has not neglected agriculture. Since 1950, annual inputs to farms have grown by three-fourths and have included costly programs that required heavy support from industry. The difference between the 145-percent growth in Soviet output since 1950 and the 75-percent growth in inputs is the effect of the increased productivity of the resources devoted to agriculture. In the 1970's, the combined productivity of land, labor, capital, and other conventional inputs in Soviet agriculture has averaged more than a third greater than in 1950. This means that a set of resources used in Soviet agriculture in the 1970's would yield more than a third more output than the same resources used in 1950.

In contrast to the impressive growth of resource use in Soviet agriculture, inputs as conventionally measured on U.S. farms remained nearly unchanged between 1950 and 1970. In the 1970's, however, rising product prices and farm incomes (in real terms) encouraged U.S. farmers to expand overall resource use by an average of nearly 1 percent per year.

Overall productivity growth in U.S. agriculture has outpaced that of the U.S.S.R.; in the 1970's averaging nearly three-fifths more than in 1950. As a result of the better U.S. productivity record, for the 1950–77 period as a whole, 85 percent of the growth in U.S. farm production can be attributed to a boost in productivity; about one-third of Soviet gains flowed from growth in output per unit of input.

Measures of productivity per unit of land, labor, and capital provide further insights into the comparative performance in the two economies. Despite an average annual rate of growth in fertilizer usage per hectare of harvested crops nearly double that of the U.S. rate between 1950 and 1977, an overall index of crop yields per hectare in the U.S.S.R. grew at less than 2 percent per year compared with an average annual growth of more than 2½ percent in the United States.

There have been rapid rates of growth in farm labor productivity in both countries. As a result, however, of a much sharper reduction in labor per unit of output in American agriculture during 1951–77—averaging nearly 4½ percent in U.S. agriculture but less than 1 percent on Soviet farms—the release of farm labor to other occupations proceeded at a much faster pace. Because of these divergent trends in labor productivity, the value of farm output per man-day in the U.S.S.R.—expressed in dollars—fell from roughly 7 percent of the U.S. level in the mid-1960's to 5½ percent in the mid-1970's.

The widening of this gap in productivity per man-day on United States and Soviet farms is surprising given the enormous agricultural investments that the U.S.S.R. has made. In 1977, Soviet farm investment was the equivalent of about $78 billion compared with U.S. investment of roughly $10.5 billion.

In the period 1970–77, total direct farm investment in the Soviet Union was 6.3 times the value of investment in the United States. As a result of the divergent rates of growth in the flow of new, fixed farm investment, capital stock on Soviet farms doubled between 1970 and 1977 while increasing only 20 percent in the United States. Despite the considerably more rapid rate of increase in capital per unit of labor input on Soviet farms in 1970–77, the annual growth in farm labor productivity was markedly slower than that of the United States.

I. Introduction [1]

Agriculture is the weakest and least productive sector of the Soviet economy with a performance characterized by low labor productivity and high costs of production. Moreover, despite an average annual rate of growth in output that has exceeded that of both the United States and the rest of the world for a period of nearly three decades, the U.S.S.R. has not managed to produce the required quantity and quality of farm products to meet domestic demand.[2] As a result, the Soviet Union has become one of the world's major importers of farm

[1] The authors are indebted to Lee W. Bettis, Margaret H. Hughes, Constance B. Krueger and Barbara S. Severin for research assistance and data development and to Joseph F. Havelka for permission to use unpublished materials concerning comparative North American-Soviet performance in grain output and yields per hectare. They also wish to thank Lee Bettis, Joseph F. Havelka and Barbara Severin for helpful suggestions.

[2] Both the Soviet leadership and populace perceive a failure of farm output to keep pace with demand. The problem of how the interplay of official policies toward the consumer and rising expectations have combined to generate high demands on agriculture is discussed in M. Elizabeth Denton's article in this volume, "Soviet Consumer Policy: Trends and Prospects."

products. While the U.S.S.R. has been attempting to achieve even higher rates of expansion in farm production, the United States continues to struggle with farm surpluses despite record exports of agricultural commodities.[3]

The difference in production effort in the two countries is reflected in the different pace of expansion in resource use. Since 1950 annual inputs into Soviet agriculture have grown more than three-fourths compared to only an 8-percent increase in the United States. The difference between the rate of growth of farm output and the rate of growth of land, capital, and other conventional inputs used in agriculture can be defined as the rate of growth of total factor productivity.

The primary purpose of this paper is to present estimates of comparative output, inputs, and factor productivity since 1950 for both United States and U.S.S.R. agriculture. Before assessing the changes in output and productivity, section II briefly examines the institutional and environmental settings in the two farm sectors. The special problem of year-to-year instability in Soviet farm output is discussed in the context of comparative United States–U.S.S.R. fluctuations in output and crop yields. Section III compares the relative levels and growth of total United States-Soviet output including both the crop and livestock components, and discusses trends in productivity. Because of important practical limitations in measuring comparative total productivity, alternative measures of partial productivity are presented in section IV. Finally, section V explores the outlook for Soviet grain output against the background of the North American performance in increasing yields in roughly analogous grain growing areas. Six appendixes provide technical details on the calculation of the indexes.

II. A Comparative Setting

A. Organization of Farming

Institutional differences between American and Soviet agriculture are vast. The collectivization of Soviet agriculture has divided farm organizations into two sectors—the socialized sector, consisting of state and collective farms and accounting for three-fourths of agricultural production—and the private sector, consisting of small private garden plots accounting for the remainder of farm output.

Practically no individual peasant holdings are left. State and collective farm households are permitted to cultivate private plots of one-half to 1 acre and maintain one or two head of livestock. In addition, nonagricultural households have "victory-garden" size plots.[4]

Soviet agriculture is clearly dominated by the nearly 48,000 collective and state farms. A collective farm is organized nominally as a

[3] Average annual net imports of agricultural commodities by the USSR in 1975–77 came to 6.8 billion. Annual U.S. net exports of farm products for the same period averaged $11.6 billion. In the same period, both U.S. and U.S.S.R. gross imports of farm products were roughly the same, but U.S. exports were 10 times more than the U.S.S.R. For a statistical summary of Soviet agricultural commodity trade see CIA, ER 78–10516, *Soviet Agricultural Trade, 1960–76: A Statistical Survey.*

[4] Official data are not available concerning the number of privately used land parcels held by both agricultural and nonagricultural households. Waedekin estimated that in 1963 between 33 and 38.5 million households were using land for purposes of private subsidiary farming; 19 to 21.5 million in rural areas, 14 to 17 million in cities, towns and urban settlements. The evidence suggests a roughly comparable number in the mid-1970s with a higher proportion in urban areas. See Karl-Eugen Waedekin, *The Private Sector in Soviet Agriculture,* (English language edition), Berkeley, Los Angeles, London, 1973, p. 125.

"producer's cooperative" whereas the state farm is organized along the lines of a state-operated industrial enterprise. The average indicators shown in table 1 suggest the immense size of these enterprises.

TABLE 1.—SELECTED CHARACTERISTICS OF AVERAGE UNITED STATES AND SOVIET FARMS, 1977[1]

	United States[2]	U.S.S.R.	
		State	Collective
Number of farms	2,706,450	20,066	27,700
Agricultural land (hectares) (per farm)	160	17,800	6,600
Number of workers (annual average) (per farm)	1.5	588	539
Cattle (per farm)	NA	1,899	1,768
Hogs (per farm)	NA	1,082	1,030
Gross receipts per farm (1973 prices)	[3] $34,730	[4] $777,402	[4] $634,545

[1] Although it would be more meaningful to provide a distribution by size, comparable data for each country are not available. Similarly, data for an overall average of small private holdings of Soviet households are not available. This is the first of several tables which compare United States-Soviet agricultural situations. For an extended list of other comparative indicators of farm productivity and resource use, see appendix E.

[2] For comparison purposes, the changing structure and wide diversity of U.S. agriculture complicate the problem of defining an "average U.S. farm." The proliferation of integrated operations, and the trends toward specialization and increased capitalization of U.S. agriculture have created vast differences among farms in terms of physical size, asset values, and marketings. For instance in 1977, farms with sales of $200,000 or more, although accounting for only 2 percent of all farms, had more than 35 percent of total cash receipts. Correspondingly, farms with sales of less than $20,000, accounted for only 10 percent of total cash receipts while comprising 70 percent of all farms. A large proportion of these farm operators relied on "off farm" sources of income to supplement farm income.

[3] Gross receipts from farm marketings, not including Government payments or value of products consumed in farm households.

[4] Gross receipts from marketings by state and collective farms. For 1977, only gross output values are available. These were reduced by usng the average ratio of gross sales to gross production for 1966–70, the most recent years for which both series are available. The constancy of the ratio for those years (55 to 56 percent) provides some assurance that the degree of error in the above estimates is low. Ruble values were converted to dollars using the ruble/dollar ratio derived by inflating 1977 USSR total farm output valued in 1968 rubles and 1957–59 dollars (see appendix A) to 1973 ruble and dollar prices.

Sources: U.S. data from Agricultural Statistics 1978 and Farm Income Statistics, ESCS, U.S. Department of Agriculture, Stat. Bul. No. 609, p. 55. U.S.S.R. data calculated from statistics in Narodnoye khozyaystvo S.S.S.R. v 1977 godu, Moscow, 1978, pp. 271 and 288 (hereafter Narkhoz and the appropriate year). Sales as a share of gross ruble output from Sel'skoye khozyaistvo S.S.S.R., Moscow, 1971, pp. 44, 52.

The characteristic that best distinguishes these three forms of of Soviet farm organization is the use and remuneration of labor services. In the small subsidiary holdings of individual households labor is intensively applied to the point of fairly low physical returns; remuneration is directly tied to output. In the case of the collective farm, labor is used according to the dictates of the collective farm chairman; above a low minimum wage labor is the residual claimant of the farm's gross income, receiving whatever remains after other obligations have been met. In the case of the state farm, which is operated directly by the government, the labor force is comparable to the industrial labor force—remunerated a fixed wage or salary independent of net farm earnings.

With respect to comparisons of farm organization and resource usage in the United States and U.S.S.R., the degree of managerial freedom is critical. The decisionmaking environment for collective and State farm managers is often compared to that of very large corporate-type farms in the United States. The evidence, however, indicates that because of continual intervention by Soviet officials and planners the decisionmaking latitude permitted individual farm managers is very narrow. Collective and State farm managers, accustomed to almost daily administrative interference "from above," would be bewildered at the depth and pattern of onfarm decisions by managers of U.S. corporate-type farms.[5]

[5] For a discussion of the organization and management of Soviet socialized agriculture, see James R. Millar (ed.), *The Soviet Rural Community, A Symposium,* chapters 3 to 6, University of Illinois Press, 1971.

B. The Environment

1. CLIMATE AND AGRICULTURE

Agriculture in the U.S.S.R. faces severe environmental limitations. Because most of the sown area is climatically comparable to the Prairie Provinces of Canada and a six-State region of the United States (hereafter refered to as the Northern Plains), west and north of the highly productive corn belt, the overall average productivity of land is lower in the U.S.S.R. than in the United States.[6]

In areas of the Soviet Union roughly analogous to North America, agricultural land is relatively lacking in adequate amounts of heat, moisture, and nutrients. Although roughly one-half of the total area of both the United States and U.S.S.R. has adequate and reliable moisture, only 10 percent of the total area of the U.S.S.R. combines sufficiency of moisture with adequate heat supply for all crops. More than 30 percent of the U.S.S.R. is too cold for agriculture, and an additional 40 percent is so cold that only hardy, early-maturing crops can be grown.[7] Only in the southern areas of the U.S.S.R. does the available warmth permit a wide range of crops. In contrast, cold is a limiting factor in about 20 percent of the United States. More than 20 percent of the United States, including Alaska, has the ideal combination of sufficient thermal and moisture resources for growing crops.[8]

The matching of Soviet areas with North American geoclimatic analogs (as shown in the map, figure 1), albeit inexact, is a useful way of highlighting these environmental characteristics.[9] Especially noteworthy is the absence of Soviet analogs of American Midwest Cornbelt States. Because of the more northerly position, the U.S.S.R. has no cropland corresponding to the cornbelt with its combination of fertile soil, adequate moisture, and a reasonably long growing season.

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[6] D. Gale Johnson found from a study of comparable grain areas in North America that the characteristic climate conditions in nine-tenths of the Soviet grain area roughly correspond with those of selected locations in six States and the three Prairie Provinces of Canada—North and South Dakota, Nebraska, Montana, Wyoming, Minnesota, Saskatchewan, Alberta, and Manitoba. D. Gale Johnson, "Climate and Crop Analogies from the Soviet Union: A Study for the Possibilities of Increasing Grain Yields," University of Chicago, Office of Agricultural Economics, Research Paper No. 5617, December 16, 1957, p. II, 7–8.

In more recent work on comparisons between Soviet and Northern Plains grain growing regions, Joseph F. Havelka has found important differences between the two areas—some related to comparative United States-Soviet policies in land management, others to the geoclimatic setting in each area. Havelka's findings are summarized in CIA, SI–78–100058, *Influence of Agrotechnology and Geoclimate on Grain Yield Potential in the U.S.S.R.* May 1978. A more detailed presentation is given in Joseph F. Havelka, "The Feasibility of Projecting Soviet Grain Production from Trends in North America's Northern Plains," April 1977, (unpublished typescript).

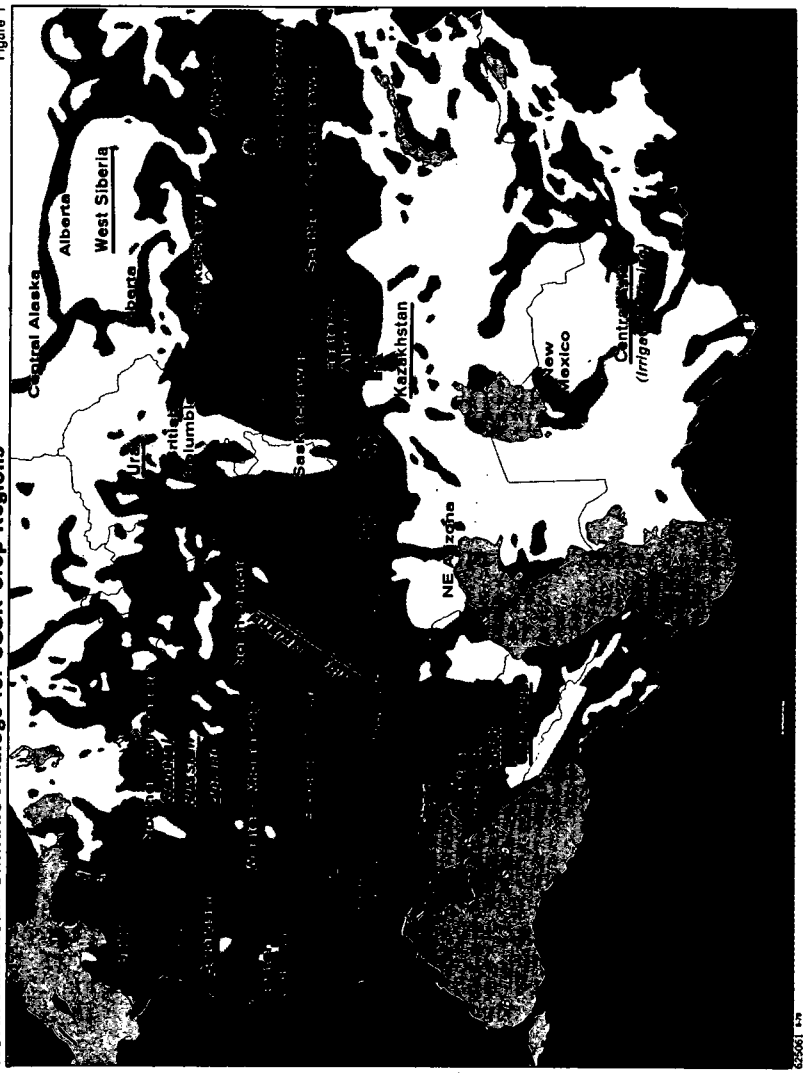
[7] CIA, *U.S.S.R. Agricultural Atlas,* December 1974, pp. 8–9. In other words, in more than 33 percent of the U.S.S.R. there are less than 90 days when average daily temperatures during the growing season exceed 10° C. Only very early varieties of selected vegetables and barley and oats can mature under such condition. In an additional 39 percent of the U.S.S.R. the number of days when the average daily temperature exceed 10° C. ranges between only 90–150 days, suitable for early maturing small grain and vegetables but generally insufficient to permit the ripening of many warm weather crops—corn, sunflowers, soybeans, sorghum, rice, fruits, melons.

[8] That is, there is a very low probability that in any one year moisture deficiencies will cause a major crop setback. In another quarter of the United States, moisture supplies are adequate enough so that there is roughly only one chance in three of sharp fluctuations in yields due to moisture deficiency. The measure of the adequacy of moisture is based on the ratio of annual precipitation to potential evaporation, the latter a function of temperature, humidity, and winds. Ibid., p. 9.

[9] As discussed below, by comparing the Soviet record with that of the United States, rough benchmarks are provided for assessing potential limits to the expansion of agricultural output in the U.S.S.R.

Figure 1

North American Climatic Analogs for USSR Crop Regions



There are, however, certain limitations on interpreting specific analogies:

(*a*) Throughout most of the Soviet Union the annual distribution of precipitation is less favorable than in North American areas used in the analogies.[10]

(*b*) Although matches in some Soviet and North American regions are comparable in terms of the distribution of precipitation and soil types, because of a larger "heat supply" in the Soviet Union's semiarid regions—associated with a longer growing season—less moisture is available for plant growth.[11]

These aberrations in the analogs help to explain the comparatively greater year-to-year fluctuations in Soviet crop yields. Another factor which tends to increase the instability of these yields is the failure of the Soviet Union to widely adopt improved farming practices which have dampened such fluctuations in North America. In this regard, the most discernible differences between grain farming practices in the U.S.S.R. and the Northern Plains is the Soviets' limited use of fallow and their failure to adapt erosion prevention and moisture conserving measures.[12] In the next section the comparative instability of crop yields in the two countries is examined.

2. INSTABILITY OF ANNUAL OUTPUT AND YIELDS

It has frequently been observed in Western market economies that instability characterizes farm prices in the interplay between agriculture and the rest of the economy. Because price elasticities of the demand for farm products are typically low, a small change in supply will lead to a large change in farm gate prices. Traditionally, these shortrun changes in supply primarily reflect variations in crop yields. The unusually wide swings in Soviet yields, taken together with an official policy of maintaining stable prices in state retail outlets, has led to wide cyclical swings in Soviet import demand for selected farm products.

Because of Soviet environmental conditions, it is not surprising that instability in output and yields per harvested area has long afflicted the U.S.S.R. Correcting for the gradual secular increase in yield, the yearly variation in total grain yield (measured from the preceding year) averaged nearly 14 percent between 1950 and 1976 or nearly double that for the United States. The difference in varia-

[10] In the North American areas a very large proportion of annual precipitation—in some cases more than three-fourths—is received during the growing season. In many of the major Soviet grain growing areas, less than half the annual precipitation occurs during this season.

[11] As a result of the longer growing season, evaporation and transpiration are higher than in the corresponding Northern Plains areas CIA/SI 70–100058, op. cit., pp. 1–4.

[12] Ibid., pp. 8–9. Throughout this paper the term "fallow" is used for what is normally referred to as "summer fallow" in U.S. terminology. In contrast to the Northern Plains custom, the Soviets seed far less of their grain on land that in the previous growing season was cultivated as fallow—a tillage practice that enhances accumulation of soil moisture and fertility and reduces the incidence of weeds and other pests for the benefit of wheat or other small grain seeded in the following year. In the U.S.S.R. only 13 percent of the area harvested during 1967–75 was cultivated as fallow. In the Northern Plains, 63 percent of the grain harvested was from land previously cultivated as fallow.

In addition, much of the Northern Plains, particularly the non-corn growing regions, are cultivated by stubble mulch tillage. In this technique, a seed bed is prepared while residues (straw and stubble) from the previous crop remain on the soil surface. This technique improves absorption, reduces evaporation, and protects the soil from water and wind erosion. The Soviets practice stubble mulching on less than one-fourth of their grain area.

bility between the annual fluctuation in each country's grain yield would be even larger if the comparison were restricted to the period since 1960.[13]

Comparative U.S.-U.S.S.R. variation in farm output and yields of five major grain and three other crops are shown in table 2. As expected, spring wheat has the largest variation in yield, since nearly all of this crop is grown in semiarid areas in both countries. Unexpectedly, however, despite the roughly analogous growing conditions the difference in spring wheat fluctuations between the two countries is larger than for other grains. The unusually high Soviet spring wheat variability compared to the United States reflects the relatively little use of fallowing in the U.S.S.R. and the limited adoption of improved tillage practices to preserve moisture in drought years.

This is underscored by comparing the coefficient of variation of spring wheat yields in the Soviet spring wheat belt of northern Kazakhstan and the Canadian spring wheat belt of the Prairie Provinces, where soil and climate conditions are roughly comparable. During the period 1956–75 the year-to-year fluctuation in the yield of spring wheat averaged 19.4 percent in the Prairie Provinces and 33.3 percent in Kazakhstan.[14] The discrepancy in use of fallow land as the predecessor to spring wheat sowings is greater between the semiarid areas of the Canadian and Soviet spring wheat belts than it is between U.S. Northern Plains and Soviet spring wheat regions.

TABLE 2—AVERAGE ANNUAL VARIATION IN FARM OUTPUT AND YIELDS OF MAJOR CROPS, 1950–76[1]

[Percent]

	USSR	United States
Total production:		
Net agricultural output	6.4	2.2
All grain production	12.7	7.2
Crop yields:		
Total grain yield	13.9	7.9
Total wheat[2]	16.5	6.1
Winter wheat	13.0	7.9
Spring wheat	21.2	12.2
Corn	14.1	9.2
Oats	14.8	8.3
Barley	14.8	6.8
Potatoes	9.8	2.9
Sugarbeets	14.5	5.1
Cotton	7.3	8.9

[1] Fluctuations in production and yields between 1950 and 1976 are measured by the coefficient of variation (CV). The CV for each crop has been computed as the ratio of the standard error, estimated when removing the influence of time, and the mean or expected value For example, the average annual variation for total grain yeild in the U S.S.R. was 13.9 percent during the period 1950–76.

[2] Based on 1960–76 data.

Sources for yield data: U.S.S.R.: Various issues of Narkhoz. United States: Various issues of Agricultural Statistics, U.S. Department of Agriculture.

Because most U.S. potatoes are grown in areas with relatively invariant levels of precipitation or are irrigated, a relatively low annual yield variability—less than 3 percent—would be expected. The annual variation in Soviet potato yields, however, is unexpectedly high. Al-

[13] In the semiarid grain growing areas of the Northern Plains States, the more rapid adoption since 1960 of moisture retaining tillage techniques, coupled with a rising share of grain grown on irrigated land and the adoption of more drought-resistant grain varieties, have reduced the year-to-year variability in overall U.S. grain yields.

[14] Because yield data for Kazakhstan for the period 1950–55 are not available the comparison is limited to the period 1956–75. The Prairie Provinces produced over 95 percent of Canada's spring wheat in 1967–75; Kazakhstan, 29 percent of U.S.S.R. spring wheat for the same period.

though in the U.S.S.R. the ubiquitous potato is widely grown in both areas of relatively inadequate and assured precipitation, more than three-fifths of output is from small land parcels of private households where, presumably, the intense use of labor and a watering bucket would greatly mitigate sharp variations in growing season precipitation. Again, surprisingly, the difference between the variability of cotton yields is narrow. All Soviet cotton is grown on irrigated acreage in contrast to less than one-third of U.S. cotton.

Regardless of the rate of secular progress in increasing output in the future, these large variabilities in yields and production of grain and other products accompanied by an official Soviet policy of maintaining fixed prices of food at retail will continue to provide what have been referred to as "transitory shocks" to world commodity markets.

III. Trends in Agricultural Output, Inputs, and Productivity in the U.S.–U.S.S.R.

A. Output

By 1977, Soviet farm output had reached nearly 2½ times the 1950 level. Although progress has been uneven, the average annual rate of growth has been 3½ percent per year, nearly double that of the United States and more than the 3 percent average growth for the rest of the world. As a result of this relatively rapid progress, Soviet output since the mid-sixties has generally averaged more than 80 percent of U.S. farm production compared with roughly three-fifths in 1950—see figure 2.[15]

All the gain in Soviet production relative to that of the United States occurred between the early 1950's and 1970. Since 1970, the acceleration in growth of U.S. farm output coupled with a slowing in the rate of increase in the U.S.S.R. has widened the difference. Indeed, the sharp rise in U.S. farm prices that provided the impetus for a relatively rapid expansion of U.S. farm output in the 1970's was ascribable in large part to the surge in Soviet import demand for United States and other foreign-produced farm products following several disappointing harvests.

To reduce the effect of annual variations in weather and cyclical swings in crop and livestock output on the comparative output performance, the relative changes shown are based on 3-year averages. The general configuration of trends described above is unchanged in the comparison of three periods (see table 3). Most of the reduction in the difference between United States and Soviet farm output between the early 1950's and the 3-year average of 1969–71 can be attributed to the rapid growth of the Soviet livestock sector relative to crops.

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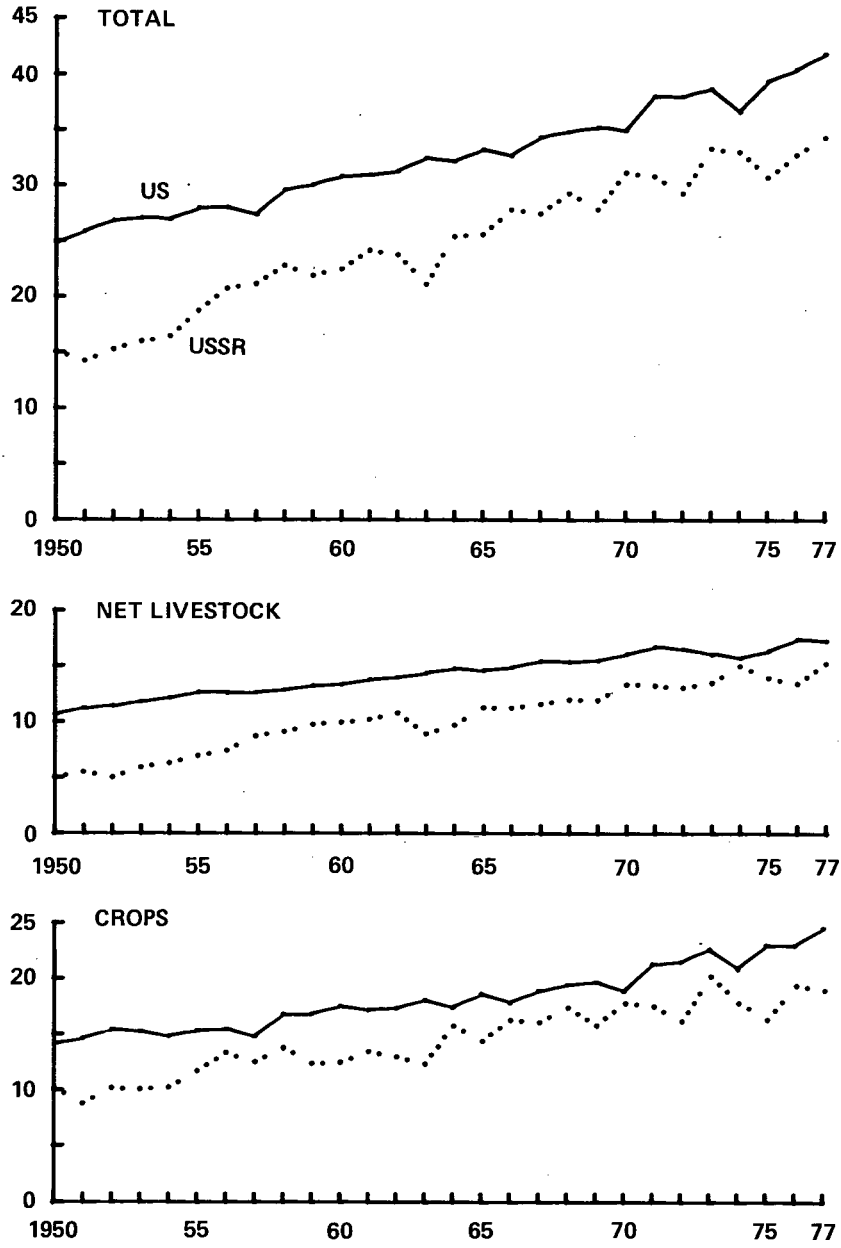
[15] The size comparisons of Soviet and U.S. farm output shown in this paper are based on the extrapolation of the series developed by F. Douglas Whitehouse and Joseph F. Havelka in "Comparisons of Farm Output in the United States and the U.S.S.R.," U.S. Congress, Joint Economic Committee, "Soviet Economic Prospects for the Seventies," U.S. Government Printing Office, 1973, Washington, D.C. pp. 340–74. As in that study, farm output includes all agricultural commodities produced on the farm less crops grown exclusively for seed purposes, the value of products fed to livestock, and hatching eggs. This provides a measure of final commodities produced by the agricultural sector. Following Whitehouse and Havelka, the percentage comparisons shown in the text of this paper are geometric averages of two separate measures of the relative size of U.S.–U.S.S.R. agricultural output; one calculated in average 1957–59 dollar prices and the other calculated in 1968 ruble prices. Soviet values in dollars shown in the text are derived by applying the geometric mean of the ruble and dollar comparisons to the U.S. dollar values. The procedure and the meaning of the results are discussed in ibid., appendix A.

Figure 2

Farm Output

Billion 1957-59 US $ [1]



1. USSR data calculated from US output using the geometric mean of comparisons of USSR and US output carried out, alternately, in dollar and ruble prices.

The slight proportional decline in Soviet farm output between the periods 1969–71 and 1975–77 reflects a noticeable slowing of growth of Soviet crop output and a surge in U.S. crop production.[16] As a result, the difference in overall production widened from roughly $6 billion in 1969–71 to $7½ billion in 1975–77 despite a more rapid Soviet pace in livestock production.

TABLE 3.—GROWTH IN FARM OUTPUT, 1950–77[1]

	Billion 1957–59 dollars[2]			Indexes	
	Average 1950–52	Average 1969–71	Average 1975–77	1969–71/ 1950–52	1975–77/ 1969–71
Net farm output:					
United States	25.8	36.1	40.6	140	113
U.S.S.R.	14.9	30.0	32.9	201	110
U.S.S.R. as a percent of United States	58.0	83.0	81.0		
Crop production:[3]					
United States	14.7	20.0	23.5	136	118
U.S.S.R.	9.7	17.0	18.0	175	106
U.S.S.R. as a percent of United States	66.0	85.0	77.0		
Net livestock production:[3]					
United States	11.1	16.1	17.1	145	106
U.S.S.R.	5.2	12.9	14.2	248	110
U.S.S.R. as a percent of United States	47.0	80.0	83.0		

[1] In order to reduce the effect of annual variations in weather, 3-yr averages were used.
[2] Data for U.S.S.R. calculated from United States output using the geometric mean of comparisons of U.S.S.R. and United States output carried out, alternately, in dollar and ruble prices.
[3] U.S.S.R. components do not add to totals due to use of geometric mean comparisons for individual products.

Source: See appendix A.

B. Inputs and Productivity

Contrary to popular belief, the Soviet regime in this 27-year period did not neglect agriculture. Since 1950, annual inputs to farms have grown by three-fourths and have included costly programs that required heavy support from industry.

The difference between the 145-percent growth in Soviet output since 1950 and the 75-percent growth in inputs is the effect of the increased productivity of the resources devoted to agriculture. In the 1970's, the combined productivity of land, labor, capital, and other conventional inputs in Soviet agriculture has averaged more than a third greater than in 1950. This means that a set of resources used in Soviet agriculture in the 1970's would yield more than a third more output than the same resources used in 1950. The "nonconventional" factors in explaining growth include such elements as new technology, improved management, a higher level of training, and greater material incentives. Most of this gain in productivity occurred before 1970; in the 1970–77 period four-fifths of the increase in output in the U.S.S.R. was attributable to additional inputs.

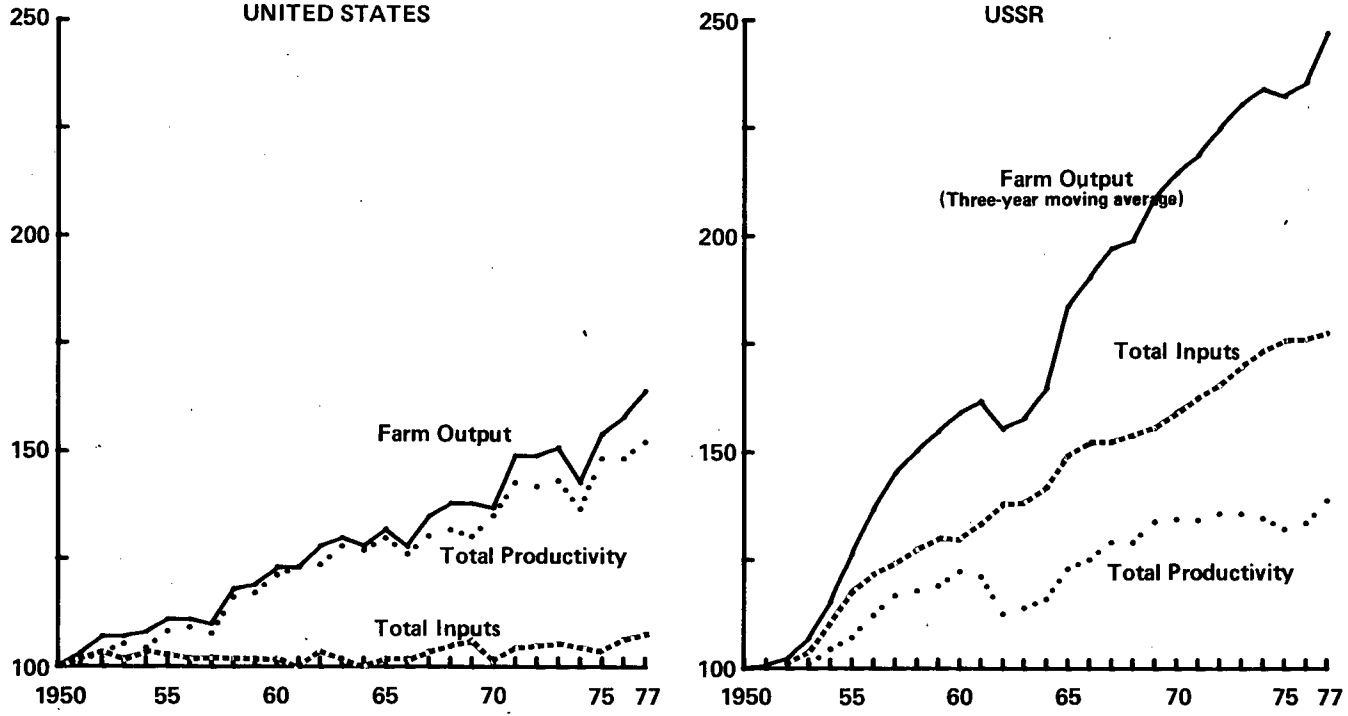
The comparative trends in outputs, inputs, and total productivity are shown in figure 3 and table 4. In contrast to the impressive growth of resource use in Soviet agriculture, inputs as conventionally measured on U.S. farms remained nearly unchanged between 1950 and 1970. In the 1970's, however, rising product prices and farm incomes (in real terms) encouraged U.S. farmers to expand overall resource use by an average of nearly 1 percent per year.

[16] This trend was spurred by a sharp upturn in U.S. farm exports, the rapid depletion of large carryover crop inventories and a sharp rise in prices for grains and oilseeds. Between 1970 and 1975, U.S. harvested acreage increased by 15 percent, mostly from land earlier taken out of cultivation.

Figure 3

Farm Output, Inputs, and Total Productivity

Index 1950=100



Moreover, concomitant with the stepup in resources allocated to U.S. agriculture in the 1970's, productivity growth in the two countries diverged in favor of the United States. Although overall growth in total productivity for 1950–77 averaged 1.6 pecent per year in the United States compared with 1.2 percent in the U.S.S.R., all of this difference is ascribable to a difference in productivity growth in the 1970's. While the average rate of growth of total factor productivity in the U.S.S.R. decreased by nearly two-thirds in the 1970's compared to the period 1961–70, the U.S. growth rate increased by more than one-half. Between 1950 and 1970 the overall productivity record was the same for both countries. (See table 4.)

For the 1950–77 period as a whole, 85 percent of the growth in U.S. farm production can be attributed to a boost in total factor productivity, but only one-third of Soviet output gains can be attributed to increased technical efficiency. More importantly, the continuous decline of Soviet productivity since the 1950's highlights the slowdown in growth of farm output. Of the 2.8 percentage point falloff in the average annual rate of increase in U.S.S.R. production between the 1950's and the 1970's three-fifths can be attributed to a reduction in productivity growth and the balance to a slowing of input flows. These trends point to the decline in the growth of efficiency in which factors are combined as the major source of decline in the rate of growth of agricultural output in the U.S.S.R.

TABLE 4.—OUTPUT, INPUTS, AND TOTAL PRODUCTIVITY IN AGRICULTURE, 1951–77[1]

	Average annual rate of growth (percent)			
	1951–60	1961–70	1971–77	1951–77
United States:				
Output	2.1	1.1	2.6	1.9
Inputs[2]	.1	0	.9	.3
Total productivity	2.0	1.1	1.7	1.6
U.S.S.R.:				
Output[3]	4.8	3.0	2.0	3.4
Inputs[4]	2.7	2.1	1.6	2.1
Total productivity	2.1	1.0	.4	1.2

[1] The base year for the calculations shown in this table and other tables in this article is the year before the stated initial year of period.

[2] Includes the categories of inputs listed in footnote 4 below but arranged under different rubrics. In addition, certain types of inputs relevant to a market economy are included: Interest charges on mortgages; grazing fees, licenses, and insurance on farm machinery, fees for customwork, taxes, and interest on livestock and crop inventories, fire, wind, and crop-hail insurance and miscellaneous charges. For indexes of the several series of inputs see U.S. Department of Agriculture, ESCS "Changes in Farm Production and Efficiency," 1977, Statistical Bulletin No. 612, p. 56. For aggregation into a total input index and more elaboration of coverage see Yao-Chi Lu, "Measuring Productivity Change in U.S. Agriculture," Southern Journal of Agricultural Economics, December 1975, pp. 69 to 75 (see appendix B of this report for further details).

[3] Because of wide annual fluctuations in Soviet agricultural production, a 3-yr moving average is used.

[4] For the U.S.S.R., indexes based on official data are used to move the several base year weights, as follows: Labor expressed as man-days; capital as reproducible physical assets and draft animals; land as an index of sown acreage in 25 regions weighted with average grain yields. Other conventional inputs include inventory value of herds of mature productive animals excluding draft animals and the value of materials purchased from sectors outside of agriculture—fertilizer, electric power, fuels and lubricants, current repair services, and industrially processed feeds (see appendix B for further details).

C. Limitations of the Meaning of the Results

Interpretation of the trends in output per unit of input of combined resources is subject to important limitations. In addition to capturing productivity increases related to changes in techniques used in production, the difference between total inputs (as conventionally

measured) and output can be explained, in part, by: (*a*) inadequate allowances for quality change (especially in average quality of the labor force);[17] (*b*) difficulties in obtaining consistent estimates of a single measure of an input;[18] (*c*) the failure of factor prices used to aggregate inputs to adequately measure the relative contribution of individual inputs to the growth in output;[19] and (*d*) an assumption that no gain or loss in efficiency can be had from increasing the scale of operations of a farm.[20]

Because of these and other limitations on the use of measurement of growth in total productivity, we also provide several partial productvity measures.[21] While labor, land, and capital productivity are, individually, inadequate indicators of production efficiency, these partial productivity indicators are helpful in answering questions pertaining to, say, comparative success in releasing of labor from farms to other sectors or the ability to increase productivity of the fixed factor of land. In the following section we explore trends in comparative productivity per unit of land, labor, and capital.

IV. Comparative Measures of Partial Productivity

A. Land Productivity

There are two series measuring productivity per hectare: crop production per cropland hectare and crop yields per harvested hectare. Both indexes are useful in analyzing changes in agriculture.

The index of the value of crop production per cropland hectare measures average change in production per hectare of cropland used

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[17] In this paper no allowance is made for change over time in the average "quality" of the man-hours from the farm labor force in either American or Soviet agriculture; that is, in composition of skills (more agronomists, fewer unskilled field workers) or in average years training within the same skill (higher proportion of college trained farm managers). Comparable data for both countries are lacking.

Within the measure of capital, change in the average quality per machine-hour provided by the stock of machinery is also reflected in change in the "residual" difference between output and inputs. In this sense, a productivity gain from, say, an improved tractor is "embodied" in the better technology incorporated. These general considerations, regarding change over time in the quality of labor and capital, can be extended to the other measured or unmeasured inputs.

[18] In the case of the U.S.S.R., the most important limitation is imposed by the assumption that all agricultural inputs can be aggregated into a single production relation. For example, the specification of a single production function where there is artificial compartmentation of farming into three "sectors"—state farms, collective farms, and private plots—suggests serious reservations. These are discussed in Douglas B. Diamond, "Trends in Output, Inputs and Factor Productivity in Soviet Agriculture," U.S. Congress, Joint Economic Committee, "New Directions in the Soviet Economy," pt. II–B, Government Printing Office, Washington, D.C., 1966, pp. 399–381.

[19] Hence, a misspecification of the weights in the production relation could be a source of bias in the results due to the assumption that the contribution of each factor is equal to its relative share in total costs.

Inputs in both the United States and U.S.S.R. have been combined using a Cobb-Douglas production function in which it is assumed that the cost of an individual input represents the value of its marginal product. Work done on estimating the aggregate production function in the United States showed that relative prices paid by farmers for certain resources did not reflect the relative values of their contributions to production. Zvi Griliches, "Research Expenditures, Education, and the Aggregate Production Function," the American Economic Review, December 1964, p. 968.

[20] There is considerable evidence that substantial economies of scale have been exploited in U.S. agriculture since 1950. Zvi Griliches, "Agriculture: Productivity and Technology," International Encyclopedia of the Social Sciences, vol. 1 (New York: MacMillan and Free Press, 1968), p. 244.

[21] In sum, it has been persuasively argued that if quantities of output and input are measured accurately, growth in total output is largely explained by growth in total input. D. W. Jorgenson and Z. Griliches, "The Explanation of Productivity Change" the Review of Economic Studies, vol. XXXIV, No. 99, July 1967, p. 249–282.

Griliches in an earlier article was able to "explain," without scale effects, most of the difference between inputs and ouput. Z. Griliches, "The Sources of Measured Productivity Growth, United States Agriculture, 1940–60." The Journal of Political Economy, vol. LXXI, August 1963, p. 331–346.

for crops.[22] As such, it reflects not only change in average yields per hectare of harvested and fallow cropland but also measures effects of changes over time in the usage of cropland.[23] For purposes of comparing the degree of "intensity" between the United States and the U.S.S.R. in use of land, a relatively fixed factor, it is a useful measure.

For purposes of determining the relative ability of two countries in raising yields per sown and harvested hectare (excluding fallow) an index of crop yields is the relevant measure. A yield index holds constant the relative importance of the various crops in the base weighting period.[24] Changes over time in acreage and the relative value of crops included do not affect the crop yield index. For purposes of measuring possibilities of raising yields per unit of sown or harvested area (by way of, say, development of better crop varieties or use of more fertilizer) the yield index is a superior measure.[25]

1. VALUE OF CROP PRODUCTION PER HECTARE

Change in the value of production per hectare of cropland proceeded at roughly the same pace in the United States and U.S.S.R. Between

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[22] Including acreages of harvested cropland, land seeded to crops but abandoned, and cultivated summer fallow in the United States; sown area (adjusted for abandonment of winter-killed fall-sown crops) plus cultivated summer fallow in the U.S.S.R. In the computations that follow, Soviet "sown" acreage is taken to include harvested fall-sown crops.

[23] In other words, changes over time in the relative importance of high-value and low-value-per-acre crops affect the index as well as the proportion of fallow land to sown area.

[24] The crop yield index is a weighted average of yield relatives, involving use of constant weights per unit of yield. One bushel yield of corn, for example, is given a value weight proportional to its relative importance in value of production of crops in the sample in the weight period.

[25] The formulas used in calculating the indexes of crop production per hectare and of crop yields may be expressed symbolically as follows:

$$IP_j = \frac{\sum_{i=1}^{n} Y_{i_j} A_{i_j} P_{i_o}}{\sum_{i=1}^{n} A_{i_j}} \Bigg/ \frac{\sum_{i=1}^{n} Y_{i_o} A_{i_o} P_{i_o}}{\sum_{i=1}^{n} A_{i_o}}$$

$$IY_j = \frac{\sum_{i=1}^{n} Y_{i_j} A^h{}_{i_o} P_{i_o}}{\sum_{i=1}^{n} Y_{i_o} A^h{}_{i_o} P_{i_o}}$$

where:

IP = index of crop production per hectare
IY = index of crop yields
Y = average yield
A = for the U.S., area of cropland used, including harvested area, crop failure and cultivated summer fallow. For the U.S.S.R., sown area (adjusted for abandonment of winter-killed fall-sown crops) plus cultivated fallow.
A^h = harvested area for the U.S. Harvested area of winter crops plus the sown area of spring crops for the U.S.S.R.
i = crop type
j = year
o = base year
n = number of crop types

For a description of the two U.S. series, see Major Statistical Series of the U.S. Department of Agriculture, vol. 2, Agricultural Handbook, No. 365, pp. 21–22.

1950 and 1977, the peak year in value of crop output per hectare was 68 percent above 1950 in the United States (1977) and 67 percent in the U.S.S.R. (1976). The average annual rate of increase between 1950 and these peak years was 1.9 percent for both countries. In order to dampen the effects of yield fluctuations due to cyclical changes in weather, a comparison of the value of crop output per hectare for selected 5-year periods provides a more appropriate view of relative changes in the past 27 years:

TABLE 5.—COMPARISON OF CROPLAND USED AND VALUE OF CROP OUTPUT PER HECTARE (1950–54=100)

[Constant prices]

	United States		U.S.S.R.	
	Cropland [1]	Output per hectare	Cropland [2]	Output per hectare
1950–54	100	100	100	100
1960–64	89	132	119	128
1965–69	88	143	120	152
1973–77	96	159	123	175

[1] Harvested cropland, crop failure, and cultivated fallow. Does not include cropland that is idle or in cover crops. Includes field and fruit crops from orchards and vineyards.
[2] Sown cropland (excluding winter-killed crops sown in the fall) and cultivated fallow. Includes field and fruit crops from orchards and vineyards.

Sources: United States; USDA, "Changes in Farm Production and Efficiency 1977," ESCS, Stat. Bulletin, No. 612, p. 19. U.S.S.R.; Crop Production—The summation of the ruble value of (a) crops shown in appendix table 4 of David W. Carey and Joseph F. Havelka, "Soviet Agriculture: Progress and Problems" in this volume, and (b) selected feed crops excluded from (a). The ruble value estimates of the crops included in (b) were prepared by Barbara S. Severin. Acreage—Narkhoz, selected years.

The Soviet record viewed from this broader perspective is relatively more impressive. Annual value of crops per hectare in 1973–77 averaged 75 percent above 1950–54. Most of this relative gain has taken place since the early sixties; by 1973–77, Soviet crop output per hectare had expanded by 37 percent compared with 20 percent in the United States. After substantially exhausting the possibility of major expansion of cultivated acreage in the 1950's, Soviet planners adopted programs to accelerate growth in yields.[26]

As suggested by trends in cultivated cropland in table 5, there was considerable idle land in the United States available for cropping. This did not act as a disincentive for U.S. farmers in raising yields per hectare on land under cultivation. Indeed, because of official Government policies establishing acreage controls on various crops—for example, corn and cotton—U.S. farmers had an incentive to increase yield—and, hence, income—per hectare of cultivated cropland.[27]

[26] In programs inaugurated between 1954 and 1962, Nikita Khrushchev directed an expansion of more than 60 million hectares in sown acreage. The "new lands" campaign, initiated in 1954, was quickly followed by an even more ambitious "corn program" in 1955. The former program resulted in the plowing up of some 42 million hectares of virgin and long-fallowed lands, mostly in Kazakhstan and Siberia. The corn program expanded the acreage of corn for grain, silage, and green feed from 4.5 million hectare in 1952 to a peak of 37 million hectares in 1962. For a detailed and critical survey, see Naum Jasny, *Khrushchev's Crop Policy*, Glasgow, 1965.

[27] U.S. farmers were provided incentives under various acreage allotment programs to restrict usage of cropland. Between 1950 and 1969, U.S. cropland that was either idle or used as pasture rose from 41 million hectares to 56 million hectares. As a share of total U.S. acreage available for crops (including fallow land), this was equivalent to 21 percent in 1960 and nearly 30 percent in 1969. With the rapid drawdown in U.S. stocks of grain and other products in the early seventies and the sharp rise in farm gate prices, the amount of idle cropland fell to 42 million hectares in 1974. More recently, with the advent of another U.S. cycle of rising inventories of farm products, falling product prices, and rising costs of production, idle cropland is again on the rise.

2. INDEX OF CROP YIELDS

In the period for which an index of crop yields is available for both countries (1950–72), the index (1950=100) peaked at 181 for the United States (1972) and at 149 for the U.S.S.R. (1968).[28] The average annual rates of increase between 1950 and these peak years was 2.7 percent for the United States and 2.1 percent for the U.S.S.R.

As in the case of the index of crop output per hectare of cropland, averages for 5-year periods (except for the seventies) were employed in order to reduce the effect of variations in weather on yields.

TABLE 6.—GROWTH IN CROP YIELDS PER HARVESTED HECTARE[1]

[1950–54=100]

	United States	U.S.S.R.
1950–54	100	100
1960–64	141	133
1965–69	156	158
1970–72	168	163
1973–76	(2)	173

[1] See footnote 25 for methodology utilized in computing the index of crop yields. Perennial plantings of fruits, and vineyards are included; cultivated fallow is excluded.
[2] Not available.

Source: United States: Crop Production, Annual Summary, selected years, SRS, U.S. Department of Agriculture. The series was discontinued in 1972. U.S.S.R.: Based on yield and acreage data in Narkhoz, selected years.

The better performance in yield-per-harvested hectare productivity in the United States was achieved despite a lower average annual rate of increase in fertilizer usage per hectare than in the U.S.S.R.[29]

TABLE 7.—USE OF FERTILIZER PER HECTARE OF HARVESTED CROPS, 1951–77

	Average annual rate of growth (percent)	
	United States	U.S.S.R.
1951–77	6.5	9.6
1951–60	7.0	4.9
1961–70	9.1	16.4
1971–77	2.3	7.1

Source: United States: USDA, ESCS, Stat. Bulletin, No. 612, op. cit., pp. 18, 27. U.S.S.R.: Narkhoz, various issues.

We can obtain a measure of the "effectiveness" of fertilizer per harvested hectare by combining the above two indexes. Between 1951 and 1972, the average annual rate of increase of fertilizer use per unit of overall yield increase (both per hectare) was 4.7 percent for the United States; 9.1 percent for the U.S.S.R. Again dampening the effect of weather variations by using 5-year periods (except for 1970–72), table 8 provides an index of crop yields on harvested land in terms of fertilizer usage per hectare.

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[28] The index of crop yields for the United States includes yields of 28 specific crops accounting for over 85 percent of all crop production in the base period (1957–59). The index for the U.S.S.R. includes yields of 15 specific crops covering roughly 90 percent of all crop production in the base period (1969–71) in CIA's index of net farm output. (See appendix table 4 of the Carey and Havelka article op. cit.) In addition, yields of hay and ensilage are included.

[29] While variation in fertilizer usage is the most important explanatory variable in long yield trends of major crops, other important elements include introduction of new crop varieties, use of pesticides, and tillage practices (including fallowing).

TABLE 8.—INDEX OF YIELD PER HECTARE DIVIDED BY AN INDEX OF FERTILIZER USE PER HECTARE

[1950–54=100]

Year	United States	U.S.S.R.
1950–54	100	100
1960–64	72	70
1965–69	50	34
1970–72	43	22

Between the periods 1950–54 and 1970–72, the index of fertilizer usage per hectare proceeded at a much faster rate than the index of yield per hectare in both countries. The rate of decline in yield per unit of fertilizer was, however, much sharper in the U.S.S.R. Despite this dramatic difference between the Soviet and United States performance, given the higher proportion of Soviet cultivated land lacking the adequate and reliable moisture required to obtain maximum benefit from fertilizers, it can be argued that the U.S.S.R. has achieved considerable success relative to the United States.[30]

Indeed, if comparisons are narrowly limited to areas where United States-Soviet soil-climate zones are analogous and, hence, fertilizer response for the same crop is similar, the measure of comparative "effectiveness of fertilizer usage" dramatically differs from the national averages. For example, U.S.–U.S.S.R. comparisons of fertilizer use and wheat yields in roughly comparable soil-climate regions are shown in Table 9. In the wet areas of Lithuania and Michigan, where fertilizer application rates are similar, wheat yields are slightly higher in the U.S.S.R. The analogous areas of the Ukraine and eastern Washington have about the same yields, with the Soviet area receiving less fertilizer.[31]

TABLE 9.—U.S. AND U.S.S.R.—FERTILIZER USE AND WHEAT YIELDS, 1975

	Area receiving fertilizer [1] (percent)	Nutrients applied [2]	Annual averge, 1971–75 wheat yield [3]
Nebraska	55	56	24.0
Washington	97	122	28.8
Ukranian S.S.R	86	70	28.4
Minnesota	95	134	22.8
Michigan	98	152	25.6
Lithuanian S.S.R	99	140	28.8

[1] Data for the United States are for areas under wheat; for the U.S.S.R. all grains, excluding corn.
[2] Kilograms of nitrogen, potassium, and phosphates per hectare.
[3] Centners per hectare.

Sources: CIA, ER 77–10577, "The Impact of Fertilizer on Soviet Grain Output," 1960–80, November 1977, p. 15. The Soviet yields shown represent an 11-percent reduction of the officially claimed yields given in the sources. This discount reflects a correction for the excess moisture and trash beyond that found in United States wheat (see footnote 36 below).

[30] In 1976, the United States used 25 percent more mineral fertilizers (nutrient content) per hectare of arable land than the U.S.S.R. This represents a substantial narrowing of the gap which existed between the two countries in 1960, when the United States consumed 3.5 times more fertilizer per hectare of arable land than the U.S.S.R. In this calculation, arable land includes cropland (as defined above) and idle cropland.

[31] CIA, ER 77–10577, *The Impact of Fertilizer on Soviet Grain Output,* 1960–80, Nov. 1977, p. 15.

B. Comparative Labor Productivity

As indicated in table 10. There have been rapid rates of growth in farm labor productivity in both countries. As a result, however, of a relatively sharper reduction in labor per unit of output in American agriculture, the release of farm labor to other occupations proceeded at a much faster pace.[31a]

TABLE 10.—AVERAGE ANNUAL RATE OF GROWTH IN FARM LABOR PRODUCTIVITY AND TOTAL LABOR INPUTS

[In percent]

	Labor productivity		Labor inputs	
	United States	U.S.S.R.	United States	U.S.S.R
1951–77	6.2	4.2	−4.3	−0.7
1951–60	6.7	5.4	−4.2	−.6
1961–70	5.9	3.4	−5.0	−.4
1971–77	6.1	3.5	−3.3	−1.5

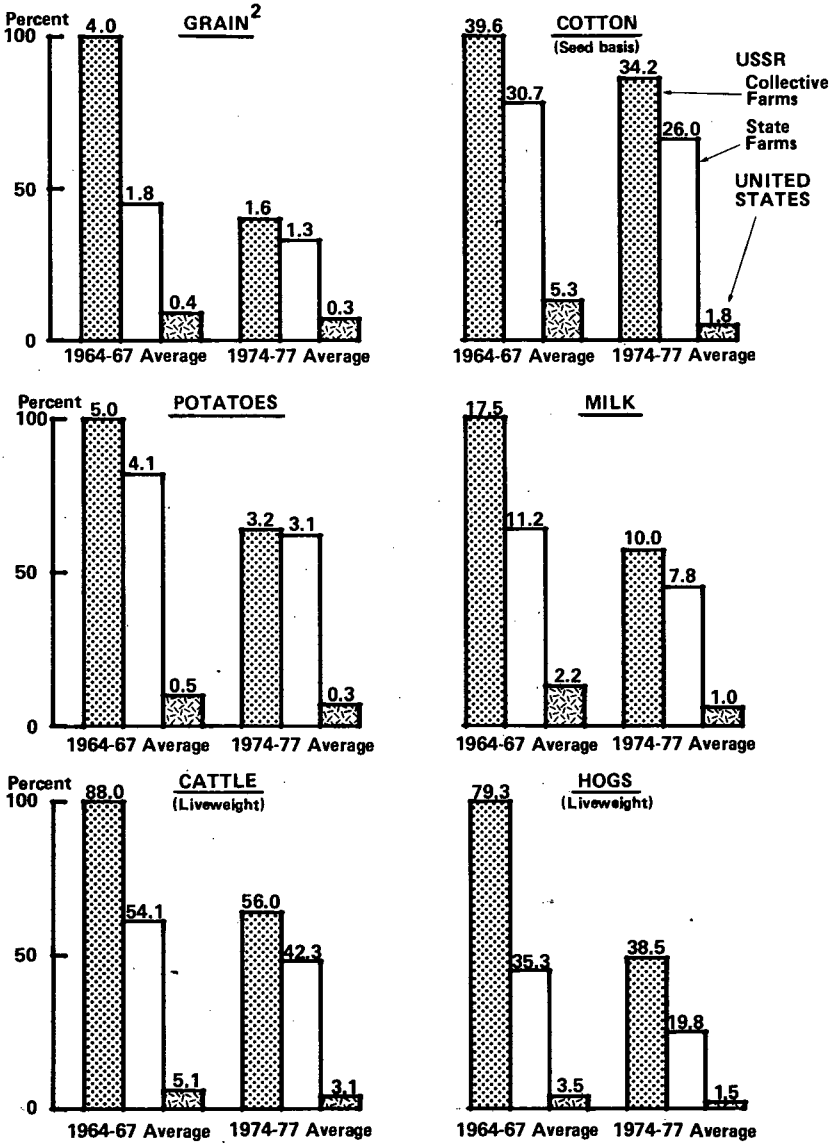
This relatively faster rate of growth in overall labor productivity on U.S. farms is roughly consistent with the changes in the past decade in man-hour inputs of U.S. farms and the Soviet socialized sector for three crops and three livestock categories (see fig. 4). There was a 45-percent average (unweighted) reduction in man-hours per unit of product or type of livestock on U.S. farms between the periods 1964–67 and 1974–77 compared with an average 33-percent (unweighted) reduction for Soviet collective and state farms. With the exception of a considerable narrowing of the gap in use of labor in growing grain, the already dramatic difference in labor inputs per major crop and livestock have widened further as a result of these divergent trends in labor savings.

[31a] In any agricultural economy, the rate of "release" of farm labor is, of course, the result of a highly complex interaction of technological, agronomic and economic forces. For the period under review, rapidly rising farm wage rates relative to machinery and other input prices, provided an impetus for both private U.S. agricultural enterpreneurs and Soviet planners to substitute other inputs for labor. For an extreme example of the impact of technical change on the demand for labor see Richard H. Day, "The Economics of Technological Change and the Demise of the Sharecropper," American Economic Review 57 (June 1967): pp. 427–49. For a more general treatment of the effects of recent mechanical and biological revolutions on the demand for labor in agriculture, see Y. Hayami and V. W. Ruttan, *Agricultural Development, An International Perspective,* Baltimore and London, 1971.

Figure 4

Labor Requirements[1]

Man-hours per centner



1. Sources and methodology: US data from unpublished annual data obtained from the National Economic Analysis Division, Economics, Statistics and Cooperative Service, United States Department of Agriculture. USSR statistics from "Narodnoye khozyaystvo S.S.S.R. v 1977 godu" and selected years. Man-hours for 1964-1967 were calculated from man-day data using 1965 man-hour/man-day ratios.
2. All grains excluding corn for USSR. Weighted average for corn, wheat and sorghum for United States.

These indicators in labor requirements per unit of crop and livestock output are, also, roughly comparable with the relative dollar values of total output per man-day of farm activity for both countries in the two periods:

TABLE 11.—VALUE OF FARM OUTPUT PER MAN-DAY

[1957–59 dollars]

	1964–67	1974–77
U.S.S.R.	2.63	3.60
United States	36.79	64.86
U.S.S.R. as a percent of United States	7.2	5.6

Source: See appendix tables A–1 and C–1. In table C–1 the index of labor productivity was expressed in output per man-hour for the United States, and output per man-day for the U.S.S.R. For this computation, it was assumed that a U.S. man-day was equivalent to 8 man-hours.

C. Comparative Capital Productivity

The slowing in recent years in the rate of growth of Soviet labor productivity and the widening of the gap in productivity per man day between United States and Soviet farms occurred despite enormous agricultural investments in the U.S.S.R. During the first half of the 1970's annual investment for farm production purposes averaged 20 percent of total Soviet investment compared with a share of about 5 percent of gross investment in the United States.[32] In 1977 Soviet investment on farms was equivalent to about $78 billion compared to U.S. investment of roughly $10.5 billion.[33] In the period 1970–77, total direct farm investment in the Soviet Union was 6.3 times the investment in U.S. farms (see table 12).

Although output per unit of labor usually increases as a result of an expanded stock of buildings and structures as well as machinery and equipment, a ruble of machinery normally is more labor-saving than a ruble in construction. A much larger share of Soviet farm investments in 1970–77 was embodied in buildings and structures—two-thirds versus one-fifth for the United States. Nevertheless, total Soviet investment in machinery for the 8-year period came to almost four times that of the United States.

[32] If investment in all agriculturally-related activity—farm housing, roads, repair facilities, schools, and other infrastructure—is included as well as investment in industries supporting agriculture, the share of total Soviet investment related to agriculture, directly or indirectly, in 1977 came to more than 36 percent.

[33] Constant 1976 dollars, gross of depreciation. See footnote to table 12 and appendix C.

TABLE 12.—COMPARISONS OF AGRICULTURAL INVESTMENT, 1960, 1965, 1970–77 [1]

	Dollar value—million 1976 dollars								
	United States			U.S.S.R.			U.S.S.R. ruble value—million 1969 rubles		
	Total	Machinery	Construction	Total	Machinery	Construction	Total	Machinery	Construction
1960	5,482	3,533	1,949	16,604	9,359	6,687	5,741	2,136	3,605
1965	7,986	5,765	2,221	29,979	16,989	11,261	9,980	3,909	6,071
1970	8,757	6,383	2,374	43,986	21,293	18,927	15,092	4,889	10,203
1971	8,254	5,984	2,271	50,564	24,542	21,756	17,347	5,619	11,728
1972	8,520	6,544	1,976	55,636	25,031	24,580	19,041	5,790	13,251
1973	11,512	8,801	2,711	61,601	28,542	26,710	20,994	6,595	14,399
1974	11,773	8,891	2,882	66,776	31,083	29,038	22,825	7,171	15,654
1975	10,782	8,343	2,439	73,695	34,882	31,106	24,813	8,044	16,769
1976	10,743	8,120	2,623	76,683	37,498	32,177	25,904	8,558	17,346
1977	10,573	7,877	2,696	78,430	38,203	33,210	26,737	8,834	17,903
Total 1970–77	80,914	60,942	19,972	507,250	240,965	217,504	172,753	55,500	117,253

[1] For comparative purposes, the use of the international exchange rate between rubles and dollars is deficient. Rather, ruble values for Soviet agricultural investment have been converted to dollar values by use of purchasing power parities (ruble-dollar ratios) for the machinery and construction components. Price ratios constructed for individual types of machinery and buildings and structures are aggregated into category ratios. Ruble-dollar ratios for (a) agricultural machinery and equipment are taken from a forthcoming CIA study that compares United States and Soviet machinery prices; (b) for construction, an updating of the 1970 ruble-1970 dollar ratios in CIA ER–76–10068, "Ruble-Dollar Ratios for Construction," February 1976. For further details concerning the sourcing and derivation of both the ruble and dollar series, see app. C. For a general discussion of United States-Soviet dollar comparisons of total output of goods and services (GNP) and the principal end-uses see the paper in this volume by Imogene Edwards, Margaret Hughes, and James Noren, "United States and U.S.S.R.: Comparison of GNP."

As a result of the disparate rates of growth in the flows of new fixed farm investment the increase in the Soviet stock of plant and equipment (capital stock) on farms increased at a much faster rate in the period under review (average annual percentage rate) :

	1951–77 (percent)
United States	2.5
U.S.S.R.	9.7

For the more recent period, capital stock on farms between 1970 and 1977 doubled in the U.S.S.R. compared to a 20 percent increase in U.S. farm capital. Despite the considerably more rapid rate of increase in capital per unit of labor input on Soviet farms in 1970–77 the annual growth in labor productivity was markedly slower.[34]

The difference in growth in the ratio of capital per unit of total agricultural output was of a similar magnitude. Once again, in order to dampen the impact of weather cycles 5-year comparisons are employed for country comparisons of capital per ruble of total output.

TABLE 13.—CAPITAL STOCK AND CAPITAL PER UNIT OF FARM OUTPUT[1]

[1950–54=100]

	Total capital stock on farms		Capital per unit of output	
	United States	U.S.S.R.	United States	U.S.S.R.
1950–54	100	100	100	100
1960–64	118	247	99	162
1965–69	135	377	105	201
1973–77	167	813	114	361

[1] Source: Capital Stock: U.S.S.R.: App. table B3, United States: Survey of Current Business, U.S. Department of Commerce, Bureau of Economic Analysis, 1950–72, April 1976, vol. 56. No. 4, p. 50; 1973–August 1976, vol. 56, No. 8, p. 64; 1974–August 1977, vol. 57, No. 8, p. 57; 1975–77, September 1978, vol. 58, No. 9, p. 46.
Output: United States and U.S.S.R.: App. table B1.

V. Grain Yields in the North American Plains as They Relate to the Outlook for Soviet Grain Yields and Production

In a discussion of the future for Soviet agriculture, center stage is held by the outlook for grain.[35] Grain is central to the regime's plans for upgrading the diet with increased output of livestock products and is the impetus driving Soviet forays into the international commodity markets.

In July 1978, in a detailed report on agriculture to the U.S.S.R.'s Communist Party Central Committee, President Brezhnev called for an overall grain yield of 20 centners per hectare in 1985 and an average annual production in 1981–85 of 238 to 243 million tons.[36] Although

[34] With 1970=100, the volume of capital stock per unit of labor input in 1977 rose by 2.3 times in the U.S.S.R. 1.5 times in the United States. The average annual rate of increase in labor productivity for the same period : U.S.S.R.—3.5 percent ; United States—6.1 percent. For the latter calculation, in order to reduce the effects of annual variations in weather, average annual output for 1969–71 and 1976–78 was used for the base (1970) and ending (1977) periods. respectively.

[35] For a discussion of the general outlook for Soviet agriculture, see the article by David W. Carey and Joseph F. Havelka in this compendium.

[36] Pravda, July 4, 1978. Officially published grain yields and production are expressed in gross or "bunker weight" terms. Since 1958, Soviet grain yields have been measured in "bunker weight," that is, gross output from the combine, which includes excess moisture, unripe and damaged kernels, and weed seeds and other trash. In order to compare Soviet grain yields since 1958 with earlier periods or with those of other countries, an average downward adjustment of 11 percent is in order. For a more detailed discussion of the required grain discount, see CIA A (ER) 75–68, *The Soviet Grain Balance, 1960–73*, September 1975, pp. 14 and 18.

specific grain acreage plans were not announced for either period, the official plan implies no increase in sowings and, indeed, a possible reduction of 6 percent in grain acreage by 1985 is indicated.[37] Taken together with the earlier announced overall grain yield goal for 1980 and making an assumption that planned acreage under grains in 1981–85 will remain at the targeted acreage for 1980, the following yield targets for 1980–85 emerge:

TABLE 14.—U.S.S.R.: TOTAL GRAIN YIELD

	Centners per hectare		Yield index (1967–75=100)
	Official [1]	Standardized [2]	
Actual:			
1967–75 average	14.2	12.6	100
1974–78 average	15.4	13.8	110
Plan:			
1980	18.5	16.5	131
1981–85 average	18.3–18.7	16.3–16.6	129–132
1985	20.0	17.8	141

[1] Sources: Actual, 1976–77: Narkhoz for selected years. 1978: Pravda, January 20, 1979. 1980: Plan based on data in Osnovnyye napraveniya rasvitiya khozyaistva v decyatoi pyatiletke, p. 66, Moscow, 1976. 1981–85: Based on the production goal of 238–243 million tons and an assumed average sown acreage of 130 million hectares. 1985: Pravda, July 7, 1978.

[2] Adjusted to standardized weight to make official yields roughly comparable to international standards. Official yields are measured in bunker weight, that is, gross weight from the combine which includes excess moisture and extraneous material. In order to compare Soviet official yields with those of other countries, we have reduced them by 11 percent (see footnote 36).

Given the substantial climatic limitations previously discussed in II.B, are these official yield goals attainable? It is instructive in considering the Soviet potential for growth in grain yields and output to compare with the Northern Plains experience.[38] As a result of his analog analysis in the 1950s, Gale Johnson measured the changes in North American yields between 1920–29 and 1941–50 for six States and three Prairie Provinces similar to Soviet regions. Johnson found a zero change in yields between the twenties and fifties when expressed as the yield per unit of combined harvest and fallow land.[39]

In a more current comparison, Joseph Havelka analyzed two recent periods of comparable weather (1950–58 and 1967–75) (see table 15). In marked contrast to the earlier findings of no change in grain yields between the twenties and the fifties for the Northern Plains (for harvested area plus fallow) there has been, in a shorter period of time, a sharp increase in yields in the North American area.

Moreover, the upward trend in Northern Plains yields has been mirrored by substantial gains in the U.S.S.R. Although the gap widened between the Northern Plains and Soviet grain yields (per har-

[37] Area sown to all crops in 1985 is planned to be only fractionally higher than it was in 1975. Fallow land has been reduced to a minimum, and there is, in fact, little potential for bringing new land into production. Soviet planners probably will not substantially shift existing pasture and fodder-producing acreage into grain production. A reduction in pasture, for example, would force the U.S.S.R. to alter current livestock-raising practices significantly. Similarly, it is unlikely that land used to produce industrial crops, such as cotton and sugar beets, would be shifted into grain production.

[38] As indicated earlier, Soviet areas with somewhat similar geoclimatic characteristics to these regions produce about nine-tenths of grain output. Because such a large proportion of Soviet grain is grown in areas comparable to the Northern Plains of the United States and Canada where the lack of precipitation is the key limitation to grain production and where (as discussed above) cultural practices are the most advanced in the world, there is a presumption that Northern Plains grain yields could provide a guide to Soviet ability for raising yields.

[39] D. Gale Johnson, "Soviet Agriculture", Bulletin of Atomic Scientists, January 1964, p. 9. North American area comprised North Dakota, South Dakota, Kansas, Nebraska, Montana, Wyoming, Alberta, Saskatchewan, and Manitoba. Based on harvested acreage alone (excluding fallow) the yield increase came to 27 percent over the 30-year period.

vested hectare) over the 17-year period, the boost of nearly one-half in Soviet yields was a major success story. Moreover, the large advantage the Northern Plains retains over Soviet grain yields—80 percent in 1967–75—would appear, at first glance, to be encouraging to Soviet planners. Presumably the latter could view the much higher yield in an analogous North American area as an achievable potential for the U.S.S.R. Nearly all of this superior yield differential, however, is attributable to a much greater use of fallow in Northern Plains crop rotations and the surge in corn yields in the U.S. component of the Northern Plains. Corn yields nearly doubled in the Northern Plains between the periods 1950–58 nad 1967–75.[40]

TABLE 15.—COMPARISON OF U.S.S.R. AND NORTHERN PLAINS GRAIN YIELDS, 1950–75

	Centners per hectare		
	1950–58	1967–75	Percent change
I. Average for all grains (per harvested hectare):			
U.S.S.R.	8.6	12.6	+47
Northern Plains	14.4	22.6	+57
II. Average for small grains (per harvested plus fallow hectare):[2]			
U.S.S.R.	6.8	10.9	+60
Northern Plains	8.8	11.7	+33

[1] Havelka's findings are presented in CIA, SI–78–100058, op. cit., p. 8. A more detailed presentation is given in Joseph F. Havelka, "The Feasibility of Projecting Soviet Grain Production From Trends in North America's Northern Plains," April 1977, (unpublished typescript). The average Soviet (official) yields given in the above sources for 1967–75 have been adjusted downward. (See footnote 36.)

[2] Adjusted from I above to exclude corn and miscellaneous grains—millet, buckwheat, rice and pulses—and to include area fallowed in previous year.

An additional boost to average yields per harvested area came from a sharp increase in grain sowings on land that had been fallowed the previous year. When grain yields in the Northern Plains are adjusted to include use of fallow and are limited to small grains (wheat, barley, oats, and rye) the increase in average yields between the periods 1950–58 and 1967–75 comes to less than 3 centners per hectare compared to a more than 8 centner per hectare rise in the unadjusted yield. As indicated in table 15, the difference between the Soviet and Northern Plains 1967–75 average adjusted yield narrows to less than 1 centner per hectare compared to 10 centners per hectare for all grains on harvested area alone. In other words, when the statistics on the Northern Plains and the U.S.S.R. are adjusted to exclude corn and low yielding special grains (millet, buckwheat, pulses) and also to reflect use of fallow land, the Soviet output per unit area, during 1967–75 is essentially the same as that in the Northern Plains. The potential share of the Soviet grain area suitable for corn is far smaller than that in the Northern Plains.[41] On balance, when placed in this comparative

[40] Havelka found that this sharp upturn in corn yields was directly related to increased application of fertilizer in all six States and to a remarkable increase in irrigated corn in Nebraska. In 1975–76, 37 percent of all corn in the six States was produced on Nebraska irrigated acreage where yield of irrigated corn was double the yield on nonirrigated corn. Havelka, op. cit. pp. 5–6.

[41] The Soviets, however, have failed to substitute corn for grains in those areas where temperatures, precipitation, and growing season is sufficient. Havelka finds that the negligible difference between the U.S.S.R. and Northern Plains small grain yields in 1967–75 do not necessarily suggest that further increases are not possible. "Small grains in the Northern Plains are produced largely outside of areas that have the most favorable soils, the longest growing season, receive the highest precipitation, apply the most fertilizer and benefit from grain irrigation because such regions are pre-empted by corn and sorghum." (*Ibid.*, p. 8). In short, Havelka argues if small grains had had equal status with corn and sorghum, their average yields in 1967–75 in the Northern Plains would have been somewhat above 11.7 centners per hectare.

context, the official plans for increasing grain yields for 1980–85 appear far too ambitious.

In a recent study on the long term outlook for Soviet grain imports, CIA made projections of grain output for 1985.[42] The report concluded that grain production was likely to range between 212 and 236 million tons (standardized terms) by 1985, the range determined by the assumptions concerning weather conditions. Under favorable conditions, output would tend toward the upper end of the projected range; under long-term average weather conditions production would tend toward the lower end of the projected range.[43]

CIA's "most likely" estimate of 212 million tons (standardized weight), taken together with the implied grain acreage target of 130 million hectares provides a yield of 16.3 centners per hectare or, on the official gross basis, 18.3 centners per hectare. Although the target of 16.3 centners per hectare remains more than one-fourth below the average yield achieved in the analogous areas of the Northern Plains in 1967–75 (22.6 c/ha), it is necessary to make adjustments to obtain an estimated yield comparable to that of the Northern Plains. In making these adjustments the following assumptions were made: (*a*) Acreage under corn and miscellaneous grain (millet, buckwheat, pulses, and rice) remains at roughly the same proportion of total grain acreage as in the last 5 years for which records are available (1973–77); (*b*) the trend in annual yields of these grains for the period 1960–77 is maintained for the period 1979–85; and (*c*) the acreage under cultivated fallow remains the same in the period 1979–85 as the average for 1973–77.

With these assumptions we obtain an adjusted plan yield per hectare of small grain sown (wheat, barley, oats, rye) plus area in cultivated fallow of 14.6 centners per hectare. This is 25 percent above the yield per hectare of small grains plus cultivated fallow in the North American area in 1967–75. If the Northern Plains experience is relevant to the Soviet setting—as we believe it is—the U.S.S.R. will be under considerable strain to achieve this projected yield in 1985.

Appendix A

U.S. and U.S.S.R. Agricultural Output

Appendix table A–1 presents a 1957–59 constant dollar comparison of U.S. and U.S.S.R. agricultural production. It compares the relative levels and year-to-year changes in total farm output and its major components during the period 1950–77.

Appendix table A–2 depicts comparisons of U.S. and U.S.S.R. total farm output and their major components, valued alternately, in U.S. and Soviet prices, as well as in terms of a geometric mean of the dollar and ruble comparisons.

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[42] CIA, ER 79–10057, *U.S.S.R.: Long Term Outlook for Grain Imports*, January 1979. The likely range of Soviet grain imports and other implications flowing from these grain output projections are discussed in this report.

[43] Expressed in standardized weight. In Soviet bunker weight, or gross terms, the projected range would be 238 and 265 million tons, respectively. See Ibid. p. 2–4 for details. A recent detailed review of the evidence underlying changes in Soviet grain output over the past two decades led to the finding that more than one-half the increase in grain production between 1962 and 1974 was the result of improved climate. It also indicates that a steady improvement in the climate of major grain-growing regions occured between 1960 and 1970. See CIA, ER 76–10577U, *U.S.S.R.: The Impact of Recent Climate Changes on Grain Production*, October 1976, p. 14.

Farm Output

Farm output in table A–1 includes all corps produced during the year except hay and pasture, hayseeds, pasture seeds, and covercrop seeds. It also includes the net production of livestock other than draft animals. Net livestock production is gross production of livestock products and inventory change minus the value of products (grain, potatoes, vegetables, and milk) fed to livestock and less the value of hatching eggs. These deductions were made to avoid counting feed crops in the production of both livestock and crops and to avoid counting hatching eggs as part of poultry meat production as well as egg production.

The data and methodology used in this paper in comparing U.S. and Soviet values of total farm output, total crop output, and net livestock output for the years 1950–71 are described in an earlier study of U.S.–U.S.S.R. comparative farm output by F. Douglas Whitehouse and Joseph F. Havelka, "Comparison of Farm Output in the United States and U.S.S.R.," U.S. Congress, Joint Economic Committee, "Soviet Economic Prospects for the Seventies," U.S. Government Printing Office, Washington, D.C., 1973.

The comparisons of Soviet and U.S. farm output shown in this paper for the years 1972–77 are extrapolations of the series by Whitehouse and Havelka. U.S. ruble and dollar values for total net farm output and total crop output for the years 1972–77 were calculated by moving forward 1971 terminal year data by means of the USDA indexes of farm and crop output reported in "Changes in Farm Production and Efficiency, 1977," U.S. Department of Agriculture, Economics, Statistics, and Cooperative Service, Statistical Bulletin No. 612, U.S. net livestock production was calculated as a residual, the difference between indexed values of total net farm output and total crop output for each year.

Soviet values of total net form output, total crop output, and net livestock output for years 1972–77 were calculated by moving terminal year 1971 data forward by the Office of Economic Research (OER), CIA, index of U.S.S.R. agricultural production. Soviet values, in millions of 1957–59 dollars, were then calculated from U.S. dollar values using the geometric mean of the comparison of U.S. and U.S.S.R. output carried out, alternately, in dollar and ruble prices. Ruble values, from which the index of net U.S.S.R. agricultural production is derived, are presented in appendix 4 of the contribution by Carey and Havelka in this volume. For a more comprehensive explanation of the methodology used in constructing the measure of net agricultural production see Douglas B. Diamond, "Trends in Output, Inputs, and Factor Productivity in Soviet Agriculture," U.S. Congress, Joint Economic Committee, "New Directions in the Soviet Economy Part II–B," U.S. Government Printing Office, Washington, D.C., 1966 and Douglas B. Diamond and Constance B. Krueger, "Recent Developments in Output and Productivity in Soviet Agriculture," Soviet Economic Prospects for the Seventies," U.S. Government Printing Office, Washington, D.C., 1973.

The authors recognize the possible errors of measurement involved in moving forward terminal year 1971 data (Whitehouse and Havelka, *op. cit.*) by the USDA and OER indexes of agricultural production. These errors are due to differences in price weights and minor methodological differences between the procedures utilized in the construction of the U.S. and U.S.S.R. indexes and those employed in the Whitehouse and Havelka study. More specifically, the ruble-dollar ratios of individual country farm output values are frozen at the originally computed 1971 level. The similar trends of ruble and dollar values in the 1950–71 series, however, suggest that the extended values for the years 1972–77 represent, we believe, the relative, if not absolute, changes in U.S. and U.S.S.R. total net agricultural output, total crop output, and net livestock production since 1971. Because of these differences, however, growth rates of net agricultural output determined from the values in appendix table A–1 will differ somewhat from those used throughout this paper in calculations of output and productivity changes since 1950. For instance, using the values from appendix table A–1, which represent geometric comparisons of U.S. and U.S.S.R. output in dollars and rubles, U.S.S.R. net agricultural output during 1951–77 grew at an annual average rate of 3.1 percent. In contrast, the average annual rate of growth for the same period calculated from the OER index of Soviet agricultural production, is 3.3 percent. Because of wide fluctuations in annual farm output, a 3-year moving average is used in this paper in all calculations involving total net U.S.S.R. agricultural output since 1950. (See appendix table B–1 for U.S./U.S.S.R. indexes of farm output.)

Comparisons of U.S. and U.S.S.R. Agricultural Output

A comparison of any two economies must deal with the problem of valuing two different assortments of output in a common set of prices. The international currency exchange rate cannot be used to compare U.S. and U.S.S.R. agricultural production because the exchange rate is set arbitrarily. Foreign trade is a tightly controlled monopoly in the U.S.S.R.; the exchange rate reflects imperfectly only the prices of goods and services that are traded internationally and not the full range of U.S. and Soviet agricultural output.

The relative values of farm output and its major components in the U.S. and U.S.S.R. differ somewhat depending upon whether comparisons are made in terms of U.S. or Soviet prices. The explanation lies in the differences in the pattern of output and prices in the U.S. and U.S.S.R. which reflect differences in tastes, levels of income, natural resources, technology, and state of development. Ruble-valued comparisons are generally biased in favor of the United States while dollar-valued comparisons generally are biased in favor of the U.S.S.R. In order to obtain a better measure of the relative size of U.S. and U.S.S.R. agricultural output, data in tables A–1 and A–2 are based upon the approach taken by Whitehouse and Havelka, *op. cit.*, who utilized the geometric mean of comparisons of U.S. and U.S.S.R. output carried out, alternately, in dollar and ruble prices. In this paper, as previously noted, indexed values of U.S. and Soviet farm production in both ruble and dollar prices, were moved forward for the years 1972–77. A geometric mean of the dollar and ruble comparisons was then calculated, providing a single measure of relative output and, arguably, a better measure than either the dollar or ruble comparison.

TABLE A–1.—UNITED STATES AND U.S.S.R.: TOTAL NET FARM, TOTAL CROP, AND NET LIVESTOCK OUTPUT, 1950–77

[Millions 1957–59 dollars][1]

Year	Net farm output		Total crop output		Net livestock output	
	United States	U.S.S.R.	United States	U.S.S.R.	United States	U.S.S.R.
1950	24, 777	15, 114	14, 130	10, 174	10, 647	5, 004
1951	25, 898	14, 244	14, 673	8, 804	11, 225	5, 500
1952	26, 833	15, 295	15, 405	10, 167	11, 428	5, 028
1953	27, 111	15, 995	15, 268	10, 077	11, 843	5, 922
1954	27, 020	16, 482	14, 838	10, 238	12, 182	6, 335
1955	27, 963	18, 735	15, 315	11, 639	12, 648	6, 956
1956	28, 035	20, 746	15, 444	13, 282	12, 591	7, 429
1957	27, 473	21, 154	14, 820	12, 449	12, 653	8, 731
1958	29, 618	22, 806	16, 752	13, 737	12, 866	9, 135
1959	30, 053	21, 939	16, 829	12, 285	13, 224	9, 786
1960	30, 849	22, 520	17, 504	12, 428	13, 339	10, 004
1961	30, 995	24, 176	17, 194	13, 411	13, 801	10, 627
1962	31, 327	23, 809	17, 292	12, 969	14, 035	10, 807
1963	32, 497	21, 123	18, 079	12, 294	14, 418	8, 939
1964	32, 227	25, 459	17, 440	15, 696	14, 787	9, 759
1965	33, 258	25, 609	18, 624	14, 340	14, 634	11, 268
1966	32, 774	27, 858	17, 866	16, 258	14, 908	11, 268
1967	34, 377	27, 502	18, 887	16, 054	15, 490	11, 618
1968	34, 889	29, 307	19, 483	17, 340	15, 406	12, 017
1969	35, 264	27, 859	19, 730	15, 784	15, 534	11, 961
1970	35, 036	31, 182	18, 905	17, 771	16, 131	13, 389
1971	38, 084	30, 848	21, 306	17, 471	16, 778	13, 255
1972	38, 084	29, 325	21, 519	16, 139	16, 565	13, 086
1973	38, 770	33, 342	22, 648	20, 157	16, 122	13, 542
1974	36, 713	33, 042	20, 922	17, 784	15, 791	15, 001
1975	39, 455	30, 775	23, 010	16, 337	16, 445	13, 978
1976	40, 508	32, 811	23, 010	19, 328	17, 498	13, 473
1977	41, 892	34, 351	24, 545	18, 900	17, 347	15, 265

[1] U.S.S.R. data calculated from United States output using the geometric mean of comparisons of U.S.S.R. and United States output carried out, alternately, in dollar and ruble prices.

TABLE A–2.—COMPARISON OF U.S. AND U.S.S.R. FARM OUTPUT (U.S.S.R. AS PERCENT OF UNITED STATES)

	Total net farm output			Crop production			Net livestock production		
	Dollar comparison	Ruble comparison	Geometric mean	Dollar comparison	Ruble comparison	Geometric mean	Dollar comparison	Ruble comparison	Geometric mean
1950	65	57	61	77	66	72	47	45	47
1951	58	52	55	64	56	60	49	48	49
1952	60	53	57	72	61	65	44	44	44
1953	62	56	59	72	60	66	48	52	50
1954	65	58	61	76	63	69	52	52	52
1955	70	63	67	84	69	76	54	56	55
1956	79	70	74	95	78	86	59	60	59
1957	81	73	77	94	76	84	67	70	69
1958	82	73	77	91	74	82	70	72	71
1959	78	69	73	81	65	73	73	75	74
1960	77	69	73	79	64	71	74	76	75
1961	82	74	78	97	70	78	77	78	77
1962	80	71	76	84	66	74	76	78	77
1963	70	61	65	77	60	68	62	62	62
1964	85	74	79	102	80	90	65	66	66
1965	82	73	77	86	68	77	76	79	77
1966	93	79	85	106	78	91	78	79	78
1967	88	74	80	98	73	85	75	75	75
1968	91	77	84	101	78	89	79	77	78
1969	85	73	79	92	69	80	76	78	77
1970	97	82	89	109	81	94	82	84	83
1971	87	75	81	96	70	82	77	82	79
1972	83	72	77	87	64	75	77	81	79
1973	93	80	86	104	76	89	82	86	84
1974	97	84	90	99	73	85	92	98	95
1975	84	73	78	83	61	71	83	88	85
1976	88	75	81	99	72	84	75	80	77
1977	88	76	82	89	66	77	85	91	88

APPENDIX B

U.S. AND U.S.S.R. PRODUCTIVITY MEASURES

Table B–1 presents U.S. and U.S.S.R. indexes of output, inputs, and factor productivity in agriculture for the period 1950–77. The index numbers in table B–1 were used to construct figure 3 in the text and are the basis for this study's calculations of growth in U.S. and U.S.S.R. farm output, inputs, and factor productivity. The U.S. output and input indexes are based upon official USDA statistics. Soviet output is taken from the U.S.S.R. index of net agricultural production (see appendix notes for table B–2 for more details on Soviet output and input indexes).

The term "factor productivity" as used in this study refers to total factor productivity, or the ratio of value of total agricultural output to that of all inputs used in agricultural production. The several inputs considered are aggregated into a geometric function of the Cobb-Douglas type. For a more detailed examination of the data and methodology used in constructing the U.S. and U.S.S.R. indexes of factor productivity, including the definition and measurement of variables, and procedures for selecting the form of the production functions, see Diamond and Krueger, op. cit., pp. 328–339 and Yao-Chi Lu, "Measuring Productivity Change in U.S. Agriculture," Southern Journal of Agricultural Economics, December 1975, pp. 69–74.

Indexes of factor productivity in U.S. agriculture for the years 1973–77 are based upon extrapolation of the series by Lu, op. cit. The terminal year 1972 index of U.S. factor productivity from the Lu study was moved forward by use of official USDA indexes of agricultural productivity as presented in "Changes in Farm Production and Efficiency, 1977," U.S. Department of Agriculture, ESCS, Statistical Bulleton No. 612. Such a procedure involves a minimum dispartity of measurement since results indicate little difference between the Lu and USDA indexed series of factor productivity for the years 1952–72. The closeness of the two productivity series is due in large part to the fact that official USDA output and input data were the basis of productivity calculations for both indexes.

Appendix table B–2 presents a series of indexes of U.S.S.R. output, total and component inputs, and factor productivity in agriculture for selected years. The output index is based upon the physical output of 41 crops and animal products and changes in inventories of 4 classes of livestock (cattle, hogs, sheep and goats), weighted by 1970 prices. In order to obtain a net measure of the physical amounts available for sale and home consumption, deductions were made for the amount of grain, potatoes, vegeteables and milk fed to livestock; the quantity of eggs used for hatching, and the amounts of grain and potatoes used for seed. The physical commodities and livestock inventory series are for the most part based upon official production data. For grain and sunflower seeds independent estimates were made that reflect downward adjustments of official data to account for extraneous material and excess moisture included in the Soviet "bunker" weight concept as well as losses in handling. For a fuller explanation of the methodology used in constructing the measure of net agricultural production, including methodological revisions from previous compendia, see the appendix, U.S.S.R. Net Agricultural Production, in the contribution by Carey and Havelka in this volume.

A detailed exposition of the derivation of the data in table B–2 underlying the several indexes on inputs—land, productive livestock, fixed capital, current purchases, and labor—and the procedure for obtaining the factor-share weights used in combining the individual series into an index of total inputs can be found in Diamond, op. cit., pp. 372–76, and Diamond and Krueger, op. cit., p. 331.

The series from which the U.S.S.R. input indexes in table B–2 were derived are shown in table B–3.

TABLE B–1.—UNITED STATES AND U.S.S.R.: INDEXES OF OUTPUT, INPUTS, AND FACTOR PRODUCTIVITY IN AGRICULTURE, 1950–77

[1950=100]

	Output		Inputs		Factor productivity	
	United States	U.S.S.R. [1]	United States	U.S.S.R.	United States	U.S.S.R.
Year:						
1950	100	100.0	100.0	100.0	100.0	100.0
1951	103	100.6	101.7	(2)	101.3	(2)
1952	107	102.2	103.4	101.0	103.5	101.2
1953	107	106.8	101.6	105.7	105.3	101.0
1954	108	115.3	103.5	110.4	104.3	104.4
1955	111	126.3	102.7	117.8	108.1	107.2
1956	111	136.8	101.8	121.8	109.0	112.3
1957	110	145.2	102.1	124.2	107.7	116.9
1958	118	150.4	101.6	127.5	116.1	118.0
1959	119	154.8	101.5	130.0	117.2	119.1
1960	123	159.2	101.4	130.0	121.3	122.5
1961	123	161.8	100.0	133.4	123.1	121.3
1962	128	155.5	103.5	138.1	123.7	112.6
1963	130	157.9	101.6	138.5	128.0	114.0
1964	128	164.7	100.1	141.9	127.9	116.1
1965	132	183.8	101.6	149.3	129.9	123.1
1966	128	190.4	101.4	152.1	126.2	125.2
1967	135	197.2	103.5	152.5	130.4	129.3
1968	138	198.9	104.7	154.0	131.8	129.2
1969	138	208.8	105.9	155.7	130.3	134.1
1970	137	214.5	101.3	159.3	135.2	134.7
1971	149	218.6	104.3	162.5	142.8	134.5
1972	149	224.8	104.9	165.4	142.0	135.9
1973	151	230.5	105.4	169.6	143.3	135.9
1974	143	234.0	104.5	173.4	136.8	134.9
1975	154	232.5	103.7	175.8	148.5	132.3
1976	158	235.5	106.4	176.1	148.5	133.7
1977	164	246.9	107.7	177.6	152.3	139.0

[1] 3-yr moving average.
[2] Not available.

TABLE B-2.—U.S.S.R.: INDEXES OF OUTPUT, INPUTS, AND FACTOR PRODUCTIVITY IN AGRICULTURE

[1965=100]

	1950	1955	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977
Output (3-yr moving average)	54	69	87	100	117	119	122	125	127	126	128	134
Total inputs	67	79	87	100	107	109	111	114	116	118	118	119
Land	75	91	97	100	98	99	100	102	102	103	103	102
Livestock (productive)	61	67	90	100	101	100	99	97	94	90	86	84
Fixed capital	25	41	64	100	150	166	184	205	229	254	279	304
Current purchases	29	44	64	100	135	144	154	165	178	194	201	210
Labor	104	105	98	100	94	94	92	92	91	89	87	85
Factor productivity	81	87	99	100	109	109	110	110	110	107	109	113

Average annual percentage rate of growth [1]

	1951–55	1956–60	1961–65	1966–70	1971–77
Output (3-yr moving average)	4.8	4.7	2.9	3.1	2.0
Total inputs	3.3	2.0	2.8	1.3	1.6
Factor productivity	1.4	2.7	.1	1.8	.4

[1] Calculated from unrounded indexes. The base is the year prior to the stated period.

TABLE B-3.—U.S.S.R.: INDICATORS OF RESOURCES AVAILABLE TO AGRICULTURE, EXPRESSED IN RUBLE VALUES OR PHYSICAL UNITS, 1950, 1955, 1960, 1965, 1970–77 [1]

	1950	1955	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977
Land:												
Annual sown acreage (millions of hectares)	146.3	185.8	203.0	209.1	206.7	207.3	210.7	215.0	216.5	217.8	217.9	217.7
Index of weighted yields (1965=100) [2]	106.7	102.3	100.0	100.0	99.6	99.4	99.1	98.9	98.6	98.5	98.4	98.3
Weighted acreages [3]	156.1	190.1	203.0	209.1	205.8	206.1	208.8	212.5	213.5	214.4	214.4	213.9
Productive livestock [4] (billion rubles, 1955 prices)	8.25	9.15	12.30	13.60	13.75	13.55	13.50	13.25	12.75	12.30	11.75	11.45
Capital stock [5] (billion rubles, 1955 prices)	12.45	19.90	31.50	48.95	73.40	81.15	90.00	100.35	112.15	124.40	136.45	148.60
Current purchases [6] (billion rubles, 1966 prices)	1.60	2.45	3.59	5.57	7.51	8.03	8.58	9.20	9.94	10.82	11.22	11.71
Labor [7] (million man-days)	10,784	10,860	10,155	10,334	9,748	9,696	9,542	9,501	9,453	9,237	8,975	8,832

[1] The data in this table represent the underlying ruble values or physical units presented in table B-2 as indexes. Because of rounding of the data in this table, the implied index numbers (1965=100) may not be comparable to those shown in table B-2 (computed from unrounded data). Data for the intervening years 1951–54 and 1956–59 were published in Diamond op. cit., p. 373, and for 1961–64 and 1966–69 in Diamond and Kruger op. cit., p. 332. For the years presented in this table, data for the capital stock and productive livestock series have been slightly revised from the earlier published series. In addition, data for all series for 1971 and 1972—and for labor in 1970 as well—have been updated.

[2] The index of weighted yields is obtained by dividing (a) the summation of the products of weighting annual sown acreage for each of the 25 regions by the average grain yield for each region in 1960–70 by (b) the total sown area for each year.

[3] The product of annual sown acreage (line 1) and the index of weighted yields (line 2). Weighted acreages (line 3) are the basis of the index of land presented in table B-2.

[4] The average annual inventory value—that is, mean of beginning and end-of-year values expressed in July 1, 1955, prices—of herds of mature "productive" animals excluding draft animals. Young animals and those being raised exclusively for slaughter are also excluded. The series is extended from 1970 on the basis of the official indexes of capital stock with and without livestock. Since 1976, the official index has been presented in 1973 prices. The revaluation largely affected the value of productive livestock. In 1970, measured in 1973 prices, the value of capital stock including livestock dropped by 4 percent from the value measured in 1955 prices; the value of capital stock excluding livestock did not change. By 1975, the last year for which both measures are given, the value of total capital stock including livestock was 7 percent less when measured in 1973 prices while the value excluding livestock was 1 percent less. The above livestock series has not been adjusted for the revaluation for the years prior to 1970; the revaluation reduced the value (according to the published indexes) of total capital by only 2 percent; the value of capital excluding livestock remained the same.

[5] The average annual values of fixed assets (buildings, machinery and equipment, land improvements such as irrigation and drainage) and draft animals. Values are expressed in replacement cost (July 1, 1955, prices) gross of depreciation and net of retirements. The series has been extended as in footnote 4 above. The revaluation had a negligible effect (less than 1 percent) on the value of capital stock.

[6] Current purchases include (a) deliveries of fertilizer to farms, (b) use of electric power for productive purposes, (c) fuels and lubricants, (d) current repairs of machinery and buildings including repair activity carried out by the farms on their own account, (e) production of rubber products for agriculture, (f) production of processed feeds (millfeed, oilcake, skim milk, sugar beet pulp) by industry, and (g) use of lime.

[7] All man-days expended in farm activity.

APPENDIX C

U.S. AND U.S.S.R.: PRODUCTIVITY OF FARM LABOR

Any comparison of United States and Soviet agricultural labor productivity necessitates consideration of the manner in which labor expenditures are allocated between the agricultural and industrial sectors. For instance, in the United States during the past 20 to 30 years, farms and farm workers have become more and more specialized. Many agricultural functions, traditionally performed at the farm level, have been transferred to non-farm business firms. The classic example of this is the transfer of farm power production to the tractor industry, from horse, mule and man power to mechanized equipment. More recently, functions displaced have included the majority of feed, seed, fertilizer and chemical preparations as well as management and custom services. As more and more intermediate goods and services are purchased, the quantity of labor expended directly in farm production has declined relative to that employed in the production of agricultural inputs. As such, the official USDA series of U.S. farm labor productivity in table C–1 overstates somewhat the contribution of farm workers and ignores the growing importance of nonfarm labor in agricultural production. While many productive functions have similarly been shifted off farms in the Soviet Union, the transfer has not taken place to the extent that it has occurred in the United States. As a result, the official Soviet published labor series somewhat overstates the size of the Soviet agricultural labor force relative to that of the United States.

In order to make the comparison of United States and Soviet labor productivity more comparable, the series constructed for U.S.S.R. labor inputs in table C–1 is based on the actual expenditure of work-days in agricultural production (conventionally expressed in Western literature as "man-days"). It represents a measure of the volume of time spent directly in production of agricultural products—crops and livestock—and in associated administrative activities. The days are undifferentiated as to the age and sex of the persons employed. The coverage includes not only time worked by the persons principally engaged in agriculture but also embraces the input of persons of households whose head is principally engaged in nonagricultural activities but who maintains (in nonagricultural enterprises) small holdings (kitchen garden and/or small holding of livestock). Also included are days worked in farm activity by members of households attached to agricultural enterprises with a principal occupation in a non-farm production activity (e.g., capital repair, municipal service) but who have a secondary source of employment in farm production activity.

For a more detailed description of the concepts and coverage of the labor input series see Diamond and Krueger, op. cit., p. 331, and Diamond, op. cit., p. 372.

The index of U.S.S.R. labor inputs described above was derived from data shown in table B–3.

TABLE C–1.—UNITED STATES AND U.S.S.R.: INDEXES OF PRODUCTIVITY OF FARM LABOR, 1950–77 [1]

	Index (1950=100)	
	United States	U.S.S.R.
1950	100	100
1951	103	108
1952	112	114
1953	115	115
1954	124	120
1955	129	125
1956	138	135
1957	150	146
1958	168	152
1959	174	158
1960	191	169
1961	197	172
1962	209	165
1963	226	174
1964	238	180
1965	262	192
1966	271	199
1967	294	213
1968	312	219
1969	324	233
1970	338	237
1971	376	243
1972	400	254
1973	382	262
1974	400	267
1975	447	272
1976	476	283
1977	509	301

[1] Output per manhour for United States; output per man-day for U.S.S.R.

Appendix D

U.S. and U.S.S.R. Comparisons of Agricultural Investment, Source Notes to Table 12 of Text

Column 2. U.S. Machinery.—Investment in machinery and equipment is the sum of private purchases of producer durables of (1) farm tractors and (2) agricultural machinery, excluding tractors. Data in current prices are from U.S. GNP accounts published annually by the U.S. Department of Commerce (*Survey of Current Business*, No. 7, July 1978, p. 49. and July issues of 1973–76). Data in current prices are deflated to 1976 dollars using implicit price deflators associated with U.S. GNP accounts (*Survey of Current Business*, July 1978, p. 65 and earlier July issues).

Column 3. U.S. Construction.—Agricultural construction is equivalent to private purchases of nonresidential farm structures. Sources of data in current prices and relevant price deflators are the same as those for machinery and equipment.

Column 4. U.S.S.R. Total Investment in Dollars.—Values for Soviet agricultural investment in dollars shown in this table are geometric means of ruble and dollar comparisons of United States and Soviet investment. Ruble and dollar comparisons for machinery and for construction are described in notes (d) and (e) below. Geometric mean dollars are derived by calculating Soviet investment as a percent of U.S. investment in rubles and in dollars and then applying the geometric mean of these percentages to U.S. investment in dollars. Geometric means are calculated separately for machinery, construction and for total investment. For a complete discussion of the theory and methods of international comparisons, see the paper in this volume by Imogene Edwards, Margaret Hughes, and James Noren, "U.S. and U.S.S.R.: Comparisons of GNP."

Column 5. U.S.S.R. Machinery (Dollars).—For the dollar comparison of machinery, Soviet investment in rubles is converted to dollars using the Soviet-weighted dollar-ruble ratio for agricultural equipment (4.797). The ratio is expressed in 1976 dollars and 1967 rubles to be as compatible as possible with official Soviet investment data in 1969 prices. For the ruble comparison, the two components of U.S. investment in agricultural machinery are converted to rubles using the U.S. weighted ruble-dollar ratio for tractors (0.290) and for other agricultural machinery (0.230). Ruble-dollar ratios for agricultural machinery are taken from a study to be published later this year—*U.S.S.R. and U.S.: Price Ratios for Machinery, 1967 Rubles/1972 Dollars.* The dollar side of these ratios was moved to 1976 using the price deflators described in note (a), above.

Column 6. U.S.S.R. Construction (Dollars).—The method of dollar values for Soviet agricultural construction parallels that for machinery and equipment. In the absence of sufficient data to construct a ratio specifically for agricultural construction, the ratio used to convert Soviet outlays to dollars for the dollar comparison is the geometric mean of ratios for industrial structures, airfields, and roads. Agricultural construction involves a substantial amount of work, particularly earthmoving and excavation, that is analogous to construction of industrial structures, airfields, and roads. Ruble values for other capital outlays (defined in note (h) below) are converted to dollars using the construction ratio. Ratios for construction are expressed in 1976 dollars and estimated 1976 rubles (see note (g) below for the derivation of 1976 rubles). The 1970 ruble—1970 dollar ratios in CIA ER 76-10006S, *Ruble-Dollar Ratios for Construction*, February 1976, were updated to 1976 rubles and 1976 dollars for this study.

U.S. outlays on nonresidential farm construction were converted to rubles using the geometric mean of ruble-dollar ratios for industrial structures, airfields and roads for reasons set forth above.

Column 7. U.S.S.R. Total Investment (Rubles).—Soviet agricultural investment in rubles includes outlays for "productive" purposes. Capital outlays in agriculture for housing, communal, and cultural purposes are excluded. Total productive agricultral investment for 1970–75 in 1969 prices is from *Narodnoye khozyaystvo SSSR v 1975 godu*, p. 511. The 1976 volume contains data for the same years in 1976 prices. Data for 1976 and 1977 in 1976 prices are from *Narodnoye khozyaystov, 1977*, p. 537. Implicit price deflators were constructed from 1970–75 data expressed in 1969 and in 1976 ruble prices. The deflators were applied to 1976 and 1977 agricultural investment in 1976 prices to obtain a full series of productive agricultural investment 1970–77 in 1969 prices.

Total agricultural investment is allocated to machinery and equipment, construction, and other capital outlays using the percentage distribution of agricultural investment found in various issues of the CEMA handbook. *Statisticheskiy ezhegodnik stran-chlenov Sovieta ekonomicheskoy vzaimopomoshchi*, 1977, p. 166; 175 edition, p. 154; 1974 edition, p. 160; 1972 edition, p. 156.)

Column 8. U.S.S.R. Machinery (Rubles).—Investment in machinery and equipment is expressed in estimated prices of 1 January 1969. Although new estimate prices introduced in 1976 are lower than 1969 prices, evidence suggests that Soviet machinery prices actually have risen. No data exist to estimate reliably 1976 ruble prices for machinery and equipment; since the new 1976 prices are rejected as too low, 1969 prices are used as a compromise.

Column 9. U.S.S.R. Construction (Rubles).—The construction component of agricultural investment includes construction-installation work and other capital outlays which consist of expenditures for surveys, plans and designs, technical documentation and the like. Other outlays account for a 9–10 percent of agricultural investment and are in 1969 ruble prices. Ruble outlays for agricultural construction in 1969 prices were updated to 1976 prices using an estimated price deflator for total construction-installation work. The deflator was derived by comparing the value of construction in constant 1969 prices as reported in the Soviet statistical handbook with the value of construction in current prices. Construction-installation work in current prices is assumed equal to value added in the construction sector. According to this calculation, 1976 construction prices are 8.8 percent higher than 1969 prices.

Appendix E

TABLE E-1.—U.S. AND U.S.S.R: SELECTED INDICATORS OF THE LEVEL OF COMPARATIVE FARM PRODUCTIVITY AND RESOURCE USE, 1977

Indicator	United States	U.S.S.R.	U.S.S.R. as a percent of United States
Agriculture's share of gross national product (percent) [1]	2.7	15.9	NA
Agriculture's share of labor force (percent)	4.2	24.1	NA
Number of persons supported by 1 farmworker	52.0	7.7	15
Cultivated area per tractor (hectares)	34.7	93.5	269
Grain area harvested per combine (hectares)	133.0	188.0	141
Total cultivated area (million hectares)	152.6	230.1	151
Food grains [2]	28.0	71.0	254
Feed grains [3]	43.3	54.0	125
Livestock yields, average live weight at slaughter:			
Cattle (kilograms)	464.5	[4] 352.0	76
Hogs (kilograms)	107.5	[4] 104.0	97
Eggs (per hen/year)	235	202	86
Milk (per cow milked/year (kilograms))	4,935	2,291	46

[1] Share of GNP at factor cost originating in agriculture in 1970 ruble prices for the U.S.S.R. and in 1977 dollar prices for the United States.
[2] Wheat, rye and rice plus buckwheat for U.S.S.R.
[3] Corn, oats and barley plus sorghum for United States and millet for U.S.S.R.
[4] Average for procured animals to be processed in government packing plants.

Sources: Data are in large part found in "Survey of Current Business" and "Agricultural Statistics, 1978," for the United States, "Narodnoye khozyaystvo S.S.S.R. v 1977 godu" for the U.S.S.R. Methodology for computing GNP data for the U.S.S.R. is discussed in "USSR: Gross National Product Accounts, 1970," CIA A (ER) 75-76, November 1975.

SOVIET AGRICULTURE: PROGRESS AND PROBLEMS

(By David W. Carey and Joseph F. Havelka*)

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*Research analysts with the Office of Geographic and Cartographic Research, Central Intelligence Agency.

I. Summary

Since 1965 the Soviet Union's agricultural programs have produced a mixture of success and failure. Success has been achieved in channeling large amounts of machinery, fertilizer, and other inputs to the farms and in producing enough food to meet the basic nutritional needs of the populace. But failure to provide the total inputs necessary or to adequately use the materials available has precluded achievement of planned increases in agricultural production and reduction of the major year-to-year swings in output. More importantly, the programs have failed to provide consumers with the amounts of high quality foods, particularly meat, that they now demand.

Part of the farm sector's problems are the result of serious environmental constraints. Even though there are some geoclimatic similarities between parts of the U.S.S.R.'s agricultural regions and parts of the U.S. Great Plains and Canadian Prairie Provinces, there are significant differences.[1] The warmest regions in the U.S.S.R. are too dry, and the growing season in the moist regions is too short. Other constraints are imposed by the institutional setting. Despite an agricultural work force eight times the size of the farm labor force in the United States, skilled labor is in short supply. Moreover, farm managers are given neither the latitude nor the incentive to more productively use the resources given them.

The Brezhnev regime has steadfastly pushed programs intended to offset these constraints, at least those constraints imposed by the physical environment. Plans for the growth in agricultural investment and the supply of industrially produced goods such as machinery and fertilizer have not always been met, but substantial resources have been dedicated to agriculture. The result has been a marked increase in agricultural production. During 1976–78, the first 3 years of the tenth 5-year plan, farm output was, on average, 50 percent greater than the average for 1961–65, and grain production was two-thirds greater. But the demand for key agricultural products such as grain and meat has grown faster, the result of a growing population, the regime's policy to maintain fixed retail prices, and yearly boosts in money incomes. Supply not only is generally short of demand but also is still largely dependent on the weather and fluctuates, often severely, from year to year. At least for the near term, agricultural policy must embrace the ideologically unpalatable private sector in order to bolster supplies of meat and vegetables.

There is growing evidence that the effort to transform the inefficient, labor-intensive, crop-producing agricultural sector into an efficient, capital-intensive, multi-product sector has been more expensive and less rewarding than the Soviets expected.[2] In large part because of its

[1] For a more comprehensive discussion of the similarities and differences in the U.S.S.R. and North American grain-growing regions, see "Influence of Agrotechnology and Geoclimate on Grain Yield Potential in the U.S.S.R.," CIA, National Foreign Assessment Center, SI 78–10058, May 1978 and Douglas B. Diamond and W. Lee Davis, "Comparative Output and Productivity of U.S. and U.S.S.R. Agriculture," in this compendium.

[2] Numerous journal articles have appeared recently calling for the more effective use of investment resources in agriculture and urging the adoption of stricter accounting measures to gauge the effectiveness of the resources used. For example, see N. G. Belov, "Ekonomika sel'skogo khozyaystva," No. 9, September 1978, pp. 65–75, I. Ivannikov, "Planovoye khozyaystvo, No. 10, October 1978, pp. 62–68. M. Korolev, "Vestnik statistiki," No. 10, October 1978, pp. 3–9, and N. T. Lebedinskiy, "Ekonomicheskaya gazeta," No. 45, November 1978, pp. 10–11.

low productivity, agriculture still absorbs a disproportionately large share of the country's resources.[3] Announced plans for the remainder of the 1970s and statements regarding agricultural expectations for the 1980s indicate that, as far as the current regime is concerned, agriculture's relative position will remain largely unchanged.[4] In keeping with an economywide slowdown in the growth of investment goods, however, the yearly growth in the flow of resources to agriculture will be reduced. Emphasis is, therefore, applied to achieving productivity gains, and much attention is being focused on the economic indicators used to direct investment funds within the sector and to control waste.

Nevertheless, the overall strategy for growth, stability, and efficiency remains centered on land reclamation, chemicalization, and mechanization. Special attention is being directed to so-called zones of guaranteed moisture, such as the Russian Nonchernozem Zone (RNCZ), where yearly rainfall is relatively high and where increased inputs will presumably have the greatest effect. Those programs will gradually boost agricultural production but at great cost. Moreover, they do not embody the breakthrough in agrotechnology needed to markedly raise yields, to shelter farm output from year-to-year variability in the weather, or to generate, through better breeds and balanced feed rations, the efficiencies needed to accommodate the growing demands of the livestock sector. The most likely result is below plan production of key commodities, particularly grain, and—unless foreign currency spending constraints dictate a change in import policy—continued purchases of foreign grain. Moreover, the boom-to-bust agricultural scenario is likely to go unchanged.

This paper briefly recaps the agricultural record of the eighth and ninth 5-year plans (1966–75), reviews the tenth 5-year plan (1976–80) and agricultural performance during 1976–78, examines the solutions to agricultural problems offered by the Brezhnev regime as applied to the RNCZ, and discusses agricultural prospects for the next few years.[5]

II. Past Performance and Future Plans

A. The Brezhnev Program, 1966–75

With the political demise of Nikita Khrushchev, the Brezhnev regime brought with it in late 1964 a new commitment to agriculture. Despite the grandiose schemes of earlier regimes, little had been done to supply farms with the industrially produced goods necessary to support a consistent expansion in agricultural production.[6] Consequently, farm output in the early 1960's nearly stagnated. The program announced by Brezhnev for the eighth 5-year plan (1966–70)

[3] The agricultural sector receives more than one-fifth of the Soviet Union's investment resources, employs one-fourth of the labor force, and produces one-sixth of the GNP.

[4] In July 1978, a special Communist Party Central Committee Plenum on agriculture briefly outlined the directions for agriculture during 1981–85. Highlights of Brezhnev's speech to the Plenum and the Plenum's resolutions are reported in "Pravda," July 5, 1978, pp. 1–2 and "Pravda," July 11, 1978, pp. 1–2.

[5] The authors wish to thank Russell A. Ambroziak, Malle N. McKinley, R. L. Patrick Johnson, Barbara S. Severin, and Irma D. Smith for their assistance in the preparation of this paper.

[6] A discussion of agricultural policies, especially under Khrushchev and Brezhnev, can be found in David M. Schoonover, "Soviet Agricultural Policies," in this compendium.

and later reaffirmed in the ninth 5-year plan (1971–75) not only set ambitious production targets but also allocated the means to reach those targets. Deliveries of fertilizer, lime, machinery, and equipment were to be radically stepped up, and land improvement efforts were to greatly expand the areas of irrigated and drained lands. The planned increases in grain production were needed to support an ambitious program to develop the country's livestock sector and thereby provide more livestock products, particularly meat, for consumers. Close examination of the results during the 1966–75 decade shows both success and failure. During 1966–70, investment targets were missed, but a period of continually favorable weather allowed farms to meet the average annual output goals. In 1971–75 investment goals were more consistently met, but output targets were missed, also the result of the weather. More important than unfulfilled plan goals, however, the agricultural shortfalls during the latter period had widespread economic effects, disrupting economic growth and necessitating large grain imports.

AGRICULTURAL INPUTS

Plans announced at the March 1965 Plenum of the Soviet Communist Party set the tasks for the remainder of the 1960's.[7] Deliveries to farms of new machinery and equipment as well as fertilizer and lime were to double in 1966–70 in comparison with 1961–65. In addition, the stock of irrigated and drained land was to increase nearly 30 percent by 1970. Performance fell short of plan (tables 1 and 2). Agriculture's share of the nation's investment resources rose sharply, but the flow of resources to agriculture were not always constant or as scheduled. After an initial spurt in 1965—and a good agricultural year in 1966—major cutbacks were made in the flow of industrially produced goods to farms in 1967–69. A decline in farm output and signs of rising consumer discontent in 1969 rekindled interest, however, and in 1970 resource flows to agriculture again accelerated.

[7] "Pravda," April 6, 1966, p. 4.

TABLE 1.—U.S.S.R.: DELIVERIES OF MACHINERY AND EQUIPMENT, PLANNED AND ACTUAL, SELECTED YEARS[1]

	Annual average		Annual average					Annual average		
	1966–70 plan	1966–70 actual	1971–75 Plan	1971–75 actual	1976 actual	1977 actual	1978 actual	1976–80 plan	1976–78 actual	1981–85 plan
Deliveries to agriculture of—										
Tractors:										
Thousand units	358	293	340	333	369	365	371	380	368	200
Rate of growth	[2] 13.7	5.2	[2] 3.2	3.7	−0.5	−1.1	1.8	[2] 0.9	0.1	[2] −21.2
Trucks:										
Thousand units	220	143	220	220	269	268	259	270	265	290
Rate of growth	[2] 29.7	10.7	[2] 11.6	11.5	−0.1	−0.3	−3.5	[2] 0.1	−0.5	[2] 2.3
Agricultural machinery:[3]										
Billion rubles	2.2	1.8	3.1	3.1	4.0	4.2	4.5	[4] 4.6	4.3	6.4
Rate of growth	[2] 11.3	7.2	[2] 12.9	12.4	6.4	5.0	7.6	[2] 6.7	6.5	[2] 8.3
Of which, combines:										
Thousand units	110	94	109	90	98	101	111	108	103	120
Rate of growth	[2] 11.1	4.1	[2] 3.8	−1.1	6.0	3.4	10.1	[2] 5.3	6.5	[2] 0.3

[1] Rates of growth computed from unrounded data.

[2] Constant rates of growth derived from actual deliveries in the base year and planned total deliveries for the succeeding 5-year period. Planned deliveries for 1980 are used as the base for 1981–85 calculations.

[3] Production of agricultural machinery is given for 1976–78 and for 1981–85 plan; other data have been adjusted to reflect actual deliveries to agriculture. All data have been converted to 1967 prices.

[4] N. P. Gusev and G. S. Gaponenko, editors, "Osnovnye nopravleniya rozvitya sel'skogo khozyaystva v desyatoy pyatiletke," Moscow, 1976, p. 38. As cited, the plan allocates 23,000,000,000 rubles of agricultural machinery to agriculture during 1976–80. Currently available data for yearly agricultural machinery production plans put production during 1976–80 at 22,300,000,000 rubles, an average yearly production of 4,500,000,000 rubles and an average annual rate of growth for 1976–80 of 5.7 percent.

Sources: "Narodnoye khozyaystvo S.S.S.R. v..... godu," selected years, and yearly plan fulfillment reports. Plan data for 1981–85 are from "Pravda," July 4 and July 11, 1978.

TABLE 2.—U.S.S.R.: EFFORTS TO IMPROVE CROPLAND, PLANNED AND ACTUAL, SELECTED YEARS[1]

	Annual average		Annual average					Annual average		
	1966–70 plan	1966–70 actual	1971–75 Plan	1971–75 actual	1976 actual	1977 actual	1978 actual	1976–80 plan	1976–78 actual	1981–85 plan
Mineral fertilizer, delivers to agriculture:[2]										
Million tons, standard units	41.4	37.0	60.6	61.3	77.7	79.8	81.2	93.4	79.6	[3] 133.0–136.0
Percent increase	15.2	11.0	10.4	10.6	2.7	2.6	1.8	9.7	2.4	[3] 2.4–3.1
Area limed:										
Million hectares	6.0	4.5	6.4	5.7	[5] 6.2	(6)	(6)	9.4	(6)	(6)
Percent increase	[3] 25.5	11.7	[4] 8.4	5.3	−1.6	(6)	(6)	[4] 13.7	(6)	(6)
Gross addition of irrigated land:										
Thousand hectares	550.0	360.0	800.0	907.8	786.0	878.0	760.0	980.0	808.0	(6)
Percent increase	[3] 11.3	−0.4	25.5	25.0	−33.4	11.7	−13.4	[4] −6.1	−13.6	(6)
Gross addition of drained land:										
Thousand hectares	1,250.0	782.0	1,000.0	882.0	726.0	834.0	680.0	940.0	746.7	(6)
Percent increase	[3] 19.6	2.9	[4] 6.9	4.5	−26.1	14.9	−18.5	−2.6	−11.5	(6)

[1] Rates of growth calculated form unrounded data.
[2] Includes feed additives.
[3] Calculated from plan data for 1980 and 1985.
[4] Constant rates of growth derived from actual performance in the base year and planned total performance for the succeeding 5-year period.
[5] "Ekonomika sel'skogo khozyaystva," No. 11, November 1977, pp. 60–67.
[6] Not available.

Sources: "Narodnoye khozyaystvo S.S.S.R. v. . . . godu", selected years and yearly plan fulfillment reports. Plan data for 1985 from "Ekonomika gazeta," No. 40, October 1978, p. 15 and "Pravda," July 11, 1978.

During 1971–75, the commitment to agriculture was more constant. New fixed investment grew at an average annual rate of more than 9.5 percent, faster than the rate achieved in 1966–70 or the 1971–75 rate for other sectors of the economy. When defined in its broadest terms to include branches supporting agricultural development, "agricultural investment" grew at an average annual rate of 10.5 percent during 1971–75.[8] As before, the investment policy promoted the delivery of trucks, agricultural machinery, fertilizer, and lime as well as expanded irrigation and drainage projects to simultaneously increase stability in farm output and boost production. Performance was marred, though, by high retirement rates of the existing stock of both machinery and improved land, which diluted the effects of these inputs.

AGRICULTURAL PRODUCTION

In general, farm production responded to the investment stimulus. Net agricultural output[9] during 1966–70 grew at a respectable 3.9 percent a year,[10] with crop production up 5.2 percent and the output of livestock products up 2.7 percent yearly (tables 3 and 4). Although agricultural production faltered in 1967 and fell 3.3 percent in 1969, annual grain production rose from the depressed 1965 level of 121.1 million tons to a then record 186.8 million tons in 1970.[11] Meat supplies grew steadily, and by 1970 per capita meat consumption was 16 percent greater than the 1965 level.

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[8] Agriculture and the branches supporting its development received slightly more than 34 percent of total investment in the economy during 1971–75. About 26 percent of the economy's investment funds were spent on agriculture alone, including productive investment (such as the purchase of agricultural machinery) as well as investment for nonproductive purposes (such as on-farm housing). By the end of the period, productive investment in agriculture alone amounted to about 20 percent of the economy's total investment. At the time, in the United States productive investment in farms was less than 5 percent of total investment. See Diamond and Davis, op. cit., for a discussion of agricultural investment in the United States and the U.S.S.R.

[9] Net agricultural production is the estimated value of agricultural output available for sales and home consumption, using 1970 prices; that is, the value of total production minus farm products used for seed and livestock feed, minus eggs used for hatching, and adjusted for changes in inventories of livestock. See the appendix for additional tabular material and a brief discussion of the methodology used to measure net agricultural production.

[10] The average annual rate of growth for net agricultural production for 1966–70 is somewhat overstated because of the poor crop output in the base year 1965 and the unusually good crop production in the terminal year 1970. The use of a 3-year moving average for production smooths the largely weather related year-to-year variations. Using such a measure, the average annual rate of growth in 1966–70 is 3.1 percent. Both measures for this and other periods are presented in table 4.

[11] Official Soviet data for grain production are used in this paper. Data include production of wheat, rye, barley, corn, oats, millet, buckwheat, rice, and pulses. Figures reported are in "bunker weight" which includes excess moisture, unripe and damaged kernels, weed seeds, and other extraneous materials and have not been adjusted to reflect post-harvest losses incurred in handling and storage. In calculating net agricultural production, the Soviet data are discounted to adjust the "bunker weight" to a "barn-weight" measure. The discount varies from year to year but averages 11 percent. See "The Soviet Grain Balance, 1960–73," Central Intelligence Agency, A (ER) 75–68, September 1975.

TABLE 3.—U.S.S.R.: PRODUCTION OF MAJOR CROPS AND ANIMAL PRODUCTS, PLANNED AND ACTUAL, SELECTED YEARS

	Annual average		Annual average					Annual average		
	1966–70 plan	1966–70 actual	1971–75 Plan	1971–75 actual	1976 actual	1977 actual	1978 actual	1976–80 plan	1976–78 actual	1981–85 plan
Rate of growth (percent):										
Total value of farm output [1]	[2] 5.3	3.9	[2] 4.4	−0.2	7.2	4.5	3.0	[2] 5.5	4.9	NA
Crops [3]	NA	5.2	NA	−1.6	21.2	−3.8	9.0	NA	8.8	NA
Animal products [4]	NA	2.7	NA	1.1	−3.6	12.6	−2.0	NA	2.3	NA
Production of major farm commodities (million metric tons):										
Grain	167.0	167.6	195.0	181.6	223.8	195.7	237.2	220.4	218.9	238–243.0
Potatoes	100.0	94.8	106.0	89.8	85.1	83.7	85.9	[6] 102.0	84.9	NA
Sugar beets	80.0	81.1	[5] 87.0	76.0	99.9	93.1	93.8	95–98.0	95.6	NA
Sunflower seeds	NA	6.4	[5] 6.8	6.0	5.3	5.9	5.3	[6] 7.6	5.5	NA
Vegetables	NA	19.5	24.7	23.0	25.0	24.1	26.3	[6] 28.1	25.2	NA
Cotton	5.6–6.0	6.1	6.8	7.7	8.3	8.8	8.5	[5] 8.5	8.5	NA
Meat	11.0	11.6	14.3	14.0	13.6	14.7	15.2	15–15.6	14.5	[7] 18.6
Milk	78.0	80.6	92.3	87.4	89.7	94.5	94.9	94–96.0	93.0	NA
Wool (thousand metric tons)	NA	398.0	464.0	442.1	435.0	458.4	461.5	[6] 473.0	452.0	NA
Eggs (billion)	34.0	35.8	46.7	51.4	56.2	61.1	64.4	58–61.0	60.6	NA

[1] Agricultural output available for sales and home consumption; that is, the value of total production minus farm products used for seed and livestock feed, minus eggs used for hatching, and adjusted for changes in inventories of livestock. Price weights for 1970 have been used in aggregating the physical output of crops and animal products (including changes in inventories of livestock).

[2] Plan for growth of gross volume of agricultural output.

[3] Value of output of food and technical crops less seed but including the portion fed to livestock.

[4] Value of output of meat, milk, eggs, wool, and other livestock products, less livestock feed and eggs used for hatching, and adjusted for changes in herd inventories.

[5] Calculated using the implied average annual rate of growth derived from production data in the base year and planned output in terminal years.

[6] N. Gusev, "Glavanaya vadacha sel'skogo khozyaystva v desyatoy pyatiletke," "Ekonomika sel'skogo khozyaystva," No. 8, 1976, pp. 14–26.

[7] Calculated from planned production in 1980 and 1985 using constant rates of growth.

NA—Not available.

Sources: Production statistics from "Narodnoye khozyaystvo S.S.S.R. v. . . . godu," selected years and yearly plan fulfillment reports. Plan data for 1966–77 are from "Pravda," Apr. 6, 1966, p. 4, for 1971–75 from "Gosudarstvennyy pyatiletniy plan razvitiya narodnogo khozyaystva S.S.S.R. na 1971–75 godu," pp. 167, 169–170, for 1976–80 from "Pravda," Mar. 7, 1976, pp. 2–8, and for 1981–85 from "Pravda," July 5, 1978, pp. 1–2.

TABLE 4.—U.S.S.R.: GROWTH OF NET AGRICULTURAL PRODUCTION (PERCENT)[1]

AVERAGE ANNUAL RATES OF GROWTH USING PRODUCTION IN THE YEAR CITED

End of period	Base year								
	1965	1970	1971	1972	1973	1974	1975	1976	1977
1970	3.9								
1971	3.1	−0.5							
1972	1.9	−2.9	−5.2						
1973	3.4	2.7	4.5	15.0					
1974	2.9	1.7	2.5	6.6	−1.2				
1975	1.8	−.2	−.1	1.7	−4.3	−7.4			
1976	2.3	1.0	1.3	3.0	−.7	−.4	7.2		
1977	2.5	1.5	1.9	3.3	.6	1.2	5.8	4.5	
1978	2.5	1.7	2.0	3.3	1.1	1.7	4.9	3.8	3.0

AVERAGE ANNUAL RATES OF GROWTH USING THREE-YEAR MOVING AVERAGES FOR YEAR CITED

1970	3.1								
1971	2.9	1.9							
1972	2.9	2.4	2.9						
1973	2.9	2.9	2.7	2.5					
1974	2.7	2.2	2.3	2.1	1.6				
1975	2.4	1.6	1.6	1.1	.5	−.7			
1976	2.3	1.6	1.5	1.2	.7	.3	1.3		
1977	2.5	2.0	2.1	1.9	1.7	1.8	3.0	4.8	

[1] Constant rates of growth for agricultural output available for sales and home consumption; that is, the value of total production minus farm products used for seed and livestock feed, minus eggs used for hatching, and adjusted for changes in inventories of livestock. Price weights for 1970 have been used in aggregating the physical output of crops and animal products (including changes in inventories of livestock).

Performance during 1971–75 was less consistent (table 5). For the period as a whole, net agricultural production fell at an annual average rate of 0.2 percent yearly with crop production down 1.6 percent and output of livestock products up 1.1 percent. The investment program failed to insure production stability, and year-to-year swings were staggering. In 1973 and 1974 farm output reached all time highs, but this success was overshadowed by a shortfall in 1972 and a drought-induced crop disaster in 1975. Poor harvests paralyzed the regime's push to give consumers more meat, a program that had swelled the demand for livestock feed. Following the 1972 harvest shortfall, large grain imports were sufficient to forestall distress slaughtering of livestock, but the 1975 grain crop failure was the worst during the Brezhnev period. Grain production was less than two-thirds of needs, and despite record grain imports and conservation efforts, feed supplies were inadequate. Distress slaughtering of livestock boosted meat production for the year, but industry began 1976 with the prospect of agricultural materials shortages. Consumers faced the worst shortfall in food supplies in more than a decade.[12]

[12] A more complete discussion of performance during the ninth 5-year plan and of the effects of the 1975 drought can be found in David W. Carey, "Soviet Agriculture: Recent Performance and Future Plans," U.S. Congress, Joint Economic Committee, "Soviet Economy in a New Perspective," U.S. Government Printing Office, Washington, D.C., 1976.

TABLE 5.—U.S.S.R.: PLANNED AND ACTUAL OUTPUT, SELECTED COMMODITIES

[In millions of metric tons]

	Annual average, 1966–70[1]	Annual average, 1971–75[2]	1975[3]	1976[4]	1977[4]	1978[5]
Grain:						
Plan	167.0	195.0	215.7	207.1	213.3	220.1
Actual	[6] 167.6	181.6	140.1	[6] 223.8	195.7	[6] 237.2
Potatoes:						
Plan	100.0	106.0	109.8	99.4	101.0	95.6
Actual	94.8	89.8	88.7	85.1	83.7	85.9
Sugar beets:						
Plan	80.0	87.0	94.0	94.7	95.6	96.2
Actual	[6] 81.1	76.0	66.3	[6] 99.9	93.1	93.8
Vegetables:						
Plan	[7]	24.7	27.4	26.2	27.1	27.5
Actual	19.5	23.0	23.4	25.0	24.1	26.3
Cotton:						
Plan	5.6–6.0	6.8	7.7	[7]	8.4	8.5
Actual	[6] 6.1	[6] 7.7	[6] 7.9	8.3	[6] 8.8	[6] 8.5
Sunflower seeds:						
Plan	[7]	6.8	7.4	7.5	7.5	7.5
Actual	6.4	6.0	5.0	5.3	5.9	5.3
Meat:						
Plan	11.0	14.3	15.3	13.3	14.5	15.6
Actual	[6] 11.6	14.0	15.0	[6] 13.6	[6] 14.7	15.2
Milk:						
Plan	78.0	92.3	94.8	87.2	92.0	95.4
Actual	[6] 80.6	87.4	90.8	[6] 89.7	[6] 94.9	94.5
Eggs:						
Plan (billion)	34.0	46.7	55.8	53.0	58.2	62.6
Actual (billion)	[6] 35.8	[6] 51.4	[6] 57.5	[6] 56.2	[6] 61.2	[6] 64.4
Wool:						
Plan (thousand metric tons)	[7]	464.0	472.0	432.0	453.0	[7]
Actual (thousand metric tons)	398.0	442.0	467.0	[6] 436.0	[6] 459.0	462.0

[1] "Pravda," Apr. 6, 1966, p. 4.
[2] Original Ninth Five-Year Plan given or derived from data in "Gosudarstvennyy pyatiletniy plan razvitiya narodnogo khozyaystvo S.S.S.R. na 1971–75 gody," pp. 167 and 169–70.
[3] N. Gusev, "Plan zavershayushchego goda pyatiletki," "Ekonomika sel'skogo khozyaystva," No. 2, 1975, p. 5.
[4] "Sel'skoye khozyaystvo vo vtorom godu desyatoy pyatiletki," "Ekonomika sel'skogo khozyaystva," No. 1, 1977, pp. 7–8.
[5] "Pravda," Dec. 15, 1977, pp. 1–3.
[6] Indicates plan fulfillment.
[7] Not available.

Sources: Production statistics from "Narodnoye khozyaystvo S.S.S.R. v. . . . godu," selected years and "Pravda," Jan. 20, 1979.

AGRICULTURAL PRODUCTIVITY AND THE WEATHER

Soviet agricultural achievement during 1966–75 was more the result of greater amounts of inputs—and good weather—than of greater efficiency. The increased flow of inputs to farms accounted for about two-thirds of the increase in agricultural production during the period; one-third of the additional production resulted from such intangibles as new technology, improved management, higher incentives for labor, and the weather. As shown below, however, the increases in farm output during the eighth and ninth 5-year plan periods were derived from different sources.

	Average annual rate of growth (percent)	
	1966–70	1971–75
Output (3-yr moving average)	3.1	1.6
Total inputs	1.3	2.0
Factor productivity	1.8	—.4

During 1966–70, output (as measured by a 3-year moving average) grew faster than inputs, but during 1971–75 the reverse was true. As a result, factor productivity grew 1.8 percent yearly during the first half of the decade and fell at an average annual rate of 0.4 percent during the remainder of the period. A little more than two-fifths of the increase in production during 1966–70 was derived from more inputs, and the remainder from productivity increases. In 1971–75, however, all the growth in farm output was attributable to greater inputs.

The effects of weather on farm output can, and often do, overshadow the effects of increased inputs or gains in productivity from other sources. Between the early 1960's and the mid-1970's farm output, especially when measured by the size of the yearly grain harvest, increased markedly. Some calculations suggest that over half of the increase in grain output was the direct result of improved weather.[13] The steppe region of the grain belt was consistently moist during this period, and the usual fluctuation between moist and dry years was largely absent. Most of the impact occurred during the late 1960's and the early 1970's and accounts for the disproportionate productivity record for the two periods. Increasingly good weather in 1966–70 boosted agricultural production faster than the rate of growth in the application of fertilizer, expansion of mechanization, use of improved land, and the like. During 1971–75, however, the U.S.S.R. had 2 years of poor weather, counteracting the effects of increased flows of industrially produced goods.[14]

THE LIVESTOCK PROGRAM

The driving force of agricultural policy under the present leadership has been and continues to be the effort to upgrade consumer diets, largely through the increased availability of meat and other livestock products. The transition to a livestock economy has not been easy, however. The program is costly in terms of the additional grain and other feed needed to support animals in specialized, large-scale livestock complexes as well as in terms of the capital needed to finance such complexes. It is the effort to insure a sufficient, stable supply of grain for the livestock program that puts the push for greater amounts of fertilizer, more machinery, and widespread land improvement characteristic of the Brezhnev era into perspective.[15]

During the eighth 5-year plan the livestock program yielded dramatic results, in part because of the lack of performance in the early 1960's. The Brezhnev regime inherited the aftermath of Khrushchev's program to catch up with the West. Livestock inventories had been

[13] "U.S.S.R.: The Impact of Recent Climate Change on Grain Production." CIA, ER 76–10577, October 1976, p. 14.

[14] Falling productivity in the 1970's is also partly accounted for by the nature of the inputs measured. Changes in capital stock, that is the gross value of buildings, structures, equipment, and draft livestock, are an important input. Fixed capital grew about 8.5 percent per year in the late 1960's but increased almost 11.5 percent yearly during 1971–75. Some Soviet economists have rationalized the increasingly negative return on capital that resulted, arguing that much of this construction supports the regime's livestock program and is not immediately translated into increased production. It is their belief, but a moot point, that production will soon accelerate. For details concerning the derivation of the measure of factor productivity used in their paper and for a discussion of the limitations in interpreting the results, see Diamond and Davis, op. cit.

[15] Concentrated feeds (mostly grain) account for only about one-third of the units of feed fed to livestock. Yields and production of the other (forage-type) feeds are increasing very slowly and such bulky feeds are inconvenient for use in centralized livestock complexes. Hence, the demand for meat largely translates into demand for grain.

cut severely in the wake of the 1963 harvest disaster, Khrushchev's specialization program had forced many private farmers away from livestock raising, and an anomaly in the price structure coupled with low productivity per animal made animal husbandry unprofitable on many collective and state farms. The new regime scaled down the unrealistic goals set by Khrushchev, eased restrictions on the private ownership of livestock, increased procurement prices, began the battle to ensure feed supplies through improvement of pastures and meadows and by increasing production of mixed feed, and promised the funds and materials needed to ensure fulfillment of agricultural production plans. The private sector responded to the new, less-restrictive atmosphere, and productivity on state and collective farms increased as well. As a result, the 1966–70 goals for output of livestock products were met. As discussed previously, however, much of this success reflected weather-related increases in grain production rather than a fundamental solution to the livestock sector's problems. The overall feed base remained uncertain, and its quality was low. Moreover, the accomplishments were only relative. Despite the improvements in per capita consumption of meat, for example, the U.S.S.R. was still far below the level of other industrialized countries.

Output goals for the ninth 5-year plan were even more ambitious than those set for 1966–70. The plan featured extensive use of large, specialized, industrially organized livestock complexes. The use of improved mechanization, balanced rations, and more efficient organization in these complexes was to lead to increased output, lower requirements for feed and labor, and higher profits. Animal husbandry complexes had been introduced during the eighth 5-year plan, with greatest success realized in poultry factories. This effort was to be expanded during 1971–75 with approximately one-third of planned capital investments for the development of animal husbandry during the period used for the construction of large-scale complexes.[16]

Unfortunately, the program encouraged a rapid expansion in livestock herds without first ensuring adequate supplies of feed grains. Since the early 1970's the program's feed requirements have run ahead of the Soviet Union's ability to produce grain. To the regime's credit, and in marked contrast to the response of other regimes, extensive livestock slaughtering and a concomitant weakening of the consumer's priority has not been the immediate response in years of poor harvests. After the harvest failures of 1972 and 1975 the leadership did not abandon the livestock program but attempted to maintain their investment in livestock herds by importing large amounts of grain. In 1972 the strategy worked. The value of total livestock inventories was maintained even though the number of hogs fell almost 7 percent. The harvest shortfall in 1975 was too severe, however. The value of livestock inventories fell 3 percent, with hogs down 20 percent, poultry down 7 percent, and sheep and goats off 3 percent (table 6). Despite these setbacks there has been no retreat from the basic program, although the effort to rebuild livestock herds after the 1975 drought necessitated scaling down meat output plans for the remainder of the 1970's.

[16] Ye. Valyuzhenich, "Planovoye khozyaystvo," No. 9, September 1976, pp. 50–54.

B. The 10th 5-Year Plan, 1976–80 [17]

Announced goals for the 10th 5-year plan indicate little change in the Brezhnev regime's approach to agriculture.[18] As before, the program is to increase agricultural output, promote more year-to-year stability, and lower costs through increased efficiency. Net agricultural production is to increase at an average annual rate of 4.1 percent during the period, a rate that far exceeds the growth achieved during 1971–75.[19] Average grain production for the period is put at 220.4 million tons with 235 million tons planned for 1980. Goals for the production of livestock products were lowered following the distress slaughtering of livestock in the wake of the poor 1975 harvest. Nevertheless, if goals are to be met, meat production will have to increase rapidly during 1977–80 following a sharp downturn in 1976.

TABLE 6.—U.S.S.R.: LIVESTOCK INVENTORIES, SELECTED YEARS

	Annual average 1966–70	Annual average 1971–75	1974	1975	1976	1977	1978
Index of total livestock inventories (1971–75, annual average=100) [1]	89.4	100.0	103.4	100.4	101.5	105.6	108.3
Number of livestock (million head, end of year) all sectors of the economy:							
Cattle	96.9	106.6	109.1	111.0	110.3	112.7	114.4
Hogs	56.3	67.6	72.3	57.9	63.1	70.5	74.7
Sheep and goats	142.1	147.4	151.2	147.1	145.3	146.6	148.8
Poultry	566.9	732.3	792.4	734.4	796.0	880.9	[2] 951.0
Socialized sector:							
Cattle	69.9	82.1	84.6	87.6	87.5	89.4	90.8
Hogs	41.6	53.9	58.6	45.7	51.3	55.7	58.6
Sheep and goats	108.9	115.7	119.2	117.7	116.5	117.2	118.8
Private sector:							
Cattle	27.0	24.4	24.5	23.4	22.8	23.3	23.6
Hogs	14.7	13.7	13.6	12.2	11.8	14.8	16.1
Sheep and goats	33.2	31.7	32.0	29.4	28.8	29.4	30.0

[1] Index of end-of-year inventories for cattle, hogs, sheep, goats, and poultry weighted by relative liveweight prices in 1970. Index values during the period 1971–75 range from a low of 97.7 in 1972 to a high of 103.4 in 1974.
[2] Estimate.

Sources: "Narodnoye khozyaystvo S.S.S.R. v. . . . godu," selected years and yearly plan fulfillment reports.

The regime's investment strategy for 1976–80 is also little changed from earlier years. About one-quarter of new fixed investment will go to agriculture as it did during the past two plan periods. But an economywide stringency in available investment funds will sharply cut the yearly growth in investment to 3.5 percent against the 9.5 percent recorded during 1971–75. As a consequence, if the plans for a slower rate of growth in investment are met, it is estimated that growth in fixed capital will slow from the 11.3 percent yearly rate during 1971–75 to roughly 8.5 percent during 1976–80.

Although the supplies of most major inputs will grow more slowly than in the past, these materials are supposed to be used more in-

[17] For a more complete discussion of the goals of the 10th 5-year plan see Barbara S. Severin and David W. Carey, "The Outlook for Soviet Agriculture," in "The Future of the Soviet Economy: 1978–1985," Holland Hunter, ed., Boulder, 1978.

[18] A comprehensive treatment of the 10th 5-year plan goals is available in N. P. Gusev and G. C. Gaponenko, editors, "Osnovnie napravleniya razvitiya sel'skogo khozyaystva v desyatoy pyatiletke," Moscow, 1976.

[19] Output plans for 1980 were used to derive planned net agricultural production for that year. If average production for 1974–76 is substituted for the poor base year 1975, the planned average annual rate of growth for 1976–80 is 3.1 percent. Soviet plans for gross volume of agricultural output call for a 5.5 percent yearly increase.

tensively. Fertilizer deliveries to agriculture are to grow at an average annual rate of 9.7 percent, close to the 10.6 percent yearly rate achieved in 1971–75, and are planned to reach 120 million tons in 1980. Much of this fertilizer is to be used on grain land and is expected to account for roughly 55 percent of the planned increase in grain production.[20] Shipments of tractors, trucks, and other agricultural machinery are to grow at sharply reduced rates. It is planned that the availability of higher quality machinery and a reduction in retirement rates will counteract the effects of this slowdown and still allow farmers to improve the timeliness of sowing and harvesting operations.

Efforts will also continue to improve cropland through irrigation and drainage. During 1976–80, gross additions of irrigated land will amount to 4.9 million hectares and of drained land, 4.7 million hectares. The average yearly gross addition to irrigated and drained land during the period will be smaller than the area added in 1975, but with current retirement rates, the net addition of improved land could equal the net addition in 1971–75. The program is designed to develop "zones of guaranteed production" for key crops, particularly grain.[21] The yearly variation in grain production in these areas, which include irrigated land and regions with relatively high yearly precipitation, is markedly less than for the remainder of the grain-growing region. But the program is expensive. More than 40 billion rubles will be spent on irrigated and drained land in 1976–80. Such spending reflects the increased costs per hectare of such improvements rather than plans to step up additions of reclaimed land. Cost per hectare (expressed in constant prices) has roughly tripled since 1960 due in part to the increased sophistication of the systems currently employed.[22] Sprinkler systems are becoming more common, construction standards have been upgraded, and closed drainage systems are being emphasized. Although the initial costs are higher, such improvements may help lower currently high retirement rates due to salinization of the soil and will at least lower water requirements per hectare.

AGRICULTURAL PERFORMANCE, 1976–78

During the first 3 years of the current 5-year plan, agriculture has made respectable progress in its post-1975 rebuilding program. The grain harvest reached a new record high in 1976, with 223.8 million tons, and again in 1978, with 237.2 million tons. The 1977 grain harvest of 195.7 million tons was disappointing relative to Soviet plans and feed requirements but was nevertheless, at the time, the U.S.S.R.'s

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[20] "Ekonomika sel'skogo khozyaystva," No. 4, April 1976, p. 49. The sources for the remaining increase in production are discussed in A. I. Stepanov, "Zernovoye khozyaystvo," No. 3, 1976, pp. 18–19 and N. Gusev, "Ekonomika sel'skogo khozyaystva," No. 8, August 1976, pp. 14–26.

[21] As defined by the Soviets these zones of guaranteed production include the Russian Nonchernozem Zone, Krasnodar Kray, the South-West Ukraine, Belorussia, and the Baltic republics. "Zernovoye khozyaystvo," No. 3, March 1976, pp. 2–3.

[22] Calculations are based on data for gross fixed investment by state and collective farms in irrigation and drainage construction as reported in "Narodnoye khozyaystvo SSSR . . . . godu" for 1965 and 1977 and on the area of newly commissioned irrigated and drained land given in yearly plan fulfillment reports.

third largest crop. Production of sugar beets and cotton is on track with the goals of the 5-year plan, but output of potatoes, a dietary staple as well as an important livestock feed, is well under the target. Likewise, sunflowerseed production, the most important source of vegetable oil as well as an increasingly valuable high protein feed supplement, is off substantially. The production of livestock products—and livestock inventories—has regained the pre-1975 levels but is below the levels envisaged in the original 10th 5-year plan. Moreover, per capita meat consumption, although up almost 10 percent from the 1976 level, is now only on a par with 1974.[23]

The recent success is more than the result of additional inputs, the supply of which has increased less than had been planned.[24] Even the scaled-down goals for delivery of fertilizer and machinery, or for the irrigation and drainage of cropland, have not been met.[25] Deliveries of fertilizer, reflecting the need to add substantial production capacity, were to grow slowly during the first part of the plan period and increase rapidly at the end to a total of 120 million tons in 1980. The commissioning of new production capacity has not kept pace with the plan, however. Deliveries have grown only 2.4 percent yearly compared with the 9.7-percent average yearly rate planned. Deliveries of agricultural machinery, in general, and grain harvesting combines, in particular, are on schedule, but shipments of tractors and trucks have fallen well short of the plan. Scheduled land improvements likewise have fallen short, although available data suggest some improvement in the retirement rates for irrigated and drained land.[26]

Weather played the dominant role in boosting agricultural production during the last 3 years. With respect to grain output, for example, the semiarid areas of the Volga valley and Kazakhstan received substantially more than normal precipitation in 1976 and 1978, and reaped record and near-record harvests. These areas are important grain-producing regions, but production varies markedly from year to year.[27] Further, although a general measure of weather such as the one used in table 7 shows 1977 to be an above normal year countrywide,

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[23] Based on the per capita meat consumption series presented in "Foreign Agriculture Circular, Livestock and Meat," U.S. Department of Agriculture, FLM 7–78, August 1978, and an estimate for 1978.

[24] During 1976–78, only about one-fourth of the growth in net agricultural output, measured on a 3-year moving average, was attributable to the increased supply of inputs. Increased factor productivity, which includes the effect of better weather, accounted for the remainder.

[25] Narodnoye khozyaystov SSSR v . . . . godu" for 1976 and 1977 and plan fulfillment reports in Pravda, Jan. 20, 1979, pp. 1–2.

[26] Precise data on the irrigated and drained area retired each year are not available Based on the reported stock of such land for the country as a whole and the newly commissioned area each year, an approximate retirement rate can be calculated. The average yearly retirement rate for irrigated land in 1966–70 was 1.8 percent of the beginning-of-year stock, 2.2 percent during 1971–75, and 0.6 percent during 1976–77. The average yearly retirement rate for drained land in 1968–70 was 1.6 percent, 1.7 percent during 1971–75, and 0.5 percent during 1976–77. Calculations are based on data available in "Narodnoye khozyaystvo SSSR v . . . . godu." selected years for 1976 and 1977. plan fulfillment reports.

[27] During the 1970's alone these areas have produced as little as 23.5 million tons of grain in 1975 and as much as an estimated 64 million tons in 1978. Year-to-year variations can also be measured by the adjusted annual deviation (AAD), the standard deviation of percentage changes in year-to-year production not accounted for by a constant growth rate. For the period 1970–78, grain production in the U.S.S.R. as a whole had an AAD of 20 percent and for the Volga valley and Kazakhstan, 46 percent.

precipitation in many parts of the Volga valley and Kazakhstan—and grain production—was off. The shortfall in these areas alone accounted for a major portion of the downturn in the Soviet Union's total grain harvest. Despite the continued overwhelming role of weather, the cumulative effect of the regime's agricultural program can also be seen. Although average monthly precipitation during October through July during 1976–78 was only 8 percent above the average for 1966–70, average annual grain production was 30 percent greater and average annual net agricultural production was up 22 percent.[28]

TABLE 7.—U.S.S.R.: AVERAGE MONTHLY PRECIPITATION, OCTOBER THROUGH JULY, AND GRAIN YIELD, 1961–78

Year	Average monthly precipitation, October through July,[1] (millimeters)	Index of average monthly precipitation, October through July (1966–70, annual average =100)	Yield of all grains (centners per hectare)	Index of grain yield (1966–70, annual average =100
Annual Average, 1961–65	34.3	82	10.2	7
1966	42.6	102	13.7	10
1967	37.6	90	12.1	8
1968	41.1	99	14.0	10
1969	38.1	92	13.2	9
1970	48.6	117	15.6	11
Annual average, 1966–70	41.6	100	13.7	10
1971	42.3	102	15.4	11
1972	37.6	90	14.0	10
1973	43.8	105	17.6	12
1974	44.1	106	15.4	11
1975	35.6	86	10.9	8
Annual average, 1971–75	40.7	98	14.7	10
1976	41.3	99	17.5	12
1977	44.2	106	15.0	10
1978	49.5	119	18.3	13
Annual average, 1976–78	45.0	108	16.9	12

[1] Precipitation, available through the World Meteorological Organization reporting system, weighted by the distribution of the area sown to grain in 1973.

Sources: Yields of all grain from "Narodnoye khozyaystvo S.S.S.R. v. . . . godu, "selected years and yearly plan fulfillment reports.

C. Plans Beyond 1980

Detailed plans for the 1980's have not been published by the Soviets, but available data suggest that at least for 1981–85 no major shifts in agricultural policy are anticipated. Indeed, resolutions passed by a special Communist Party Central Committee Plenum in July 1978 and a speech by Brezhnev to the plenum call for a continuation of current programs. Brezhnev specifically charged the party with ensuring that capital investment in agriculture grows steadily and at least maintains its current share of total investment. As in the past, improvements in the quality of inputs are called for, with emphasis on new and better designed machines in lieu of stepped up deliveries. Fertilizer deliveries are scheduled to grow at roughly the average rate posted in 1976–78, well below the 1976–80 planned growth.[29] Presumably here also, improvements in quality and product mix are to substitute for increased quantities.

[28] Calculations suggest that during the period 1976–78, weather accounted for four-fifths of the increase from an expected value calculation for 1975. The remainder of the increase was due to other "technology," presumably the increased supply of fertilizer.

[29] Based on data from "Ekonomicheskaya gazeta," No. 40, October 1978, p. 14.

Other statements regarding agriculture's investment needs are more indictments of past and present practices than changes in investment policy. Brezhnev noted that present accounting measures and incentives result in wasted and misallocated resources. Especially in the case of livestock complexes, facilities are "overbuilt" while the housing needs of rural workers go unattended. Likewise insufficient attention is given to extending and modernizing the rural road network or to developing the skilled labor force needed for modern farming. In each case agricultural losses are the result.

Data on outputs for the 1980's are also limited. Grain production during 1981–85 is to average between 238 and 243 million tons. Brezhnev's call for 20 centners of grain per hectare by 1985 would result in a crop of 260 million tons, assuming 130 million hectares were harvested. His call for 1 ton per capita by 1990 would require a crop of 290 million tons, according to current population projections.[30] Meat production is to reach 19.5 million tons by 1985, and output of cotton and sunflowerseeds is to increase, the latter sharply.

III. The Brezhnev Program: The Case of the Russian Nonchernozem Zone (RNCZ)

The agricultural programs pursued by the Brezhnev regime are most visible in the highly touted effort to develop the nonchernozem zone of the Russian Republic.[31] This area is dubbed a "zone of guaranteed moisture," where agricultural production, although low, is relatively protected from the drastic year-to-year swings in output common in the more arid regions of the U.S.S.R. As part of a 15-year program (1976–90) to increase and stabilize agricultural output nationwide, the flow of materials and investment funds is scheduled to grow faster in this area than anywhere else in the farm belt.

The RNCZ is already a significant if not yet self-sufficient agricultural region (table 8); nor is the current effort the first time that attention has been fixed on the zone. The current program is, however, far more ambitious than previous programs. During 1976–80 the RNCZ is scheduled to receive 35 billion rubles of fixed agricultural investment, the equivalent of all capital investment in agriculture there during the previous 15 years.[32] The level of investment, in fact, much exceeds the zone's contribution to agricultural output. By 1980, for example, the RNCZ is to provide only one-sixth of the country's farm products yet will absorb roughly one-fourth of the agricultural investment.[33] By the program's end, Soviet planners expect the RNCZ to respond to this attention with an expanded and stable supply of

[30] According to recent U.S. Department of Commerce population projections, the population of the U.S.S.R. will be 290.2 million people in 1990.

[31] The term chernozem literally means "black earth." The term nonchernozem, therefore, suggests soils of lower fertility with a lesser potential for agriculture. Overall, the U.S.S.R. nonchernozem zone includes all of the vast region north of the belt of chernozem soils which form the heartland of Soviet agriculture. Although the entire nonchernozem zone covers over one-half of the country and reaches from the western Ukraine to the Far East region, practically all of the population and the economic and agricultural development are west of the Urals. The program to develop the nonchernozem zone of the Russian Republic applies to the Northwest, Central, and Volga-Vyatka regions; Perm, Sverdlovsk, and Udmurt Oblasts in the Urals region; and Kaliningrad Oblast in the Baltics region. It therefore excludes Belorussia, the Baltic republics, and parts of the western Ukraine.

[32] L. Florent'yev, "Voprosy ekonomiki," No. 10, October 1974, pp. 38–49.

[33] I. Ya. Semenov, "Ekonomika stroitel'stva," No. 7, 1978, pp. 3–9.

crops and livestock products. The prospects for the Russian Nonchernozem Zone, therefore, partly determine the prospects for Soviet agricultural production during the 1980's.

TABLE 8.—AGRICULTURAL PROFILE OF THE U.S.S.R. AND THE RUSSIAN NONCHERNOZEM ZONE (RNCZ), 1977

	U.S.S.R.	RNCZ	RNCZ as percent of U.S.S.R.
Population (millions)	255.5	59.2	23.2
Urban	156.6	44.4	28.4
Rural	98.9	14.8	14.9
Land (million hectares):			
Total area	2,227.5	283.0	12.7
Land in agricultural enterprises	1,049.3	112.5	10.7
Agricultural land	552.6	47.0	8.5
Cultivated land	226.0	31.7	14.0
Natural meadows and pastures	321.1	15.0	4.7
Area sown to crops:			
All cultivated crops	217.7	30.2	13.9
Grain	130.3	16.4	12.6
Forage crops	63.4	10.6	16.7
Potatoes	7.1	2.1	29.6
Vegetables	1.6	.2	12.5
Flax	1.2	.6	50.0
Area of improved land:[1]			
Irrigated land	15.8	.5	3.5
Drained land	12.3	2.3	19.1
With covered drains	7.1	1.4	19.8
Gross addition of improved land:[1]			
Irrigated land	.834	.093	11.2
Drained land	.878	.231	26.3
Gross agricultural production (billion rubles)	123.5	19.4	15.7
All crops	55.9	7.4	13.2
Livestock products	67.6	12.0	17.8
Production of selected commodities (million metric tons):			
Grain	195.7	24.3	12.4
Potatoes	83.6	25.2	30.1
Vegetables	24.1	3.4	14.1
Meat	14.7	2.4	16.3
Milk	94.7	19.7	20.8
Eggs, billion units	61.1	14.3	23.4
Wool, thousand metric tons	458.4	14.0	3.1
Flax, thousand metric tons	485.0	211.0	43.5
Livestock herds (million head, end of year):			
All cattle	112.7	18.4	16.3
Cows	42.6	7.8	18.3
Swine	70.5	9.6	13.6
Sheep and goats	146.6	7.6	5.2
Agricultural capital inventories:			
All productive assets (billion rubles)[2]	184	28	15.3
Tractors (thousands)	2,462	402	16.3
Grain combines (thousands)	693	102	14.7
All capital expenditures, all sectors (billions rubles)	122.3	23.6	19.3
In agricultural sector	25.0	6.1	24.4

[1] In kolkhozes, sovkhozes and other state agricultural enterprises.
[2] Productive assets of sovkhozes, kolkhozes, and interfarm agricultural enterprises, including buildings, machinery, livestock, and planted crops.

Sources: "Narodnoye khozyaystvo S.S.S.R. v 1977 godu," and "Narodnoye khozyaystvo R.S.F.S.R. v. 1977 godu."

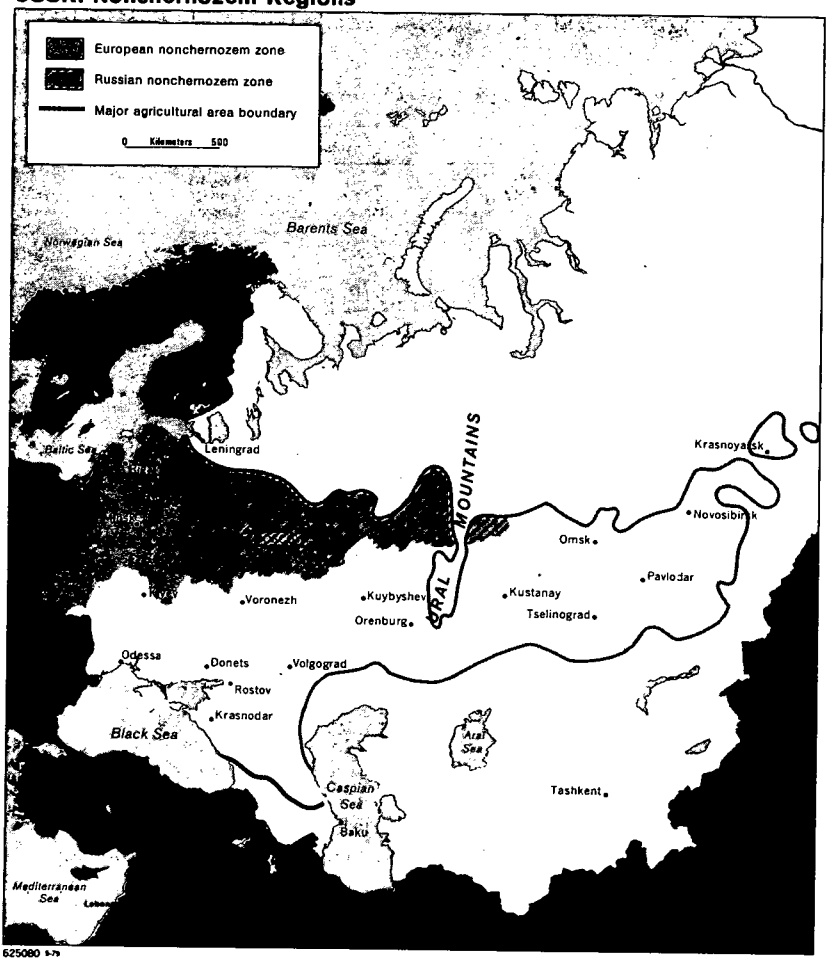
A. Geoclimatic Conditions of the RNCZ

The Russian Nonchernozem Zone covers a vast area but is relatively poor in agricultural resources.[34] Occupying a major portion of the northern European U.S.S.R., the RNCZ approximates the size of the United States east of the Mississippi (map). Although it encompasses 13 percent of the U.S.S.R. territory, only one-sixth (47 million hectares) of the zone is suitable for agriculture and only a little more than

[34] As discussed in K. F. Stroyev, "Geografiya v shkole," No. 5, 1974, pp. 5–12.

one-tenth (32 million hectares) is cultivated.[35] The remaining farmland is in natural meadows and pastures. Unlike the cultivated areas of the Russian steppe, the farmland in the RNCZ is heavily broken up by non-productive tracts, the result of continental glaciation. The topgraphy is marked by fingerlike patterns of swampland, streams, and overgrown, stoney or sandy areas, and there are few large contiguous tracts of agricultural land. Individual fields generally are small, irregularly shaped, and relatively isolated, conditions which seriously restrict the use of large agricultural machinery.

USSR: Nonchernozem Regions



Moreover, widespread deficiencies of the farmland make it difficult to increase crop production either through higher yields or through an expansion in sown area. Virtually all of the farmland needs some type

[35] "Perspektivy razvitiya ekonomiki i kul'tury Nechernozemnoy zony RSFSR," Moscow, 1976, p. 3. Data are also available in "Narodnoye khozyaystvo S.S.S.R. v . . . godu," selected years and "Narodnoye khozyaystvo R.S.F.S.R. v. . . . godu," selected years.

of improvement (table 9).[36] About 8 million hectares, including 2 million hectares of presently cultivated land, are too marshy and waterlogged for good crop growth. Some 1.7 million hectares of agricultural land, including 1.3 million hectares of tilled land, are rocky, a condition which not only lowers crop yields and interferes with crop operations but also damages farm machinery. The encroachment of brush interferes with the productivity of 1.5 million hectares of meadow lands and about 5 million hectares of natural pastures. About 6 million hectares, mostly of cultivated land, are by Soviet account particularly susceptible to erosion.[37] Soils throughout the RNCZ are generally sandy and do not hold moisture and nutrients well; in 1.2 million hectares of agricultural land these conditions are particularly pronounced.

TABLE 9.—RUSSIAN NONCHERNOZEM ZONE: LAND IMPROVEMENT REQUIREMENTS

		Areas that are—						
	Surveyed area [1]	Excessively acid	Marshy	Stoney	Very sandy	Subject to water erosion	Subject to wind erosion	Overgrown
All agricultural land:								
Area (thousand hectares)	49,034	31,308	7,991	1,717	1,148	5,620	NA	NA
Percent of total	100.0	63.8	16.3	3.5	2.3	11.5	NA	NA
Cultivated land:								
Area (thousand hectares)	30,696	27,356	2,145	1,259	662	5,055	75	NA
Percent of total	100.0	89.1	7.3	4.1	2.0	16.5	0.2	NA
Natural pastures and meadows:								
Area (thousand hectares)	17,750	3,699	5,793	408	526	545	NA	6,400
Percent of total	100.0	20.8	32.6	2.3	3.0	3.1	NA	36.1

[1] Surveyed areas do not equal areas presently in agricultural enterprises.
NA—Not available.

Source: A. I. Monov, I. G. Averin, and V. P. Pogozhev, "Sel'skoye khozyaystvo Nechernozemnoy zony RSFSR," Moscow" 1978, pp. 12–22.

Chemicalization is sorely needed as well. Soviet surveys indicate that almost two-thirds of all agricultural land in the RNCZ, including practically all of the cultivated land, is acidic to a medium or strong degree. Application of lime to these soils would directly benefit crop yields and also permit the more productive use of chemical fertilizer. More than three-fourths of the tilled land is also low in available phosphorous, a deficiency which, like high acidity, restricts crop yields and also reduces the effectiveness of other chemical nutrients. Moreover, a phosphorous deficiency can delay the maturation of crops, a critical factor for the production of grain and other crops in the northern regions.[38]

The rural infrastructure, dictated largely by the region's topography, is also fragmented and rudimentary. Historically, farmers settled in numerous small, isolated communities, each limited to the number of families that could be supported by the adjacent accessible land. Presently the 142,500 rural centers in the RNCZ average 119 residents;

[36] A. I. Monov, I. G. Averin, and V. P. Pogozhev, "Sel'skoye khozyaystvo Nechernozemnoy zony RSFSR," Moscow, 1978, pp. 12–22.
[37] See also A. T. Vagin, "Mechanizatsiya zashity pochv ot vodnoy erozii v Nechernozemnoy polose," Leningrad, 1977.
[38] A. I. Monov, et al., op. cit.

about half of these villages have fewer than 50 persons. A lack of adequate roads contributes to the isolation of these settlements and seriously hampers the movement, within the area as well as to industrial centers, of farm resources and commodities.[39]

The climate in the RNCZ is generally suitable only for raising spring-sown small grains, potatoes, flax, and cool-season vegetables. Most of the area averages 20 to 24 inches of precipitation per year, with a large area west of Moscow and a smaller area near the Ural Mountains receiving slightly more. Roughly two-thirds of the precipitation occurs during April to October with rainfall heaviest during July and August. The frost-free period is relatively short. Most of the area averages 120 to 140 days, and some farmlands near the Urals average as few as 95 days. Only the southern tip of the RNCZ averages a frost-free period longer than 140 days.[40]

B. The Development Program

A panoply of Soviet agrarian improvement measures is to be generously applied to the RNCZ.[41] Formally adopted in July 1974 and implemented with the 1976–80 plan, the program for 1976–90 encompasses unprecedented expenditures in the zone, including: large-scale land melioration; increased and more comprehensive mechanization of crops and livestock raising and processing; extensive rural reconstruction to both benefit farm production and to improve rural living conditions; increased use of agrochemicals; and a broader application of agricultural science and technological innovations to improve efficiency in agricultural production.[42] For example, before the program is completed, an additional 9 to 10 million hectares will have been drained; this is 10 times as much land as was drained during 1971–75 and will result in a sixfold expansion in total drained land. Likewise, 2 to 2.5 million hectares will be added to the irrigated area, another sixfold expansion.[43]

The massive investment in the RNCZ is to yield a 100 to 150 percent increase in the gross output of principal farm products by 1990.[44] Planners expect agricultural production in the zone to grow faster than in the country's other regions. During the 1980's, for example, grain production in the RNCZ is to increase by almost two-fifths,

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[39] V. Ivanov, "Planovoye khozyaystvo," No. 5, 1978. pp. 102–109. Poor roads are not only a problem in the RNCZ. Improvements in the network of highways could boost nationwide crop production by 11 to 12 percent without increasing harvest yields according to A. Amosov and Yu. Marunchenko, "Voprosy ekonomiki," No. 3, March 1978, pp. 51–60.

[40] P. E. Lydolph, editor, "Climates of the Soviet Union," in "World Survey of Climatology," vol. 7. New York, 1977.

[41] L. I. Brezhnev, "Kompleksnaya programma razvitiya Nechernozem'ya," Moscow, 1977.

[42] V. A. Chernyshov, E. G. Val'dgauz, and L.S. Bogdanova, "Intensifikatsiya zemledeliya v Nechernozemnoy zone," Leningrad, 1977.

[43] The 1976–90 RNCZ program is not the first instance of special attention to nonchernozem region farms, but it is an effort to overcome prior neglect. Since the early 1940's more than 7 million hectares of nonchernozem farmland had fallen into disuse, becoming overgrown and marshy. (See N. Itskov, "Pravda," July 24, 1965, p. 2.) Their retrieval was first postponed under Khrushchev when scarce resources were diverted to develop the New Lands. The 7 year plan (1959–65) also failed to rehabilitate the area because of insufficient lime, fertilizer, farm machinery, and land reclamation efforts. Moreover, replacement on nonchernozem farms of close-sown forage crops (grasses, clovers, etc.) with row-type forage crops (corn-for-silage, feed roots, etc.) aggravated feed shortages during the 1963 and 1965 droughts. When Brezhnev's 1966–70 agricultural program allotted more resources to nonchernozem farms, output increased faster than in many other regions, but the RNCZ still lags behind other nonchernozem regions—largely Belorussia and the Baltics—in the level of crop yields, in the support of livestock raising with indigenously grown feed, and in land improvement.

[44] A. N. Gladyshev and V. P. Mozhin, editors, "Proizvoditel'nye sily Nechernozemnoy zony RSFSR," Moscow, 1977, p. 3.

reaching 43 million tons in 1990, while output from the remaining grain area is to expand by one-fifth. In all, the RNCZ is to supply about 21 percent of the planned increases in U.S.S.R. grain output during 1976–90.

Guidelines for 1976–80 are more detailed. The flow of inputs to agriculture is to increase faster in the RNCZ than in the country's other agricultural regions (table 10). Gross additions of drained land are to reach 1.8 million hectares, 38 percent of all the newly drained area in the country, as compared with the RNCZ share of 22 percent during 1971–75. Moreover, much of the RNCZ drainage will be covered, a more expensive method than open drains but one that interferes less with field operations. Gross additions of irrigated land are to reach 667,000 hectares. Although the stock of irrigated land in the RNCZ is not great, here too additions will outpace the improvements made in other areas.[45] Efforts will also be made to markedly increase the application of lime and fertilizer. During 1976–80 about 120 million tons of lime will be applied to the acid soils in the RNCZ, almost double the application during 1971–75. As in the past, the RNCZ accounts for about half of the national area scheduled for treatment with lime.

TABLE 10.—PLANNED EXPANSION IN AGRICULTURE IN THE U.S.S.R. AND RUSSIAN NONCHERNOZEM ZONE (RNCZ)

	Performance			Planned expansion[1]		
	U.S.S.R.	RNCZ	RNCZ as percent of U.S.S.R.	U.S.S.R.	RNCZ	RNCZ as percent of U.S.S.R.
Production of farm products:	Average annual, 1971–75			1980		
All farm products, official measure (billion rubles, 1973 prices)	113.7	17.7	15.6	146.5	24.4	16.7
Grain (million metric tons)	181.5	19.8	10.9	235.0	31.0	13.2
Potatoes (million metric tons)	89.8	26.0	29.0	104.0	35.3	33.9
Vegetables (million metric tons)	23.0	4.3	18.8	30.0	6.0	20.0
Meat (million metric tons)	14.0	2.2	15.6	17.3	2.9	16.8
Milk (million metric tons)	87.4	18.4	21.1	102.0	23.0	22.5
Egg (billion)	51.4	11.4	22.2	66.8	15.6	23.4
Wool (thousand metric tons)	442.1	17.1	3.9	515.0	18.5	3.6
New allocations to farm resources, total for period:	1971–75			1976–80		
Gross fixed investments (billion rubles, 1973 prices)	130.5	19.2	14.7	171.7	35.0	20.4
Tractors (thousand units)	1,667.0	287.0	17.2	1,900.0	380.0	20.0
Trucks (thousand units)	1,102.0	190.0	17.2	1,350.0	230.0	17.0
Grain Combines (thousand units)	449.0	73.0	16.2	538.0	94.0	17.5
Fertilizer (million tons)	307.0	63.0	20.5	467.0	120.0	25.7
Gross additions to drained land (thousand hectares)	4,374.0	953.0	21.8	4,700.0	1,800.0	38.0
Covered drainage	NA	NA	NA	NA	1,265.0	NA
Gross additions to irrigated land (thousand hectares)	4,552.0	512.0	11.2	4,900.0	667.0	13.6
Liming of acid soils: Area limed (million hectares)	28.7	15.0	52.3	47.0	22.9	48.7

[1] In addition, limited data are available for other plan periods. By 1990, grain production is to reach 290 million tons in the USSR, 43 million tons, or 14.8% in the RNCZ. Additions to drained land in the RNCZ are to encompass 6.5 to 8 million hectares during 1981–85; during 1976–90, 9 to 10 million hectares are to be drained, 7 to 8 million hectares via covered drains. Gross additions to irrigated land during 1976–90 are to reach 2 to 2.5 million hectares.

NA—Not available.

Sources: "Narodnoye khozyaystvo S.S.S.R. v. ... godu," selected years; "Narodnoye khozyaystvo R.S.F.S.R. v. ... godu," selected years; A. I. Monov, I. G. Averin, and V. P. Pogozhev "Sel'skoye khozyaystvo Nechernozemnoy zony RSFSR," Moscow, 1978; and "Pravda," Mar. 7, 1976, pp. 2–8.

[45] Supplemental irrigation is useful in the RNCZ during prolonged periods between summer rains, particularly on sandy soils and for important crops sensitive to fluctuations in soil moisture. Irrigation is primarily by portable sprinklers and includes dual control systems for both drainage and irrigation of lands too wet in spring but too dry in summer. Principal irrigated crops in the RNCZ are shallow-rooted vegetables and high-yield forage crops, the latter of special importance to the dairy industry. See L. K. Ernst, "Vestnik sel'skokhozyaystvennoy nauki," No. 2, 1976, pp. 32–37.

The zone's share of chemical fertilizer deliveries to agriculture will increase 5 percent to almost 26 percent. Fertilizer use will almost double in the RNCZ while increasing only 52 percent in the U.S.S.R. as a whole. Similarly, the RNCZ will account for larger shares of the deliveries of new agricultural machinery and of agricultural construction.

Development of the rural infrastructure in the RNCZ is also to begin immediately. Partly as an effort to stem the outmigration of rural workers, many smaller villages are to be eliminated.[46] During 1976–80 alone, some 170,000 families are to be relocated to larger centers, particularly central farmsteads of state and collective farms. New housing, schools, hospitals, and stores are to add to the quality of life for rural workers. In addition, up to 25,000 kilometers of roads are to be built during 1976–80 to connect farms with the new settlements, railroads, and industrial centers.

By 1980 the RNCZ is to account for an increased share of U.S.S.R. production of major farm products. Grain production is to reach 31 million tons, up almost 60 percent from the average level in 1971–75. About four-fifths of this increase is to come from increased yields and the rest from an expansion of the sown area.[47] Eventually, the RNCZ grain area will reach over 20 million hectares, compared to an average of 15.3 million hectares in 1971–75 (table 11). The nationwide program to stimulate livestock output by shifting livestock raising into industrially organized large-scale complexes is also to be actively pursued in the RNCZ. Practically all of the beef and three-fifths of the pork sold to the state will be produced at specialized livestock complexes. By 1980 production of meat in the zone is to increase by 32 percent over the average for 1971–75, compared to a 24-percent increase for the country as a whole; production of milk by 25 percent versus 17 percent for the U.S.S.R.; and production of eggs by 37 percent versus 16 percent.

TABLE 11.—GRAIN PRODUCTION IN THE RUSSIAN NONCHERNOZEM ZONE (RNCZ), SELECTED YEARS

Year	Sown area (million hectares)	Yield (centners per hectare)	Production (million metric tons)	RNCZ as a percent of total U.S.S.R. production
1940	18.8	8.5	15.9	16.6
1950	17.6	6.3	11.1	13.7
1958–65, average annual	15.3	7.6	11.7	9.1
1966–70, average annual	14.6	11.8	17.2	10.3
1971–75, average annual	15.3	12.9	19.8	10.9
1976	16.1	16.4	26.4	11.8
1977	16.4	14.8	24.3	12.4
1978	16.9	NA	NA	NA
1980 plan	NA	NA	31.0	13.2
1990 plan	NA	NA	43.0	14.8

NA—Not available.

Sources: "Narodnoye khozyaystvo S.S.S.R. v . . . godu," selected years; "Narodnoye khozyaystvo R.S.F.S.R. v . . . godu," selected years; and A. I. Monov, I. G. Averin, and V. P. Pogozhev "Sel'skoye khozyaystovo Nechernozemnoy zony RSFSR," Moscow, 1978.

C. The Future of the Russian Nonchernozem Zone Program

The attention given the RNCZ is well placed and needed to overcome the effects of past neglect. That other areas where nonchernozem soils predominate, such as Belorussia and the Baltic republics, are relatively

[46] A. Sozykin, "Sovetskaya Rossiya," June 21, 1978, p. 2.
[47] A. I. Monov, et al., op. cit.

more productive agriculturally than the RNCZ indicates improvement there is certainly feasible.[48] But the Soviets' one-fell-swoop approach, which includes extensive revamping of the rural infrastructure as well as increased inputs to agriculture, has raised expectations for increased agricultural output well beyond the level that can be achieved given the nature of the investment program. Planned expenditures—for hospitals, schools, and the like—swell the RNCZ program but have no direct affect on output. In Western countries such restructuring of the rural RNCZ would not be regarded as agricultural investment at all. Agricultural gains will be made as a result of the increased allocations of conventional inputs—particularly fertilizer, lime, machinery, and feed imported from other regions, but the return on total investment in the RNCZ over the life of the program will be disproportionately low and the impact on national production will be limited.

Despite years of fanfare the RNCZ program is off to a slow start.[49] After 3 years, investment lags well behind schedule and has yet to make much impact on agricultural production. Funds for fixed capital improvements are being used at less than allotted rates, and projects are neither initiated nor completed on time. Indeed, the RNCZ countryside still shows little evidence that a massive transformation is underway.[50] The production record for 1976–78 is equally lackluster. Overall farm output in 1977 was scarcely above the 1975 level, and only modest gains were made in 1978. Abnormally wet weather and a slowdown in delivery of key inputs probably account for the poor performance.

Over the longer term, the RNCZ program suffers not from a lack of agricultural policy initiatives but rather from the problems besetting Soviet agriculture in general. Many new construction projects are ill planned, the technical requirements for agriculture often are exceeded, and hence, as Brezhnev noted in July 1978, more materials and funds are used than are necessary. Poor design and inadequate maintenance leads to high retirement rates for farm machinery and limits the net gain in farm inventories from increased deliveries of new machines. Further, crop yield responses are restricted by severe lags in the introduction of modern crop varieties, in the adoption of suitable methods of applying fertilizer and other agricultural chemicals, and in the selection of proper tillage and harvesting practices.

As in other agricultural regions, the livestock industry is especially problem ridden and has not realized the increased efficiency which the specialized livestock complexes are to provide.[51] Achieved economies-of-scale with respect to management, labor, and mechanization are not yet sufficient to justify the centralization of livestock raising. Some experts therefore urge the modernization of existing, smaller farms rather than the establishment of totally new complexes. Special conditions in the RNCZ present difficulties as well. The severe winters require relatively expensive facilities and care for livestock. Feed sup-

[48] For example, during 1976–77 the gross value of agricultural output per hectare of agricultural land in other nonchernozem areas (Belorussia and the Baltic republics) was 76 percent greater than in the RNCZ; grain yields were 65 percent greater than in the RNCZ. Calculations are based on data in "Narodnoye khozyaystvo SSSR v 1977 godu" and "Narodnoye khozyaystvo RSFSR v 1977 godu."

[49] G. Ogryzkin, "Khozyaystvo i pravo," No. 11, November 1978, pp. 13–19.

[50] "Pravda," July 5, 1978, pp. 1–2, and D. K. Willis, "Christian Science Monitor," Oct. 4, 1978, p. 23. An earlier evaluation is given in P. E. Lydolph, "The Agricultural Potential of the Nonchernozem Zone," in "The Future of Agriculture in the Soviet Union and Eastern Europe, the 1976–80 Five-Year Plan," Roy Laird, editor, Boulder, 1977.

[51] V. N. Semenov, "Finansy S.S.S.R.," No. 10, October 1978, pp. 3–13.

plies are also difficult to maintain. Some officials complain that the problems outnumber the benefits and suggest that the RNCZ import meat instead of feed grain, preferring that livestock be fattened in other regions where a more moderate climate and surplus grain gives farms a comparative advantage.[52] In addition, the technical and financial problems of livestock complexes in the RNCZ are more severe than elsewhere partly because of the large number of dairy operations. Dairy complexes are located near the cities because poor roads limit the transportation of perishable commodities. Located like this, supplying the needed amounts of bulky forage-type feed becomes far more difficult.

In many respects, the regime has oversold the nonchernozem program and its likely effect on the country's agricultural production. If plans are realized, the zone will provide only 16.8 percent of the country's meat by 1980 compared to 15.6 percent during 1971–75 and, in fact, will not yet be self-sufficient in the production of meat and dairy foods. The ability of the RNCZ to contribute to higher and more stable grain production in the U.S.S.R. is rather more limited than planners suggest. Grain production in the zone has been more stable year to year than production in the rest of the country, but Soviet reference to the nonchernozem zone as a region of surplus moisture is misleading.[53] As elsewhere, RNCZ crop yields generally are restricted by and fluctuate with annual—particularly summer—precipitation. Even if planned land reclamation and the liberal use of fertilizer and lime allow the output goals to be reached, the effect on total grain production will be small. Only about 13 percent of all grain output in 1980 and 15 percent of total planned production in 1990 would come from RNCZ farms. Achievement of the targeted increases in output, therefore, will not contribute greatly to agricultural stability in the U.S.S.R. and will be achieved only at great cost.

IV. U.S.S.R. Agricultural Prospects

Overall, results from the agricultural programs in place since 1965 are respectable. Output of most agricultural products in the U.S.S.R. is up markedly, and although the weather has in large part been responsible, the cumulative effect of the regime's programs to furnish farms with industrially produced inputs (e.g., chemical fertilizer) can be seen. Some calculations suggest, for example, that in recent years as much as 2½ million tons have been added annually to winter grain production as the result of these increased inputs.[54] The mix of com-

[52] V. Dobrynin, "Ekonomika sel'skogo khozyaystva," No. 5, May 1978, pp. 68–75.

[53] Grain production year to year in the RNCZ is relatively stable. The adjusted annual deviation for grain production during 1958–77 was 10.7 pecrent for the RNCZ and 21.0 percent for the rest of the country's grain area. But designation of the RNCZ as an area of surplus and guaranteed moisture, that is, as an area where the average annual level of precipitation exceeds the potential for losses of moisture through evaporation, is an oversimplification. On most cropland, the so-called moisture surplus is dissipated in runoff and percolation losses from the poor RNCZ soils and because summer rainfall is irregular. The lack of warmth also is a distinct restriction to crop productivity in the RNCZ, since the relatively cool growing season is particularly favorable only for a limited number of crops. See, for example, S. G. Skoropanov, "Vestnik academic nauk SSSR," No. 9, September 1966, pp. 54–61.

[54] The effects of changes in harvested area, weather, and technology on the production of winter and spring grains were separated using multiple regression analysis for the period 1960–78. The technology trend is strongest for winter grains, paralleling the increase in the application of fertilizer. The methodology employed in the calculation is discussed in "U.S.S.R.: The Impact of Recent Climate Change on Grain Production," op. cit.

modities produced has also improved, and consumers' diets are better now than in the early 1960's.[55] Nevertheless, these same consumers are denied the quantities of meat and other high-quality foods they would prefer. Future agricultural progress will be most directly measured by the gains made in per capita meat consumption. These gains, in turn, are dependent on increasing the supply of grain.

For immediate help, the regime has turned to the private sector, which produces about one-third of the U.S.S.R. livestock products. By encouraging private producers, the regime can increase meat production with minimum state involvement.[56] The future contribution from this source, however, is restricted by a shrinking rural population and the limited amount of livestock that can be tended by private farmers, who must also work in the socialized sector. For long-run reconciliation of the imbalance between the supply and demand for grain and meat, the Soviet leadership must promote breakthroughs in agrotechnology that will support greater grain output as well as efficiencies in the production of livestock products. Moreover, these agrotechnological improvements must be backed by a continued supply of conventional inputs. On no front are the prospects good.

The demand for meat will not be met soon. The original livestock program for the 10th 5-year plan called for the production of 17.3 million tons of meat in 1980. Announcements made in July 1978 revealed a 1985 meat production goal of 19.5 million tons. With production at these levels, the gap between supply and a demand spurred by population growth and rising personal disposable income will continue to widen.[57] And production of meat even at the plan level is not guaranteed. The program relies on hoped-for improvements in efficiency, especially from the large-scale industrial livestock complexes, but so far, gains in productivity in such complexes have come more slowly than expected, and the gains achieved have saved labor rather than increased production. Despite the advent of these complexes, problems long familiar to Soviet farmers remain: feed availability per animal has only barely outpaced expansion in livestock herds and remains below announced standards; the quality of feed does not support maximum output per animal; and the use of dual-purpose breeds of cattle limits potential production of both meat and milk.[58]

Most importantly, the production of meat at the planned levels would require more grain than will probably be available for this purpose, considering the likely domestic output. In 1980 about 244

[55] This is especially true with regard to meat. Per capita consumption of meat averaged 32 kilograms in 1961–65 but reached an estimated 49 kilograms in 1978, based on data available in "Foreign Agriculture Circular, Livestock and Meat," op. cit.

[56] The costs to the state are somewhat greater than implied here, however. Private agricultural production comes almost exclusively from small holdings of land, up to one-half hectare, which frequently also support one or two head of livestock and a small flock of poultry. Private farmers have access to additional areas for pasturing of livestock, and resources—including labor, young livestock, feed, and other materials—are siphoned, legally or illegally, from the farms to the private plots. For a more detailed discussion of the role of the private sector in determining consumer diets, see M. Elizabeth Denton, "Soviet Consumer Policy: Trends and Prospects," in this compendium.

[57] For discussion of requirements for and likely production of meat and grain in the Soviet Union, see "U.S.S.R.: Long-Term Outlook for Grain Imports," CIA, National Foreign Assessment Center, ER 79–10057, January 1979.

[58] V. Dobrynin, op. cit., A. V. Cherekayev, "Zhivotnovodstvo," No. 12, December 1978, pp. 56–58, and others.

million tons of grain will be needed for food, feed, and other uses; similarly, 256 million tons will be needed in 1985.[59] Planned output of grain is 235 million tons in 1980, somewhat shy of the requirement, and about 260 million tons in 1985, which would meet the requirement if it could be achieved. Odds are, however, that grain production won't reach the plan level. Although the grain program is based on continued inputs of fertilizer, land reclamation, and machinery, weather remains the dominant factor in grain production. Assuming that there is no major change in climate during the coming decade, U.S.S.R. grain production is unlikely to exceed 215 million tons in 1980 or 235 million tons in 1985.[60] The Soviets are unlikely, however, to fall short every year by 25 to 30 million tons, as might be inferred from these calculations. In all probability, production will continue to fluctuate from year to year, with production in some years approaching requirements.

There is, of course, a great deal of uncertainty regarding such projections. But little can be seen on the horizon that will push grain production much above the current "technology" trend.[61] The impact of fertilizer is cut by low quality, improper chemical mix, excessive transportation losses, and improper application.[62] Furthermore, deliveries of fertilizer and other inputs to agriculture is scheduled to grow much more slowly during the current 5-year plan and the first half of the next one. And since 1975, such deliveries have grown even more slowly than planned. In addition, although roughly one-fifth of the increase in the country's grain production in 1976–90 is to come from the Russian Nonchernozem Zone, the RNCZ program has been a campaign more of words than of substance. Even in the best of cases, future gains in this region, as in other parts of the country, are limited by available inputs. Nor is the current approach to agroscience research likely to produce results soon. The programs in effect do not provide practical solutions to agricultural problems and hold little hope for the type of breakthrough needed to bring grain requirements and supply in line or to allow accumulation of the reserves that would dampen the feast or famine nature of Soviet agriculture.[63]

Consequently, the future for Soviet agriculture looks very much like the past, a mixture of success and failure. The current regime has had success in raising the general level of agricultural production, and continued progress is likely although it will be harder and more costly to

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[59] "U.S.S.R.: Long Term Outlook for Grain Imports," op. cit.

[60] The projection for 1990 is 255 million tons of grain, short of the 290 million ton level called for by Brezhnev in July 1978. All projections are based on a linear technology trend, constant sown area, and random weather (precipitation and temperature) with the same average as the past 17 years. These projections have a standard error of estimate, due to weather effects, of 24 million tons. The techniques employed in preparing the projections are discussed in "U.S.S.R.: The Impact of Recent Climate Change on Grain Production," op. ct. and Russell A. Ambroziak, "Relating Climate Change to Its Effects," CIA, National Foreign Assessment Center, GC 78–10154, August 1978.

[61] In this context "technical" variables include the amount of land under cultivation and the intensity of cultivation; intensity is, in turn influenced by irrigation, fertilization, crop varieties, mechanization, and other farming technologies employed.

[62] During 1976–80, such problems will lower the possible returns from increased fertilizer use by one-third. For details, see "The Impact of Fertilizer on Soviet Grain Output, 1960–80," CIA, National Foreign Assessment Center, ER 77–10557, November 1977.

[63] Problems with agroscience research have been addressed by decrees such as "On Measures to Further Improve the Effectiveness of Agricultural Science and Strengthen Its Ties With Production," "Pravda," Sept. 10, 1976, pp. 1–2 and discussed in articles such as "Ekonomika sel'skogo khozaystva," No. 4, April 1977, pp. 8–21.

achieve. With the slower growth in the supply of conventional inputs now planned, more emphasis must be placed on the efficient use of these resources, an area where the present regime has largely failed. The Brezhnev program has also failed to dampen the year-to-year fluctuations in output. This good-year, bad-year scenario is likely to continue. In some years the supply of grain will be sufficient for livestock herds. In most years it won't. To the extent that the Soviets persist in their commitment to the consumer and are willing to spend hard currency, grain will be imported. In the next few years, then, greater and greater resources will be needed to keep consumers adequately supplied with agricultural commodities, in part because of the need to use hard currency to periodically bolster supplies and in part because gains in the efficient use of material inputs needed for growth in domestic production will not offset their increased cost.

Appendix

U.S.S.R.: Net Agricultural Production

The measure of agricultural production used in this paper is comparable to that used in earlier Joint Economic Committee compendia. It is an approximation of the value of farm output available for sale and home consumption and is based on the physical output of 41 crops and animal products weighted by average prices received by all producers (collective and state farms, other state agricultural enterprises, and individual producers) in 1970 for output sold through state procurement channels and the collective farm market and commission trade. This value of agricultural output is then adjusted for changes in inventories of four classes of livestock, and deductions are made to account for the intra-agricultural uses of farm products such as feel and seed; that is, deductions are made for the amounts of grain, potatoes, and milk fed to livestock; for the quantity of eggs used for hatching; and for the amounts of grain and potatoes used as seed. The physical commodities and livestock inventory series are for the most part official production statistics. Data for grain and sunflower seed production have been discounted to reflect waste and losses in handling. Procurement data are used for sugar beets and some minor crops. Estimates for output of individual types of vegetables are derived by using the relative shares of each type of vegetable in government purchases. Additional adjustments are made to some minor crops to compensate for the lack of data.

An index of the value of net agricultural output from 1965 through 1978 is given in appendix table 1; indexes for crop and livestock production appear in appendix table 2. Output of commodities included in the calculations, minus seed but including the portion fed to livestock, is shown in appendix table 3, and the value of net agricultural production, as defined above, is derived in appendix table 4. The series differs somewhat from that reported in earlier compendia because of revisions in the methodology used to estimate the annual waste and losses of grain due to handling, the techniques used to estimate quantities of grain, vegetables, and potatoes fed to livestock, and the base-year prices for grain and vegetables used for feed.

For additional explanations of the methodology used in constructing this measure of net agricultural production see David W. Carey, "Soviet Agriculture: Recent Performance and Future Plans," U.S. Congress, Joint Economic Committee, "Soviet Economy in a New Perspective." U.S. Government Printing Office, Washington, D.C., 1976; Douglas B. Diamond and Constance B. Krueger, "Recent Developments in Output and Productivity in Soviet Agriculture," U.S. Congress, Joint Economic Committee, "Soviet Economic Prospects for the Seventies," U.S. Government Printing Office, Washington, D.C., 1973; and Douglas B. Diamond, "Trends in Output, Inputs, and Factor Productivity in Soviet Agriculture," U.S. Congress, Joint Economic Committee, "New Directions in the Soviet Economy, Part II–B," U.S. Government Printing Office, Washington, D.C., 1966.

TABLE 1.—U.S.S.R.: INDEX OF THE VALUE OF NET AGRICULTURAL PRODUCTION, 1965–78

Year	Index (1970=100)	Annual rate of growth (percent)
1965	82.8	6.8
1966	86.9	4.9
1967	86.5	−.4
1968	91.9	6.3
1969	88.9	−3.3
1970	100.0	12.5
1971	99.5	−.5
1972	94.3	−5.2
1973	108.4	15.0
1974	107.1	−1.2
1975	99.2	−7.4
1976	106.3	7.2
1977	111.1	4.5
1978	114.4	3.0

TABLE 2.—U.S.S.R.: INDEXES OF AGRICULTURAL PRODUCTION, 1965–78

[1970=100]

Year	Net agricultural production	Crops [1]	Livestock [2]
1965	83	77	87
1966	87	90	84
1967	86	89	84
1968	92	98	87
1969	89	88	89
1970	100	100	100
1971	100	99	100
1972	94	90	98
1973	108	116	101
1974	107	101	112
1975	99	92	105
1976	106	112	102
1977	111	107	114
1978	114	117	112

[1] Value of food and technical crops less seed but including the portion fed to livestock.
[2] Value of output of meat, milk, eggs, wool, and other livestock products less livestock feed and eggs used for hatching and adjusted for changes in herd inventories.

TABLE 3.—U.S.S.R.: PRODUCTION OF COMMODITIES USED IN NET AGRICULTURAL OUTPUT, 1965–78

[Thousand metric tons]

Component	1970 prices (rubles per ton)	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
Wheat	103	39,835.2	76,995.7	54,633.5	70,966.4	54,246.7	71,543.7	74,010.7	64,316.7	80,760.6	59,195.7	46,542.6	70,143.1	68,324.8	93,712.0
Rye	116	11,143.7	8,806.8	8,617.7	9,957.8	6,684.7	8,682.1	9,201.2	6,372.6	7,732.1	10,713.9	6,270.4	10,165.2	9,276.1	10,004.0
Buckwheat	306	698.4	673.9	880.5	1,181.0	991.9	743.9	864.5	561.1	951.4	682.6	295.4	637.3	751.6	887.1
Rice	306	486.6	594.1	734.5	901.0	884.4	1,018.8	1,178.7	1,388.0	1,400.0	1,534.3	1,708.5	1,615.1	1,849.2	1,729.3
Corn for grain	138	6,638.7	6,955.8	7,445.3	7,362.0	9,658.0	7,419.5	6,951.7	8,167.5	10,628.7	9,768.4	6,002.0	8,110.1	9,183.9	7,350.7
Oats	82	4,390.3	7,012.3	8,639.0	8,885.0	9,510.9	10,393.0	11,074.0	10,466.4	12,613.7	10,920.9	8,950.4	13,499.1	13,788.9	12,530.8
Barley	81	14,756.5	21,653.5	18,216.0	22,590.7	23,812.8	28,603.8	26,436.2	27,724.4	41,220.3	40,558.1	26,022.1	53,517.5	40,042.3	47,569.4
Millet	81	1,939.8	2,749.2	2,769.3	2,350.4	2,760.1	1,729.5	1,746.4	1,837.5	3,694.6	2,422.5	940.5	2,692.3	1,700.6	2,136.2
Pulses	113	4,626.1	5,091.2	4,613.0	5,458.7	5,633.0	5,401.5	4,992.8	5,074.5	5,831.5	6,199.5	3,538.0	6,341.2	5,474.6	5,495.3
Other grain	61	153.4	62.7	66.6	207.0	65.3	137.4	195.4	154.6	205.2	350.6	203.5	228.0	175.9	151.5
Total grain	103	84,668.7	130,595.3	106,615.3	129,859.9	114,247.9	135,673.0	136,651.5	126,063.4	165,038.1	142,346.6	100,473.5	166,949.0	146,567.9	181,566.8
Potatoes	114	72,313.2	71,908.2	79,635.1	86,412.1	76,389.0	81,461.4	77,656.4	63,330.4	92,967.7	65,854.3	73,670.2	71,636.7	70,224.7	72,524.0
Beets	108	917.0	1,018.0	1,006.0	1,046.0	1,125.0	1,188.0	1,167.0	1,117.0	1,451.9	1,389.0	1,260.0	1,699.0	1,352.0	1,470.0
Cabbage	95	6,504.0	6,054.0	7,577.0	6,369.0	6,298.0	7,486.0	7,356.0	7,037.0	9,147.0	8,733.0	7,920.0	8,772.0	8,476.0	9,230.0
Carrots	153	987.0	964.0	1,047.0	1,103.0	1,331.0	1,294.0	1,271.0	1,214.0	1,576.4	1,513.0	1,372.0	1,524.0	1,473.0	1,600.0
Cucumbers	212	1,410.0	1,750.0	2,053.0	1,787.0	1,725.0	2,291.0	2,250.0	2,154.0	2,800.1	2,680.0	2,430.0	2,699.0	2,608.0	2,840.0
Onions	430	1,639.0	1,661.0	1,417.0	1,559.0	1,575.0	2,015.0	1,980.0	1,892.0	2,457.9	2,357.0	2,138.0	2,374.0	2,294.0	2,500.0
Tomatoes	168	5,129.0	5,143.0	6,078.0	5,893.0	5,436.0	5,558.0	5,402.0	5,231.0	6,800.7	6,500.0	5,895.0	6,523.0	6,303.0	6,860.0
Other vegetables	99	1,041.0	1,267.0	1,356.0	1,254.0	1,255.0	1,378.0	1,354.0	1,296.0	1,693.0	1,639.0	2,336.0	1,699.0	1,642.0	1,790.9
Total vegetables	163	17,627.0	17,857.0	20,534.0	19,011.0	18,745.0	21,212.0	20,840.0	19,941.0	25,927.0	24,811.0	23,351.0	24,990.0	24,148.0	26,290.0

Fruits, berries, nuts	282	8,100.0	7,805.0	8,966.0	10,621.0	9,467.0	11,690.0	12,307.0	9,570.0	13,351.0	12,441.0	14,235.0	15,260.0	15,275.0	15,000.0
Sugarbeets	26	67,500.0	69,715.0	81,579.0	84,168.0	65,283.0	71,385.0	64,329.0	68,043.0	77,799.0	67,471.0	61,880.0	85,142.0	84,880.0	84,400.0
Cotton	555	5,662.0	5,981.0	5,970.0	5,945.0	5,708.0	6,890.0	7,101.0	7,296.0	7,664.0	8,409.0	7,864.0	8,278.0	8,762.0	8,500.0
Tobacco	2,086	184.0	169.0	178.0	215.0	215.0	228.0	230.0	275.0	273.0	292.0	287.0	299.0	299.0	300.0
Makhurka	582	43.0	43.0	38.0	32.0	46.0	39.0	24.0	17.0	26.0	18.0	9.0	12.0	7.0	7.0
Sunflower seeds	187	5,013.1	5,658.0	6,079.4	6,150.2	5,849.4	5,652.5	5,210.0	4,644.2	6,794.2	6,241.3	4,590.8	4,854.8	5,431.7	4,885.2
Soybeans	260	429.0	638.0	553.0	531.0	437.0	607.0	536.0	258.0	424.0	360.0	780.0	480.0	545.0	500.0
Flax seed	245	85.0	100.0	100.0	100.0	90.0	65.0	64.0	62.0	101.0	63.0	90.0	58.0	65.0	60.0
Mustard seed	250	80.0	100.0	80.0	75.0	70.0	50.0	49.0	48.0	131.0	122.0	70.0	106.0	97.0	100.0
Castor beans	800	20.0	45.0	90.0	106.0	60.0	79.0	78.0	76.0	89.0	76.0	80.0	41.0	36.0	50.0
Other oil crops	375	6.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	22.0	15.0	7.0	25.0	69.0	30.0
Total oil crops	203	5,633.1	6,548.0	6,909.4	6,969.2	6,513.4	6,460.5	5,944.0	5,095.2	7,561.2	6,877.3	5,617.8	5,564.8	6,243.7	5,625.2
Fiber flax	2,344	480.0	461.0	485.0	402.0	487.0	456.0	486.0	456.0	443.0	409.0	493.0	509.0	485.0	500.0
Tea	940	197.0	238.2	234.4	229.0	244.6	272.7	280.0	291.0	305.4	329.9	352.3	375.4	434.1	400.0
Beef and veal	2,454	3,917.0	4,377.0	5,081.0	5,513.0	5,569.0	5,393.0	5,490.0	5,715.0	5,873.0	6,384.0	6,400.0	6,600.0	6,900.0	7,000.0
Pork	2,252	4,143.0	4,465.0	4,456.0	4,079.0	4,094.0	4,543.0	5,290.0	5,413.0	5,081.0	5,515.0	5,700.0	4,300.0	5,000.0	5,500.0
Mutton and kid	1,824	1,013.0	933.0	1,028.0	1,029.0	969.0	1,002.0	997.0	901.0	954.0	974.0	1,000.0	878.0	900.0	800.0
Poultry	2,368	696.0	745.0	764.0	817.0	866.0	1,071.0	1,197.0	1,203.0	1,295.0	1,420.0	1,500.0	1,414.0	1,700.0	1,800.0
Other meat	3,601	187.0	184.0	186.0	210.0	272.0	269.0	298.0	401.0	324.0	327.0	368.0	408.0	200.0	100.0
Total meat	2,351	9,956.0	10,704.0	11,515.0	11,648.0	11,770.0	12,278.0	13,272.0	13,633.0	18,527.0	14,620.0	14,968.0	13,600.0	14,700.0	15,200.0
Milk	196	72,563.0	75,992.0	79,920.0	82,295.0	81,540.0	83,016.0	83,183.0	83,181.0	88,300.0	91,760.0	90,804.0	89,675.0	94,665.0	94,500.0
Eggs (million eggs)	100	29,068.0	31,672.0	33,921.0	35,679.0	37,190.0	40,740.0	45,100.0	47,910.0	51,154.0	55,509.0	57,463.0	56,187.0	61,085.0	64,400.0
Wool	4,650	356.9	370.9	394.5	415.1	389.7	418.9	428.8	420.1	433.3	461.6	466.6	436.0	458.0	462.0
Honey	1,600	291.5	228.3	211.1	204.1	178.6	210.0	210.0	210.0	221.0	174.5	199.3	188.0	200.0	200.0
Silk cocoons	5,100	34.8	34.7	36.9	36.1	35.7	33.7	36.7	37.0	40.0	39.0	43.0	45.0	43.0	45.0
Changes in number of livestock (thousand of heads):															
Cattle	442	6,265.0	3,675.0	56.0	−1,432.0	−573.0	4,063.0	3,209.0	1,572.0	2,260.0	2,856.0	1,912.0	−688.0	2,344.0	1,710.0
Hogs	173	6,733.0	−1,548.0	−7,161.0	−1,820.0	7,008.0	11,428.0	3,951.0	−4,841.0	3,439.0	2,240.0	−14,373.0	5,156.0	7,456.0	4,189.0
Sheep and goats	37	4,642.0	5,726.0	2,999.0	2,100.0	−10,338.0	7,618.0	1,912.0	−643.0	3,844.0	2,698.0	−4,141.0	−1,718.0	1,238.0	2,189.0

TABLE 4.—U.S.S.R.: VALUE OF NET AGRICULTURAL OUTPUT, 1965–78

[Million rubles (1970 price weights)]

Component	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
Food grains	5,758.3	9,340.2	7,121.1	9,101.7	6,937.0	8,915.5	9,315.6	7,960.3	9,934.8	8,018.3	6,134.5	9,093.1	8,445.3	11,613.4
Feed grains	3,160.7	4,090.7	3,961.0	4,394.2	4,905.6	4,951.9	4,726.3	4,962.7	6,810.7	6,446.9	4,158.4	7,509.6	6,408.6	6,698.3
Total grain	8,919.0	13,430.8	11,082.1	13,495.9	11,842.6	13,867.4	14,041.9	12,923.0	16,745.5	14,465.3	10,292.8	16,602.7	14,853.9	18,311.8
Potatoes	8,243.7	8,197.5	9,078.4	9,851.0	8,708.3	9,286.6	8,852.8	7,219.7	10,598.3	7,507.4	8,398.4	8,166.6	8,005.6	8,267.7
Vegetables	2,836.3	2,907.3	3,188.5	3,050.2	3,003.9	3,460.0	3,399.4	3,252.2	4,227.6	4,047.1	3,754.5	4,074.7	3,937.4	4,287.2
Oil crops	1,108.1	1,312.1	1,399.7	1,418.8	1,297.6	1,309.1	1,206.6	1,026.2	1,517.7	1,373.1	1,167.5	1,115.5	1,252.3	1,134.5
Fruits, berries, nuts	2,284.2	2,201.0	2,528.4	2,995.1	2,669.7	3,296.6	3,470.6	2,698.7	3,765.0	3,508.4	4,014.3	4,303.3	4,307.5	4,230.0
Sugarbeets	1,755.0	1,812.6	2,121.1	2,188.4	1,697.4	1,856.0	1,672.6	1,769.1	2,022.8	1,754.2	1,608.9	2,213.7	2,206.9	2,194.4
Cotton	3,142.4	3,319.5	3,313.3	3,299.5	3,167.9	3,823.9	3,941.1	4,049.3	4,253.5	4,667.0	4,364.5	4,594.3	4,862.9	4,717.5
Tobacco	383.8	352.5	371.3	448.5	448.5	475.6	479.8	573.6	569.5	609.1	598.7	623.7	623.7	625.8
Makhorka	25.0	25.0	22.1	18.6	26.8	22.7	14.0	9.9	15.1	10.5	5.2	7.0	4.1	4.1
Fiber flax	1,125.1	1,080.6	1,136.8	942.3	1,141.5	1,068.9	1,139.2	1,068.9	1,038.4	958.7	1,155.6	1,193.1	1,136.8	1,172.0
Tea	185.2	223.9	220.3	215.3	229.9	256.3	263.2	273.5	287.1	310.1	331.2	352.9	408.1	376.0
Total crops	30,007.8	34,862.8	34,462.2	37,923.5	34,234.2	38,723.0	38,481.0	34,864.1	45,040.4	30,210.8	35,691.6	43,247.5	41,599.2	45,320.9
Meat	23,111.6	24,924.9	26,857.7	27,282.6	27,683.6	28,797.7	31,141.7	32,150.8	31,828.1	34,402.8	35,243.2	32,299.0	34,580.0	35,645.7
Milk	14,222.3	14,894.4	15,664.3	16,129.8	15,981.8	16,271.1	16,303.9	16,303.5	17,306.8	17,985.0	17,797.6	17,576.3	18,554.3	18,522.0
Eggs	2,906.8	3,167.2	3,392.1	3,567.9	3,719.0	4,074.0	4,510.0	4,791.0	5,115.4	5,550.9	5,746.3	5,618.7	6,108.5	6,440.0
Wool	1,659.6	1,724.7	1,834.4	1,930.2	1,812.1	1,947.9	1,993.9	1,953.5	2,014.8	2,146.4	2,169.7	2,027.4	2,129.7	2,148.3
Honey	466.4	365.3	337.8	326.6	285.8	336.0	336.0	336.0	353.6	279.2	318.9	300.8	320.0	320.0
Silk cocoons	177.5	177.0	188.2	184.1	182.1	171.9	187.2	188.7	204.0	198.9	219.3	229.5	219.3	229.5
Livestock change	4,105.7	1,568.4	−1,103.1	−870.1	576.6	4,054.8	2,172.6	−166.5	1,736.1	1,749.7	−1,794.6	524.3	2,371.7	1,561.5
Gross livestock products	46,649.9	46,821.8	47,171.4	48,551.1	50,241.0	55,653.3	56,615.3	55,557.0	58,558.9	62,312.9	59,700.3	58,576.1	64,283.6	64,867.0
Net livestock products	38,528.9	37,056.6	37,138.4	38,178.0	39,376.7	44,063.9	43,864.8	43,199.3	44,716.1	49,464.3	46,444.2	44,768.2	50,385.9	49,377.6
Total net farm output	68,536.7	71,919.4	71,600.6	76,101.5	73,610.8	82,791.9	82,345.8	78,063.4	89,756.5	88,675.1	82,135.8	88,015.7	91,985.1	94,698.5

SOVIET AGRICULTURAL POLICIES*

(By David M. Schoonover)

CONTENTS

TABLES

I. SUMMARY

Agricultural policies in the U.S.S.R. during the 60 years of Soviet rule have evolved from ones of exploitation to ones encouraging a massive infusion of resources; from policies with a focus on supporting industrialization to policies with considerable consumer orientation. Further evolution toward a greater emphasis on efficient use of resources is underway, but resource requirements still are great—and growing.

*An earlier version of this paper, entitled "Soviet Agricultural Policies from Development to Maturity," was published in Soviet Union, vol. 4, pt. 2, 1977.

Changes in Soviet leadership typically have brought substantial modification of agricultural policy. The groundwork for Soviet agricultural institutions was laid by Lenin with official land nationalization and the introduction of collective and state farms, which he was only able to implement to a limited extent. It remained for Stalin to impose Soviet-style central planning and to carry out collectivization in the rural sector, thus establishing control over the peasant masses. Central planning and control enabled the exploitation of agriculture via unfavorable terms of trade and the very sparing use of government investments to develop agricultural production potential. Even at lower levels of production, more grain was drawn out of the countryside to further industrialization. Residual earnings for farmer incomes were very low.

Khrushchev accomplished a major increase in agricultural production, partially through an extensive plowup of new lands in Siberia and Kazakhstan. He also to some degree decentralized agricultural planning and management and introduced a series of price increases that enabled farms to profitably produce some commodities. Farm and farmer incomes improved and investments in agriculture jumped sharply. After 1958, however, progress was stopped short, as Khrushchev turned more to administrative reorganizations and campaigns and became stingy with additional increases in resources.

Brezhnev's agricultural program introduced at a plenum of the Communist Party Central Committee in March 1965 brought a massive infusion of investment resources with a continuously rising share of total investments in the economy directed into agriculture. Prices were increased to enable profitability in more types of production. A great deal more stability and certainty was introduced in agricultural sales plans, but strong incentives were built in for exceeding plan goals. Institutional reforms were introduced which narrowed the differences between collective and state farms and greatly improved the income status of collective farmers. During the last half of the 1960's, agricultural production was boosted upward sharply, and farm and farmer incomes increased rapidly.

Policies for the overall food-and-fiber sector in the Soviet Union became much more consumer oriented in the 1970's, probably owing to a perceived relationship between industrial labor productivity and consumer well-being. The production gains of the 1960's supported this shifting orientation. The basic principles of Brezhnev's 1965 agricultural policies largely were maintained during the 1971–75 plan, but production efforts were focused primarily on a program to rapidly increase livestock production to meet consumer demands for meat, milk, and other livestock products. The government sought to industrialize livestock and poultry production through construction of large, specialized production complexes. Policies were adopted to boost feed production, but plans were too ambitious. As a consequence of the commitment to the livestock program and feed shortfalls, the government reversed its agricultural trade policy and resorted to large imports of grain, particularly following poor crops. During this period, the government continued its emphasis on irrigation and drainage projects and adopted a new program for the nonchernozem soil region of North European RSFSR.

The 10th 5-year plan for 1976–80 calls for a smaller rate of growth of investments into agriculture, but puts much more emphasis on efficient use of resources. Efficiency is to be fostered primarily through greater specialization, though cautioning against hasty implementation of specialization became noticeable in 1978. The lead in specialization is given to a program of interfarm cooperation—focusing particularly on livestock production—and agroindustrial integration. Planned fertilizer expansion and land improvement continue strong, despite slower growth of some investments. Through 1978, however, very little increase occurred in fertilizer deliveries. Plans for feed and livestock production appear reasonably consistent, but planned livestock product consumption increases are meager and appear inconsistent with income targets. Except for grain and a few other products, most agricultural output goals for 1976–80 now appear ambitious. The long-term agreement to purchase U.S. grain seems to offer several assurances and benefits to the Soviet leadership until grain reserves in the U.S.S.R. can be increased substantially. Increased budgetary subsidization of meat and milk prices—already high—was further aggravated by selected price increases in 1979 and is likely to continue until efficiency gains are sufficient to hold down advancing costs.

Major goals for 1981–85, announced by Brezhnev at the July 1978 plenum on agriculture, suggest an intended basic continuity in agricultural policies. The resource commitment to agriculture is planned to continue strong. Agriculture's share of total investments will not decline. The leadership will continue to strive for new technologies to improve efficiency. The 1981–85 average grain output target of 238–243 million tons appears attainable if weather is not exceptionally unfavorable and if planned resources are made available. Livestock product output likely will grow, but not adequately, unless demand can be reduced. Soviet agricultural policymakers likely will continue to seek solutions to the fundamental economic issues within the inherited institutional constraints—state ownership of resources, central planning, and administered prices.

II. A Half Century of Soviet Agriculture

A. Agricultural Polices Before Khrushchev

1. Establishment of institutions.—During the nearly 40 years of pre-Khrushchev Soviet rule, from 1917 to 1953, a large number of institutions were established and policies adopted that shape and constrain current agricultural policies. The dominant new institutions were the almost complete government and collective ownership of resources of production and the central planning of production goals and allocation of materials. The primary dependence on planners' preferences in economic decisionmaking has been implemented largely by nonmarket forces, while prices on the majority of producer and consumer goods are administratively fixed.

All land formally has been nationalized since the land decrees of November 8, 1917 (October 26 on the old Russian Calendar), and February 19, 1918.[1] Official land nationalization was one of the first acts of the Bolsheviks under Lenin. Effective nationalization has

[1] Lazar Volin, "A Century of Russian Agriculture: From Alexander II to Khrushchev," (Cambridge, Mass.: Harvard University Press, 1970), pp. 128, 129.

existed since collectivization during the early 1930's, although use of land has been granted rent-free in perpetuity to collective farms. A new land-use law, adopted December 13, 1968, and effective July 1, 1969, reaffirmed complete nationalization of land.[2]

The organization of agricultural production in collective and state farms was established as a goal soon after the revolution and both types of farms were brought into existence in 1918, but the main thrust of collectivization occurred in the early 1930's.[3] Soviet agricultural production was organized primarily on collective farms from the early 1930's until the mid-1950's when a process of conversion of collective farms to state farms was commenced. State farms accounted for only 10 percent of all sown area in 1950, but by 1965 this had grown to 43 percent.

Throughout this period, there were two fundamental differences between collective and state farms. First, state farms essentially were funded out of the State budget, but collective farms largely were dependent on their own earnings. Collective farms depended primarily on internal generation of funds for investments for further growth. Secondly, state farm workers received a regular wage for work performed, but collective farmers were residual claimants on the farm income after other expenses were paid and investment funds set aside. Other differences could be cited. Collective farms legally manage collectively-held assets, rather than state assets (land is held, but not owned), but there are no provisions for a collective farmer to withdraw his share of the productive resources. Since collective farms and farmers were dependent on their own means, prices paid to collective farms for commodities generally were higher than to state farms. Also, the household plots of collective farmers for subsistence production of vegetables, fruit, and livestock products generally were larger.

Central planning of production and allocation of materials became a pervasive phenomenon in the Soviet economy with the adoption of the first 5-year plan for 1928–32. Collectivization enabled the implementation of centralized management at the enterprise level. Farm managers were told the areas to be seeded to various crops or left fallow, expected yields, numbers of livestock, volume of output to be sold, and the quantities of inputs to buy. Even farm practices were specified.[4] On top of this, the machine-tractor stations (MTS)—created at the time of collectivization to provide mechanization services—acted as a second manager of the farm.

The first major decentralization of agricultural planning occurred in March 1955 when a reduction of centrally planned indicators was announced, leaving sales quotas the principal obligation assigned to farms. Each farm was to draw up its own financial and production plan that would assure fulfillment of the procurement or sales plan. Continued violations of this reform were noted, however, during the Khrushchev era.[5] The relative autonomy of farm management was substantially increased by the liquidation of the MTS in early 1958.

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[2] Pravda, Dec. 14, 1968.
[3] Volin, op. cit., pp. 151, 156, 222.
[4] Ibid., p. 544.
[5] Lazar Volin, "Khrushchev and the Soviet Agricultural Scene," in Soviet and East European Agriculture, ed. Jerzy F. Karcz (Berkeley and Los Angeles: University of California Press, 1967), p. 3.

2. Agriculture's role in Soviet development.—Development theories of labor-surplus economies, such as the U.S.S.R. in 1928, generally assign a fundamental role to agriculture—the primary labor-surplus sector—in the supply of resources for development. As outlined by Johnson and Mellor, the major ways in which agriculture contributes to development are: [6]

(1) Expanded food supplies to meet increased demands of the nonagricultural sector;
(2) Increased agricultural exports to supply foreign exchange;
(3) Supply of labor force for industry;
(4) Provision of investment capital for industry; and
(5) Rising farm incomes provide an industrial market.

Actual declines in per capita availability of grain occurred during the Soviet development program, although temporary declines in livestock inventories to some extent offset increased requirements due to population growth. Per capita grain output recovered prerevolutionary levels only during the first half of the 1950's. Substantial increases in per capita output occurred with the implementation of extensive agricultural programs—such as the plowing up of virgin lands in Siberia and Kazakhstan—following Stalin's death in 1953. The declines in per capita grain output prior to the 1950's were poorly offset by growth in other food supplies. Meat production also failed to keep up with population growth.

Marketings of grain, however, increased continuously in the 1930's and again in the years following World War II. Compulsory sales at low prices of agricultural commodities to the government provided a cheap supply of food for the urban population and the growing industrial labor force. Farms provided this grain at the expense of their own customary supplies, operating with an average of 10–15 million tons less grain annually during the 1930's, than the amount retained in the countryside in the years preceding collectivization. The precollectivization levels of grain retained on farms were not regained until the completion of the virgin lands expansion in the mid-1950's.[7]

Gross agricultural production (Soviet data) regained the 1928 level only twice in prewar years—1937 and 1940.

Agriculture did not provide a large exportable surplus during the early years of Soviet development; in fact, declines in production of some commodities, combined with a difficult foreign marketing situation, resulted in reduced foreign sales of traditional agricultural exports. A notable exception is the high level of grain exports in 1930 and 1931.[8] On the other hand, programs to increase production of certain industrial crops, particularly cotton, enabled a reduction in imports. A further import saving was effected simply by the decision to restrict consumption of certain agricultural commodities.

Soviet agriculture rather successfully served its role as a source of labor for industry. At the same time that a mass of unskilled peasantry was maintained in rural areas, a rapid and steady flow of workers

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[6] Bruce F. Johnson and John W. Mellor, "The Role of Agriculture in Economic Development," American Economic Review, 51, No. 4 (Sept. 1961), pp. 566–593.

[7] Supplies of grain left on farms from 1903–13 through 1954–58 are calculated from data in Tsentralnoye Statisticheskoye Upravleniye S.S.S.R. Selskoye Khozyaistvo S.S.S.R. (Moscow: Gosstatizdat TsSU S.S.S.R., 1960), pp. 86, 196.

[8] Ministerstvo Vneshney Torgovli S.S.S.R., Vneshnyaya Torgovlya S.S.S.R. za 1918–1940 g (Moscow: Vneshtorgizdat, 1960), pp. 58, 84, 110, 144, 179.

was absorbed in the cities. Furthermore, the population losses of World War II were largely absorbed by rural areas and the growth of urban population resumed promptly in the postwar period. However, the slow growth of productivity of the agricultural labor force in the postwar years in an economy with rapidly growing labor demand in the industrial sector acted as a brake on more productive labor employment. Although urban population continued to grow, practically negligible reduction in rural population took place from World War II until 1965.

The transfer of investment capital to industry was accomplished primarily by discriminatory pricing of agricultural products at low levels. The principal function of the prices paid to collective farmers for agricultural commodities has been to set the terms of trade for the peasantry. The government extracted the agricultural surplus by setting the terms of trade at an extremely unfavorable ratio for collective farms and farmers during much of the period of Soviet development. Compulsory sales to the government at low prices provided a cheap supply of food for the urban population and the growing industrial labor force.

Prices failed to cover costs of production of most agricultural products through about the mid-1950's.[9] Livestock production generally still remained unprofitable in the 1960's. Agricultural procurement prices were raised sharply in 1953, 1956, 1958, 1962, and 1965. Some measure of the relative price disadvantage faced by agriculture during the Stalin era can be depicted by noting that grain and livestock prices were more than 6 times as high in 1956 as in 1952.[10] A declining tendency was noted in industrial wholesale prices during this period.

The drawing off of capital from agriculture through compulsory sales at low prices was enabled by the tight political and economic control wielded over the peasantry from the inception of the forced collectivization drives during the first 5-year plan. The unfavorable terms of trade for agriculture held rural incomes at extremely low levels and impaired production incentives. The resultant low incomes to an immeasurable extent also hindered investments into agricultural expansion.. Investments into agricultural production averaged about 13 percent of total investments in the economy during 1928–58, but have subsequently increased to about 20 percent (table 1).

The long period when prices were inadequate to cover production costs, no doubt, imposed a drain on the existing resource stock in agriculture. Consequently, when the Government eventually began to attempt to boost agricultural output through increased investments, the task was made more onerous by the need to renew, as well as expand, the productive resource base.

The Soviet approach to development ruled from consideration the fifth possible contribution of agriculture—the creation of a market for industry through rising rural incomes.

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[9] See the discussion of prices and costs of production from 1928 through the 1950's in Nancy Nimitz, "Soviet Agricultural Prices and Costs," in Joint Economic Committee, Congress of the United States, "Comparisons of the United States and Soviet Economies," pt. I (Washington: Government Printing Office, 1959), pp. 239–284.

[10] S. G. Stolyarov, "O Tsenakh i Tsenoobrazovanii v S.S.S.R.," 3d edition, (Moscow: Statistika, 1969), p. 121.

TABLE 1--USSR CAPITAL INVESTMENTS IN THE ECONOMY AND AGRICULTURE, 1918-78 1/ AND PLAN 1976-80

Years	Total economy	Agricultural Complex			Share of Total Investments			Increase over previous 5 years			
		Total	Agriculture	Agricultural productive	Agricultural complex	Agriculture	Agricultural productive	Total	Agricultural complex	Agriculture	Agricultural productive
	Billion rubles				Percent			Percent			
Total, 1918-77	1,703.7	385.0	354.7	296.2	22.6	20.8	17.4	NA	NA	NA	NA
1918-28 (excluding 4th qtr. 1928)	4.4	NA	0.1	0.1	NA	3.3	3.1	NA	NA	NA	NA
1928 (4th qtr.)-32	8.8	NA	1.5	1.4	NA	17.4	15.5	NA	NA	NA	NA
1933-37	19.7	NA	2.6	2.3	NA	13.2	11.7	NA	NA	NA	NA
1938-41 (1st half)	20.4	NA	2.4	2.2	NA	11.8	10.8	NA	NA	NA	NA
1941 (2nd half)-45	20.5	NA	2.0	1.9	NA	9.8	9.3	NA	NA	NA	NA
1946-50	47.4	NA	6.1	5.6	NA	12.9	11.8	NA	NA	NA	NA
1951-55	89.8	NA	14.6	12.8	NA	16.3	14.2	89	NA	139	129
1956-60	168.0	NA	28.3	24.0	NA	16.8	14.3	87	NA	94	88
1961-65	243.5	48.2	45.3	37.8	19.8	18.6	15.5	45	NA	60	58
1966-70	347.9	81.5	74.1	59.1	23.4	21.3	17.2	43	69	64	58
1971-75	493.0	130.5	118.3	99.1	26.5	24.0	20.1	42	60	60	66
1976-78	369.0	99.8	90.2	74.9	27.0	24.4	20.3	NA	NA	NA	NA
1976-80 plan	621.4	170.4	NA	NA	27.4	NA	NA	26	31	NA	NA

NA = Not available

1/ 1976 prices

B. *Khrushchev's Agricultural Policies* (1953–64)

1. Resources and incentive programs.—The policies of Stalin's successors, after his death in 1953, brought a sharp departure from the years of exploitation of Soviet farms and peasantry. After 25 years of exacting the maximum contribution from an agricultural sector, which itself remained practically stagnant, the restraints imposed by this stagnation on general economic growth gave rise to more obvious concern. Industry now was in a position to provide much of its own investment capital and labor force. The output of food, however, was not keeping pace with the growth in urban demand. Furthermore, an extremely large share of the labor force still was tied up in the agricultural sector, where low productivity contributed small gains to total economic growth. In 1953 about 57 percent of the population still resided in rural areas, and although the share of the labor force in agricultural production, as such, was less, the rural population not working on farms generally was involved in providing support and services to agriculture.

The problems imposed on Soviet economic development by an underdeveloped and unproductive agriculture were recognized by Khrushchev in his first leadership speech in September 1953. He noted:

> . . . that without the advance of agriculture the problems of building communism cannot be successfully solved. Communist society cannot be built without an abundance of grain, meat, milk, butter, vegetables, and other agricultural products.[11]

In an effort to increase agricultural production, actions were taken on several fronts during the first years of Khrushchev's leadership. These actions included:

(1) Programs for rapid expansion of crop areas;
(2) Partial decentralization of planning and management;
(3) Higher prices and other measures to provide peasant incentives; and
(4) Increased investments in productive capital in agriculture.

The large-scale plowup of new lands east of the Volga River in Siberia and Kazakhstan resulted in an expansion of more than a fifth in total sown area from 1953 to 1956. The average contribution of the semiarid new lands (virgin lands) to government grain acquisitions during 1954–63—14.1 million tons annually more than during 1949–53—essentially equaled the increase in total purchases—13.6 million tons. In addition to contributing to bread and feedgrain supplies of both the Government and farms, the shift of grain production to the new lands enabled expansion of other feed crops in the traditional farming areas. The total area of seeded forage crops jumped from 21 million hectares in 1950 to peaks (until the 1970's) of 63 million hectares in 1960 and 1963. A major program initiated during these years was the expansion of corn for livestock feeding and corn accounted for most of the increase in forage crop area. Area of corn—primarily for silage and green feed, but also

[11] Cited by Lazar Volin in Karcz, op. cit., p. 3.

for grain—advanced from 3.5 million hectares in 1953 to a peak 37 million hectares in 1962. Much of this expansion was in areas poorly suited for corn production.

The area expansion programs alone required a considerable increase in investments and drew heavily on the rural labor force. Mechanization needs of the new areas required not only more tractors and equipment, but more workers skilled in operating and maintaining equipment. The programs also contributed substantially to national food supplies. The programs had a one-time impact, however, which reached a natural limit in the course of a few years, and did not solve the more basic problem of stagnation in productivity of Soviet agriculture.

More leeway in planning was granted to farms in 1955 and this was further extended with the abolition of the MTS in 1958. The continued assignment of sales quotas, however, generally left farms with little real freedom in planning production.

Prices of major agricultural commodities were raised sharply in 1953 and again in 1956 and 1958. The jumps in procurement prices greatly aided production profitabilities and were reflected in rapidly increasing collective farm earnings. Even rapid increases, however, left average incomes of collective farmers well below other incomes in the economy. As late as 1963, the average monthly income payments to collective farmers were only about two-fifths of the overall average level in the economy and a little over half the level of state farm worker wages [12] (table 2). These collective farmer earnings, of course, were substantially supplemented by in-kind consumption and, depending on the nearness to urban areas, cash sales from the household plots. The reduction of taxes and the lowering and eventual elimination—from January 1958—of compulsory deliveries from the household plots also benefited collective farmers.[13]

The increases in farm incomes, resulting from higher farm prices and some increases in productivity, combined with the area expansion program were associated with a major jump in agricultural investments. The total level of investments in agricultural production during 1951–55 more than doubled over the previous 5 years and investments again almost doubled during 1956–60. The growth in agricultural investments exceeded growth in total investments in the economy with the consequence that agriculture's share rose to over 14 percent, on the average, during the 1950's. This was the highest share since the first 5-year plan.

2. Stagnation after 1958.—Agriculture had been exploited too long, however, for the necessary farmer incentives and land and livestock productivity to be brought to life by the measures of those few years. Further price increases were withheld until 1962. Although farm prices now were much higher, they still did not adequately cover production costs of many basic commodities. Livestock prices still generally did not cover costs on either collective or state farms. On state farms, the total average profitability became increasingly negative from 1958

[12] Calculated from official data on average employment and total income payments.
[13] Lazar Volin, "Agricultural Policy of the Soviet Union," in Joint Economic Committee, Congress of the United States, Comparisons of the United States and Soviet Economies, pt. I (Washington, Government Printing Office, 1959), p. 300.

TABLE 2--USSR AVERAGE EMPLOYMENT AND LABOR EARNINGS IN THE ECONOMY AND ON STATE AND COLLECTIVE FARMS, 1960-78 AND 1980 PLAN

Years	Average Employment			Average Monthly Earnings			Man-Day Earnings	
	Economy 1/	State Farms	Collective farms	Economy 1/	State Farms	Collective farms 2/ 3/	State Farms	Collective farms 3/
	Millions			Rubles				
1960	62.0	5.8	21.7	80.6	53.9	28.4	2.31	1.40
1961	65.9	6.9	20.3	83.9	58.1	32.8	2.48	1.63
1962	68.3	7.3	19.8	86.7	66.2	36.2	2.82	1.82
1963	70.5	7.5	19.2	88.2	66.8	37.8	2.86	1.92
1964	73.3	7.7	19.0	90.8	70.5	44.8	3.02	2.27
1965	76.9	8.2	18.6	96.5	74.6	51.5	3.21	2.68
1966	79.7	8.4	18.5	100.2	80.0	57.7	3.48	3.05
1967	82.3	8.4	18.2	104.7	84.4	62.8	3.66	3.32
1968	85.1	8.5	18.0	112.7	92.2	66.2	4.07	3.52
1969	87.9	8.8	17.2	116.9	93.5	68.3	4.15	3.62
1970	90.2	8.9	16.7	122.0	101.1	74.9	4.43	3.90
1971	92.8	9.2	16.3	125.9	106.6	78.2	4.65	4.03
1972	95.2	9.3	16.1	130.2	112.1	80.8	4.89	4.11
1973	97.5	9.8	15.9	134.9	117.9	87.0	5.13	4.38
1974	99.8	10.1	15.7	141.1	124.7	90.8	5.42	4.50
1975	102.2	10.3	15.2	145.8	127.3	91.6	5.51	4.54
1976	104.2	11.0	14.8	151.4	135.1	98.5	5.83	4.77
1977	106.4	11.2	14.4	155.2	139.5	105.3	6.05	5.09
1978 4/	108.5	11.3	14.0	160.0	143.5	110.7	NA	5.24
1980 plan	NA	NA	NA	170	155	116	NA	NA

1/ Excluding collective farms.
2/ Calculated from total income payments and average employment.
3/ Payments in money and products for earnings in socialized sector.
4/ Preliminary.

through 1963.[14] At the same time, a campaign was mounted against the private sector which resulted in substantial reductions in area and livestock holdings and consequently reduced farmer incomes.[15] Cash incomes of collective farmers at this time were still far too low to provide strong incentives.

The growth in investments was less rapid after 1959. Production investments in collective farms actually declined and did not significantly exceed 1958 levels until 1964. Collective farms during this period, however, were burdened with the purchase from the MTS of 1.8 billion rubles of equipment, which was not included in investment.[16] State production investments in agriculture, on the other hand, grew rapidly after 1960. The declines in Government sales to agriculture of most farm equipment for several years after 1957, though, suggest that little improvement was attained in the immediate productive capability of agriculture. Much of the investment apparently went into livestock buildings and more long-term land improvement programs. Growth in other productive inputs, such as fertilizer, also was moderate until 1963, when supplies commenced growing swiftly.

The programs and reforms of Khrushchev brought agricultural production to a new plateau. Gross agricultural output during 1956–60 was more than 40 percent above the level of the previous 5 years (table 3). The progress did not continue, however. Few gains were made during 1959–63; in fact, average output was only 3 percent above the peak level of 1958.

The rising demand for livestock products and their inadequate supply led to a simultaneous increase on June 1, 1962, of retail and farm prices on most livestock products.[17] Some internal disturbances in reaction to the retail price increase were rumored.

During the latter years under Khrushchev's leadership, solutions to the problem of increasing productivity were sought in administrative reorganizations and campaigns. The last of these campaigns—a program to plow up fallow and grasslands and plant them to supposedly more productive crops—led to disastrous economic consequences. A record low fallow area in the semiarid new lands coincided with extremely dry weather in 1963 to produce essentially a crop failure. Hog numbers were cut back sharply and large imports of grain were made from the West. In 1964, Khrushchev was ousted.

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[14] Morris Bornstein, "Soviet Price Theory and Policy," in Joint Economic Committee, Congress of the United States, New Directions in the Soviet Economy, pt. I, Economic Policy (Washington: Government Printing Office, 1966), p. 81.

[15] Jerszy F. Karez, "Seven Years on the Farm: Retrospect and Prospects," in Joint Economic Committee, Congress of the United States, New Directions in the Soviet Economy, p. II–B, Economic Performance (Washington; Government Printing Office, 1966), pp. 413–414.

[16] See footnote in Tsentralnoye Statisticheskoye Upravleniye, Narodnoye Khozyaistvo SSSR v 1965 g (Moscow: Statistika, 1966) p. 536.

[17] Regional Analysis Division, Economic Research Service," The Agricultural Situation in 1961–62 in the Soviet Union and Other Eastern European Countries," ERS-Foreign-29, U.S. Department of Agriculture (Sept. 1962), p. 15.

TABLE 3 -- USSR AGRICULTURAL PRODUCTION, GROSS OUTPUT AND MAJOR COMMODITIES, AVERAGES
1909-13 Base, 1924-28, 1936-40, 1946-78, And Plans 1976-80

Years	Gross output 1/	Grain 2/	Seed Cotton	Sugar-beets 3/	Sunflower seeds	Fiber flax 4/	Potatoes	Vege-tables	Meat 5/	Milk	Wool 6/	Eggs
	Billion rubles	Million m. tons	Million m. tons	Million m. tons	Million m. tons	Million m. tons	Million m. tons	Million m. tons	Million m. tons	Million m. tons	Million m. tons	Billions
Pre-1940 boundaries												
1909-13	NA	65.2	0.68	9.7	NA	0.260	22.4	NA	3.9	24.1	0.180	9.5
1924-28	NA	69.3	0.58	7.9	1.87	0.275	41.1	NA	4.2	29.3	0.157	9.2
1936-40	NA	77.4	2.50	17.1	1.79	0.331	49.4	10.5	4.0	26.5	0.129	9.6
Present boundaries												
1909-13	32.5	72.5	0.68	10.1	NA	0.316	30.6	NA	4.8	28.8	0.192	11.2
1946-50	44.4	64.8	2.32	13.5	1.55	0.225	80.7	11.4	3.5	32.3	0.147	7.5
1951-55	51.9	88.5	3.89	24.0	2.46	0.234	69.5	11.2	5.7	37.9	0.226	15.9
1956-60	73.7	121.5	4.36	45.6	3.67	0.438	88.3	15.1	7.9	57.2	0.317	23.6
1961-65	82.8	130.3	4.99	59.2	5.07	0.408	81.6	16.9	9.3	64.7	0.362	28.7
1966-70	100.4	167.6	6.10	81.1	6.39	0.458	94.8	19.5	11.6	80.6	0.398	35.8
1971-75	113.7	181.6	7.67	76.0	5.97	0.456	89.8	23.0	14.0	87.4	0.442	51.4
1976-78	124.8	218.9	8.51	95.6	5.50	0.458	84.9	25.2	14.5	93.0	0.452	60.6
1976-80 plan.	132.0	220.0	8.50	96.6	7.60	0.539	102.1	28.1	15.4	95.3	0.473	60.8
Increase over previous period												
1951-55	17	37	68	78	59	4	-14	-2	63	17	54	112
1956-60	42	37	12	90	49	87	27	35	39	51	40	48
1961-65	12	7	14	30	38	-7	-8	12	18	13	14	22
1966-70	21	29	22	37	26	12	16	15	25	25	10	25
1971-75	13	8	26	-6	-7	0	-5	18	21	8	11	44
1976-80 plan.	16	21	11	27	27	18	14	22	10	9	7	18

NA = Not available.
1/ Constant 1973 prices.
2/ Bunker weight.
3/ Factory use.
4/ Fiber basis.
5/ Carcass weight.
6/ Greasy basis.

III. Agricultural Policy Under Brezhnev

A. Brezhnev's Program for Agriculture (1965–70)

1. March 1965 plenum and the 23d Party Congress.—The first major economic program of the post-Khrushchev leadership was in agriculture. The principal guidelines for agricultural development through 1970 were set forth by General Secretary of the Communist Party, Leonid Brezhnev, at a party plenum on agriculture convened in March 1965.

These guidelines were spelled out in greater detail, and a few additions were made, at the 23d Congress of the Communist Party of the Soviet Union, held in the spring of 1966.

The Soviet economy had experienced a sharp slowdown in growth during 1958–64, compared with 1950–58. The second-ranking agricultural sector had experienced the sharpest decline in growth.[18] Within industry, the light and food industry branches, heavily dependent on agricultural raw materials, had decelerated more sharply than other branches. Simply meeting food needs of the population had required large expenditures of foreign exchange in 1964, following the poor 1963 harvest.

Even before the March 1965 plenum on agriculture, the new Soviet leadership sought to establish a more favorable environment for its agricultural policies. These first acts included restoration of limited private livestock raising where it had been unduly restricted,[19] implementation of a pension program for collective farmers,[20] and lessening of the direct involvement of the party in farm supervision through reuniting the split party committees on agriculture and industry—a move taken by Khrushchev in November 1962, which apparently had been extremely unpopular politically.[21] The leadership also lent support to legitimate agricultural scientific research by dismissing from their posts the longtime tsar of agricultural science, T. D. Lysenko, and his leading supporter in the Ministry of Agriculture.[22]

The agricultural actions announced by Brezhnev at the March 1965 plenum established policy directions that have continued to the present time to guide Soviet agriculture, albeit with substantial further elaboration. The principal announcements by Brezhnev at the March 1965 Plenum included:[23]

(1) Reduced planned goals on State purchases of grains and livestock products with amounts fixed through 1970;

(2) Increased State purchase prices to collective and State farms on grains and meat, which followed a previously announced increase on milk prices;

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[18] Stanley H. Cohn, "Soviet Growth Retardation: Trends in Resource Availability and Efficiency," in Joint Economic Committee, Congress of the United States, "New Directions in the Soviet Economy," Part II–A, Economic Performance (Washington: Government Printing Office, 1966), p. 104.

[19] The first indication of this was in an Ukrainian Party and Government decree published in Pravda Ukrainy, November 5, 1964. This was followed by a rash of similar decrees in other republics.

[20] David W. Bronson and Barbara S. Severin, "Recent Trends in Consumption and Disposable Money Income in the U.S.S.R." in Joint Economic Committee, Congress of the United States, New Directions in the Soviet Economy, part II–B, Economic Performance (Washington: Government Printing Office, 1966), p. 512.

[21] Erich Strauss, "Soviet Agriculture in Perspective" (New York: Frederick A. Praeger, 1969, pp. 229–230.

[22] TASS (English), Feb. 10, 1965.

[23] Pravda, March 27, 1965.

(3) Premiums on prices of several commodities, including a 50 percent bonus on above-plan sales of grain, which later was followed by a 100 percent bonus to collective farms on above-average sales of sunflower seeds and a 50 percent bonus on above-average sales of cotton;

(4) A considerable rise in the level of investments into agriculture, with particular emphasis on stepped-up deliveries of machinery;

(5) Altered tax procedures to eliminate double taxation of collective farm labor payments;

(6) Cancellation of long-term debts of weak collectives;

(7) Elimination of price discrimination between rural and urban areas on consumer goods;

(8) A promise, implemented in 1966, to eliminate discriminatory price relationships on producer goods between agriculture and industry;

(9) Another promise to improve the system of extending credit to collective farms; and

(10) A suggestion that profitability should be taken as the basis for appraisal of success on State farms.

The various price and concessional measures were intended to play a strong incentive role by boosting incomes of farms and farmers. The long-term fixed sales quotas gave farms more certainty in planning. The Soviety Minister of Finance, V. F. Garbuzov, stated that estimated costs of these measures—excluding investments—was more than 22 billion rubles during 1966–70 plus more than 3 billion rubles in 1965.[24] For comparison, the total value of collective farm and private agricultural sales to government organizations in 1965 was 21.5 billion rubles. Finally, resources available to agriculture were to be boosted both through higher farm incomes and direct government investments.

A few additional changes were made in the economic framework for agriculture at the 23d Party Congress in early 1966. These included:[25]

(1) A planned doubling in supplies of mineral fertilizers used in agriculture by 1970—but this was less than promised previously by Khrushchev;

(2) A comprehensive land improvement program—irrigation, drainage, liming—which subsequently was discussed in greater detail at a special plenum of the Communist Party Central Committee in May 1966, but which largely was already envisaged in the investment goals previously announced;

(3) Stricter procurement contracts, specifying fines for failure to meet them, with especially severe penalties on procurement organizations which fail to accept delivery of perishable commodities;

(4) A program to greatly improve electrification in rural areas;

(5) A suggestion to develop farm specialization, which largely was postponed until subsequent plans;

(6) A suggestion, spelled out in 1967, to develop subsidiary farm enterprises to better use off-season labor and farm raw materials;

[24] Plenum Tsentralnovo Komiteta Kommunisticheskoy Partii Sovetskovo Soyuza, 24–26 Marta 1965 goda," Stenograficheskiy Otchyot (Moscow: Izdatelstvo Politicheskoy Literatury, 1965), pp. 132–133.

[25] Pravda, Apr. 10, 1966.

(7) Emphasis on the role of specialists and scientific farming principles, apparently in contrast to the Party and administrative bureaucracy; and

(8) A directive to improve housing and public amenities in rural areas.

2. Institutional reforms.—During the 23d Congress, Brezhnev proposed a monthly wage system for collective farmers, which was officially recommended by a decree of May 1966.[26] Previous liberalization of credit extension to collective farms facilitated the new monthly wage system. In January 1966 direct bank credits to cover seasonal needs, including monetary labor payments, were made available to about 3,000 collective farms. Previously, most seasonal credit was provided in the form of advances from Government purchasing organizations and no credits were given directly for labor payments. Direct short-term bank credits were available to almost all collective farms by mid-1969.[27]

The establishment of a source of credit to cover labor payments, as well as generally improved farm incomes, enabled a major change in collective farmer income payment policy. Collective farmers traditionally were residual claimants on the farm income, which meant that income payments fluctuated sharply—and the cash component also was quite low in most cases. Effective July 1966, the system of guaranteed monthly income payments was introduced. Income payments became a priority claimant on farm funds, taking precedence over allocations to the capital fund. Payments were to be established at existing state farm rates for specific types of work. Loans up to 5 years were made available to cover labor payments. By 1968 more than 90 percent of collective farms reportedly made monthly payments. The actual guarantee under the new system is best described by Clarke, who states:[28]

> * * * it seems fairly clear that what is guaranteed for an individual kolkhoznik is not a definite amount per month, but a definite amount for the work that he does and the fact that he will be paid monthly what he has earned.

A significant development in 1967 was an experiment involving 400 of the approximately 12,000 state farms in the country, which required them to adopt profit-and-loss accounting and to develop on the basis of their own profitability, rather than by means of state subsidies. To make this possible, state purchase prices were raised on commodities sold by these farms to levels prevailing on collective farms and the number of centrally planned directives issued to these state farm managers was lowered.[29] This reform largely resembled the new system of planning and management in industry. Centralized plans were reduced to the following: commodity sales to the state (physical quantities), total wages fund, total profits, budget grants, capital charges, centralized investments, and the supply of production inputs. An annual charge of 1 percent on fixed capital resources was introduced. Four funds were designated to receive specified percentages of profits, as follows: material incentive—15 (up to 12 percent of the wages fund);

[26] Pravda, May 18, 1966.
[27] V. V. Kochkarev, "Pryamoye Bankovskoye Kreditovaniye Kolkhozov," in "Khozyaistvennaya Reforma v SSSR," eds. A. F. Rumyantsev, et. al. (Moscow: Izdatelstvo Pravda, 1969), pp. 77–85.
[28] Roger A. Clarke, "Soviet Agricultural Reforms Since Khrushchev," Soviet Studies, 20, No. 2 (October 1968), pp. 159–178.
[29] Pravda, Apr. 15, 1967.

welfare (public amenities and housing)—10; investment—10; and insurance—20. The residual profit may be used to purchase operating capital, repay credits, and finance centrally planned investments. A portion also may be reabsorbed into the state budget for distribution to other farms.[30]

By 1970 the economic reform had been expanded to about 5,000 state farms—a third of the total. All state farms, then numbering about 18,000, reportedly had embraced the reform by 1975. The reform greatly enhances the role of profits in farm management. Bonuses and other funds depend on farm profits. Farms have limited freedom to establish their own production plans, provided sales plans can be met. State investment assistance now largely is limited to irrigation, drainage, electric power lines, and other types of infrastructure. However, despite farm assumption of investment financing, centralized control is retained over investments owing to the lack of free trade in productive resources. The reforms in state farm management, together with the introduction of a system of monthly labor payments on collective farms, have tended to make these two major organizational forms of socialized agriculture more closely resemble each other.

The third All-Union Congress of Collective Farmers held in November 1969 adopted—on November 27—a new model collective farm charter, to replace the 1935 charter.[31] The general assembly of collective farm members was reaffirmed as the sovereign body of the farm. According to the charter, the general assembly elects the farm chairman and administration for a 3-year term and approves plans and internal regulations.

The 1969 charter generally made few clear innovations, but did incorporate certain de facto changes in farm rights and obligations, such as the guaranteed monthly income payments and the provision of pensions and other forms of social security to collective farmers. The obligations of the farm to the state, particularly in land use and fulfillment of the state purchasing plan, were clearly noted. The 1935 charter specified the subdivision of collective farms into production brigades; the new charter states that organization may be into divisions or sections, farms, brigades, teams, and other units, thus leaving more organizational flexibility. The team (zveno) generally is a relatively small production unit. These subunits may maintain their own internal accounts. Although the 1969 charter lists a number of funds receiving a share of gross farm income, unlike state farms, no precise share of income to be allocated to each fund is specified. The plots of collective farmers are limited to 0.5 hectare (including dwelling). Collective farm households are allowed 1 cow with a calf up to 1 year; 1 head of cattle up to a 2-year-old; 1 sow with pigs up to 3 months or 2 fattening hogs; up to 10 sheep or goats; and poultry, rabbits, and bees with no specified limit.

The 1969 charter makes provision for the association of collective farms into unions. A system of collective farm councils—with organizations at the raion, oblast, and republic levels and a national council—was established at the Congress. The charter also provides for association with other production enterprises, for example, intercollective farm or collective-state farm production associations.

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[30] Clarke, op. cit.
[31] The full text of the model charter may be found in Selskaya Zhizn, Nov. 30, 1969.

3. Bolstered agricultural performance.—The agricultural programs of the second half of the 1960's—which were characterized primarily by higher prices and incomes, more resources for investments, greater leeway and certainty of farms and farmers in their planning, and greater use of profits and monetary incentives as maximizing objectives—strongly stimulated agricultural performance. Gross agricultural output during 1966–70 gained 21 percent and grain production was up 29 percent over the level of the previous 5 years. Livestock performance also was strong; meat and milk output each were up 25 percent. These gains far exceeded performance during 1961–65. Some of the difference, no doubt, could be attributed to more favorable weather during 1966–70.

Added resources and incentives, however, must have played a strong role in the better agricultural performance during 1966–70. During this period, agricultural investments grew by two-thirds, while total economic investments were up a little over 40 percent. Deliveries of fertilizer to agriculture also were up two-thirds. From 1965 to 1970 average monthly incomes of collective farmers (excluding household plot earnings) grew by 45 percent and those of state farm workers by 36 percent, compared with wage growth of 26 percent generally in the economy.

B. The Livestock Program and Consumer Orientation (1971–75)

1. Rapid growth of livestock production sought.—The fundamental element of the Soviet agricultural program during the first half of the 1970's was the commitment to rapidly increase livestock production and to satisfy more fully the growth in consumer demand for livestock products. This commitment extended to use of imports of grain to help cover shortfalls in livestock feed output and to an acceptance of external debts to make possible such imports. Principal policy guidelines established in March 1965 on internal agricultural programs essentially were continued, but policies evolved to accommodate the growing emphasis on livestock.

More favorable preconditions for the livestock program were established by increased prices on poultry—effective May 1969—and livestock and livestock products—decreed in March 1970.[32] Key price changes included: (1) Establishment of 50-percent premiums on above-plan sales of livestock products (provided no declines occurred in annual farm livestock herds); (2) the fixing of livestock prices received by collective farms at the premium levels decreed in 1965 or at higher levels—and the extension of these higher prices to state farm and private sales as well; (3) establishment of additional price premiums of 35 to 50 percent on young cattle fattened beyond specified weights; (4) price increases of 20 percent on milk and cream; and (5) price increases of 20 to 30 percent on several grades of wool, as well as increases on sheep and goats.[33]

The ninth 5-year plan for 1971–75 called for large increases in output in livestock products, generally stipulating a repetition of the sharp gains made during the previous 5 years. Growth during 1966–

[32] "Resheniya Partii i Pravitelstva Po Selskomu Khozyaistvu" (1965–1974 gg.) (Moscow: Kolos, 1975), pp. 353–354, 419–422.
[33] Pravda, July 3, 1970.

70, however, had been exaggerated to some extent by the low level of production in the base period. Continuation of these growth rates in the 1970's was a more difficult challenge. The planned percentage growth in 1971–75 average output over the previous 5 years was: meat—23; milk—15; eggs 30; and wool—17.[34] Compared with the 1970 level, per capita consumption of livestock products in 1975 was to increase by the following percentages: meat—23; milk and dairy products—11; eggs—21.[35]

The importance attached to the sector was indicated by the unveiling of the agricultural program for 1971–75 at a special plenum of the Party Central Committee well in advance of the 24th Party Congress in April 1971. As in March 1965 the major address at the July 1970 plenum on agriculture was given by Party General-Secretary Brezhnev.[36] Brezhnev's address emphasized strong growth of investments into agriculture and provided many of the 1971–75 output targets, paying special attention to livestock and feed. Few changes were indicated, however, in the basic direction of agricultural policy.

In February 1971 the Soviet Party and Government adopted a decree on the further development of industrialized production of eggs and poultry meat, followed by a decree in April on the industrialized production of other livestock products.[37] The decrees called for Government construction during 1971–75 of 1,170 specialized livestock complexes—including 307 for beef, 228 for pork, and 635 for milk—and the construction or expansion of 585 poultry "factories"—large, integrated poultry operations. The planned cattle and hog operations varied in size, but ranged up to 20,000 to 30,000 head-of-cattle feed lots and 108,000 head hog farms (in terms of annual fattening capacity). Planned 1975 production from these specialized enterprises represented about 37 percent of the total production plan on eggs, 34 percent on poultry meat, 5 percent on other meat, and 2 percent on milk.[38]

The policy to develop large, specialized livestock complexes was not destined during 1971–75 to replace traditional livestock operations on collective and state farms. The major effort in expansion of production, however, was directed into these operations. The complexes provided a vehicle for the introduction of more advanced technologies and better management and feeding practices. They were only one part, however, of the overall livestock program.

2. Feed production and trade policies.—The critical feature of the livestock program was the commitment to expand the supply of feeds. The 5-year plan called for a 40-percent jump in feed supplies from 1970 to 1975. This required a 26-percent gain in concentrates (primarily grain), but a much sharper gain in other feeds (primarily roughages).[39]

Foremost among the policies to expand feed production was the strong support for development of the fertilizer industry and the in-

[34] "Gosudarstvenny Pyatiletny Plan Razvitiya Narodnovo Khozyaistva SSSR na 1971–1975 gody," ed. N. K. Baibakov (Moscow: Izdatelstvo Politicheskoy Literatury, 1972), p. 167.
[35] Ibid., p. 300.
[36] Pravda, July 3, 1970.
[37] Resheniya, op. cit., pp. 540–545, 644–651.
[38] David M. Schoonover, "The Soviet Feed-Livestock Economy: Projections and Policies," in Economic Development in the Soviet Union and Eastern Europe, vol. 2, Sectoral Analysis, ed. Zbigniew M. Fallenbuchl (New York: Praeger Publishers, 1976), pp. 232–233.
[39] Gosudarstvenny Pyatiletny Plan, op. cit., p. 175.

crease in deliveries of fertilizer to agriculture. Fertilizer deliveries jumped 69 percent from 1965 to 1970 and were planned to increase 64 percent from 1970 to 1975. The aggregate plan was exceeded slightly. Most of the increase in fertilizer supplies in the 1970's apparently has been allocated to grains and forage crops—the principal livestock feeds.

Other policies to boost feed production or to improve feed conversion ratios included irrigation and drainage programs, massive liming operations, expansion of grain areas (albeit partially at the expense of forage crops), developmental work on higher protein feed sources, development of a rapidly growing mixed-feed industry, and efforts to improve the livestock breeding herd.

Despite the increases in fertilizer supplies and other resources, the 1971–75 plans on production of feeds (especially roughages) were far more ambitious than could be attained in the course of a few years. The weak link in the livestock program was the feed supply. Feed requirements to produce planned levels of livestock product output were greater than feed production potentials.[40] Although the roughage production plans were fundamentally overambitious, the grain targets basically appeared attainable in years of average or better weather. These two circumstances meant that the Soviets faced a chronic deficit in overall feed supplies and a considerably greater deficit in years when poor weather reduced the grain crop.

Prior to 1971, the U.S.S.R. had imported relatively small quantities of grain and had maintained sizable net exports, except following the poor 1963 and 1965 crops. Grain imports exceeded exports, however, following the 1971 crop. The massive imports of more than 20 million tons following the drought-reduced 1972 crop set world grain prices climbing sharply. Large grain imports have continued in the 1970's. Average grain imports for the 5 marketing years following the 1971–75 crops reached almost 15 million tons (more than 10 million on a net trade basis).[41] Following the disastrous 1975 crop, imports exceeded 25 million tons. In October 1975 the U.S.S.R. signed a long-term grain agreement with the United States to purchase at least 6 million tons of wheat and corn annually over the 5 years beginning October 1976. Soviet grain imports in the 1970's represent a sharp departure from the traditional policy of autarky in temperate-zone agricultural commodities.

Meat import policies also shifted. Beginning in 1974 the U.S.S.R. has been an usual importer of large amounts of meats and exports have dwindled to low levels.

The U.S.S.R. has a history, however, of importing selected technologically-advanced inputs to put into production. A step-up of interest in agriculturally-related foreign technology became evident in the 1970's. Breeding-stock and seeds were imported. Feed lots and feed manufacturing processes were purchased, as were fertilizer plants and equipment. The U.S.S.R. signed an agreement on agricultural

[40] For a detailed analysis and projection of the gap between feed demand and domestic supply based on policies through 1973 see David M. Schoonover, "The Soviet Feed-Livestock Economy: Preliminary Findings on Performance and Trade Implications," in Prospects for Agricultural Trade with the U.S.S.R., ERS-Foreign 356, U.S. Department of Agriculture (April 1974), pp. 24–42.

[41] Economic Research Service, "U.S.S.R. Agricultural Situation: Review of 1976 and Outlook for 1977," FAER No. 132, U.S. Department of Agriculture (April 1977), p. 6.

cooperation with the United States in June 1973, which appeared to offer some increased access to U.S. agricultural research and applied technology.

3. Land improvements and organizational policies.—The livestock program and the associated shift in trade policy were the principal focus of Soviet agricultural policy during the first half of the 1970's, but the continuing emphasis on fundamental land improvement also has great long-term significance. Annual investments in irrigation and drainage project construction have increased from 1.6 billion rubles in 1965 to 4.9 billion in 1975. The total of these investments during 1971–75 was 19.4 billion rubles, or a fifth of all so-called "productive" investments in agriculture. During the decade from 1965 to 1975, irrigated land in crops in the socialized sector increased from 9.8 to 13.3 million hectares; drained land increased from 7.2 to 9.6 million hectares. Gross additions to irrigated and drained land were much greater, but a large share of improved lands went out of use owing to poor upkeep, salinization, or other problems. The ratio of net to gross additions, however, has improved over time. The several large-scale irrigation and drainage projects now in various stages of completion or discussion eventually could provide a dependable high-yield base for a significant share of production of grains, forages, and other crops.

A program announced by Brezhnev in March 1974 to develop the nonchernozem soil region of the RSFSR (encompassing much of North European U.S.S.R.) during 1976–90 is closely related to the long-term land improvement efforts.[42] During the 15 years of the program, land reclamation work is to include drainage of 9 to 10 million hectares, irrigation of 2 to 2.5 million hectares, and liming of 23 million hectares.[43] The program has broader objectives, however, and is designed to build roads and other infrastructure and to raise the attractiveness of the region to rural workers, as well as to increase agricultural production.

Another major new policy during 1971–75 was the official approval given to interfarm cooperation and agroindustrial integration. Types of cooperative and agroindustrial organization had existed for many years, especially in farm construction and subsidiary production, and further evolution of these two forms of organization had been underway for more than a decade. Experience in Moldavia was particularly instrumental in the evolution of these types of organizations. Official policy to encourage such organizations, however, was clearly enunciated by the top leadership for the first time in Brezhnev's speech at the December 1973 plenum of the Party Central Committee.[44] In the 1970's, associations of collective farms, state farms, or collective and state farms, together with feed mills or feed lots, became an important form of organizing Soviet livestock production. Agroindustrial associations, however, typically were involved in other sectors, such as fruit and vegetable production and processing.

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[42] Pravda, Mar. 16, 1974.
[43] Resheniya, op. cit., pp. 889–904.
[44] L. I. Brezhnev, Speech at the Plenum CC–CPSU, Dec. 10, 1973, in Voprosy Agrarnoy Politiki KPSS i Osvoyeniye Tselinnykh Zemel Kazakhstana: Rechi i Doklady (Moscow: Izdatelstvo Politicheskoy Literatury, 1974), pp. 349–350.

4. Shortfalls cause economic strains.—The Soviet Government and enterprises generally followed through on the planned level of resources directed into agriculture during 1971–75, but output was considerably short of the goal. Gross investment for the 5 years was up 60 percent, compared with 56 percent planned. Investments in agriculture jumped to 26 percent of total investments in the economy, compared with 23 percent during the previous 5 years. Fertilizer deliveries to agriculture increased 65 percent, compared with 64 percent planned.[45] There were some significant shortfalls, such as in deliveries of grain combines or in area drained, but other investments exceeded planned levels to assure fulfillment of the aggregate plan.

Output goals for some commodities, especially fruit, vegetables, potatoes, and a number of industrial crops were clearly overambitious; poor weather in 1975 prevented attainment of the grain goal. Feed supplies fell far short of plans, as did milk output, but distress slaughtering in 1975 brought meat production close to the planned level. For the 5 years, gross agricultural output increased 13 percent compared with the target of 22 percent.[46] The setback in 1975 strongly affected overall performance of the economy.

Farm incomes grew less than planned during 1971–75 and this was reflected in labor earnings—at least of collective farmers. Incomes of state farm workers grew by 26 percent from 1970 to 1975, compared with the general wage gain in the economy of 20 percent. Average earnings of collective farmers, however, grew only 22 percent, compared with the target of 31 percent.[47] Collective farmer earnings from the socialized sector remained at less than two-thirds of the average wage level in the economy.

Profitability of farm production declined during the first half of the 1970's, owing to increases in production costs. Despite price increases in 1970, production of milk and potatoes remained unprofitable on state farms and covered only variable costs on collective farms. Milk prices were raised another 8 percent, on the average, in April 1975.[48]

The increases in purchase prices and increased marketing volumes of livestock products, combined with fixed retail prices held stable since 1962, required increasing Government subsidization in the 1970's. According to the chairman of the U.S.S.R. State Price Committee, the subsidy on meat and milk prices totaled 19 billion rubles in 1975.[49] This level of subsidization was about 9 percent of total state budgetary expenditures.

C. The Quest for Agricultural Efficiency (1976–80)

1. Specialization and efficiency programs.—The Soviet 10th 5-year plan (1976–80), launched at the 25th Party Congress in February–March 1976, was referred to by Brezhnev as a plan emphasizing

[45] Economic Research Service, "The Agricultural Situation in the Soviet Union: Review of 1975 and Outlook for 1976," FAER No. 118, U.S. Department of Agriculture (April 1976), p. 30.
[46] Ibid., p. 29.
[47] Gosudarstveny Pyatiletny Plan, op. cit., p. 282.
[48] L. Grushetsky, "Sovershenstvovat Tsenoobrazovaniye," Ekonomika Selskovo Khozyaistva, No. 7 (July 1975), pp. 44–45.
[49] Pravda, Jan. 5, 1977.

efficiency and quality.[50] The same emphasis, especially on efficiency—defined broadly to include both gains in improved allocation and in technological progress—is the major new focus of the plans for agriculture. This efficiency is sought in many ways: improved use of mineral fertilizers through organization of agrochemical services, longer life of agricultural machines before the first major overhaul, intensified breeding work on crops and livestock, lowered costs of production through higher labor productivity.

The greatest hopes for increased efficiency, however, were placed on the program for specialization and concentration of agricultural production through interfarm cooperation and agroindustrial integration. The Party assigned responsibilities for working out plans for this program—to republic and oblast party committees and governmental organs; Gosplan U.S.S.R. and its local organizations; the U.S.S.R. Ministries of Agriculture, Food Industry, Meat and Dairy Industry, and Light Industry and their local units; the Collective Farm Council; and to workers, specialists, and scientists generally in the food-and-fiber system—in a decree published on June 2, 1976.[51] The specialization and concentration of production through interfarm cooperation and agroindustrial integration are the intended basis for an "industrialization" of agricultural production. This industrialization, in turn, is expected to lead to greater efficiency, especially in livestock production. In a compendium on the 1976–80 plan, prepared under the direction of the head agricultural planner of Gosplan, one Soviet specialist asserted:[52]

> The transfer of beef and pork production to an industrial basis would permit a nearly doubling of production in the socialized sector with the same amount of feed and a simultaneous cut in the labor requirement and a considerable lowering of the unit cost of production.

The number of interfarm enterprises engaged in production or processing of agricultural products had reached almost 1,700 by the beginning of 1976 (compared with about 1,000 5 years earlier), and more than 1,900 at the beginning of 1978. The 1,457 interfarm enterprises with agricultural activities in 1975 had shareholder membership of more than 20,000 farms (including double-counting of multiple memberships). These enterprises were primarily involved in livestock, poultry, or mixed-feed production. In addition, in 1976 there were 56 agroindustrial associations and 512 agroindustrial enterprises (excluding poultry "factories").[53] By the beginning of 1978 the numbers had grown to 124 agroindustrial associations and 661 agroindustrial enterprises.[54]

The 1976–80 plan gives continued emphasis to the development of large-scale livestock and poultry production complexes. Government investments of more than 10 billion rubles are planned for construction of livestock complexes and poultry factories—twice as much as during 1971–75. The total number of state, collective, and interfarm livestock complexes in 1977 was 2,403, of which, the number specialized

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[50] Pravda, Feb. 25, 1976.
[51] Pravda, June 2, 1976.
[52] N. Ye. Smetanin, "Uglubleniye Spetsializatsii i Kontsentratsii Proizvodstva", in Osnovnie Napravleniya Razvitiya Selskovo Khozyaistva v Desyatoy Pyatiletke, ed. N. P. Gusev and G. S. Gaponenko (Moscow: Ekonomika, 1976), p. 56.
[53] Ibid., pp. 59–61.
[54] L. Vashchukov and B. Pleshkov, "Slagaemie Intensifikatsii Selskovo Khozyaistva", Vestnik Statistiki, No. 10 (October 1978), p. 33.

in milk—1,630; cattle raising and fattening—275; hogs—410; and heifer raising—88. These complexes accounted for the following percentage shares of marketings by the socialized sector: milk—3.4; cattle (live weight)—7.6; hogs—23.3.[55] In addition, by the beginning of 1978 there were 796 so-called poultry "factories".[56] Soviet planners foresee "industrialized"production of 80 percent of the eggs, 30 percent of the pork, and 14 percent of the milk and beef by 1980.[57]

The largest share of agricultural output during 1976–80, however, still will be produced on collective and state farms. As of January 1, 1976, there were 29,000 collective farms—with an average of 6,400 hectares of agricultural land—and 18,000 state farms—with an average of 18,900 hectares of agricultural land. Most of these farms still were involved in a great many types of agricultural production. The enunciated policy was to move to 2 or 3 main types of production per farm—in turn, with intrafarm specialization. A partial move toward specialization reportedly already was worked out and approved in 1975 in Lithuania, where farms generally will produce only one main crop besides grain and one other type of livestock product besides milk.[58]

By 1978, concerns of a too-rapid shift toward specialization were expressed with some frequency. In July, Brezhnev stated that, "it would be incorrect to weaken attention to hog production on nonspecialized farms". He also noted that some farms incorrectly were reducing numbers or liquidating entire herds of livestock.[59] Other specialists advised that renovation of livestock facilities on collective and state farms would be economically efficient, especially where farms possessed their own feed base. Subsidiary poultry and hog farm enterprises, as well as complexes, were recommended.[60] Private livestock raising on household plots also received renewed support most notably by Brezhnev in a major address on agriculture.[61]

2. Price and resource policies.—Except for the emphasis on specialization as a means of increasing efficiency—and the overriding emphasis on interfarm cooperation and agroindustrial integration as a means of specialization—the apparent agricultural policies for 1976–80 largely follow the guidelines announced in March 1965. The principal alteration is the policy adopted in the early 1970's to import grains to supplement domestic feed supplies.

Modifications also have been made in procurement price policy, although the basic principle is the same. The policy of establishing government procurement plans with two components—a base-price quota and a bonus-price quota—has been expanded to include essentially all major agricultural commodities. During 1971–75 the total procurement plan apparently was allocated to farms. According to planning officials, for 1976–80 the total plan is allocated to procurement organizations, but only the base-price quotas should be allocated to farms. The bonus-price quotas apparently are secured by procurement organizations through contracting with farms. The prices on so-called "above plan" or bonus price quota sales generally are set at 50 percent above the base price. Levels of base-price quotas generally

[55] Vashchukov and Pleshkov, op. cit., p. 31.
[56] V. Manyakin, "Selskoye Khozyaistvo na Sovremennom Etape", Vestnik Statistiki, No. 10 (October 1978), p. 20.
[57] Smetanin, op. cit., p. 56.
[58] Ibid., p. 60.
[59] Pravda, July 4, 1978.
[60] Vashchukov and Pleshkov, op. cit., pp. 31–32.
[61] Pravda, July 4, 1978.

were raised for 1976–80. In the case of grain, this was the first major increase since 1965. Bonus-price quotas now are a smaller percentage of the total procurement plan on most commodities and amount to the following percentages: grain—17; cotton, sugarbeets, sunflowerseeds, and potatoes—15; karakul skins and tea leaves—10; livestock and poultry, milk, eggs, and wool—3. As a result of the relative changes in the quotas, base-quota prices paid to collective and state farms were increased in 1976 by the following percentages: sunflowerseeds—10; grain—7.6; livestock and poultry, milk, eggs, wool, and sugarbeets—3; and cotton—2.[62]

Additional measures were announced in 1978 to provide greater economic stimulus to production and sales of several agricultural commodities. Beginning January 1, 1979, prices paid both to socialized farms and individuals were raised by the following percentages: milk and dairy products—14; sheep and goats—11; wool—18; karakul skins—35; potatoes—38; and selected vegetables (cucumbers, tomatoes, onions, and garlic)—9. The increase was the second during the 1976–80 plan for milk, wool, sheep and goats. Added government expenditures of 3.2 billion rubles per year were expected to cover the price increases. As has been customary, retail prices were not increased.[63]

Principal features of the Soviet 1976–80 food and agricultural policies—other than the interfarm cooperation and agroindustrial integration program and the procurement quota and price changes—are:

(1) A sharp slowdown in the growth rate of aggregate capital investments into agriculture;
(2) Planned rapid gains to continue in fertilizer production and use;
(3) A planned strong growth in output of grains and several major crops;
(4) An agreement to import large amounts of grain each year.
(5) Small gains in average livestock product output;
(6) Little growth in planned consumption of livestock products;
(7) Some slowdown in consumer income increases, but stable retail prices on major foods;
(8) Substantial farmer income gains, a sharp boost in pensions to collective farmers and financial aid for private rural house construction; and
(9) Several measures announced in 1978 to provide financial relief to farms, including credit extensions or writeoffs and higher income tax exemptions.[64]

3. Assessment of current policies.—Planned levels of output appear attainable for only a few crop and livestock products. The grain target may be attainable, but will require relatively favorable weather during the last 2 years of the tenth 5-year plan. Average output during the first 3 years was only 2 million tons short of the 1976–80 target. Unfavorable prospects for grain and feed crops developed early in the 1979 season. Plans on some crops, such as potatoes and sunflowerseeds, are highly ambitious, as are implied targets on many forage crops. The overall gross agricultural ouput target of a 16-percent increase is unlikely to be met, even with relatively favorable weather. Average gross output for the first three years was well below the planned 1976–80 value.

Livestock production goals seem relatively consistent with feed production plans, especially if some progress is made on the goal of in-

[62] N. P. Gusev and G. P. Rudenko, "Sovershenstvovaniye Zagotovok i Stimulirovaniye Kachestva Selskokhozyaistvennoy Produktsii", in Osnovnie Napravleniya Razvitiya Selskovo Khozyaistva v Desyatoy Pyatiletke, ed. N. P. Gusev and G. S. Gaponenko (Moscow: Ekonomika, 1976), pp. 89–92.
[63] Pravda, Oct. 25, 1978.
[64] Pravda, July 4, 1978.

creased efficiency, although actual targets on forage crop production are ambitious.

Livestock production prospects were bolstered by the record grain crop in 1976, which permitted good recovery from the consequences of the 1975 drought—one of the worst, if not the worst, in this century. Another record grain crop in 1978 gave a further boost to livestock prospects, but moderate shortfalls are likely in attaining the 5-year goals, except for eggs. Despite the unlikelihood of attaining the original planned levels, higher livestock product goals have been indicated in some sources.[65]

Planned resource allocations probably were sufficient, if implemented, for near attainment of the 1976–80 production targets (barring unusually unfavorable weather). Planners foresaw application of about 47 million tons (standardized gross weight) of fertilizer on grain by 1980,[66] compared with about 27 million tons in 1975.[67] Fertilizer use on forage crops and hay meadows was planned to double to 30 million tons.[68] Total deliveries of fertilizer to agriculture (including chemical feed additives) were planned at 120 million tons in 1980.[69] The scheduled 59 percent rate of increase over the 5 years is only slightly slower than the 65 percent rate achieved from 1970 to 1975.

A severe slump, however, in the rate of growth of fertilizer deliveries during 1976–78 and the modest growth planned for 1979 make attainment of the 1980 fertilizer goal extremely unlikely. Plans called for annual fertilizer deliveries to increase by almost 45 million tons from 1975 to 1980, but the increase for the first 3 years was only about 5 million tons and—if the 1979 annual goal is reached—the increase for the first 4 years will barely reach 10 million tons. Even if an extremely strong and unlikely surge in fertilizer deliveries during 1980 permitted attainment of the 5-year plan target, growth in average crop output during the period would be hampered by the slow growth during the previous 4 years.

Except for fertilizers, the aggregate level of investments into the agricultural complex during 1976–78 appeared about in line with planned growth for 1976–80.

Despite the planned sharp slowdown in growth, the share of agricultural investments in total investments in the economy will increase owing to an even sharper drop in the latter. Furthermore, much of the slower growth apparently was intended in traditional construction and machinery investments. Construction of livestock complexes and irrigation and drainage programs were planned to be pushed strongly. Plans call for irrigated lands to be commissioned on more than 5 million hectares (4.2 million through government investments) and drained lands on 4.7 million hectares.[70]

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[65] Ekonomicheskaya Gazeta, No. 17 (April 1977), p. 10.
[66] N. T. Borchenko and G. S. Gaponenko, "Uvelicheniye Proizvodstva Selskokhozyaistvennoy Produktsii", in Osnovnie Napravleniya Razvitiya Selskovo Khozyaistva v Desyatoy Pyatiletke, ed. N. P. Gusev and G. S. Gaponenko (Moscow: Ekonomika, 1976), p. 66.
[67] Yu. P. Buryakov, "Khlebnoye Pole," Zernovoye Khozyaistvo, No. 1 (January 1976), pp. 2–3.
[68] A. I. Monov, "Na Blago Sovetskovo Naroda," Zemledeliye, No. 1 (January 1977), p. 6.
[69] Pravda, Oct. 28, 1976.
[70] N. M. Golovanev, "Programma Melioratsii Zemel", in Osnovnie Napravleniya Razvitiya Selskovo Khozyaistva v Desyatoy Pyatiletke, ed. N. P. Gusev and G. S. Gaponenko (Moscow: Ekonomika, 1976), p. 30.

The government plans to construct capacity for an additional 30 million tons of off-farm grain storage in elevators during 1976–80.[71] This is more than the planned increase in average grain procurements and seems to indicate some intended increase in grain stocks. Additional grain stocks would give Soviet policymakers considerably more leeway in import and livestock inventory change decisions in the event of poor harvests. Owing to weather alone, Soviet grain crops can fluctuate by more than 50 million tons between consecutive years. Construction of the planned elevator capacity would enable reserves to cover only a portion of such variability.

The Soviet agreement to purchase at least 6 million tons of wheat and corn annually from the United States for the 5 years beginning October 1976 seems to offer several assurances to the Soviet leadership. First and foremost is insurance to cover the uncertainty about weather and its impact on feed supplies in the interval until grain stocks can be built up. Another is the possibility of using these imports to build reserves. A third is the assurance of covering this portion of feed supplies if the feed production effort falls short of goals in any basic way.

The apparent consistency in the planned resources and feed-livestock production relationships does not seem to extend to the planned relationships between incomes and food consumption.[72] Average monthly wages are scheduled to increase by 17 percent.[73] Per capita consumption of meat, milk and dairy products, and eggs, however, is only projected by the planners to increase by 5 percent.[74] Although the meat and milk consumption goals are consistent with the production plans, they seem to imply a lower elasticity of demand with respect to income than generally is assumed for the Soviet Union.

Retail price increases apparently are ruled out, except as a measure of last resort, although they also would help alleviate another problem—the growing budgetary subsidization of meat and milk prices. Without retail price increases, these subsidies are likely to grow, as costs of production have increased markedly in the 1970's and are likely to increase further until efficiency gains can offset rises in the cost components. The higher prices to farms announced in 1978 were expected to raise average farm incomes by 3.2 billion rubles—at the cost of higher subsidies since retail price increases were ruled out.[75] During 1976–80 average monthly wages of state farm workers are slated to rise 22 percent and collective farmer earnings on the socialized sector are expected to grow by 26 percent.[76] Considerable gains in efficiency will be required, therefore, to hold down advancing costs.

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[71] Pravda, Mar. 7, 1976.
[72] David M. Schoonover, "Soviet Agricultural Trade and the Feed-Livestock Economy," in Joint Economic Committee, Congress of the United States, Soviet Economy in a New Perspective (Washington: Government Printing Office, 1976), pp. 817–819.
[73] Pravda, Oct. 28, 1976.
[74] N. Gusev, "Glavnaya Zadacha Selskovo Khozyaistva v Desyatoy Pyatiletke," Ekonomika Selskovo Khozyaistva, No. 8 (August 1976), p. 17.
[75] Pravda, Oct. 25, 1978.
[76] G. S. Gaponenko and N. Ye. Smetanin, "Povysheniye Effektivnosti Selskokhozyaistvennovo Proizvodstva," in Osnovnie Napravleniya Razvitiya Selskovo Khozyaistva v Desyatoy Pyatiletke, ed. N. P. Gusev and G. S. Gaponenko (Moscow: Ekonomika, 1976), pp. 107–108.

D. Directions for the 1980's

1. July 1978 plenum on agriculture.—Brezhnev addressed another special plenum on agriculture in July 1978 and major targets for the 1981–85 plan were announced. This unusual act of announcing 5-year plan goals midway through the previous plan apparently was dictated primarily by two circumstances.

On the one hand, the unsatisfactory progress in attaining 1976–80 planned growth probably already was evident to Soviet leaders at the plan midpoint. Fertilizer shortfalls and other problems were restraining crop production growth, despite relatively favorable weather, and meat production had barely recovered to 1975 levels. The leadership probably viewed the plenum both as a means to reassure the population of their serious intent to stimulate agricultural production and food supplies, and to take several corrective measures.

At the same time, the increasing complexities of planning the Soviet economy require better and more timely communication of intentions. The early announcement of principal agricultural targets for the 1981–85 plan on the eve of detailed plan preparations no doubt was viewed as a means of providing better guidance to all branches and levels of planning.

The major agricultural production guidelines for 1981–85 announced at the July 1978 plenum appear reasonable if commensurate resources are made available and weather is not exceptionally unfavorable. The average grain output goal of 238 to 243 million tons is 8 to 10 percent above the 1976–80 goal. Attainment likely will depend not only on weather, but on the ability of the leadership to get the fertilizer program back on schedule in short order. A meat target of 19.5 million tons in 1985 was announced.[77] Although this is 2.2 million tons above the 1980 goal,[78] it likely will require a considerably larger increase over actual production in 1980. Though far from easy to attain, the goal is within reach if feed supplies rise as planned. The greatest difficulty probably lies in increasing nongrain feed supplies. For the majority of regions of the U.S.S.R. Brezhnev placed top priority among meats on beef production. The development of haylands, seeded pastures, and range pastures is expected to be a critical element for success of the Soviet beef program. At the plenum, Brezhnev also called for the increase of grain production by 1990 to 1 ton per capita—a far more difficult task than the 1981–85 goal.

Brezhnev promised the agricultural sector a continued massive infusion of resources during 1981–85. He stated that the share of agriculture in total investments would be no less than the levels already attained. In addition, he said that annual fertilizer deliveries during the 5 years would reach 135 to 140 million tons (and feed additives would reach 7 million tons). Given the problems in stimulating fertilizer output during 1976–80, an extremely large increase likely will be required during 1981–85.

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[77] Pravda, July 4, 1978.
[78] Borchenko and Gaponenko, op. cit., p. 80.

A number of party and Government decrees on agriculture were approved at the July plenum.[79] Subjects of the decrees included:

(1) Investment plans for tractor and agricultural equipment manufacture and goals for upgrading deliveries of tractors and agricultural machinery during 1981–85;

(2) Plans for resources directed into forage crop production and goals for forage crop output by 1985;

(3) Investment plans for livestock and feed equipment manufactured during 1981–85 and goals for upgrading deliveries of livestock and feed equipment during 1978–85;

(4) Plans for increasing the capacity of the mixed feed industry, including a 1985 goal or 72 million tons of mixed feed output at state industrial enterprises;

(5) Plans for investment in the microbiological industry during 1981–85 and targeted additions to production capacity for feed yeasts, amino acids, and other agricultural inputs;

(6) Creation of an All-Union Scientific-Production Association for Livestock Breeding and instructions to work out a detailed breeding program for each oblast, as well as other measures to improve breeding work;

(7) Plans for strengthening veterinary services;

(8) Plans for expanding sugar industry capacity and the delivery of equipment to sugarbeet farms during 1981–85, as well as the target to procure 97 million tons of sugarbeets in 1985;

(9) Plans to greatly step up the work on breeding, testing, and seed treatment of hybrid seed corn during 1981–85;

(10) Economic relief to farms through the writing off of 7.3 billion rubles of indebtedness and the extension of payback on another 4 billion rubles to 12 years, plus higher prices beginning January 1, 1979, on milk and dairy products, sheep and goats, wool, karakul skins, potatoes, and selected vegetables;

(11) Extension to state farms on January 1, 1979 of the same insurance on losses to weather and natural disasters then available to collective farms; and

(12) Encouragement for assistance in construction of private dwellings on farms, with state credits—50 percent of the loan paid in equal monthly amounts over 20 years, and the other 50 percent paid through the economic incentive fund of the farm—and a 20-percent down payment by owner.

At the plenum, Brezhnev announced the return to a single procurement plan for each commodity in each farm and region during 1981–85. He noted that the use of various supplementary plans and above-plan quotas had led to a multitude of plans, which was negatively affecting activities.

He also noted the creation of new organizations to better supply vegetables and potatoes to cities. Financially integrated associations will be created and will include not only specialized production units, but also enterprises for storage and processing.

2. Unresolved issues.—Soviet leadership under Brezhnev has maintained a great deal of stability in agricultural policies over a decade

[79] Pravda, July 11, 1978.

and a half. The most notable feature of these policies has been the continual boosting of resources and incentives to stimulate greater production. Output has been increased but costs have been high—and are expected to remain high.

A principal issue is the ability of the Government to continue to pour the tremendous and growing amounts of investments into agriculture and agricultural inputs at relatively low rates of return. The incremental returns on many of the competing demands for these resources may well have greater economic or social benefits.

Another issue is the need to attain greater efficiency in the use of resources in production—to increase the return from a given level of input. No doubt there is awareness of approaching constraints on further increases in resources directed into agriculture. In the case of labor, resources in agriculture already are declining. Programs to stimulate incentives may call forth added output. At the same time, the increasing complexities of managing a planned economy raise questions about the ability of economic managers to attain greater efficiencies through improved resource allocation. The challenge then is to raise output by introducing improved technologies. The degree of success in reducing grain fed per unit of livestock output—through introduction of improved breeds and other technologies, for example—may be pivotal to the future development of Soviet agriculture and food production.

Questions related to organization of agricultural production still appear to be an issue. Organization affects the ability to manage resources to attain their more efficient allocation and to facilitate the introduction of new technologies. Renewed attention has been given to household plots and private livestock holding as a source of added output. The more basic question, though, seems to concern the relative importance in future agricultural production of large specialized complexes, particularly for livestock, versus the more traditional collective and state farms. Current investment decisions, particularly investments into the specialized complexes, could fix organizational patterns until well into the future.

Still another issue relates to distribution of the output produced. Although still lagging, farmer incomes have improved relative to urban wages. A newer issue is the extremely high subsidization of retail prices on some agricultural products, especially meat and milk. This subsidization fuels demand and keeps up the pressure to pour still more resources into agricultural production as a means of satisfying that demand. The need to dispose of surplus agricultural production has not yet become a major problem in the Soviet economy, but could emerge in the future.

In their most fundamental sense, the unresolved issues of Soviet agricultural policy are essentially the same as the issues facing agricultural policymakers elsewhere. The institutional constraints—State ownership of resources, central planning, administered prices—however, create peculiar Soviet-type symptoms of the fundamental economic problems.

Soviet agricultural policies of the 1980's likely will be geared to find solutions to problems within the limits of the institutional constraints.

SOVIET AGRICULTURE: AN ECONOMETRIC ANALYSIS OF TECHNOLOGY AND BEHAVIOR

(By Donald W. Green*)

CONTENTS

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SUMMARY

This paper presents the structure of Soviet agriculture from a model-builder's perspective with an appropriate specification of technology and bureaucratic behavior. Estimation results are given for four major components of the agricultural model—crop production, the livestock sector, labor participation, and capital investment. Finally, the technological equations are used to project Soviet grain and meat output for the period of the 11th 5-year plan (1981–85). These projections are compared with official Soviet goals, grain projections by the CIA, and an earlier study by the author using SOVMOD III.

*Vice president, Chase Manhattan Bank. The author's research in this area began initially during the SOVMOD project carried out jointly by SRI International and Wharton Econometric Forecasting Associates under contract to the U.S. Government. Subsequent work was supported by a research grant from the Russian Institute, Columbia University. The author also wishes to acknowledge the contributions made by Daniel Bond, Michael Marrese and Tayyeb Shabbir.

1. The Structure of Soviet Agriculture: An Overview

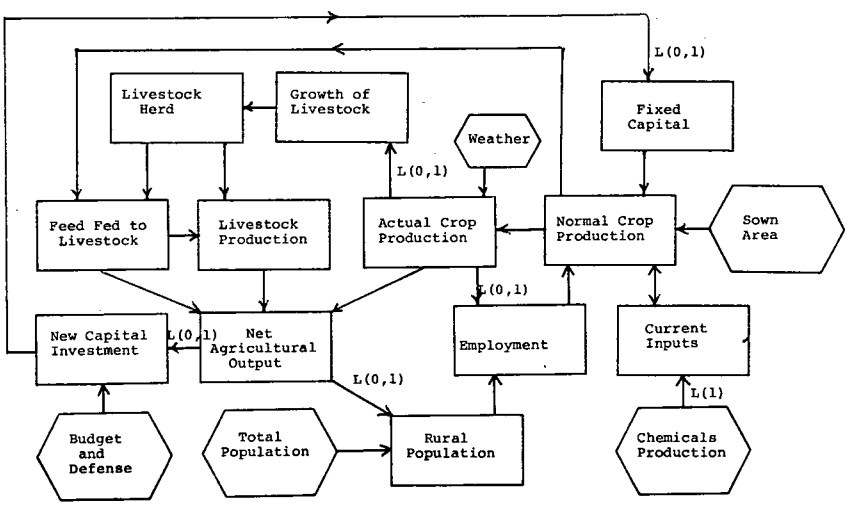
Early in the development of an econometric model of the Soviet Union, it became clear that the agricultural harvest played a fundamental macroeconomic role in the economic system. Not only was there a large direct impact on national income, industrial sectors dependent on agricultural inputs, and personal consumption. Many other macroeconomic variables in the Soviet economy were responsive to the conditions of current and past harvests; among those variables were profits, sector employment, capital investment, and the state budget. Therefore, a model of Soviet agriculture should provide not only a reasonable representation of a complex technology but also generate a macroeconomic signal for use in modeling the behavior of Soviet planners, enterprises and households.[1]

The agricultural sector poses a major challenge to the econometric modeler because of the simultaneity of output and variable inputs. Two systems of simultaneity appear to be relevant for Soviet agriculture. The first system connects weather conditions, employment, wages, material inputs from other sectors, and agricultural production. The second system of simultaneity involves the livestock sector and the impact of crop production on the growth of the herd, the allocation of feed for livestock, and the determination of animal product output and meat production.

Figure 1

The Structure of the Agricultural Sector

Impacts are within the current year unless indicated by the lag operator: L(1,2) means a one and two-year lag. Hexagons indicate variables which are exogenous to the sector.



In figure 1, a simplified diagram of the agricultural sector in SOVMOD III is provided; not shown is the meat subsector within animal products and grain which is a component of crop output. The major

[1] Donald W. Green and Christopher I. Higgins, "SOVMOD I: A Macroeconometric Model of the Soviet Union". (New York, 1977), p. 9.

exogenous variables in the sector are the weather indexes which influence crop output, annual budgets and defense expenditures which influence capital investment, and grain imports which influence the allocation of feed to livestock. The output of chemicals and petrochemicals influences the level of agricultural current purchases from other sectors with a year's lag. The two systems of simultaneity are clearly indicated: (1) The interdependence of the livestock herd and feed fed to livestock in the determination of animal product output and the growth of the herd; and (2) the simultaneity of total agricultural output, current purchases from other sectors, capital stock (through current investment), and employment (through collective farm participation rates).

The components of the agricultural model will be examined in the sections below, but the structure can be described briefly with the use of figure 1. We begin with the determination of crop production at the center of the system. Normal crop production in any year is a function of sown area, employment, fixed capital, and material inputs (fertilizer, fuel, spare parts, and so forth). Actual crop production is determined by weather conditions and this function generates a measure of the crop deviation. Similar equations determine normal grain output and actual grain production.

Livestock production and meat production are determined by the livestock herd, feed fed to livestock, and the crop deviation (current and lagged). Feed fed to livestock is a function of the livestock herd (primarily cattle), crop production, and grain imports. The growth of the livestock herd is a function of the crop deviation (current and lagged) and various policy decisions.

Net agricultural production is calculated from crop production plus animal product output less feed fed to livestock. Deviations from normal agricultural output influence new capital investment along with state budgets and defense expenditure. Capital investment is phased into fixed capital with an estimated capital formation equation. Conditions in agriculture also influence employment with 1- and 2-year lags. The share of total population in rural areas is influenced by past harvest conditions with great outmigration following poor harvests. The composition of agricultural employment and agricultural wages are also directly influenced by the crop deviation.

2. The Concept of Normal Output and Two-Step Estimation

The estimation of production functions for agriculture has often been troublesome given the complexity of agricultural technology and the sensitivity of yields to weather conditions. These problems are accentuated in the case of the Soviet Union given the diversity of growing conditions and the variability of annual weather patterns over much of the arable land. Early econometric studies of Soviet agriculture often found a very high elasticity of output for labor inputs, a result which did not appear plausible given the size of the Soviet rural labor force.[2] It is now clear that this estimate of the labor coefficient arose from the high correlation in shortrun variation of output and

[2] Hans-Jurgen Wagener, "Sectoral Growth—The Case of Soviet Agriculture," Forschungsbericht 1973 (Osteuropa-Institut Munchen, Munich, 1974); Michael Marrese, "An Econometric Model of the Soviet Agricultural Sector," SRI–WEFA Working Paper No. 21 (July 1974).

labor in response to weather and the secular decline in agricultural employment in the Soviet Union. In SOVMOD I, this estimation problem was solved with a two-stage procedure: (1) A linked-peak series for net agricultural output was explained by the primary factors of labor and capital, and (2) deviations from peak output were explained by weather variations.[3]

In the estimation of SOVMOD II, this procedure was found to be inadequate for grain production. Because of the dominance of two bumper harvests in 1958 and 1973, any linked-peak series was reduced to a straight line over the sample period. To incorporate more information from the output series, four bumper harvests were deleted (1958, 1966, 1970, and 1973) and a linked-peak series interpolated from the remaining observations. We have called this a "linked-second-peak" series.

With the decision to disaggregate and refine the agricultural sector in SOVMOD III, our basic methodology was carefully reconsidered.[4] Linked-peak series have usually been calculated in order to measure capacity utilization. The assumption is made that production peaks reflect capacity output and capacity expands smoothly between peaks; many refinements, of course, may be introduced to relax those strict assumptions. In the case of agriculture, however, a bumper harvest reflects favorable weather as well as technological capacity. A linked-second-peak series, therefore, provides a better approximation of capacity since it excludes both bumper harvests and harvest failures.[5]

This procedure may be illustrated by the diagram in figure 2 for total crop production (XCROP70). The two-step estimation procedure first assumes that the upward movement in the production of normal output is due solely to factor inputs and materials. A linked-second-peak series was regressed on employment, sown area, capital, and current purchases from other sectors. The predicted values from this estimation become our definition of normal output (XCROPN). It is "normal" in the Soviet sense of an above-average standard of performance. This measure of normal output thus incorporates information from output growth (mediocre to good harvests) and the growth pattern of productive imputs.

In the second step of the estimation, the proportional deviation of actual output (XCROP70) from normal output (XCROPN) is regressed on weather variables. For grain production, it is important to recognize that this methodology differs from that adopted in the CIA's earlier analysis. In that study, grain yield per hectare was regressed on a time trend and weather variables.[6] Over the 15 years 1961–1975, the CIA method attributes a greater impact of weather conditions on grain production than will our two-step procedure. In figure 3, the relationship between normal grain production and actual output is presented.

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[3] Donald W. Green, "The Agricultural Sector of the SRI–WEFA Model," SRI–WEFA Working Paper No. 26 (September 1974).

[4] Donald W. Green, "An Econometric Model of Soviet Agriculture," SRI-WEFA Working Paper No. 58 (September 1977).

[5] This procedure does not suppress information as some have suggested. The subset of observations selected for interpolation depends upon these observations which are excluded. Consequently, the linked-second-peak series does not simply represent information from only seven or eight observations.

[6] Central Intelligence Agency, "U.S.S.R.: The Impact of Recent Climate Change on Grain Production", ER 76–10577 U, October 1977.

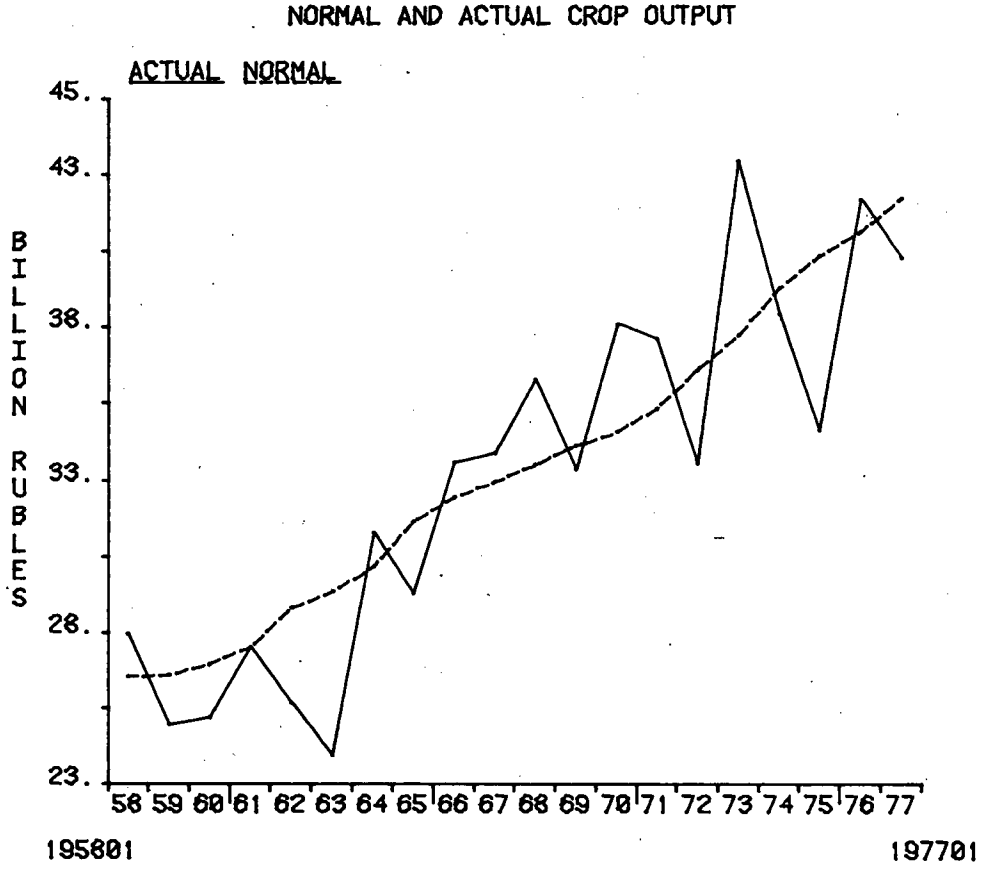

Figure 2
Total Crops: Normal and Actual Output

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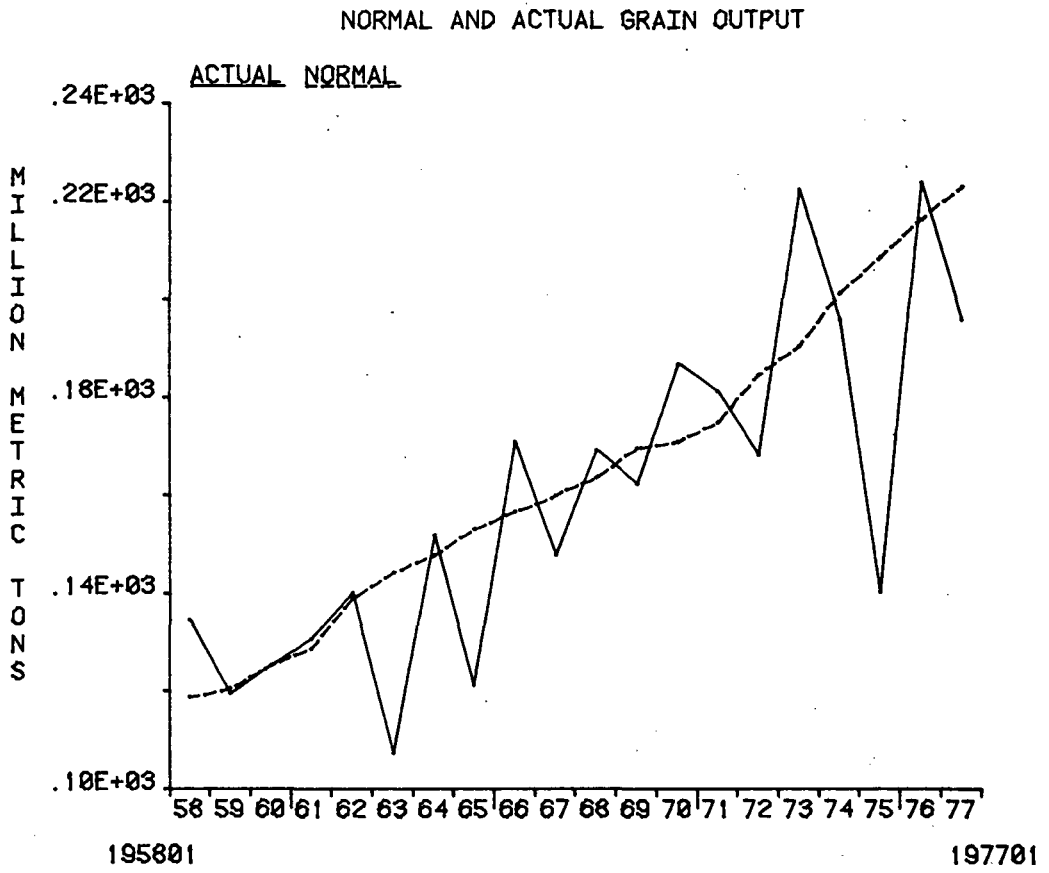

Figure 3
Total Grain: Normal and Actual Output

The series for net agricultural output provides some additional problems because of the possibility of offsetting movements in crop production, animal production, and feed fed to livestock. By including productive livestock as an argument in the estimation for normal output (XAGTN), part of the deviation in actual output has already captured in normal output before estimating the weather impact.

3. The Determination of Agricultural Output: Total Crops, Grain, and Net Agricultural Production

Even when the output series has been appropriately smoothed by linked-second-peak interpolation, the econometric estimation of production functions remains difficult. Output elasticities for labor are usually negative and other parameter estimates are often unreasonable when three or more factor inputs are included as dependent variables. Consequently, to obtain reasonable production functions for analysis and forecasting one must often introduce additional information by imposing elasticities for particular inputs. There now exist two major sources of additional information: (1) Cross section estimation results at the Republican level in the U.S.S.R.; and (2) Western estimates of factor shares in agricultural value added.

Recently, Daniel Bond has estimated agricultural production functions for the Soviet Union using pooled cross section, time-series techniques.[7] These suggest that capital elasticities are in the range of 0.20 to 0.30, labor elasticities are 0.50 to 0.60, with land as the residual factor under constant returns to scale. These estimations were for total agricultural output (official data) and regional estimates for livestock and current purchases were not available.

Using factor shares in agricultural value-added as output elasticities is equivalent to assuming cost-minimization in the Soviet context. Diamond and Krueger (1973) have provided a useful vector of factor shares estimated for 1966.[8] This vector is presented in table 1 along with the output elasticities actually used in our econometric model of Soviet agriculture. Comparing the 1966 factor shares with the output elasticities for net agricultural production, two differences are important. First, the imposed output elasticities for labor and land are smaller than the factor shares, a combined total of 41 percent compared with 64 percent. Second, the estimated elasticity for productive livestock is much higher than the estimated factor share (33 percent compared with 3 percent). The combined contribution of land, capital and current purchases is larger for total crops and grain. The complete estimations for normal output are presented in table 2. The serial correlation suggested by the low Durbin-Watson statistics is not a serious problem. It arises from the methodology of linked-second-peak interpolation and is corrected in the second step of the estimation procedure.

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[7] Daniel L. Bond, "Multiregional Economic Development in the Soviet Union: 1960–1975." Ph. D. dissertation (North Carolina, 1979).

[8] Douglas B. Diamond and Constance B. Krueger, "Recent Developments in Output and Productivity in Soviet Agriculture", in U.S. Congress, Soviet Economic Prospects for the Seventies (Washington, D.C. 1973), p. 328–330.

The second step of the estimation procedure determines the deviation of actual output from normal output as a function of three simple weather variables:

(1) Spring-summer precipitation (JPS9): Average precipitation during the growing months (April to September) for 5 representative grain-growing regions. Precipitation averages are weighted by relative grain output for those areas.[9]

TABLE 1.—FACTOR SHARES AND OUTPUT ELASTICITIES

	Factor shares in value-added	Output elasticities		
		Total crops	Grain	Net agricultural production
Labor	0.58	0.49	0.24	[1] 0.35
Land	.12	[2] .15	[2] .35	[1] .05
Fixed capital	.15	[1] .20	[1] .25	.14
Productive livestock	.03			.33
Current purchases	.12	.16	.16	[1] .10
Sum	1.00	1.00	1.00	0.97

[1] Imposed in the estimation.
[2] Imposed by constant-returns-to-scale restriction.

TABLE 2.—THE DETERMINATION OF NORMAL OUTPUT

Category	Constant	Sown area (ASGR9)	Employment (NAT)	Fixed capital (KAIR)	Productive livestock (ALV)	Current purchases (AVCP70)	R^2	S.E.	D.W.
Total crops	−0.0238	†0.1516	0.4892	*0.20		0.1592	0.828	0.025	0.29
XCROPN	(1.52)		(6.79)			(10.35)			
Total grain	1.1069	†.35	.2413	*.25		.1587	.814	.029	.39
XGRTN	(7.16)		(2.91)			(8.95)			
Net agricultural output	.6307	*.05	*.35	.1388	0.3328	*.10	.982	.015	1.11
XAGTN	(2.03)			(6.15)	(3.38)				

†Indicates the elasticity is determined by the restriction to constant returns to scale.
*Indicates an imposed elasticity.

Note: These equations are actually the definitions of normal output. The statistical properties are those from regressing the linked-second-peak series on factor inputs. All estimations are in log-linear form. Sample periods: 1955–77 for XCROPN and XGRTN, 1958–77 for XAGTN.

(2) Winter temperature (JTW9T): Mean monthly temperature (January to March) for the Southern Ukraine, an important region for winter wheat. This series has now been truncated so that mean temperatures above zero degrees centigrade are set equal to zero; the impact, therefore, is only on the downward side for winter-kill.

(3) Winter precipitation (JPW9): Mean monthly precipitation (January to March) for the Southern Ukraine. Winter precipitation contributes snow cover for winter wheat and soil moisture for early spring crops.

Considerable work remains to be done in refining such indexes and developing alternatives, but we have found that these three indexes explain more than half of the deviation of actual output from normal output.

[9] See Green and Higgins, op. cit., pp. 259–262 for a more complete description of JPS9 and JTW9.

Estimation results for the deviation of actual agricultural production are presented in table 3. The sample period of these estimations is only 15 observations, 1962–1976, because of the limited availability of weather data. For total crops, the standard error in predicting actual output is 6.3 percent; the largest percentage errors appear in 1964 (12 percent below the actual value), 1969 (7½ percent above), and 1975 (7 percent above). For total grain, the standard error of prediction is 11½ percent or around 20–25 million metric tons in the 1970's. The largest percentage errors for grain appear in 1975 (23½ percent above the actual value) and 1964 (17 percent below). For net agricultural output (XAGT70) where there exist offsetting movements in animal product output, the standard error of prediction is only 3.4 percent—one-half the error for total crops and less than one-third of the error for total grain. The largest percentage errors occur in 1976 (5 percent above actual output), 1972 (4½ percent below) and 1963 (4½ percent above).

TABLE 3.—WEATHER DETERMINATION OF THE DEVIATION FROM NORMAL OUTPUT

Category (mean deviation)	Constant	Spring-summer precipitation	Winter temperature	Winter precipitation	R^2	S.E.	D.W
Total crops	−0.0122	0.1447	0.0061	0.0996	0.598	0.063	1.66
(−0.0119)	(.51)	(3.85)	(1.36)	(2.23)			
Total grain	−.0530	.2043	.0683	.1477	.438	.115	2.32
(−0.0471)	(1.22)	(2.97)	(.83)	(1.81)			
Net agricultural output	−.0001	.1215	.0084	.0222	.793	.034	.89
(−0.0070)	(.01)	(5.94)	(3.43)	(.91)			

Note: The dependent variable is the difference between the log of actual output and the log of normal output. Sample period is 1962–76 for all regressions.

The final component in the crop sector is the determination of agricultural current purchases from other sectors. Earlier analysis had found that the two major determinants of current purchases were normal crop production and the output of chemicals and petrochemicals (lagged 1 year). There does not appear to be any systematic relationship between the harvest deviation (current or lagged) and deliveries of fertilizer and fuel to agriculture. It may be that the application of such inputs does fluctuate with the state of the harvest (as does employment), but the inventory adjustment takes place within the agricultural sector and is not directly observed. The equation used in the determination of current purchases is given below:

$$\frac{100.AVCP70}{XCROPN} = \underset{(22.14)}{7.0019} + \underset{(26.64)}{7.0204}\ \frac{XOCH_{-1}}{XCROPN}$$

$$\bar{R}=0.994 \qquad SE=0.50 \qquad D.W.=0.91$$

Sample period: 1955–1977

4. Livestock Output and Growth

Production of animal product output depends upon the size of livestock herd, the volume and composition of feed fed to livestock, and the allocation of other factors to livestock production. However, efforts to construct data on capital and labor services to the livestock sector have not been successful, primarily because of intrafarm allocation

between crop production and livestock production. Consequently, in a macroeconomic determination of livestock output there are three separate sources of information:

(1) The size and composition of the herd, with Soviet livestock data available for cattle, swine, and sheep and goats;

(2) The value of feed fed to livestock, calculated using 1970 prices for different components; and

(3) The harvest deviation for total crops, which influences the timing of animal slaughtering as well as the efficiency of livestock management.

Combining this information in an appropriate way remains a difficult problem, and in this paper a new specification has been introduced.[10]

The basic approach begins with a log-linear production function with factor productivity dependent on current and past harvests:

(4-1) $$\text{Livestock Output} = A\ (\text{Herd size})^{\alpha}\ (\text{Feed})^{\beta}\ e^{\text{Harvest}}$$

Rather than use the aggregate value of livestock using Soviet official prices, it was desired to introduce the composition of the herd (cattle, swine, sheep and goats) directly. Parametric experiments suggested a restriction of B (the feed elasticity) to 0.35—0.40 and introducing the harvest deviation as a linear impact on the effective herd size:

(4-2) $$\frac{\text{Livestock Output}}{(\text{Feed})^{\beta}} = \alpha_0 + \alpha_1\ \text{Cattle} + \alpha_2\ \text{Swine} + \alpha_3\ \text{Sheep \& Goats} + \alpha_4 \text{Harvest}$$

Estimated equations based on this specification are presented in table 4 for total livestock output and total meat production. In each production function, two livestock categories are significant while the third is not. In each, the most significant coefficient is the impact of the cattle herd. Surprisingly, the swine coefficient is significant in the determination of total livestock output but not meat production. This may arise from the interaction of the growth of the herd and the harvest deviation. However, introducing the harvest deviation does not improve the meat equation. The productivity in total animal output is reduced by poor harvest conditions as was expected. Meat production is sustained during a poor harvest given additional slaughtering, but is reduced the following year when herds are being rebuilt.

TABLE 4.—OUTPUT FROM THE LIVESTOCK SECTOR

Output category, dependent variable, and mean	Constant	Cattle	Swine	Sheep and goats	Harvest	R^2	S.E.	D.W
Total animal product output:								
XANIM70/AFEED70 (0.35)	4.4401	0.0844	0.1264	0.0190	6.7984 [1] XCDV01	0.924	0.72	1.65
(22.00)	(1.08)	(4.90)	(4.23)	(.48)	(3.76)			
Total meat production:								
XMEAT70/AFEED70 (0.40)	8.3645	.0573	.0182	.0899	--------	.794	.52	2.21
(11.02)	(1.84)	(4.57)	(.83)	(2.39)				
Feed fed to livestock:								
AFEED70/XCROPN (0.75)	—.1792	.0090	----------		.3046 [1] XCDV01	.891	.037	1.71
(0.685)	(2.07)	(10.17)			(1.92)			

[1] XCDV01 is the average crop deviation, current and lagged 1 year. XCDV is the crop deviation from normal output.

Note: Sample period of regressions: 1956–77 for animal product output; 1959–77 for meat; 1960–77 for feed to livestock. Livestock variables are annual levels, the average of initial and terminal stocks, and therefore only approximate the average annual stock.

[10] Green (1977), op. cit., introduced a log specification which proved unstable in long-range projections.

The allocation of feed to livestock has been specified as a requirements function, scaled by normal crop production and adjusted by the state of the harvest. Feed has been related to total crops rather than total grain because of the importance of potatoes as a feed crop in the Soviet Union. The missing element in this specification is the impact of grain imports. If the grain import variable is added to the specification, the coefficient has the expected sign but is not significant:

$$(4\text{–}3)\quad \frac{AFEED70}{XCROPN^{0.75}} = \underset{(0.70)}{-0.08753} \underset{(5.70)}{+0.0079}\ \text{Cattle} \underset{(2.18)}{+0.3958}\ \text{XCDV01} \underset{(1.013)}{+0.00196}\ \text{Grain Imports}$$

$\bar{R}^2$=0.892 S.E.=0.037 D.W.=1.63

When grain imports are scaled by total grain production or normal grain production, the estimated coefficient is even less significant.

In our revised model of the Soviet agricultural sector, physical counts of the livestock herd are used for cattle, hogs, sheep, and goats. In addition, there is a value measure of productive livestock (ALVR70) computed by aggregating those counts using 1970 prices. Livestock growth is a function of long-term policy (the constant term and a shift for the 1970's), the harvest deviation for crops, and specific policy interventions in certain years. The estimates for growth rate equations are presented in table 5 with variables defined in the notes to the table.

Livestock growth during the 1960–77 period has been very volatile in the Soviet Union. Average annual growth has been 2.1 percent for total livestock: Cattle (2.4 percent), hogs (3.0 percent), and sheep and goats (0.2 percent). Growth rates have slowed down during the 1970's in all categories despite the financial commitments to raising the supply of meat to consumers. The impact of the harvest is most pronounced for hogs with an impact multiplier of 1.2; that is, a 10 percent drop in the harvest results in a 12 percent drop in the swine herd over a 2-year period. The harvest impact is much less for cattle (0.13) and sheep and goats (0.17), since rebuilding cattle herds is so difficult and most sheep and goats are maintained on pasturage and not prepared feeds.

TABLE 5.—GROWTH OF LIVESTOCK

Category (mean growth)	Constant	Harvest deviation	1970's shift	Specific interventions	R^2	S.E.	D.W.
Cattle	0.0059	0.1297	0.0347	—0.0692 Q6769	0.514	0.020	2.33
(0.0238)	(.75)	(2.78)	(3.10)	(4.45)			
Hogs	—.0195	1.1629	.1046	—0.3116 (Q63–Q64)	.738	.083	1.56
(0.0296)	(.60)	(3.05)	(2.35)	(5.19)			
				—0.2433 Q6768			
				(3.39)			
Sheep and goats	—.0072	.1679	.0214	—0.0620 Q64—0.1045 Q69	.734	.019	1.95
(0.0016)	(1.00)	(4.26)	(2.24)	(3.11) (5.22)			
Total livestock	—.0009	.2366	.0454	—0.0609 (Q63–Q64)	.668	.026	1.76
(0.0208)	(.0)	(3.68)	(3.02)	(3.18)			
				—0.0855 Q6769			
				(4.08)			

Note: Sample period: 1960–77. Dependent variables: Growth rates of end-year stock over previous end-year. Total livestock calculated from stocks and 1970 prices. Harvest deviation: Average deviation in total crops for current and previous year. 1970's shift: A dummy variable equal to 1 through 1970, 0 thereafter. Interventions: Dummy variables for years indicated; a bar indicates that the dummy variable has been adjusted to a mean of zero over the sample period.

Certain specific interventions were important during the 1960's. There was an amplified swing in the swine herd during 1963–64 of 31 percent due to panic slaughtering after the 1973 grain harvest failure.[11] In 1964, there was a 6 percent reduction in the herd of sheep and goats, above the expected reduction due to the 1963 harvest. In 1967 to 1969, there were significant reductions in herd size despite reasonably good harvests. This restraint, imposed by financial restrictions on collective farms and a decision not to import Western grain, was felt most sharply in the swine and cattle herds. That strategy which proved very costly in the late 1960s has been substantially abandoned during the 1970s.

5. The Determination of Labor Participation in Soviet Agriculture

Three categories of agricultural employment have been distinguished in this model of Soviet agriculture: state farm employment, collective farm employment, and private agricultural employment. The Soviet Union publishes annual data for state and collective farm employment and the estimate of private employment in man-years is calculated from published data for crop area and livestock holdings in the private sector.

Estimation results for labor participation equations are presented in table 6 with definitions of all variables. Each participation rate is based on the total rural population of the USSR, and long-term structural shifts are indicated by the trends (actually the log of a linear trend). The upward trend for employment on state farms is expected to persist, while the downward trends for collective and private agriculture are truncated in the early 1970's. In projections, this results in a small upward trend in the total agricultural participation rate (from 36.3 percent in 1977 to 38.1 percent in 1985).

The shift in Soviet policy toward private plots, livestock holdings, and agricultural sales after the ouster of Khrushchev is shown to have raised rural participation in private agriculture by about one percentage point (the coefficient for QSH65).

TABLE 6.—LABOR PARTICIPATION EQUATIONS FOR SOVIET AGRICULTURE

Participation rates (percent) (mean value: 1958–77)	Constant	Trends and policy shifts	Harvest impacts	R^2	S.E.	D.W.
State farms	−33.79	+11.40 QLT28	−3.35 XCDV12	0.979	0.25	1.94
(8.33)	(23.65)	(29.51)	(3.48)			
Collective farms	15.11	−18.26 QLT28/72 +2.96 XCDV	+9.24 XCDV12	.952	.50	.96
(17.41)	(92.79.	(19.47) (2.18)	(4.68)			
Private agriculture	10.55	−3.90 QLT28/72 −1.10 QSH65	+2.74 XCDV01	.617	.27	1.61
(10.65)	(116.06)	(3.63) (3.52)	(2.10)			

Note: All equations estimated over sample period of 1958–77. Dependent variable is 100 times the ratio of average employment (State, collective, or private) to midyear rural population. Independent variables: QLT28—Log trend beginning with 1928 set equal to zero. QLT28/72—Log trend truncated at 1972 (scaled to zero in 1972 and thereafter). QSH65—Dummy variable equal to one through 1964 and zero thereafter. XCDV—Crop deviation from normal output. XCDV01—Average crop deviation, current and lagged 1 year. XCDV12—Average crop deviation, lagged 1 and 2 years.

[11] This is a swing beyond that which could be attributed to a linear harvest impact. The problem may be that in this range (where the crop shortfall exceeds 10 percent) the impact may be nonlinear. A smaller swing of 13 percent did occur after the 135 million metric ton harvest of 1975.

Around this long-term pattern of agricultural participation, short-run movements are related to deviations in current and past harvests. During years of good harvests, employment on collective farms and in the private sector increases (indicated by the positive coefficients on XCDV and XCDV01). For collective farms, additional labor is usually required to harvest above-average crops. This might be expected to squeeze labor out of the private sector, but the apparent rise in private employment may only reflect increases in private livestock holdings given the greater availability of feed grains. The longer impacts (XCDV12) of a crop deviation primarily affect the shift between state and collective farm employment. After a major harvest failure, there is an accelerated rise in state sector employment and a more than commensurate decline in collective farm employment. Collective farmers, who bear a large share of the burden of poor harvests, are more anxious to leave the sector after difficult years. Furthermore, Soviet agricultural officials compensate state farms after poor harvests with greater real and financial resources.

6. Capital Investment in Agriculture

Our earliest investigation of the determinants of capital investment began with a list of factors suggested by various Western scholars: (1) A rhythmic pattern introduced by the institutions of 5-year planning; (2) the short-run impact of the annual plan for capital construction; and (3) a contingency impact from priority demand for durables, particularly for military use.[12] To integrate these factors for econometric estimation, we eventually settled upon a growth-rate specification. In addition to its convenience for estimation and simulation, this specification also corresponds to the indicators used in plan deliberation and evaluation. Given the substantial variance remaining after the introduction of such factors for investment in various sectors, we began to consider various contingency measures in the search for patterns of bureaucratic regularity.

In the case of capital investment in agriculture, there appeared to exist a stable response pattern to current and past harvests. The state of the harvest in the previous year (measured by the percentage deviation of actual from normal output) has a negative effect upon the planned growth of investment and the realization of those plans; this constitutes a compensatory response of the bureaucracy. With disaggregation it became clear that this "crisis response" was most evident in the delivery of machinery and equipment to agriculture. The factor of priority demand for durables and materials limits the feasible growth of capital investment. The state of the current harvest has a direct impact on the realized growth of capital investment, primarily in construction done by state and collective farms.

In table 7, estimated equations are presented for total agricultural investment, the structures category, and machinery investment. The budget variable is most significant in the determination of structural investment in agriculture. It is this category which is also sensitive to current harvest conditions and defense operating and maintenance ex-

[12] See Green and Higgins, op. cit., chapter 5, and Donald W. Green, "Plans, Defense Expenditure and Profits: The Determinants of Soviet Capital Investment," SRI–WEFA Working Paper No. 56 (April 1977).

penditures (a category of priority procurement of fuels and materials in industry). Agricultural machinery investment is shown to be significantly related to last year's harvest (a compensatory response of the central leadership) and defense durables procurement. When defense procurement of durables rises, there is a compositional shift in agricultural investment from machinery to structures.

TABLE 7.—AGRICULTURAL CAPITAL INVESTMENT*

Growth rate category (sample mean)	Constant	State budget (GFA)	Operating defense (GDF)	Defense durables (BDM)	Current harvest (XADV)	Past harvest ($XADV_{-1}$)	R^2	D.W.
Total agricultural investment	0.050	0.450	−0.136		0.279	−0.179	0.818	2.44
(0.103)	(4.36)	(5.06)	(3.90)		(3.44)	(2.29)		
Construction investment in agriculture	−.036	.632	−.198	0.276	.414		.712	2.33
(0.104)	(.64)	(4.67)	(3.61)	(1.48)	(3.41)			
Machinery investment in agriculture	.212	.096		−.512		−.474	.875	2.10
(0.101)	(6.32)	(1.45)		(4.43)		(6.19)		

*Sample period is 1961–75. The series for defense durables has not been extended to 1977.
Variables: GFA is the growth rate of State financing in the annual budget ex ante, adjusted for 1969 changes in durables prices. XADV is the deviaton of actual net agricultural output from normal output. GDF is the growth rate of operating and maintenance expenditures of the Soviet military; 1977 estimates by Stanley Cohn. BDM is the smoothed ratio of the defense durables to output of the machine-building branch. The measure of defense durables used is the increment to State reserves constructed by Stanley Cohn (1977).

7. Soviet Long-Range Targets and Western Projections

At the July 1978 plenum of the CPSU Central Committee, President Brezhnev presented a major report on the general objectives for agricultural growth during the 11th 5-year plan (1981–1985).[13] As indicated in table 8, the principal targets for grain and meat are ambitious but not necessarily unreasonable: (a) An average of 238–243 million metric tons of grain during 1981–85; and (b) 19.5 million metric tons of meat in 1985. In particular, the 1985 meat target is much less ambitious when compared with the official target for 1980 rather than achieved production during 1977–78. Concerning major inputs to crop production, Brezhnev placed his greatest emphasis on mineral fertilizer and machinery. In the livestock sector, priority was given to beef and poultry and the stress was on livestock productivity, i.e., slaughter weight rather than herd size.

One surprising feature of the plenum targets was the similarity to a SOVMOD projection to 1985 prepared by the author during 1977 and published in 1978.[14] This projection is also presented in table 8 (No. 3a). The higher value in the range came from a baseline projection which assumed stable favorable weather over the forecast period. The lower limit in the range is based on the study's alternative projection with less favorable weather (average conditions of 1962–65). The unstable livestock component of this version of SOVMOD III is indicated by the wide range given (15.2 to 19.2 million metric tons) for 1985 meat production. The upper limit of this range is quite close to the official target of 19.5.

[13] Report delivered by L. I. Brezhnev (July 3, 1978), translated in Reprints from the Soviet Press (July 31, 1978).
[14] The paper was presented in September 1977 and later published as Donald W. Green, "The Soviet Union and the World Economy in the 1980's: A Review of Alternatives," in Holland Hunter, ed., The Future of the Soviet Economy: 1978–1985 (Boulder, Colo., 1978). The details of the agricultural projection were not published.

TABLE 8.—AGRICULTURAL PROJECTIONS TO 1985

Alternative projections	Total grain output (average 1981–85) (million metric tons)	Annual growth rate (percent)	Total meat in 1985 (million metric tons)	Annual growth rate (percent)
Soviet official targets of the July Plenum (1978)[1]	238–243	1.8 (over plan for 1976–80)	19.5	3.5 (over 1977) 2.5 (over 1980 plan).
Central Intelligence Agency (1979)[2]	203–226	2.2 (from 1980 to 1985)		
(Range: Favorable weather and long-term average weather).	(1980: 190–212), (1985: 212–236)		(Soviet target accepted as reasonable)	
Author's projections:[3]				
(a) SOVMOD projection (1978)	234–246	2.2	15.2–19.2	0.3–3.3 (over 1977).
(b) New projection (1979)	238–248	2.5	17.6–18.3	2.2–2.7 (over 1977).

[1] Report delivered by L. I. Brezhnev, July 3, 1978; Reprints from the Soviet Press (July 31, 1978).
[2] Central Intelligence Agency, U.S.S.R.: Long-Term Outlook for Grain Imports, ER 79–10057, January 1979.
[3] Donald W. Green, "The Soviet Union and the World Economy in the 1980s: A Review of Alternatives," in Holland Hunter, ed., The Future of the Soviet Economy: 1978–1985 (Boulder, Colo., 1978) The agricultural table of the forecast was not published.

Early in 1979, the Central Intelligence Agency issued their revised outlook for Soviet grain imports and production.[15] They concluded that the plenum grain goal was quite high and would depend on: (1) A continuation of favorable weather conditions; or (2) more rapid growth in technical progress. The broad range of their grain projection is presented in table 8; even the upper limit in their projection is 15 million tons below the midpoint of the Soviet goal. To achieve the Soviet meat target in 1985, they conclude that the U.S.S.R. would have to import at least 15 million tons of grain annually through 1985.

Finally, table 8 presents a new projection based on the analysis given in this paper. This projection is not calculated using a full model so indirect effects along the growth path have been ignored. The grain projection range is based on the growth of normal output given the following assumptions for productive inputs:

Annual growth rates—1978–1985

Input:	*Percent*
Land	0.4
Employment	−0.5
Fixed capital	7.5
Current inputs	4.5

The range of output is then calculated from normal output using deviations for favorable weather (average deviation of −4½ for 1955–1977) and less favorable weather (average deviation of −8½ for 1962–1965).

The projection for meat is based on 1978–1985 growth rates expected for livestock and feed. From the equations in table 5, one can calculate future growth rates for livestock. Such calculations suggest that only the cattle herd will expand significantly in the 1980's. We expect slightly more rapid growth of livestock than the equations indicate; this adjustment may also compensate for the absence of the poultry contribution to meat production in our specification:

[In percent]

Category	Annual growth rates from table 5	Expected growth rates to 1985
Cattle	1.6	2.0
Hogs	−.6	.5
Sheep and goats	0	.5
Total	1.1	1.6

Our projection for total crops, for the same range of weather conditions, gives 2.8 to 3.1-percent growth in feed fed to livestock. Combining these alternative projections, we find a range of 17.6 to 18.3 million tons for meat production in 1985, more than 1 million tons below the plenum goal. This situation could have serious implications for the Soviet consumer goods market if per capita meat consumption rises only 1½ percent annually while per capita real income is rising 2 to 2½ percent.

[15] Central Intelligence Agency, "U.S.S.R.: Long-Term Outlook for Grain Imports," ER 79–10057, January 1979.

Appendix A

LIST OF AGRICULTURAL VARIABLES

Symbol and description	Units	Source
AFEED70, value of feed fed to livestock, 1970 prices	Billion 1970 rubles	SAIOER.
ALVCT, cattle inventory (January 1)	Million head	SAIOER.
ALVHG, swine inventory (January 1)	million head	SAIOER.
ALVR70, value of productive livestock (January 1), 1970 prices	Billion 1970 rubles	SAIOER.
ALVSG, sheep and goats inventory (January 1)	Million head	SAIOER.
ASGR9, area sown to grain	Million hectares	SAIOER.
AVCP70, value of agricultural current purchases	Billion 1970 rubles	SAIOER.
IA, capital investment in agriculture	Billion 1970 rubles	N.Kh.
IAC, agricultural investment: structures	Billion 1970 rubles	N.Kh.
IAM, agricultural investment: machinery	Billion 1970 rubles	N.Kh.
JPS9, spring-summer precipitation index	Centimeters	SOVMOD.
JPW9, winter precipitation index	Centimeters	SOVMOD.
JTW9T, winter temperature index (truncated)	Degree centimeters	SOVMOD.
KAIR, agricultural fixed capital (mean year), 1955 prices	Billion 1955 rubles	N.Kh.
MGR, total grain imports	Million metric tons	N.Kh.
NAKOL, collective farm employment	Million person	FDAD.
NAPRV, private agricultural employment (man-years)	Million person	FDAD.
NASOV, state farm employment	Million person	FDAD.
NAT, total agricultural employment	Million person	FDAD.
NPOP9, total population	Million person	N.Kh.
NPOPR, rural population	Million person	N.Kh.
XADV, percentage deviation from normal output, total	None	SOVMOD.
XAGT70, net agricultural production, 1970 prices	Billion 1970 rubles	SAIOER.
XAGTN, normal agricultural production	Billion 1970 rubles	SOVMOD.
XANIM70, animal product output	Billion 1970 rubles	SAIOER.
XCDV, percentage deviation from normal output, crops	None	SOVMOD.
XCROR70, total crop output, 1970 prices	Billion 1970 rubles	SAIOER.
XCROPN, normal crop output	Billion 1970 rubles	SOVMOD.
XGDV, percentage deviation from normal output, grain	None	SOVMOD.
XGRT, total grain production (Soviet series)	Million metric tons	SOVMOD.
XGRTN, normal grain production	Million metric tons	SOVMOD.
XMEAT70, total meat production, 1970 prices	Billion 1970 rubles	SAIOER.
XOCH, output index, chemicals and petrochemicals	1970=100	OER.

Sources: FDAD—Foreign Demographic Analysis Division, Department of Commerce. N.Kh.—Soviet official statistics Annual Handbook. OER—Office of Economic Research, Central Intelligency Agency. SAIOER—Soviet Agricultural Index Databank, OER. SOVMOD—SRI-WEFA Soviet Econometric Model Databank (data presented in app. B).

Appendix B

DATA: HARVEST DEVIATION AND WEATHER VARIABLES

Year	XCDV crop deviation	XGDV grain deviation	JPS9 spring-summer precipitation	JPW9 winter precipitation	JTW9T winter temperature
1955	−0.012	−0.014			
1956	.084	.101			
1957	−.007	−.105			
1958	.055	.132			
1959	−.062	−.008	−0.439	−0.025	
1960	−.065	0	−.158	−.175	
1961	0	.017	−.087	−.225	
1962	−.111	.008	−.168	−.175	0
1963	−.187	−.255	−.778	.340	−9.5
1964	.037	.027	.029	−.332	−7.3
1965	−.076	−.210	−.312	−.235	−2.5
1966	.037	.091	−.143	.390	0
1967	.029	−.076	.013	.253	−5.1
1968	.084	.034	.214	.139	−.8
1969	−.023	−.045	.669	.233	−9.3
1970	.103	.093	.559	.455	0
1971	.065	.036	.503	−.307	0
1972	−.083	−.088	.094	−.634	−8.1
1973	.154	.168	.715	.302	−.6
1974	−.022	−.028	.557	−.518	0
1975	−.144	−.329	−.114	−.584	0
1976	.026	.034	.848	−.180	−5.7
1977	−.047	−.122			

U.S.S.R. GRAIN AND OILSEED TRADE IN THE SEVENTIES

(By Judith G. Goldich)

CONTENTS

I. Summary

Soviet agricultural trade policy underwent an abrupt shift in the early 1970's, when the U.S.S.R. imported substantial quantities of grain and oilseeds while cutting back on its exports of these products. In the seventies, the variability of U.S.S.R. grain and oilseed trade increased, with strong and continuing repercussions for world farm trade, including that of the United States.

The change in grain trade policy was required by the Soviet Government's program to satisfy internal demand for livestock products, principally meat. Meat output was to jump to an average of 14.3 million tons during the ninth 5-year plan (FYP) (1971–75). Grain production was targeted at an average of 195 million tons.

A similar situation prevailed for the 10th 5-year plan (1976–80). Although livestock product goals and feed goals were consistent—chiefly because a relatively low growth in the increase in livestock product output was planned—the very poor 1977 grain harvest and disappointing sunflowerseed harvests throughout this plan have insured continuance of the digestible protein shortfall.

The deficit between perceived feed requirements and domestic supply provoked a response late in 1971, when large-scale grain and soybean purchases began. Large, but erratic purchases have continued throughout the seventies. The Soviets have continued to export grain although their ability to do so has been curtailed.

The volume of Soviet grain and oilseed trade expanded sharply in the seventies. Five major suppliers—the United States, Canada, Australia, Argentina, and France—accounted for most of the grain sup-

plied, while the United States and Brazil supplied most of the oilseed component in the form of whole soybeans. The countries of the Council for Mutual Economic Assistance (CMEA) account for a large share of Soviet grain exports. Soviet oilseed exports have been very low in the seventies.

The United States is an important supplier of grain and oilseeds to the Soviet Union, and the U.S.S.R. has become an increasingly major market for U.S. agricultural products, ranking in the top five for each of the past 3 fiscal years.

The U.S.S.R. will remain as a major agricultural market for the United States in part because of continuously increasing demand for grain and oilseeds, and the Soviet agricultural sector's inability to meet this demand at least in the medium term. The U.S.S.R. will remain an important though variable factor in the world grain and oilseed market in the eighties.

II. Introduction

The U.S.S.R. is an important but uncertain element in international grain and oilseed markets. Formerly a large net exporter of grain, oilseeds and vegetable oil, in the seventies it has generally become a large net grain and oilseed importer, accounting for a substantial share of the variability in world grain and oilseed trade. The Soviets became overall net grain importers beginning in 1972 and have remained such due to a continuing imbalance between domestic grain supplies and requirements. Soviet agricultural plans foresee a substantial expansion in grain output in the current and following 5-year plans (1976–80, 1981–85). While most agricultural experts believe that achieving self-sufficiency in grain production remains far in the future, especially with continuing increases in domestic demand, the pattern of occasional self-sufficiency—especially in wheat—coupled with occasionally disastrously short harvests will likely continue.

The Soviets have been important in both the world soybean and sunflowerseed oil markets, and their future activities will likely continue to be important in these sectors. Oilseed production is variable, in large part because of the great variability of sunflowerseed production in the seventies.[1] While increases in soybean production are planned, the response has been slow in arriving, and production generally remains low. As a result of increased domestic requirements and disappointing domestic production, oilseed and product imports have increased and sunflowerseed exports (as seed) have been discontinued, with all of the reported exports in the early seventies going to the GDR. Soybean imports have increased dramatically. Vegetable oil imports have doubled in volume, but remain low. Sunflowerseed oil exports have dropped substantially from the peak levels of the second half of the sixties, while the CMEA [2] share of exports has increased. Oilmeal exports reportedly have been discontinued while imports remain at very low levels.

[1] U.S.S.R. oilseed production includes sunflowerseed, cottonseed, peanuts, rapeseed, mustard seed, sesame seed, and flaxseed.

[2] The Council for Mutual Economic Assistance, including Bulgaria, Cuba, Czechoslovakia, German Democratic Republic (GDR), Hungary, Mongolia, Poland, and Romania. Vietnam became a full member in 1978, but is not carried as a member in this report.

The object of this paper is to examine U.S.S.R. grain and oilseed trade in the 1970's, to review the determinants of this trade, and to consider possible future behavior in the grain and oilseed markets. The Soviet Union provides substantial but by no means complete information on its grain and oilseed trade. Most data in this report are from the official Soviet foreign trade handbook, *Vneshniaia Torgovlia.* This information was entered into a computerized data base.[3]

Soviet data have often omitted major suppliers and destinations and in 1972 and 1977 omitted almost all information on the volume of grain trade. Omissions of major suppliers and destinations have generally been allowed to stand, except in the case of the United States. For those instances when no Soviet data on imports from the United States were supplied, official U.S. statistics were used, and footnoted appropriately. Data on 1977 grain trade are estimated, as they were omitted from Soviet statistics.

III. Determinants of Grain and Oilseed Trade

Current Soviet agricultural policies are the outgrowth of attempts to improve Soviet consumer welfare. These policies, which can be summarized as increased production of meat and livestock products, have existed since the revolution. However, emphasis on consumer satisfaction has increased since the mid-1960's. Soviet determination to obtain increased meat production was fully confirmed by the decision to import a substantial share of the required volumes of grain and oilseeds in the early 1970's.

A. Brezhnevian Reforms

The Brezhnev regime has attempted to increase the production and distribution of consumer goods to the public. Real wages have increased substantially since the 1960's, providing the population with ever greater amounts of disposable income. Housing and food costs—in the state sector at least—remain relatively stable. The increasing availability of cash coupled with Government promises to improve the standard of living have led Soviet citizens to expect an array of more and better products. Expanding the nonfood consumer goods sector is an important part of increasing the standard of living. A visible improvement could be made by improving the diet. The most popular food item that could be supplied is meat. Consequently, the ninth FYP that began in 1971 stressed diet improvement, to be attained chiefly through increased production of meat and livestock products (table 1). Accomplishing this goal required increasing livestock numbers and improving livestock rations, primarily by increasing the feeding of concentrates (chiefly grains).

[3] For further details on U.S.S.R. agricultural trade by volume, see Judith G. Goldich "U.S.S.R. Agricultural Trade, 1955–77: A Historical Perspective," forthcoming from the U.S. Department of Agriculture. For details on trade by value, see "Soviet Agricultural Commodity Trade, 1960–76: A Statistical Survey," Central Intelligence Agency, (ER 78–10516, September 1978).

B. Goals and Achievements of the Ninth FYP

According to the directives of the ninth FYP, meat output was to jump to an average of 14.3 million tons in 1971–75, nearly one-quarter more than the 11.6-million-ton average actually achieved in 1966–70. Similarly, meat output in the current (1976–80) plan was to rise almost 17 percent, to an average of 15.4 million tons. Output goals were backed up with increased grain and oilseed production targets. Investments in the agricultural sector were also scheduled to increase sharply.

TABLE 1.—AGRICULTURAL PRODUCTION, U.S.S.R., ACTUAL 1961–65, 1966–70, 1971–75 AND PLANNED 1971–75, 1976–80

[Averages in millions of tons, increases in percent]

	1961–65 annual average	1966–70 annual average	Increase over 1961–65	1971–75 plan average	Increase over 1966–70	1971–75 actual average	Increase over 1966–70	1976–80 plan average	Planned increase 1976–80
Meat and poultry [1]	9.3	11.6	25	14.3	23	14.1	23	15.4	9
Milk	64.7	80.5	24	92.3	15	87.5	9	96.0	10
Eggs (billion)	28.8	35.7	24	46.7	31	51.5	44	60.8	18
Grain	130.3	167.5	29	195.0	17	181.6	8	220.0	21
Sunflowerseed	5.1	6.4	25	7.0	9	6.0	−6	7.6	27

[1] Carcass weight.

Soviet food consumption data indicate that the average Soviet citizen consumes an adequate diet, although consumption of potatoes and grain products is substantially higher than in the United States, while consumption of meat, milk, and eggs is among the lowest of the European members of CMEA (table 2).

The planned rate of growth of agricultural output in the ninth FYP over the rate of the eighth FYP was somewhat less than the actual extent to which growth in the eighth exceeded growth in the seventh (1961–65). Similarly, planned increases in output of livestock products in the tenth FYP are lower than those actually achieved in the preceding ninth FYP.

Average grain production during the ninth FYP was 182 million tons, compared with the 168 million of the preceding period. However, programmed increases in feed supplies proved insufficient to support livestock product goals. Increasing supplies of grain required a larger grain area; the increased sowings were located in increasingly marginal climatic regions, thus tending to increase the variability of the size of the crop. While it is true that production has increased—witness the record 237 million ton output of 1978—the Soviets are as likely to have a dismal 195 million ton crop, as they did in 1977. In poor years, the disparity between production and requirements is so great that the Soviets are compelled either to import vast volumes of grain or to cut grain requirements by distress slaughter of livestock herds. Even in very good years such as 1978, USDA estimated that the Soviets would import substantial quantities of grain for both food and feed use, and to rebuild stocks against the next grain shortfall.

TABLE 2.—CONSUMPTION OF SELECTED FOOD PRODUCTS, SELECTED YEARS, 1966–77

[In kilograms]

Year	Bulgaria	Hungary	German Democratic Republic	Poland	Czechoslovakia	U.S.S.R.
Meat and products:[1]						
1960	32.7	47.6	55.0	49.9	56.8	40
1965	43.1	51.6	58.7	56.0	61.7	41
1970	43.7	57.6	66.1	61.2	71.9	48
1975	60.6	68.0	77.8	78.4	81.1	57
1976	64.5	[2] 70.2	80.7	93.6	81.4	55
1977						57
Milk and products:[3]						
1960	126	114	(4)	363	173	240
1965	137	97	(4)	367	180	251
1970	161	110	(4)	413	196	307
1975	198	127	(4)	432	210	316
1976	206	135	(4)	430	208	315
1977						322
Eggs (pieces):						
1960	84	160	197	143	179	118
1965	100	188	211	163	228	124
1970	122	247	239	186	277	159
1975	146	274	269	209	297	216
1976	149	270	269	214	294	206
1977	171	285	278	214	295	224

[1] Including subproducts and fat in terms of meat. Data for Hungary, German Democratic Republic and Czechoslovakia exclude fat.
[2] Including fish and fish products.
[3] In terms of fresh milk, including butter, in terms of fresh milk. Data for Hungary and Czechoslovakia exclude butter.
[4] Not available.

Source: Council for Mutual Economic Cooperation and Assistance, "Statistichiskii Yezhegodnik Stran-Chlenov Soviet Ekonomicheskoy Vzaimopomoshchi, 1977" (Moscow, Statistika, 1977), p. 52. Data for 1977 are from Eastern Europe Agricultural Situation: Review of 1978 and Outlook for 1979," (USDA, Supplement 3 to WAS–18, May 1979), p. 45, and "U.S.S.R. Agricultural Situation: Review of 1978 and Outlook for 1979," (USDA, Supplement 1 to WAS–18, April 1979), p. 45. Meat and product consumption in Eastern Europe in 1977 were not compatible with the earlier series and are omitted.

Two poor grain harvests wrecked agriculture's possibility of meeting crop goals in the ninth plan period, in turn putting serious strains on the livestock sector, which found itself short of the feeds required to reach the livestock product goals (table 3). Estimated average grain utilization during the 1971/72–1975/76 period was about 193 million tons.[4] While this was slightly lower than planned production, the domestic utilization figures contain no allowance for exports; the time frame included the periods of sharply reduced grain utilization occurring in 1971/72 and 1975/76. A better planned annual domestic utilization figure for the ninth FYP would have been around 200 to 205 million tons, 5 to 10 million tons in excess of planned grain production. The difference between planned production and planned utilization immediately suggested the need for fairly large grain imports to cover the deficit.

Similarly, output of sunflowerseed not only failed to reach anticipated levels during the ninth plan, but actually declined somewhat in comparison with 1966–70 (table 4). Soviet oilseed production is severely limited by climatic conditions. Requirements are increasing as expanding livestock inventories boost the demand for protein, which

[4] See Michael D. Zahn's article in this volume for further details on grain supply and utilization. Domestic utilization includes seed, manufactures, food, feed, dockage, and waste.

is readily supplied in the form of oilmeal. These increased requirements come at the same time as increasing variability in the main Soviet oilseed crop—sunflowers—is being experienced. Sunflower production, which averaged 6.4 million tons in the eighth FYP, dropped to a 6.0-million-ton average in the ninth FYP, and totaled only 5.3, 5.9, and 5.3 million tons in 1976, 1977, and 1978. respectively. Production has become more variable in part due to increasing disease problems. The Soviets plant only a few open-pollinated varieties. These varieties are susceptible to many diseases, including downy mildew, gray and white rot, and broomrape (*Orobanche cumana wallr*), parasite found in most sunflower fields in the Ukraine and North Caucasus. Although disease can be controlled by long rotational periods, sunflowerseeds are an extremely profitable crop for the Soviet farms, which plant them rather more often on the same land than they should, thus increasing the disease problems.[5]

TABLE 3.—U.S.S.R. WHEAT AND COARSE GRAIN PRODUCTION BY TYPE, 1966–78

[In thousands of metric tons]

Year	Wheat	Coarse grain				Other [1]	Total grain
		Rye	Barley	Oats	Corn		
1966–70 average	90,192	12,834	30,454	11,938	9,558	12,586	167,562
1971	98,760	12,787	34,571	14,650	8,597	11,810	181,175
1972	85,993	9,633	36,813	14,095	9,830	11,874	168,238
1973	109,784	10,759	55,044	17,516	13,216	16,211	222,530
1974	83,913	15,223	54,208	15,302	12,104	14,958	195,708
1975	66,224	9,064	35,808	12,495	7,328	9,199	140,118
1971–75 average	89,941	11,493	43,289	14,812	10,215	12,215	181,554
1976	96,882	13,991	69,539	18,113	10,138	15,092	223,755
1977	92,161	8,480	52,687	18,407	10,979	13,082	195,727
1978 [2]	120,800	13,600	59,300	18,900	9,000	13,400	237,000

[1] Includes millet, buckwheat, rice, pulses, and miscellaneous grain.
[2] Preliminary.

TABLE 4.—U.S.S.R. VEGETABLE OIL PRODUCTION, TOTAL AND SUNFLOWERSEED OIL, 5-YEAR AVERAGES, 1966–75, AND ANNUAL 1971–78

[In thousand metric tons]

Year	Total [1]	Sunflowerseed
1966–70 average	2,932	2,212
1971	2,923	2,133
1972	2,841	2,004
1973	2,677	1,714
1974	3,412	2,560
1975	3,344	2,471
1971–75 average	3,039	2,176
1976	2,775	1,649
1977	2,943	1,777
1978 [2]	2,964	1,932

[1] From all sources.
[2] Preliminary.

[5] For further information on sunflowerseed production, see Judith G. Goldich, "Sunflowerseed in the U.S.S.R. : Production, Processing, and Trade," forthcoming from the U.S. Department of Agriculture.

C. Goals and Achievements of the 10th FYP

Influenced by the somewhat disappointing results of the ninth FYP, Soviet planners reduced the rate of planned growth of meat and egg production for the 10th FYP sharply in comparison with the original 1971–75 target. Translated to the consumer level, the planned rates of growth suggested that meat and egg availabilities would increase far more slowly during 1976–80 than they did in 1971–75. Nevertheless, increases were targeted in grain and high protein feed supplies, such as sunflowerseed, and roughages. Grain production was targeted to average 220 million tons during 1976–80. This did not seem unreasonable, and in the first 3 years of the plan period, output actually averaged 218 million metric tons.

Sunflowerseed production, however, has been substantially below plan, and while the Soviets have announced a 7.6-million-ton goal for 1979, it is certain that the ambitious 7.6-million-ton average set for the whole 10th FYP will not be achieved. Of the oil-bearing material produced in the U.S.S.R., only the figures on cottonseed could offer any consolation to Soviet planners. Despite ambitious goals, increased inputs, and financial incentives, production of soybeans remains widely variable. Flaxseed output is declining. Total oilseed production, including oilseeds, seeds from fiber crops, and seeds from miscellaneous crops, ranges from 11 to 13 million tons annually.

Shortages of oil-bearing material pose multiple problems to the U.S.S.R., though these perhaps have not been considered as urgent as the grain shortages. The U.S.S.R. Ministry of Food Industry requires oilseeds to keep its oil-processing facilities operating. Capacity of this system has increased some and the decline in sunflowerseed production leaves crush capacity idle. Demand for vegetable oil currently exceeds supply and is growing with the increase in the size of the population, while output has become increasingly variable. More important, supplies of oilseed meal, a very important protein component of livestock rations, are well below those required by the animal husbandry sector, which feeds extra amounts of grain to help make up the shortage. If feed conversion ratios could be improved by increasing the nongrain protein components of livestock feed, including both oilseed meal and forages as well as synthetic feed additives, such as urea, substantial quantities of grain could be saved. This could reduce import requirements.

Soviet planners are aware of the severe climatic and other factors tending to increase the variability of the size of the domestic grain and oilseed crops and undoubtedly foresaw that imports of grain and possibly of soybeans would be necessary, at least for a time.

Conversations with the Soviets also suggest that they believe that the requirements for imports will stabilize and eventually decline, as more reliable domestic grain and oilseed production becomes a reality, and falls more in line with domestic supply requirements. In the meantime, however, the sporadic shortages which have provoked large but erratic grain and oilseed purchases are now expected to continue well into the eighties.[6]

[6] See the "Agricutlural Situation in the Soviet Union, Review of 1975 and Outlook for 1976." (USDA, FAER No. 118, April 1976) for an early assessment of the 10th FYP.

IV. U.S.S.R. Grain and Oilseed Trade

A. Grain Imports

The deficit between domestic supply of grain and perceived requirements provoked a response in 1971/72, when the Soviets initiated a large grain-buying program. Purchases have continued at irregular but generally large levels in the seventies.

The Soviets do not necessarily import all the grain and soybeans optimally required in years of domestic shortfall. For example, despite total 1976 imports of almost 21 million tons, following the disastrously poor 1975 grain harvest, the Soviets were forced to cut hog numbers by 14 million (20 percent), sheep by 4 million (3 percent), and poultry by 58 million (7 percent). Cattle numbers actually increased somewhat by January 1976 over a year earlier although some decrease occurred later in 1976. The losses were almost completely made up by 1978, owing in part to the improved feed situation in 1976–78. The gap between theoretical import requirements and actual imports is explained chiefly by limits in port handling capacity, and problems with internal distribution of grain. Availability of hard currency may also play a role in the total volume of Soviet grain and oilseed imports.

Wheat was generally the Soviet Union's largest single grain import during 1971–77. In 1974 and 1976, however, corn predominated. Although the U.S.S.R. was formerly a major wheat exporter, shipping a substantially larger share of production than at present, it became a net importer in 1972 and has remained so each year since then, except for 1974.

Soviet wheat imports have ranged from 2.3 to 15.2 million tons during 1971–78. Although the U.S.S.R. is the world's largest producer of wheat, USDA estimates indicate that except in the record years 1973/74 and 1976/77 domestic utilization exceeded production, in part because of the heavy use of wheat for feed. Major wheat suppliers include the United States, Canada, and Australia, with France and Argentina supplying minor amounts. Record volume imports from the United States in 1973 occurred as the result of a significant reduction in Soviet winter wheat output in 1972 as well as to availability of Commodity Credit Corporation (CCC) financing.

Coarse grain imports tripled in 1971 to almost 1 million tons, and have ranged up to 13.6 million tons in 1976.[7] USDA estimates indicate that domestic utilization has exceeded supply every year except 1973/74 since 1971/72. Corn has been the most important coarse grain import in the seventies. The United States has been the most important supplier of corn; the Soviets imported 11.4 million tons of corn in 1976 with the United States supplying almost 10 million of the total. Brazil, Argentina, and Hungary supply almost all of the remainder of corn. Barley imports come chiefly from France and Canada, oats from the United States, and rye from the Federal Republic of Germany, Sweden, and Hungary.

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[7] Coarse grain here includes barley, corn, oats, and rye. The U.S. definition of coarse grains also includes grain sorghum.

B. Grain Exports

The volume of Soviet grain exports changed very little during 1955–75. Yearly exports averaged 5.9 million tons, 5.9 million, 5.6 million, and 5.7 million in 1956–60, 1961–65, 1966–70, and 1971–75, respectively, although they were sharply below average in 1976 following the disastrous 1975 grain harvest. Exports are believed to have recovered to an estimated 3.4 million tons in 1977.[8]

Wheat has accounted for the largest share of grain exports fairly consistently since 1955, although shipments as a share of production have declined. The volume of wheat exported is variable, averaging a stable 4.6 and 4.7 million tons during the eighth and ninth 5-year plans, then dropping off to an average of less than 1.5 million in the first 2 years of the 10th plan. In the seventies exports ranged from 808,000 tons (in 1976) to a high of 7.6 million in 1971. During this period almost all wheat exports went to CMEA, North Korea, and Vietnam. Small quantities of wheat are purchased on Soviet account for shipment to third countries, including Cuba. Such shipments show in the trade records both as imports into the U.S.S.R. and as Soviet exports.[9]

Coarse grain exports have ranged from less than 700,000 tons to almost 1.8 million in the seventies. Barley is the most important coarse grain export, accounting for all but about 200,000 tons of the estimated total in 1977. Poland and Czechoslovakia have been the most important destinations for coarse grain since 1971. With the exception of 1974, almost all Soviet corn exports have gone to CMEA members. Oat exports are very low; Cuba is the only known destination at present. Rye exports apparently were discontinued after 1972.

C. Oilseed and Product Imports

At present, the Soviets choose to import raw oil-bearing materials for domestic processing. Imports increased sharply during the ninth FYP, but still remained relatively low, averaging just 360,700 tons. Imports jumped sharply in 1976 and 1977, reaching 1.8 and 1.5 million tons, respectively, with soybeans accounting for most of the total. The Soviets could certainly put even larger volumes to good use, but limits in the handling, processing, and distribution systems may still be holding oilseed imports at low levels. Similarly, edible vegetable oil imports have been limited through 1978, although some increase was seen in early 1979.

Soybeans dominate Soviet imports at present, and have accounted for from four-fifths to almost all of the import total in the 1970's. Imports have been at irregular levels, ranging from none in 1974 to 1.8 million tons in 1976. Of the total of 4.6 million tons of soybeans imported during 1971–77, the U.S. supplied slightly less than half with Brazil shipping the remainder.

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[8] Soviet trade data omitted information on the quantity of grain exported in 1977. Estimated quantities were calculated from the reported value of exports to each country and price/quantity ratios for the same commodity and country in 1976, where available. These estimates are, of course, subject to revision.

[9] For further information on Soviet trade statistics, see the "Methodological Explanation" included in each Vneshniaia Torgovlia.

The U.S.S.R. also continues to import minor amounts of other oilseeds and oil-bearing materials, including copra, linseed, palm nuts, peanuts, and sesame.

Both vegetable oil and oilseed meal [10] imports are quite low. Argentina and the Philippines currently dominate as vegetable oil suppliers, while India supplies all the known oilseed meal.

D. Oilseed and Product Exports

Soviet oilseed exports declined sharply in the seventies, chiefly as the result of a sharp drop and, in 1976 and 1977, discontinuation of sunflowerseed shipments. The GDR accounted for all sunflowerseed shipments during the ninth FYP; cottonseed is shipped to both Greece and Lebanon. Similarly, vegetable oil—primarily sunflowerseed oil—shipments have declined markedly from the higher levels of the sixties. Sunflowerseed oil is shipped to a number of markets in Europe and the third world, including the FRG, France, India, the Netherlands, and Spain. The CMEA countries have accounted for an average of a third of the total during 1971–75; their share increased to about half in 1976 and 1977. Oil exports still substantially exceed imports despite the fact that sunflowerseed production—the source of most domestic oil—has been at disappointing levels every year after the record crop of 1973. Finally, Soviet oilseed meal exports apparently were discontinued after 1972; none are reported in Soviet data. During the sixties, destinations included Belgium, Denmark, Finland, France, and Norway as well as Cuba, Czechoslovakia, and Hungary.

V. U.S.–U.S.S.R. Grain and Oilseed Trade in the Seventies

The Soviet Union was a minor market for U.S. agricultural products through 1971. Exports were variable during 1971–75, but they boomed to an average of more than $600 million worth during that period, and reached $1.1 and $1.8 billion worth in 1977 and 1978, respectively. Grain and soybeans account for about 97 percent of the dollar total.

In 1972, the Soviets imported 7.3 million tons of U.S. grain and 400,000 tons of U.S. soybeans. Volume increased the following year to 14.3 million and 550,000 tons respectively, but dropped sharply in 1974 to 3.4 million and almost none, largely in response to sharply higher domestic availabilities from the record grain and sunflowerseed crops harvested in the fall of 1973. Purchases edged upward in 1975 and by late 1975 were expected to surge sharply higher in 1976, as the signs of a disastrous grain crop in 1975 became apparent.

In partial response to the repeated pattern of wide yearly variability in Soviet purchases of U.S. grain, the two countries signed a 5-year long-term agreement (LTA) on grain trade in October 1975. Under the terms of the LTA, the Soviets agreed to purchase and the United States to sell 6 to 8 million tons of U.S. wheat and corn per year in each 12-month period beginning October 1, 1976, and end-

[10] Under the U.S.S.R. trade classification system, fishmeal is excluded from the category "oilcake and meal."

ing September 30, 1981. The LTA permits the Soviets to purchase more than the 8-million ton total after consultations with the U.S. Government. An escape clause permits sales of less than 6 million tons if U.S. grain supplies (estimated stocks plus forecasted production) are less than 225 million tons. The LTA has tended to reduce fluctuations in the volume of Soviet imports of U.S. grains. For example, in calendar 1977, the first year of the agreement, Soviet imports of U.S. grain exceeded the 6 million tons minimum despite the fact that the U.S.S.R. harvested a record grain crop in 1976.

Soybeans are the second most important U.S. agricultural commodity sold to the U.S.S.R., although volume totals remain low. The volume of Soviet soybean imports from the United States is related both to Soviet demand and availability from other sources. The only current competitor with the United States is Brazil, although Argentina may also emerge as its own production capacity comes on stream.

VI. Future Prospects for U.S.S.R. Grain and Oilseed Trade

The Soviet Union will remain an important though variable factor in world grain and oilseed trade through the 1980's. Substantial increases in grain and oilseed production are scheduled for the 10th FYP, and output of protein supplements and forages are also targeted to expand. However, variability in the size of annual harvests is expected to remain quite high, and occasional years of very large imports followed by years of much reduced imports—or possibly of net exports—can be expected.

The Soviets can be expected to continue seeking alternative suppliers for wheat, which they now procure from the United States, Canada, Australia, and Argentina. Both alternate suppliers and substitutes may be acquired for corn, which is purchased mainly from the United States, but also from Argentina and Brazil and soybeans, which are bought from the United States and Brazil.

Soviet exports of grain and oilseeds and products are not likely to increase appreciably on a regular basis, although occasional increases in exports may occur.

Finally, the Soviet Union will remain a destination for substantial quantities of U.S. grain and soybeans.

Appendix
Tables

TABLE 1 --USSR GRAIN TRADE, 5-YEAR AVERAGES 1956-75, AND ANNUAL 1955-77

LINE NAME	TOTAL IMPORTS	TOTAL EXPORTS	NET IMPORTS	WHEAT IMPORTS	WHEAT EXPORTS	NET WHEAT IMPORTS	CORGRAIN IMPORTS	CORGRAIN EXPORTS	NET CORGRN IMPORTS
				1000 METRIC TONS					
1956-60 AVE	384.9	5906.3	-5521.4	246.7	4491.7	-4244.9	138.2	1414.7	-1276.5
1961-65 AVE	3497.9	5879.8	-2381.9	3492.0	3472.9	9.1	15.9	2406.9	-2391.0
1966-70 AVE	2866.9	5622.8	-2755.8	2527.0	4631.2	-2104.2	339.9	991.5	-651.6
1971	3500.0	8639.6	-5139.6	2300.0	7616.6	-5316.6	1200.0	1023.0	177.0
1972	15500.0	4560.2	10939.8	8100.0	3890.3	4209.7	7400.0	669.9	6730.1
1973	23000.0	4853.3	18046.7	15200.0	4192.9	11007.1	8700.0	660.4	8039.6
1974	7131.0	7029.5	101.5	2706.7	5262.0	-2555.3	4424.3	1767.5	2656.8
1975	15900.0	3578.0	12321.0	9145.6	2464.7	6680.9	5763.4	913.3	5850.1
1971-75 AVE	13188.0	5732.1	7455.9	7490.5	4725.3	2765.2	5697.5	1006.8	4690.7
1976	20638.0	1468.0	19170.0	5496.0	808.0	5878.0	13952.0	660.0	13292.0
1977	10313.8	3393.6	6920.2	5296.6	1737.0	4559.6	4017.2	1656.6	2360.6

NOTE: CORGRAIN IS TOTAL GRAIN LESS WHEAT.

SOURCE: ESTIMATED OR DERIVED FROM OFFICIAL USSR STATISTICS

MARCH 1979
INTERNATIONAL TRADE POLICY, FAS, USDA

TABLE 2 --USSR GRAIN IMPORTS,
5-YEAR AVERAGES 1956-75,
AND ANNUAL 1971-77

LINE NAME	1956-60 AVERAGE	1961-65 AVERAGE	1966-70 AVERAGE	1971	1972	1973	1974	1975	1971-75 AVERAGE	1976	1977
					1000 METRIC TONS						
ARGENTINA	4.2	173.7	132.0	196.2	0.0	0.0	669.9	1764.4	526.1	1260.6	410.8
AUSTRALIA	0.0	528.2	27.4	277.1	478.6	844.6	580.8	1186.4	673.5	1262.7	959.1
BRAZIL	0.0	0.0	0.0	50.4	0.0	0.0	287.9	749.2	217.5	535.3	62.3
CANADA	222.2	2000.9	1812.0	1805.1	4681.0	4205.2	458.5	2710.7	2773.6	3099.0	2352.4
DENMARK	12.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FRG	0.0	0.0	0.0	0.0	62.8	172.0	0.0	0.0	47.0	0.0	0.0
FRANCE	0.0	166.7	267.9	437.3	1317.4	1362.3	145.0	205.0	693.4	939.0	0.0
KENYA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.2	3.6	0.0	0.0
MEXICO	0.0	0.0	113.1	151.0	0.0	0.0	0.0	0.0	30.2	0.0	10.1
PRC	33.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SPAIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.9	10.4	44.2	0.0
SWEDEN	0.0	0.0	0.0	0.0	304.8	406.1	83.1	23.5	163.5	0.0	19.3
SYRIA	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THAILAND	0.0	0.0	0.0	35.5	0.0	0.0	0.0	0.0	7.1	0.0	0.0
UNITED KINGDOM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.2	8.4	11.8	0.0
UNITED STATES	0.0	356.9	0.0	0.0	7239.4	15370.7	4143.0	7141.0	6778.8	11962.0	6265.0
YUGOSLAVIA	3.8	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CMEA:											
BULGARIA	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HUNGARY	0.0	0.0	0.0	0.0	99.9	543.9	137.1	854.3	327.0	420.6	222.8
MONGOLIA	12.8	1.0	24.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
POLAND	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ROMANIA	66.6	148.6	119.4	0.0	209.9	182.7	0.0	380.5	154.6	327.8	0.0
CMEA TOTAL	87.7	149.7	143.7	0.0	309.9	726.6	137.1	1234.8	481.7	748.4	222.8
OTHER 1/	20.1	118.0	370.9	547.4	1106.2	812.5	625.7	774.1	773.2	1375.0	12.0
WORLD TOTAL	384.0	3497.9	2866.9	3500.0	15500.0	23900.0	7131.0	15909.0	13188.0	20638.0	10313.8

1/ RESIDUAL.

SOURCE: ESTIMATED OR DERIVED FROM OFFICIAL USSR STATISTICS

MARCH 1979
INTERNATIONAL TRADE POLICY, FAS, USDA

TABLE 3 --USSR GRAIN EXPORTS,
5-YEAR AVERAGES 1956-75,
AND ANNUAL 1971-77

LINE NAME	1956-60 AVE	1961-65 AVE	1966-70 AVE	1971	1972	1973	1974	1975	1971-75 AVE	1976	1977
					1000 METRIC TONS						
AFGHANISTAN	0.0	0.0	32.9	59.4	0.0	12.1	0.0	10.0	16.3	0.0	0.0
ALBANIA	68.1	10.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ALGERIA	0.0	0.0	39.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AUSTRIA	67.0	65.0	35.0	91.7	0.0	0.0	0.0	0.0	18.3	0.0	0.0
BELGIUM	46.1	31.7	9.6	19.8	0.0	0.0	0.0	0.0	4.0	0.0	0.0
BRAZIL	41.1	171.4	46.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CHILE	0.0	0.0	0.0	124.6	10.9	74.9	0.0	0.0	42.1	0.0	0.0
CYPRUS	0.0	0.0	4.4	3.3	0.0	0.0	0.0	0.0	0.7	0.0	0.0
DENMARK	28.0	14.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EGYPT	203.7	0.0	359.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ETHIOPIA	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FRANCE	46.3	16.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FRG	94.8	138.8	36.1	56.5	0.0	0.0	0.0	0.0	11.3	0.0	0.0
FINLAND	336.5	175.1	34.9	33.3	29.5	5.1	0.0	0.0	13.6	0.0	0.0
GREECE	1.5	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INDIA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IRAQ	29.3	9.7	0.0	117.1	0.0	0.0	0.0	0.0	23.4	0.0	0.0
IRELAND	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ITALY	46.1	134.0	97.5	148.6	0.0	0.0	0.0	16.5	33.0	0.0	0.0
KOREA, NORTH	38.2	98.2	178.3	152.2	156.6	181.8	181.1	212.2	176.8	212.6	292.1
LEBANON	2.2	5.8	0.0	83.3	0.0	0.0	0.0	0.0	16.7	0.0	0.0
LIBYA	2.9	6.8	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MALTA	0.0	0.0	0.0	16.7	0.0	0.0	0.0	8.9	5.1	0.0	0.0
MOROCCO	11.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NETHERLANDS	211.2	102.6	83.1	83.8	0.0	0.0	0.0	0.0	16.8	0.0	0.0
NORWAY	120.2	45.0	20.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PRC	0.0	70.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PORTUGAL	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SPAIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUDAN	0.0	56.5	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SWEDEN	63.9	61.4	22.9	1.9	0.0	0.0	0.0	23.5	5.1	0.0	0.0
SWITZERLAND	0.5	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TUNISIA	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UNITED KINGDOM	183.5	386.5	195.8	282.9	0.0	0.0	0.0	0.0	56.6	0.0	0.0
YUGOSLAVIA	173.3	14.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CMEA:											
BULGARIA	95.9	99.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CUBA	11.5	428.9	512.3	573.9	552.2	538.9	570.2	533.3	553.7	536.6	784.7
CZECHOSLOVAKI	1389.1	1239.4	1354.7	1489.2	1898.8	1894.1	668.7	587.1	986.0	56.4	312.6
GDR	1596.5	1559.0	1334.9	1912.7	1066.5	977.7	1425.1	719.8	1220.4	187.2	873.4
HUNGARY	201.6	248.8	156.1	425.9	0.0	0.0	0.0	0.0	85.2	0.0	0.0
MONGOLIA	0.0	0.0	11.3	0.0	28.0	69.5	0.0	20.1	21.9	0.0	67.4
POLAND	669.0	577.3	944.0	2132.6	1179.9	1069.2	1898.2	1014.6	1458.9	268.8	795.9
ROMANIA	158.9	80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CMEA TOTAL	4122.5	4224.5	4313.3	6534.3	3989.4	3749.4	4562.2	2874.9	4326.0	1049.0	2834.0
OTHER 1/	13.0	91.8	189.7	830.2	453.8	830.0	2286.2	432.0	966.4	206.4	267.5
TOTAL	5906.3	5879.0	5622.8	8639.6	4568.2	4853.3	7029.5	3578.0	5732.1	1468.0	3393.6

1/ RESIDUAL.

SOURCE: ESTIMATED OR DERIVED FROM OFFICIAL USSR STATISTICS

MARCH 1979
INTERNATIONAL TRADE POLICY, FAS, USDA

TABLE 4 --USSR WHEAT IMPORTS,
5-YEAR AVERAGES 1956-75,
AND ANNUAL 1971-77

LINE NAME	1956-60 AVERAGE	1961-65 AVERAGE	1966-70 AVERAGE	1971	1972	1973	1974	1975	1971-75 AVERAGE	1976	1977
					1000 METRIC TONS						
ARGENTINA	0.0	173.7	288.7	0.0	0.0	0.0	206.2	810.1	203.3	961.4	1/ 84.7
AUSTRALIA	0.0	582.7	27.4	277.1	479.6	844.6	580.8	1186.4	673.5	1262.7	959.1
CANADA	201.0	2000.9	1812.0	1805.1	3999.9	3534.8	410.5	2196.8	2389.4	2038.0	2253.0
FRANCE	0.0	166.7	267.9	199.7	539.2	343.5	0.0	0.0	216.5	0.0	0.0
PRC	17.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SWEDEN	0.0	0.0	0.0	0.0	41.4	130.0	57.8	0.0	45.8	0.0	0.0
UNITED STATES	0.0	356.9	0.0	0.0	2418.6	9847.9	1323.0	3810.9	3480.1	2052.0	1/ 2830.0
CMEA:											
BULGARIA	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HUNGARY	0.0	0.0	0.0	0.0	99.9	154.7	117.8	674.6	209.8	20.0	149.8
MONGOLIA	10.1	51.2	10.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
POLAND	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ROMANIA	0.0	147.9	78.6	0.0	209.9	182.7	0.0	380.5	154.6	327.8	0.0
CMEA TOTAL	18.5	199.1	88.6	0.0	309.8	337.4	117.8	1055.1	364.4	347.8	149.8
OTHER 2/	9.5	2.0	42.5	18.1	312.5	159.8	10.6	85.3	117.5	24.1	0.0
WORLD TOTAL	246.7	3482.0	2527.0	2300.0	9100.0	15200.0	2706.7	9145.6	7490.5	6686.0	1/ 6296.6

1/ CALCULATED.
2/ RESIDUAL.

SOURCE: USSR OFFICIAL STATISTICS

MARCH 1979
INTERNATIONAL TRADE POLICY, FAS, USDA

TABLE 5 --USSR WHEAT EXPORTS, 5-YEAR AVERAGES 1956-75, AND ANNUAL 1971-77

LINE NAME	1956-60 AVERAGE	1961-65 AVERAGE	1966-70 AVERAGE	1971	1972	1973	1974	1975	1971-75 AVERAGE	1976	1/ 1977
					1000 METRIC TONS						
AFGHANISTAN	0.0	0.0	32.9	59.4	0.0	12.1	0.0	10.0	16.3	0.0	31.5
ALBANIA	67.7	10.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ALGERIA	0.0	5.9	39.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AUSTRIA	0.0	0.0	1.5	43.7	0.0	0.0	0.0	0.0	8.7	0.0	0.0
BELGIUM	15.3	26.8	10.9	19.8	0.0	0.0	0.0	0.0	4.0	0.0	0.0
BRAZIL	41.1	171.4	44.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CHILE	0.0	0.0	0.0	0.0	10.9	74.9	0.0	0.0	17.2	0.0	0.0
CYPRUS	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.7	0.0	0.0
DENMARK	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EGYPT	203.7	0.0	359.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FRG	31.2	53.9	34.8	56.5	0.0	0.0	0.0	0.0	11.3	0.0	0.0
FINLAND	226.4	112.3	12.5	14.5	9.3	5.1	0.0	0.0	5.8	0.0	0.0
FRANCE	46.3	16.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GREECE	1.5	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INDIA	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IRAN	0.0	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IRAQ	29.3	9.7	0.0	117.1	0.0	0.0	0.0	0.0	23.4	0.0	0.0
IRELAND	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ITALY	12.1	36.7	53.8	22.5	0.0	0.0	0.0	0.0	4.5	0.0	0.0
JAPAN	15.4	17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
KOREA, NORTH	38.2	68.0	170.3	152.2	156.6	191.8	181.1	212.2	176.8	212.8	292.4
LEBANON	0.0	5.8	0.0	88.3	0.0	0.0	0.0	0.0	17.7	0.0	0.0
LIBYA	2.9	6.3	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MOROCCO	11.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

NETHERLANDS	114.4	82.6	83.1	83.8	0.0	0.0	0.0	0.0	16.8	0.0	0.0
PRC	0.0	41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PORTUGAL	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUDAN	0.0	25.6	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SWEDEN	36.2	28.4	11.8	1.9	0.0	0.0	0.0	0.0	0.4	0.0	0.0
SWITZERLAND	0.5	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UNITED KINGDOM	88.6	191.9	168.6	282.9	0.0	0.0	0.0	0.0	56.6	0.0	0.0
VIETNAM	0.0	0.0	1.2	0.0	0.0	0.0	0.0	125.0	25.0	200.0	222.6
YEMEN ARAB REP	0.0	0.0	0.0	0.0	0.0	0.0	23.6	0.0	4.7	0.0	0.0
YUGOSLAVIA	169.7	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CMEA:											
BULGARIA	95.4	68.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CUBA	11.5	255.0	306.8	404.8	436.6	419.8	397.1	404.4	412.5	389.3	544.9
CZECHOSLOVAKI	1109.6	759.4	1051.7	1188.4	898.0	759.8	412.4	504.9	752.7	0.0	100.0
GDR	1075.2	973.6	1170.5	1857.6	1047.9	879.0	1078.7	577.2	1088.1	0.0	477.9
HUNGARY	160.2	97.8	115.4	368.5	0.0	0.0	0.0	0.0	73.7	0.0	0.0
MONGOLIA	0.0	0.0	24.2	0.0	20.0	69.5	0.0	20.1	21.9	0.0	67.7
POLAND	607.8	204.2	819.3	1905.5	956.5	960.9	1605.1	763.2	1238.2	0.0	0.0
ROMANIA	158.9	80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CMEA TOTAL	3214.6	2438.3	3487.9	5726.8	3359.0	3088.0	3493.3	2269.8	3587.2	389.3	1190.5
OTHER 2/	12.9	70.4	87.1	945.9	364.5	930.0	1564.0	47.7	748.4	5.9	0.0
WORLD TOTAL	4491.7	3472.9	4631.2	7616.6	3890.3	4192.9	5262.0	2664.7	4725.3	808.0	1737.0

1/ CALCULATED.
2/ RESIDUAL.

SOURCE: USSR OFFICIAL STATISTICS

MARCH 1979
INTERNATIONAL TRADE POLICY, FAS, USDA

TABLE 6 --USSR COARSE GRAIN
IMPORTS, 5-YEAR AVERAGES
1956-75, AND ANNUAL 1971-77

LINE NAME	BARLEY	CORN	OATS	RYE	1/ RESIDUAL	TOTAL
			1000 METRIC TONS			
1956-60 AVE	39.8	91.8	5.7	0.0	0.8	138.2
1961-65 AVE	0.0	4.5	0.0	0.0	11.4	15.9
1966-70 AVE	0.0	317.4	0.0	0.0	22.6	339.9
1971	179.3	880.8	139.3	0.0	0.6	1200.0
1972	2600.0	4059.1	600.0	100.0	40.9	7400.0
1973	1900.0	5379.1	100.0	1300.0	20.9	8700.0
1974	244.0	3440.3	9.0	691.0	0.0	4424.3
1975	1001.0	5568.0	214.0	0.0	0.4	6763.4
1971-75 AVE	1192.9	3861.5	212.5	418.2	12.6	5697.5
1976	2244.0	11376.0	332.0	0.0	0.0	13952.0
1977 1/	43.0	3918.6	51.4	19.2	0.0	4032.2

NOTE: COARSE GRAIN IS TOTAL GRAIN LESS WHEAT.

1/ CALCULATED.

SOURCE: USSR OFFICIAL STATISTICS, EXCEPT AS NOTED

MARCH 1979
INTERNATIONAL TRADE POLICY, FAS, USDA

TABLE 7 --USSR COARSE GRAIN
EXPORTS, 5-YEAR AVERAGES
1956-77, AND ANNUAL 1971-77

LINE NAME	BARLEY	CORN	OATS	RYE	1/ RESIDUAL	TOTAL
			1000 METRIC TONS			
1956-60 AVE	544.7	175.2	164.4	530.5	-0.0	1414.7
1961-65 AVE	960.3	715.0	53.5	678.1	-0.0	2406.9
1966-70 AVE	521.8	219.1	9.0	245.6	0.0	991.6
1971	687.7	117.6	9.8	207.9	0.0	1023.0
1972	298.1	248.7	8.0	115.0	0.0	669.8
1973	276.2	365.1	19.1	0.0	0.0	660.4
1974	924.2	792.1	61.2	0.0	0.0	1767.5
1975	818.3	86.2	9.0	0.0	-0.2	913.3
1971-75 AVE	600.9	319.9	21.4	44.6	-0.0	1006.8
1976	503.0	148.7	9.0	0.0	-0.1	660.6
1977 1/	1449.4	191.0	16.2	0.0	0.0	1656.6

NOTE: COARSE GRAIN IS TOTAL GRAIN LESS WHEAT.

1/ CALCULATED.

SOURCE: USSR OFFICIAL STATISTICS, EXCEPT AS NOTED
MARCH 1978
INTERNATIONAL TRADE POLICY, FAS, USDA

TABLE 8 --USSR CORN IMPORTS,
5-YEAR AVERAGES 1956-75,
AND ANNUAL 1971-77

LINE NAME	1956-60 AVERAGE	1961-65 AVERAGE	1966-70 AVERAGE	1971	1972	1973	1974	1975	1971-75 AVERAGE	1976	1977
					1000 METRIC TONS						
ARGENTINA	0.0	0.0	43.3	196.2	0.0	0.0	463.8	954.3	322.9	299.2	1/ 326.1
BRAZIL	0.0	0.0	0.0	50.4	0.0	0.0	287.9	749.2	217.5	535.3	62.3
CANADA /	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	101.7	42.2
FRANCE	0.0	0.0	1.9	58.3	0.0	0.0	0.0	0.0	11.7	0.0	0.0
KENYA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.2	3.6	0.0	0.0
MEXICO	0.0	0.0	113.1	151.0	0.0	0.0	0.0	0.0	30.2	0.0	0.0
THAILAND	0.0	0.0	0.0	35.5	0.0	0.0	0.0	0.0	7.1	0.0	0.0
UNITED STATES	0.0	0.0	0.0	388.6	3572.2	4750.2	2529.4	3284.1	2904.9	9891.0	3435.0
YUGOSLAVIA	16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CMEA:											
HUNGARY	0.0	0.0	0.0	0.0	0.0	367.1	19.3	179.7	113.2	400.5	1/ 53.0
ROMANIA	52.4	0.0	40.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CMEA TOTAL	52.4	0.0	40.8	0.0	0.0	367.1	19.3	179.7	113.2	400.5	53.0
OTHER 2/	23.4	4.5	118.2	0.8	486.9	261.8	139.9	362.5	250.4	148.3	0.0
WORLD TOTAL	91.8	4.5	317.4	880.8	4059.1	5379.1	3440.3	5546.8	3861.5	11376.0	3/ 3918.6

1/ CALCULATED.
2/ RESIDUAL.
3/ TOTAL NOT REPORTED. VOLUME ESTIMATE IS SUM OF INDIVIDUAL COUNTRY DATA.

SOURCE: USSR OFFICIAL STATISTICS, EXCEPT AS NOTED

MARCH 1979
INTERNATIONAL TRADE POLICY, FAS, USDA

TABLE 9 --USSR BARLEY EXPORTS,
5-YEAR AVERAGES 1956-75,
AND ANNUAL 1971-77

LINE NAME	1956-60 AVERAGE	1961-65 AVERAGE	1966-70 AVERAGE	1971	1972	1973	1974	1975	1971-75 AVERAGE	1976	1/ 1977
					1000 METRIC TONS						
AUSTRIA	37.6	28.1	26.0	48.0	0.0	0.0	0.0	0.0	9.6	0.0	0.0
BELGIUM	24.9	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CYPRUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DENMARK	10.0	14.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FRG	51.3	43.2	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FINLAND	0.0	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ITALY	15.7	53.8	43.7	126.1	0.0	0.0	0.0	18.5	28.5	0.0	0.0
MALTA	0.0	0.0	0.0	8.4	0.0	0.0	0.0	8.9	3.5	0.0	0.0
NETHERLANDS	51.8	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORWAY	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SWEDEN	4.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UNITED KINGDOM	12.2	89.5	27.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
YUGOSLAVIA	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CMEA:											
BULGARIA	0.0	28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CUBA	0.0	39.3	39.4	41.7	46.8	20.0	69.1	34.2	42.4	46.3	33.2
CZECHOSLOVAKI	96.7	224.0	146.6	151.6	88.9	137.5	84.8	82.3	109.0	0.0	296.3
GDR	164.1	163.7	124.6	55.1	18.6	98.7	73.8	142.7	77.8	187.2	324.0
HUNGARY	41.4	97.8	28.6	57.4	0.0	0.0	0.0	0.0	11.5	0.0	0.0
POLAND	18.2	150.9	74.6	187.2	94.6	20.0	246.7	251.0	159.9	268.8	795.9
CMEA TOTAL	320.3	703.7	413.6	493.0	248.9	276.2	474.4	510.2	400.5	502.3	1449.4
OTHER 2/	13.8	5.7	9.7	12.2	49.2	0.0	449.8	286.7	158.8	0.7	0.0
WORLD TOTAL	544.7	960.3	521.8	687.7	299.1	276.2	924.2	810.3	600.9	503.0	1449.4

1/ CALCULATED.
2/ RESIDUAL.

SOURCE: USSR OFFICIAL STATISTICS

MARCH 1979
INTERNATIONAL TRADE POLICY, FAS, USDA

TABLE 10 --USSR OILSEED IMPORTS
BY TYPE, 5-YEAR AVERAGES
1956-75, AND ANNUAL 1971-77

LINE NAME	1956-60 AVERAGE	1961-65 AVERAGE	1966-70 AVERAGE	1971	1972	1973	1974	1975	1971-75 AVERAGE	1976	1977
					1000 METRIC TONS						
CASTOR BEANS	11.7	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COPRA	1.1	12.6	3.8	3.0	35.3	27.8	29.0	29.0	24.8	9.8	19.9
COTTONSEED	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LINSEED	9.7	10.9	5.7	1.5	7.4	6.8	7.2	6.6	5.9	11.0	3.6
PALM NUT & KERN	0.0	3.9	4.3	4.0	4.1	2.0	1.5	4.0	3.1	2.7	2.3
PEANUTS 1/	75.2	25.5	27.8	28.0	28.9	21.0	27.4	20.9	26.4	28.2	40.1
RAPE & MUSTARD	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SESAME SEED	5.1	10.1	7.5	8.0	6.4	5.0	5.1	6.4	6.8	6.0	5.4
SOYBEANS	519.2	20.7	0.0	0.0	2/ 339.6	2/ 715.3	2/ 0.0	2/ 363.3	293.6	2/ 1769.1	2/ 1354.1
SUNFLOWERSEED	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UNSPECIFIED 3/	15.4	2.9	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	20.1
TOTAL	640.6	88.4	50.1	45.6	481.7	767.9	70.3	430.2	360.7	1826.8	1455.3

1/ GREEN, SHELLED BASIS.
2/ TOTALS NOT REPORTED. VOLUME ESTIMATES ARE SUMS OF INDIVIDUAL COUNTRY DATA ADJUSTED TO ACCOUNT FOR KNOWN IMPORTS FROM THE U.S.
3/ RESIDUAL.

SOURCE: USSR OFFICIAL STATISTICS, EXCEPT AS NOTED

MARCH 1979
INTERNATIONAL TRADE POLICY, FAS, USDA

TABLE 11 --USSR OILSEED EXPORTS
BY TYPE, 5-YEAR AVERAGES
1956-75, AND ANNUAL 1971-77

LINE NAME	1956-60 AVERAGE	1961-65 AVERAGE	1966-70 AVERAGE	1971	1972	1973	1974	1975	1971-75 AVERAGE	1976	1977
					1000 METRIC TONS						
COTTONSEED	0.0	0.0	25.8	29.0	25.1	9.2	41.6	51.8	31.3	49.8	28.4
SOYBEANS	6.2	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUNFLOWERSEED	56.6	96.8	259.2	84.1	74.0	73.1	63.4	61.0	71.1	0.0	0.0
UNSPECIFIED 1/	7.3	8.4	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL 2/	70.1	107.3	291.2	113.1	99.1	82.3	105.0	112.8	102.5	49.8	28.4

1/ RESIDUAL BELIEVED TO BE MOSTLY COTTONSEED.
2/ TOTAL NOT REPORTED AFTER 1969. VOLUME ESTIMATE IS SUM OF INDIVIDUAL COMMODITIES.

SOURCE: USSR OFFICIAL STATISTICS, EXCEPT AS NOTED

MARCH 1979
INTERNATIONAL TRADE POLICY, FAS, USDA

TABLE 12 -- USSR SUNFLOWERSEED OIL
EXPORTS, 5-YEAR AVERAGES 1956-75
AND ANNUAL 1971-77

LINE NAME	1956-60 AVERAGE	1961-65 AVERAGE	1966-70 AVERAGE	1971	1972	1973	1974	1975	1971-75 AVERAGE	1976	1977
					1000 METRIC TONS						
ALGERIA	3.0	7.3	27.0	32.9	41.0	19.3	38.9	18.5	30.1	0.0	0.0
BANGLADESH	0.0	0.0	0.0	4.0	0.0	4.7	4.5	0.0	2.6	0.0	0.0
BELGIUM	0.0	2.9	6.1	11.5	0.0	0.0	4.5	3.0	3.8	7.0	1.5
BRAZIL	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CANADA	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CYPRUS	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.2	0.0	0.0
DENMARK	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EGYPT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FRG 1/	0.0	0.0	5.7	3.0	82.8	79.9	100.3	81.1	69.4	74.5	38.6
FRANCE	0.0	0.0	1.5	8.4	21.2	22.6	60.6	71.6	36.9	48.0	15.8
INDIA	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IRAN	0.0	0.0	29.3	0.0	10.0	10.3	34.6	27.7	16.9	2.4	0.0
MOROCCO	0.0	0.8	22.1	4.2	20.2	22.8	0.0	0.0	9.4	0.0	0.0
NETHERLANDS	0.0	0.4	21.6	12.6	10.7	6.8	9.0	6.3	9.1	10.0	10.9
PAKISTAN	0.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PERU	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SPAIN	0.0	6.2	1.1	0.0	0.0	0.0	5.8	25.6	6.3	1.1	1.4
SWITZERLAND	0.0	0.0	0.3	3.6	2.8	2.6	3.5	1.9	2.9	0.8	25.6
TUNISIA	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TURKEY	0.0	0.0	2.8	0.0	0.0	0.0	5.0	0.0	1.0	0.0	0.0
YUGOSLAVIA	0.0	0.0	29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CMEA1											
BULGARIA	0.0	0.0	23.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CUBA	0.0	0.0	0.0	0.0	63.5	48.1	65.3	60.7	47.5	57.3	72.6
CZECHOSLOVAKI	0.0	17.3	35.9	28.4	27.8	27.6	31.2	24.7	27.9	30.6	33.3
GDR	0.0	0.0	0.0	0.0	47.5	43.1	57.0	20.1	34.7	19.1	5.5
MONGOLIA	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8	0.3	1.3	0.5
POLAND	0.0	0.0	0.0	0.0	22.0	25.7	24.5	20.5	18.5	30.0	17.4
CMEA TOTAL	0.0	17.3	58.9	28.4	160.9	144.5	178.8	132.8	129.1	138.3	129.3
OTHER 2/	18.4	146.7	335.6	267.9	40.6	24.4	29.2	14.8	75.8	10.4	7.6
WORLD TOTAL	3/18.4	3/ 180.4	583.7	379.6	398.4	342.0	481.2	387.8	396.8	292.8	230.9

1/ INCLUDES SHIPMENTS TO WEST BERLIN, REPORTED SEPARATELY.
2/ RESIDUAL.
3/ FAO TRADE YEARBOOK, VARIOUS ISSUES.

SOURCE: USSR OFFICIAL STATISTICS, EXCEPT AS NOTED.

MARCH 1979
INTERNATIONAL TRADE POLICY, FAS, USDA

TABLE 13 --USSR SUNFLOWERSEED
EXPORTS, 5-YEAR AVERAGES
1956-75, AND ANNUAL 1971-77

LINE NAME	1956-60 AVERAGE	1961-65 AVERAGE	1966-70 AVERAGE	1971	1972	1973	1974	1975	1971-75 AVERAGE	1976	1977
					1000 METRIC TONS						
DENMARK	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FRG	0.0	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FINLAND	0.0	0.0	15.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ITALY	0.0	0.0	25.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
JAPAN	0.0	0.0	44.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LEBANON	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NETHERLANDS	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SPAIN	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CMEA:											
CZECHOSLOVAKI	23.8	35.8	54.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDR	32.3	60.4	82.4	84.0	74.0	73.1	63.4	61.0	71.1	0.0	0.0
HUNGARY	0.0	0.0	18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CMEA TOTAL	56.1	96.3	154.4	84.0	74.0	73.1	63.4	61.0	71.1	0.0	0.0
OTHER 1/	1.5	0.4	11.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WORLD TOTAL	58.6	96.8	259.2	84.1	74.0	73.1	63.4	61.0	71.1	0.0	0.0

1/ RESIDUAL.

SOURCE: USSR OFFICIAL STATISTICS

MARCH 1979
INTERNATIONAL TRADE POLICY, FAS, USDA

TABLE 14 --USSR SOYBEAN IMPORTS,
5-YEAR AVERAGES 1956-75
AND ANNUAL 1971-77

LINE NAME	1956-60 AVERAGE	1961-65 AVERAGE	1966-70 AVERAGE	1971	1972	1973	1974	1975	1971-75 AVERAGE	1976	1977
					1000 METRIC TONS						
BRAZIL	0.0	0.0	0.0	0.0	0.0	155.5	0.0	348.6	100.8	1344.4	568.7
PRC	519.2	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UNITED STATES	0.0	0.0	0.0	0.0	1/399.6	1/549.8	1/ 0.0	1/ 14.7	192.8	424.7	795.4
OTHER 2/	0.0	18.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	519.2	20.7	0.0	0.0	3/399.6	3/705.3	3/ 0.0	3/363.3	3/ 293.6	3/ 1769.1	3/ 1364.1

1/ OFFICIAL U.S. STATISTICS, INCLUDING TRANSSHIPMENTS.
2/ RESIDUAL.
3/ TOTALS NOT REPORTED. VOLUME ESTIMATES ARE SUMS OF INDIVIDUAL COUNTRY DATA.

SOURCE: USSR OFFICIAL STATISTICS, EXCEPT AS NOTED

MARCH 1979
INTERNATIONAL TRADE POLICY, FAS, USDA

TABLE 15 --USSR OILSEED MEAL
IMPORTS, 5-YEAR AVERAGES
1956-75, AND ANNUAL 1971-77

LINE NAME	1956-60 AVE	1961-65 AVE	1966-70 AVE	1971	1972	1973	1974	1975	1971-75 AVE	1976	1977
					1000 METRIC TONS						
FINLAND	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INDIA	0.0	15.9	60.7	92.5	126.4	105.9	73.8	70.4	94.8	0.0	19.2
PRC	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SYRIA	0.0	4.8	17.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WORLD TOTAL 1	9.5	20.6	77.9	92.5	126.4	105.9	73.8	70.4	94.8	0.0	19.2

1/ TOTALS NOT REPORTED. VOLUME ESTIMATES ARE SUMS OF COUNTRY PARTNER DATA.

SOURCE: USSR OFFICIAL STATISTICS, EXCEPT AS NOTED

MARCH 1979
INTERNATIONAL TRADE POLICY, FAS, USDA

TABLE 16 --USSR OILSEED MEAL EXPORTS, 5-YEAR AVERAGES 1956-75, AND ANNUAL 1971-77

LINE NAME	1956-60 AVE	1961-65 AVE	1966-70 AVE	1971	1972	1973	1974	1975	1971-75 AVE	1976	1977
					1000 METRIC TONS						
BELGIUM	21.7	19.8	22.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DENMARK	125.8	57.8	51.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FRG	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FINLAND	50.0	39.2	20.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FRANCE	8.8	18.1	37.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ITALY	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
JAPAN	5.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NETHERLANDS	0.0	0.0	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORWAY	29.7	12.2	15.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SWEDEN	14.5	11.8	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UNITED KINGDOM	28.5	8.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CMEA:											
CUBA	0.5	21.3	15.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CZECHOSLOVAKI	22.0	15.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HUNGARY	6.3	4.3	31.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CMEA TOTAL	28.8	41.1	47.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER 1/	27.7	10.2	81.9	44.0	52.0	0.0	0.0	0.0	19.2	0.0	0.0
WORLD TOTAL	349.3	220.5	295.3	44.0	52.0	0.0	0.0	0.0	19.2	0.0	0.0

1/ RESIDUAL.

SOURCE: USSR OFFICIAL STATISTICS

MARCH 1979
INTERNATIONAL TRADE POLICY, FAS, USDA

TABLE 17--U.S. AGRICULTURAL
EXPORTS TO USSR BY VOLUME,
5-YR AVE 1956-75, ANNUAL 1971-78

LINE NAME	1956-60 AVE	1961-65 AVE	1966-70 AVE	1971	1972	1973	1974	1975	1971-75 AVE	1976	1977	1978
						1000 METRIC TONS						
WHEAT	0	337	0	3	2733	8727	1063	4118	3329	1800	3017	2925
CORN	1	0	0	471	3438	4816	2155	3433	2863	9601	3766	10407
RYE	0	0	0	0	0	682	160	0	168	0	0	0
BARLEY	0	0	0	0	816	106	0	0	184	98	0	0
OATS	0	0	0	41	306	0	0	46	79	19	0	0
RICE	0	11	0	0	0	0	0	22	4	52	88	16
GRAIN SORGHUM	0	0	0	0	0	1	1	0	0	2	0	0
TOTAL GRAIN	1	348	0	515	7293	14332	3379	7619	6628	11572	6871	13348
POULTRY MEAT	0	0	0	0	0	0	0	0	0	2	6	0
CATL HIDES, 1000	55	658	1233	1251	518	48	447	660	585	143	28	298
CITRUS FRUIT	0	0	0	0	0	5	4	10	4	13	13	13
HOPS	0	0	0	0	0	1	1	0	0	0	2	2
SOYBEANS	0	12	0	0	400	550	0	15	193	579	565	832
VEG OILS AND WAX	0	0	0	0	10	21	0	0	6	0	0	0
TALLOW	37	55	7	0	0	0	0	40	8	0	0	44

SOURCE: US OFFICIAL STATISTICS. INCLUDES TRANSSHIPMENTS

MARCH 1979
INTERNATIONAL TRADE POLICY, FAS, USDA

TABLE 18--U.S. AGRICULTURAL
EXPORTS TO USSR BY VALUE
5-YR AVE 1956-75, ANNUAL 1971-78

LINE NAME	1956-60 AVE	1961-65 AVE	1966-70 AVE	1971	1972	1973	1974	1975	1971-75 AVE	1976	1977	1978
						1000 DOLLARS						
WHEAT	0	0	0	724	160026	556639	124130	672711	302846	264005	426769	355792
CORN	231	0	0	25243	186515	294522	159454	452642	223675	1164504	412632	1098916
RYE	0	0	0	0	0	55615	17629	0	14649	0	0	0
BARLEY	0	0	0	0	34117	10356	0	4	8895	11220	0	0
OATS	0	0	0	1829	12102	0	0	5217	3830	2222	0	0
RICE	0	0	0	0	0	0	0	9168	1834	15308	25219	5969
GRAIN SORGHUM	0	0	0	0	0	303	518	0	164	1057	0	0
TOTAL GRAIN	231	0	0	27796	392760	917435	301731	1139742	555893	1458316	864620	1460677
POULTRY MEAT	0	0	0	0	0	0	0	0	0	2368	6726	0
CATL HIDES	551	12089	14506	10876	9557	1108	7877	5182	6920	2470	668	8089
CITRUS FRUITS	0	0	0	0	0	1096	947	2064	821	2888	2882	3075
HOPS	0	0	0	0	0	1941	3073	974	1198	444	2739	4004
SOYBEANS	0	0	0	0	53563	87164	0	2914	28728	126425	154437	222121
VEG OIL AND WAX	0	0	0	0	1700	5586	0	0	1457	0	0	6
TALLOW	0	1520	1824	0	0	0	0	13998	2800	0	0	18744
OTHER 1/	775	1463	1755	5881	1848	2745	10112	5410	5199	7355	28367	37932
TOTAL	1558	15071	18085	44553	459428	1017075	323740	1170284	603016	1600266	1060439	1754648

1/ RESIDUAL.

SOURCE: US OFFICIAL STATISTICS, INCLUDING TRANSSHIPMENTS

MARCH 1979
INTERNATIONAL TRADE POLICY, FAS, USDA

TABLE 19--U.S. AGRICULTURAL
IMPORTS FROM USSR BY VOLUME
5-YR AVE 1956-75, ANNUAL 1971-78

LINE NAME	1956-60 AVE	1961-65 AVE	1966-70 AVE	1971	1972	1973	1974	1975	1971-75 AVE	1976	1977	1978
						METRIC TONS						
BRISTLES	30	19	45	0	24	69	50	4	29	0	0	0
CASEIN AND GLUE	0	40	0	0	0	291	1705	1516	702	877	1957	2039
COTTON LINTNERS	6752	6183	4677	0	0	0	0	0	0	0	0	0
FURSKINS												
GELATIN	0	0	0	0	101	1010	1104	105	464	284	64	13
HAIR, ANIMAL	105	0	0	0	0	0	0	0	0	5	0	0
LICORICE ROOT	3951	4331	3470	1181	0	0	0	3151	866	1873	0	0
MOLASSES	0	0	0	0	0	0	1093	0	219	0	0	0
SHEEP AND LAMBSK	0	0	2	0	0	0	36	34	14	0	97	0

NA=NOT AVAILABLE

SOURCE: US OFFICIAL STATISTICS

MARCH 1979
INTERNATIONAL TRADE POLICY, FAS, USDA

TABLE 20--U.S. AGRICULTURAL IMPORTS FROM USSR BY VALUE
5-YR AVE 1956-75, ANNUAL 1971-78

LINE NAME	1956-60 AVE	1961-65 AVE	1966-70 AVE	1971	1972	1973	1974	1975	1971-75 AVE	1976	1977	1978
						1000 DOLLARS						
BRISTLES	250	198	540	4	240	516	406	28	239	0	0	0
CASEIN AND GLUE	0	11	0	0	0	217	2039	1711	793	732	1701	2362
COTTON LINTNERS	635	710	546	0	0	0	0	0	0	0	0	0
FURSKINS 1/	0	0	675	2730	3007	3134	4540	3528	3388	6148	7427	8403
GELATIN	0	0	0	0	19	280	346	34	136	77	26	9
HAIR, ANIMAL	137	0	10	0	0	0	0	0	0	44	0	0
LICORICE ROOT	392	445	372	129	0	0	0	980	222	565	0	0
MOLASSES	0	0	0	0	0	0	468	0	94	0	0	0
SHEEP AND LAMBSK	0	0	47	0	0	0	183	80	53	0	326	0
OTHER 2/	320	395	591	157	583	555	515	850	532	801	1394	1605
TOTAL	1734	1760	2781	3020	3849	4702	8497	7211	5456	8367	10874	12379

1/ IMPORT INFORMATION NOT AVAILABLE BEFORE 1970.
SOVIET STATISTICS INDICATE SUBSTANTIAL EXPORTS TO THE US.
2/ RESIDUAL.

SOURCE: US OFFICIAL STATISTICS
MARCH 1979
INTERNATIONAL TRADE POLICY, FAS, USDA

SOVIET LIVESTOCK FEED IN PERSPECTIVE

(By Michael D. Zahn)

CONTENTS

TABLES

INTRODUCTION

In the early seventies the U.S.S.R. crossed a fundamental threshold in the approach to its grain-livestock economy and emerged not only as a major grain importer, but also with a dynamic livestock sector. The livestock sector became dynamic because it was not treated simply as a residual in Soviet agriculture. Traditionally, animal inventories had been liquidated during poor crop production years in order to aline inventories with domestic feed supplies. In particular, hogs would be the adjusted livestock category because it was a major consumer of concentrate feeds, most importantly grain, and because it had a short reproductive biological cycle within which to reestablish herd sizes.

No one can pinpoint with absolute surety the time when the Soviets actually made the major policy decision to import grain as needed to

offset shortfalls in planned years of domestic production. Following the March 1965 Plenum, Brezhnev's policy initiatives appear to have clearly highlighted the role of the livestock sector, but it was not until 1971 and 1972 that the policy, if it existed, was called to task. Soviet grain stocks during the latter part of the sixties appear to have been more than adequate to meet the requirements of expanding livestock feed use. In addition, grain production was very good compared to the early sixties.

Large Soviet grain imports in 1972/73 overtly demonstrated that the traditional policy of internal belt tightening during the lean years had changed.[1] The 1972 Soviet grain crop was probably around 20 million tons short of planned output and 13 million tons or 7 percent below that of 1971 (tables 1 and 2).[2] But, quite unlike other poor production years, net grain imports rose to a record 21 million tons in 1972/73. This allowed grain for feed to rise to an estimated record level of 98 million tons, representing over one-half of total grain utilization.

The Russian wheat deals of 1972 misled many of us as to the causes of Soviet grain demand. In the United States, as in many countries around the world, wheat is viewed as a food grain and not as a feed grain, because wheat for livestock feed represents such a small proportion of wheat utilization. For example, in the United States wheat for feed use in 1978/79 is projected at 18 percent of total domestic use, or 4.1 million tons.[3] In the U.S.S.R., however, wheat for feed constituted on average an estimated 34 million tons per year, or 37 percent of total wheat utilization in 1971/72–1975/76. Over the same period wheat made up 35 percent of the total grain used for feed. Clearly, wheat in the U.S.S.R. is as much a feed grain as a food grain. Therefore, following the large wheat imports of 1972/73 coarse grains replaced wheat as the largest share of total U.S.S.R. grain imports, because the impetus for grain imports was derived from livestock feed demands. Since 1972/73 Soviet coarse grain imports have always exceeded wheat imports, and in all probability this pattern will continue.

The new role of the U.S.S.R. in international grain markets and the integral part that the Soviet livestock sector plays in this role prompts us to take a serious look at the feed-livestock economy in order to place the fundamental relationships in perspective.

The Focus of Soviet Livestock Feeding

Meat output in calendar year 1978 reached a record 15.2 million tons, or 24 percent more than the 12.3 million tons produced in 1970. Other livestock products displayed similar progress over the same period (table 3). Milk production climbed 14 percent, and egg production was up 58 percent. This growth in livestock product output was based on increased feed availabilities and larger animal inventories (table 4).

[1] All split year marketing references are July–June, unless otherwise indicated.

[2] Total grain, by Soviet definition, includes wheat, coarse grains, buckwheat, paddy rice, miscellaneous grains, and pulses.

[3] Wheat Situation, WS–247, February 1979 (USDA–ESCS); year begins June 1. This level of wheat for feed in 1978/79 is higher than normal due to the relatively low wheat price in the United States.

From the viewpoint of the Soviet consumer, the growth in output has meant improved per capita consumption levels. The most important category, per capita consumption of meat, in 1977 was up 9 percent over levels of 1970. The improvement in meat consumption has been derived almost entirely from domestic production. Meat imports have never exceeded 5 percent of total meat output.

Despite the great strides toward improved livestock product availabilities in the U.S.S.R., per capita consumption is still far below the consumption norms set by the U.S.S.R. Academy of Sciences (table 5). Among the livestock product categories, the largest shortfall is in meat consumption, where 1977 per capita levels were 30 percent below the norm. The U.S.S.R. does not compare favorably in per capita consumption of meat and meat products with neighboring COMECON countries (table 6). Some of this international disparity in meat consumption is compensated by the relatively large U.S.S.R. per capita consumption of fish and fish products. Nonetheless, if the U.S.S.R. were to raise its per capita consumption of meat to levels equivalent to Poland's in 1977, meat output would have to expand by 35 percent, or more than 5 million tons. By examining the intertemporal consumption improvements within the U.S.S.R. and the remaining requirements to meet either the consumption norms or international comparability, it is clear that considerable expansion in the Soviet livestock economy is still necessary.

Soviet plan goals for meat production call for 17.3 million tons and 19.5 million tons in 1980 and 1985 respectively.[4] Despite the fact that these goals are most probably too ambitious, even if the 1985 goal is attained the per capita meat consumption norm would not be met.

The overall tasks of meeting Soviet consumer demand for livestock products are formidable. Continued growth of livestock products will be dependent upon domestically generated feed supplies and imported livestock feed. In order to understand the current role that feed plays in the livestock economy and to speculate on the feasibility of meeting livestock production targets, it is necessary to break down feed supplies by type.

The Availability of Feed Use Data From Soviet Sources

Soviet aggregate feed use data are very limited and only partially complete. The first official aggregate feed statistics were published in *Narodnoye khozyaistvo S.S.S.R.* v. *1961 godu.* The series, published in the 1961 statistical yearbook covering the years 1953 and 1958–61, excluded pasture (which was subsequently included for the following years) and divided the aggregate feed figures into four categories: (1) Concentrate feed; (2) succulent feed; (3) coarse feed; and (4) total feed in terms of feed units. In *Narodnoye khozyaistvo S.S.S.R.* v. *1964 godu,* a breakdown of feed expenditures in feed units is presented by Union Republic on collective and state farms. Later, in 1971, the Soviets outlined a breakdown of feed by type used on collective and state farms covering the years 1961–70.[5] Finally, beginning with

[4] Osnovnie napravleniya razvitiya selskovo khozyaistva v desyatoy pyatiletke, (Moscow: Ekonomika, 1976), p. 80; and Izvestiya, July 4, 1978, p. 2.
[5] Selskoye khozyaistvo SSSR, (Moscow: Statistika, 1971).

Narodnoye khozyaistvo S.S.S.R. v. *1975 godu*, feed expenditures in feed units are divided between collective farms and interfarm associations, and state farms. Individual republic handbooks have compiled feed expenditure figures with varying degrees of precision and homogeneity over this same period. Nonetheless, on an aggregate basis, we are still left with the official feed use breakdown into four major categories (concentrates, succulents, coarse feed, and pasture) and an aggregate feed unit total.

In order to accurately appraise the feed use situation, we need considerably more accuracy in the sources of livestock feed. Occasionally, detailed breakdowns of feed use have been published.[6] The most detailed to date has 11 categories (12 on a feed unit basis) and 4 subcategories (3 on a feed unit basis). It covers only collective and state farms for the years 1965–73. Table 7 presents this breakdown for 1965–73, both in the natural weights and in terms of feed units (oat equivalents).

The Plan of Statistical Work of the Central Statistical Administration indicates that these statistics are compiled every year from collective and state farm accounts, and are estimated in an aggregated form from livestock product outputs and animal inventories based on household budget surveys of private owners (i.e. collective farmers, workers, and employees).[7] With approximately one-third of Soviet livestock products being produced on private plots, the deficiency of having official Soviet feed figures detailed only for the socialized sector is considerable. In addition, the Soviet livestock feed use data are reported on a calendar year basis as opposed to a marketing year.

Two brief points should be made about the definition of the official Soviet livestock feed categories as utilized by the Central Statistical Administration. First, concentrate feed (*kontsentrirovaniye korma*) includes concentrates of plant origin only. Therefore, meat and bonemeal, for example, are not included. Second, pasture is a residual representing the difference between all feed accounted for and feed necessary to produce a given level of livestock products and maintain a given level of animal inventories.

The deficiencies of the officially reported Soviet feed data and a desire for improved monitoring of the feed-livestock economy have led to development of independently generated feed data.

Analysis of Feed Use and Distribution by Category of Livestock

The results of the independently generated U.S.S.R. feed data are summarized in tables 8–12. This feed use data is fully integrated with USDA's Economics, Statistics, and Cooperatives Service's grain balances for the U.S.S.R.[8]

This portrait of feed supplies presents a comprehensive view of growth and change. The compound growth rate of total oat equivalents has been 4.3 percent per year from 1956–57 to 1978–79. The

[6] Nalichiye i raskhod kormov v kolkhozakh i sovkhozakh v 1973 godu, (Moscow: TsSU, 1974); V. F. Klyuikov and A. P. Golikova. "K voprosu o snizhenii sebestoimosti prolzvodstva produktov zhivotnovodstva," Sbornik nauchnykh trudov, Vsesoyuzny nauchno-issledovatelsky institut ekonomiki sekskovo khozyaistva No. 75 (1975), pp. 55–62.

[7] Plan statisticheskikh rabot (Moscow: TsSU, 1970), p. 114.

[8] Data sources and description of methodology are available from the author upon request.

growth pattern was not steady, but instead characteristic of the vagaries of weather's influence on total crop output. The most marked improvement occurred during the sixties when total oat equivalents, on average, from the first half of the decade (1961/62 to 1965/66) to the second half of the decade (1966/67 to 1970/71) increased by 25 percent. Over the next 5-year period, total oat equivalents grew about half as fast. This slowing in the growth rate of feed supplies has spurred speculation that the Soviets may have severe difficulties in meeting planned increases in livestock product output. For example, total oat equivalents in 1978/79, with the record 235-million-ton grain crop, were only 6 percent more than in 1973/74.

Following the poor production year of 1975, the Soviets have had relatively favorable crop conditions in 1976, 1977, and 1978. The 224-million-ton grain crop in 1976 helped restore feed supplies and surpassed the total amount of oat equivalents fed in the 1974/75 season. The 1978 grain crop of 235 million metric tons will enhance feed supplies, further, especially when supplemented by grain imports. It seems quite possible that the Soviets will achieve a record 417 million metric tons of oat equivalent for feed in 1978/79.

In 1956/57, roughages made up nearly 50 percent of the total oat equivalent supplies with pasture contributing a 24-percent share and concentrates making up just over a quarter of the supply. Under the Brezhnev administration, considerable emphasis was placed on increasing the amount of concentrates fed. Comparing the 1971/72–1975/76 period to the late fifties, we see that roughages and pasture have fallen to less than a two-thirds contribution in total oat equivalents. This has occurred, however, not due to an absolute fall in production of pasture and roughages, but because the growth in concentrates has outstripped the growth in roughages and pasture.

If one examines the contribution of nongrain concentrates (millfeeds, oilmeal, fishmeal, meat and bonemeal, grass and clover meal, feed yeasts, whole milk and skim milk) to total oat equivalent supplies, the dominance of grain concentrates is apparent. In 1978/79 grain concentrates are estimated to be 85 percent of total concentrates. Of the nongrain concentrates, grass and clover meal is the only concentrate—a recently new one—which is making significant inroads in bolstering feed supplies. In the 1977/78 marketing year, grass and clover meal for feed amounted to 5.9 million tons, nearly a 500 percent increase since the beginning of the seventies. The amount of millfeeds fed has remained relatively constant over time, resulting in a decreased share. Fishmeal, feed yeasts, and meat and bonemeal have played only a minor role in the total feed supply picture. Certainly, these commodities play a significant role in particular subsectors of the livestock economy; but, on the whole, their contribution has been minor.

There are several new categories of concentrates which are not reflected in our analysis of oat equivalents because they do not have energy conversion factors, but still have a positive impact on feed conversion. Feed phosphates were first utilized during the early sixties, but it was not until the seventies that their impact was appreciable, reaching 2.3 million tons in 1977/78. Urea for feed is in a nascent stage of development primarily because of the high fiber content in

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cattle rations. Prospects for these two feed categories may be quite promising in the years to come.

Although the share of roughages and pasture in total feed supplies has fallen off to only two-thirds, this remains a considerable amount. By comparison, in the United States, roughages and pasture make up little more than one-half of total feed supplies. The disturbing factor in the use of roughages and pasture in the U.S.S.R. has been its slow growth rate over time, low yields [9] and lack of attention that the activity has been given. For example, in recent years, the Soviets have not been able to meet their planned production goals for cured hay—the most important individual roughage crop in terms of feed value. This might be understandable in that roughage production is an internal matter within a production unit (kolkhoz, for example) and not susceptible to the prodding of the Ministry of Procurements.

Final production figures for cured hay production in 1975, 1976, and 1977 have been approximately 15–20 percent below plan. Part of the below-planned performance is attributable to a change in harvesting policy with the Soviets shifting to haylage production. This initial development can be seen in the socialized sector beginning with 1971 (table 7).

The Soviet press is continually riddled with articles deriding the manner in which forage crops are handled. The problems are not localized but prevalent throughout the U.S.S.R. In the winter of 1973–74, 26.5 percent of the silage in Belorussia was classified as "poor", in Estonia—30.5 percent, in Bryansk oblast—32.9 percent, in Chernigov oblast—45 percent. And, in the RSFSR 31 percent of the silage produced in 1973 was classified as "poor".[10]

Such is also the case with other forages. For example, over the winter of 1974–75, 30.5 percent of the hay in Belorussia was classified as "unsatisfactory", in Bryansk oblast—77.3 percent, and in Chernigov oblast—61 percent.[11] For the country as a whole, it is claimed that the low quality hay, haylage, silage, and grass meal lowers the potential feed unit value of these items by 30–35 percent.[12] Carotin losses have been abnormally high by Soviet admission due to poor harvesting techniques, lack of adequate storage, and insufficient incentives. When this is coupled with the poor yields of these crops, considerable opportunities surface for improving and enhancing the availability of roughages and pastures within the existing system. Since roughages and pasture account for almost two-thirds of the oat equivalent feed supplies, a mere 10-percent improvement in roughages and pasture production would increase total feed supplies by 20–25 million tons of oat equivalents annually, or an amount equal to 15–20 percent of the total grain for feed. Such an increase would directly be available to ruminant animals but by decreasing the demand for concentrates it would indirectly aid monogastic animals as well.

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[9] The potential for doubling Soviet hay yields is evident from a comparison with Soviet, United States and Canadian hay yields. Average Soviet tame hay yields in 1971–75 were around 1.74 tons per hectare, while the U.S. average was in the neighborhood of 4.79 tons. Even North Dakota's hay yields are about twice the Soviet average.

[10] Puti snizheniya sebestoimosti selskokhozyaistvennoy produktsii, (Moscow: Kolos, 1977), p. 121.

[11] Klyuikov and Golikova, p. 58.

[12] Selskaya zhizn, Sept. 3, 1978, p. 2; and V. Drobrynin, "Problemy molochnovo skotovodostva," Ekonomika selskovo khozyaistva, No. 5, 1978.

Roughage production and pasture improvement have received little attention by western analysts compared to other feed supplies such as grain and oilseeds because they lack glamor and are not internationally traded; nonetheless, they remain the mainstay of the Soviet livestock economy. The future growth of feed supplies in the U.S.S.R. may more closely mirror the improvements in roughages and pasture should the gains in production of grain concentrates slow or limits be placed on imports.

An approximation of how the total feed units are distributed among livestock products and inventories is displayed in tables 11 and 12. This distribution of feed units is based primarily upon N. Burlakov's article "Effektivnost proizvodstva produktsii zhivotnovodstva." [13] The shifts in distribution over time are much as one might expect, with a larger share of total feed units going toward beef, pork, poultry, and egg production at the expense of sheep and horses. The reduction in horse numbers has in and of itself allowed some shift of feed resources to other livestock product sectors. In the 1956/57 marketing year, horses consumed an estimated 25 million tons of feed units. but by the 1978/79 marketing year that amount had fallen to 14 million tons or a savings of 11 million tons of feed. Sheep numbers have remained relatively constant through the sixties and, thereby, have not exerted any extra demand for feed units (table 4). The increase in feed unit availabilities have gone to beef, milk, pork, poultry, and egg production, with cattle currently consuming the major share of approximately 60 percent, up from 50 percent in the midfifties.

This pattern of redirecting feed use is also shown in table 12, which summarizes the distribution of concentrate feeds expressed in oat equivalents. Once again, beef, milk, poultry meat, and egg production have benefited by reducing the share of total concentrates consumed by horses.

Factors Influencing the Future Growth of Feed Use

What the future may hold for feed supplies in the U.S.S.R. is open to speculation. Grain concentrates have been steadily becoming a larger part of aggregate feed supplies; however, the seventies have been marked by considerable Soviet grain imports to enhance and maintain grain concentrates for feed. If the livestock production goals for 1980 and 1985 have any chance of being met in the near term, the trend toward increased concentrates must continue and a strong emphasis must be placed on improved feed conversion. Total oat equivalents per animal unit have grown 22 percent from 1961/62–1965/66 to 1971/72–1975/76 while concentrates, in terms of oat equivalents, have grown about 75 percent over the same period. Should the Soviets remain on their present path of expension in feed use, the 1980 and 1985 livestock production goals will be very costly in terms of feed and most probably will far outstrip the U.S.S.R.'s ability to generate the feed requirements internally within the agricultural sector. Consequently, the choice will shortly become one of either abandoning some of the livestock production goals or relying more heavily on for-

[13] N. Burlakov, "Effektivnost proizvodstva produktsii zhivotnovodstva", Ekonomika selskovo khozyaistva, No. 5, 1972.

eign feed supplies to fuel the expansion within hard currency foreign exchange limitations.

The 1980 plan goals assumed that 149.0 million tons of concentrates (Soviet definition—plant origin only) would be necessary to produce 17.3 million tons of meat, 102.1 million tons of milk, 66.8 billion eggs, and 515,000 tons of wool.[14] However, in 1977 143.0 million tons of concentrates were required to produce 14.7 million tons of meat, 94.9 million tons of milk and 61.2 billion eggs. Clearly the costs of increased livestock production are dearer than the planners had envisioned.

From data compiled on the independently derived feed supplies, we can calculate the estimated increases in concentrates necessary to meet the 1980 livestock plan goals. With feed conversion at the 1978/79 level, concentrates for feed would have to increase by about 12 percent to attain the 1980 goals.

Plan goals for 1985 call for 19.5 million tons of meat. If feed conversion does not improve, then an increase of 16 percent in total concentrates over 1978/79 would be necessary to reach the meat goal alone. The 1985 production plans for other livestock products are presently not available.

The attainment of livestock production goals and ultimately meeting consumer demand for livestock products will be not only dependent on increasing feed supplies, but will also rely heavily on improved feed efficiency.

Actual raw protein levels per feed unit are only 85 percent of the norm, and there has been no improvement in at least the last 15 years.[15] By increasing the protein content of feed units, livestock conversion efficiencies can be improved without expanding the total quantities of feed consumed. Similarly, only about one-third of the grain used for feed is processed, thereby decreasing the digestibility and efficiency of grain for feed.

The overall protein deficiency in livestock feed is serious, thereby complicating projections of future growth in feed conversion because of the existing untapped potential. In the Ukraine, the deficiency has been estimated at 1.8 million tons of protein, which, if corrected, could save 11 million tons of oat equivalents including over 3 million tons of concentrates.[16] Part of the solution to the protein deficiencies lies not with the overall protein level, but with the amino acids. Currently, Soviet protein sources are deficient in lysine.[17] Resolution of the protein problems will depend upon the ability of Soviet planners to direct their production efforts to avoid being constrained by limited amino acids such as lysine.

One final caveat about speculating on the future of Soviet feed use and conversion efficiency should be noted. It is easy to be misled by the feed conversion efficiency in selected sectors of Soviet agriculture, as in any economy, quite simply because in most presentations of feeding efficiency the issue of feed quality is never addressed. Disparity in feed quality is especially large in the U.S.S.R. Unless this problem is considered in the microeconomic example, it is not applicable in a macroeconomic framework.

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[14] Osnovnie napravleniya razvitiya selskovo khozyaistva v desyatoy pyatiletke, p. 80.
[15] N. P. Aleksandrov, Vestnik selskokhozyaistvennoy nauki, No. 12 (1978), p. 45; and, Klyuikov and Golikova, p. 59.
[16] F. Yu. Palify, Vestnik selskokhozyaistvennoy nauki, No. 1 (1978).
[17] K. M. Solntsev, Vestnik selskokhozyaistvennoy nauki, No. 7 (1978).

Summary

The Soviet feed-livestock economy is a broad multifaceted structure in which grain is but one part. In order to understand the present and future role of the U.S.S.R. in the area of grain utilization, the salient issues of the Soviet feed-livestock economy must be addressed. A presentation of feed use has been made in which grain for feed was placed in perspective with other feed supplies. This general overview is but one step toward offering a more complete picture of the Soviet feed-livestock economy in an effort to improve our understanding of the true breadth of the situation.

Our ability to explain, forecast, and appreciate the significance of future movements by the U.S.S.R. in international grain and oilseed markets may be closely tied to our understanding of the Soviet feed-livestock economy. It is hoped that this overview of feed helps to restore some perspective that may have been lost with the large grain purchases of the early seventies.

Table 1--Total supply and estimated utilization of grain, USSR, 1956/57-1978/79 1/

Year beginning July 1	Production	Trade			Availability	Utilization						Stock change 2/ 3/
		Imports	Exports	Net 2/		Seed	Industrial	Food	Dockage-waste	Feed	Total	
						Million metric tons						
1956/57	125.0	.9	5.4	-4.5	120	18	3	42	12	33	108	+12
1957/58	102.6	1.5	6.2	-4.7	98	18	3	43	10	34	109	-11
1958/59	134.7	1.7	7.7	-6.0	129	18	3	43	13	39	117	+12
1959/60	119.5	1.0	6.8	-5.8	114	18	3	43	12	40	116	-2
1960/61	125.5	.8	7.0	-6.2	119	20	3	42	13	41	118	+1
1961/62	130.8	.8	8.4	-7.6	123	21	3	44	13	45	126	-3
1962/63	140.2	.6	8.3	-7.7	133	23	2	48	14	43	130	+2
1963/64	107.5	10.4	4.7	+5.7	113	23	2	47	5	32	110	+3
1964/65	152.1	2.6	4.3	-1.7	150	22	3	45	17	44	130	+20
1965/66	121.1	9.0	5.3	+3.7	125	24	3	44	12	56	139	-14
1966/67	171.2	3.9	5.3	-1.4	170	24	3	44	14	60	144	+26
1967/68	147.9	2.3	6.4	-4.1	144	24	3	44	12	64	146	-2
1968/69	169.5	1.2	7.4	-6.2	163	25	3	44	17	72	160	+3
1969/70	162.4	1.8	7.6	-5.8	157	23	3	45	23	83	177	-20
1970/71	186.8	1.3	8.5	-7.2	180	25	3	45	22	92	188	-8
1971/72	181.2	8.3	6.9	+1.4	183	27	3	45	13	93	181	+2
1972/73	168.2	22.8	1.8	+21.0	189	26	3	45	15	98	187	+2
1973/74	222.5	11.3	6.1	+5.2	228	27	3	45	33	105	214	+14
1974/75	195.7	5.7	5.3	+.4	196	28	3	45	23	107	206	-10
1975/76	140.1	26.1	.7	+25.4	166	28	3	45	14	89	180	-14
1976/77	223.8	11.0	3.3	+7.7	232	29	3	45	31	112	221	+11
1977/78	195.7	19.1	2.3	+16.8	213	28	4	45	29	120	227	-14
1978/79 4/	235.0	5/ 14.3	2.8	+11.5	247	28	4	46	27	125	230	+17
1979/80												
1980/81												

1/ Rounded to the nearest million tons, except for production and trade data. Thus, totals may not add due to rounding.
2/ Minus indicates net exports or draw-down of stocks.
3/ Difference between availability and estimated total utilization.
4/ Preliminary.
5/ Includes an estimated 500,000 tons of rice (paddy basis).

Table 2--Supply and estimated utilization of wheat and coarse grains, USSR, 1971/72-1978/79 1/

Year beginning July 1	Production	Trade			Availability	Utilization						Stock change 2/ 3/
		Imports	Exports	Net 2/		Seed	Industrial	Food	Dockage-waste	Feed	Total	
	Million metric tons											
Wheat												
1971/72	98.8	3.5	5.8	-2.3	97	15	1	35	7	36	94	+3
1972/73	86.0	15.6	1.3	+14.3	100	14	1	35	8	41	98	+2
1973/74	109.8	4.5	5.0	-.5	109	14	1	34	16	30	96	+13
1974/75	83.9	2.5	4.0	-1.5	82	14	1	34	10	34	93	-11
1975/76	66.2	10.1	.5	+9.6	76	15	1	35	7	30	87	-11
1976/77	96.9	4.6	1.0	+3.6	101	15	1	35	14	28	93	+8
1977/78	92.2	6.9	1.0	+5.9	98	15	1	35	14	43	107	-9
1978/79 4/	120.8	5.3	1.5	+3.8	125	14	1	35	14	44	108	+17
1979/80												
1980/81												
Coarse grains 5/												
1971/72	72.6	4.3	.9	+3.4	76	10	2	7	5	51	76	0
1972/73	72.5	6.9	.4	+6.5	79	11	2	7	7	53	79	0
1973/74	101.0	6.4	.9	+5.5	107	11	2	7	15	70	105	+1
1974/75	99.7	2.7	1.0	+1.7	101	11	2	7	12	68	100	+1
1975/76	65.8	15.6	0	+15.6	81	12	2	7	7	56	84	-3
1976/77	115.0	5.7	2.0	+3.7	119	12	3	7	16	78	116	+3
1977/78	92.6	11.7	1.0	+10.7	103	11	3	7	14	73	108	-5
1978/79 4/	103.8	8.5	1.0	+7.5	111	12	3	7	12	77	111	0
1979/80												
1980/81												

1/ Rounded to the nearest million tons, except for production and trade data. Thus, totals may not add due to rounding.
2/ Minus indicates net exports or draw-down of stocks.
3/ Difference between availability and estimated total utilization.
4/ Preliminary.
5/ Includes rye, barley, oats, corn, and millet.

Table 3--Production of principal livestock products, USSR, 5-year averages, 1966-75, and annual, 1966-78

Year	Meat						Milk	Wool 2/	Eggs
	Total	Beef and veal	Pork 1/	Mutton, lamb, and goat	Poultry	Other			
	1,000 metric tons								Millions
1966	10,704	4,377	4,465	933	745	184	75,992	371	31,672
1967	11,515	5,081	4,456	1,028	764	186	79,920	394	33,921
1968	11,648	5,513	4,079	1,029	817	210	82,295	415	35,679
1969	11,770	5,569	4,094	969	866	272	81,540	390	37,190
1970	12,278	5,393	4,543	1,002	1,071	269	83,016	419	40,740
Average:	11,583	5,187	4,327	992	853	224	80,553	398	35,840
1971	13,272	5,536	5,277	996	1,183	280	83,183	429	45,100
1972	13,633	5,722	5,445	923	1,237	306	83,181	420	47,910
1973	13,527	5,873	5,081	954	1,295	324	88,300	433	51,154
1974	14,620	6,384	5,515	974	1,420	327	91,760	462	55,509
1975	14,968	6,409	5,651	1,014	1,539	355	90,804	467	57,463
Average:	14,008	5,984	5,394	972	1,335	323	87,446	442	51,427
1976	13,583	6,615	4,343	885	1,411	329	89,675	436	56,187
1977	14,692	6,892	4,961	898	1,644	297	94,900	459	61,200
1978	3/ 15,200	4/ 6,900	4/ 5,300	4/ 900	4/ 1,800	4/ 300	3/ 94,500	3/ 462	3/ 64,400
1979									
1980									
Average:									

1/ Including fat.
2/ Greasy basis.
3/ Preliminary.
4/ Estimate.

Table 4--January 1 livestock numbers and animal units in terms of cows, USSR, 1955, 1960-79

Year	Cattle		Hogs		Sheep	Goats	Horses	Poultry	Total animal units 2/
	Total	Cows 1/	Total	Sows					
	Million head								
1955	56.7	26.4	31.0	NA	99.0	14.0	14.1	3/ 375.0	3/ 86.8
1960	74.2	33.9	53.4	4.22	136.1	7.9	11.0	514.3	109.8
1961	75.8	34.8	58.7	4.70	133.0	7.3	9.9	515.6	111.3
1962	82.1	36.3	66.7	NA	137.5	7.0	9.4	542.6	118.5
1963	87.0	38.0	70.0	NA	139.7	6.7	9.1	550.4	123.1
1964	85.4	38.3	40.9	NA	133.9	5.7	8.5	449.1	110.2
1965	87.1	38.8	52.8	NA	125.2	5.4	7.9	456.2	113.7
1966	93.4	39.3	59.6	4.11	129.8	5.5	8.0	490.7	121.0
1967	97.1	40.2	58.0	3.81	135.5	5.5	8.0	516.3	124.2
1968	97.2	40.4	50.9	3.36	138.4	5.5	8.0	528.4	122.7
1969	95.7	40.1	49.0	3.30	140.6	5.6	8.0	546.9	121.7
1970	95.2	39.4	56.1	3.62	130.7	5.1	7.5	590.3	122.6
1971	99.2	39.8	67.5	4.04	138.0	5.4	7.4	652.7	130.5
1972	102.4	40.0	71.4	4.02	139.9	5.4	7.3	686.5	134.4
1973	104.0	40.6	66.6	3.95	139.1	5.6	7.1	700.0	134.1
1974	106.3	41.4	70.0	4.03	142.6	5.9	6.8	747.7	138.0
1975	109.1	41.9	72.3	4.02	145.3	5.9	6.8	792.4	141.6
1976	111.0	41.9	57.9	3.71	141.4	5.7	6.4	734.4	136.5
1977	110.3	42.0	63.1	3.76	139.8	5.5	6.0	796.0	138.4
1978	112.7	42.6	70.5	4.04	141.0	5.6	5.8	880.9	143.9
1979	114.4	43.1	74.7	3/ 4.30	3/ 143.1	3/ 5.7	3/ 5.8	3/ 940.0	3/ 147.8
1980									

NA = Not available.

1/ Revised series beginning 1966; excludes cows placed on feed for slaughter.
2/ In terms of cows. Conversion ratios as follows: Cattle (other than cows) .6; hogs .3; total sheep and goats .1; horses 1.0; and poultry .02. Source: Spravochnik ekonomista kolkhoza i sovkhoza, (Moscow, 1970), p. 523.
3/ Estimate.

Table 5--Per capita consumption of selected food products, USSR, 5-year averages, 1966-75, and annual, 1950, 1960, and 1970-77

Year	Meat and fat	Fish and fish products	Milk and milk products 1/	Eggs	Sugar	Vegetable oil	Potatoes	Grain 2/	Vegetables and melons	Fruits and berries
	Kilograms			No. of eggs	Kilograms					
Consumption norm	82	18.6	405	292	40.0	9.1	97	110	146	113
1950	26	7.0	172	60	11.6	2.7	241	172	51	11
1960	40	9.9	240	118	28.0	5.3	143	164	70	22
1970	48	15.4	307	159	38.8	6.8	130	149	82	35
1966-70 average	47	14.3	287	144	37.2	6.5	132	150	78	NA
1971	50	14.8	300	174	39.5	7.0	128	147	85	39
1972	52	15.1	296	185	38.8	7.0	121	145	80	36
1973	53	16.1	307	195	40.8	7.3	122	143	85	41
1974	55	16.5	316	205	41.0	7.9	121	142	87	37
1975	57	16.8	315	216	40.9	7.6	120	141	89	39
1971-75 average	53	15.9	307	195	40.2	7.4	122	144	85	38
1976	56	18.4	316	209	41.9	7.7	119	141	86	39
1977	57	17.7	322	224	42.0	7.9	122	140	89	41
1978										
1979										
1980 plan	63	20.9	335	225	50.0	NA	115	144	113	44
1976-80 average										
1981										
1982										
1983										
1984										
1985										
1981-85 average										

Note: Consumption norm is the level of consumption recommended by the Institute of Nutrition, Academy of Sciences, USSR.
NA = Not available.

1/ Including milk equivalent of butter.
2/ Flour equivalent.

Table 6--Per capita consumption in selected COMECON countries, 1977

Product	Bulgaria	Czechoslovakia	GDR	Hungary	Poland	USSR
			Kilograms			
Meat and meat products (including fat and offals)	62.0	1/ 81.3	1/ 83.6	1/ 2/ 70.5	77.1	57
Fish and fish products	5.9	6.0	7.6	NA	7.6	17.7
Milk and milk products (in terms of milk)	208	3/ 214	NA	3/ 146	438	322
Eggs (number)	171	295	278	306	214	224
Vegetable oils	14.5	4/ 6.7	2.0	5/ 5.6	2.7	7.9
Sugar and sugar products (in terms of white sugar)	34.0	38.0	39.8	34.5	41.5	42.0
Grain products (in terms of flour)	157	108	94.1	118	6/ 121	140
Vegetables (in terms of fresh)	123	NA	90.0	7/ 173	6/ 8/ 86.8	89
Potatoes	24.7	92.0	140	66.5	6/ 168	122

NA = Not available.

1/ Excluding fat.
2/ Includes fish and fish products.
3/ Excluding butter.
4/ Includes special types of oil.
5/ Includes margarine.
6/ Expressed on agricultural year July 1 thru June 30.
7/ Includes fruit and berries.
8/ Excludes processed products.

Source: Statisticheskiy ezhegodnik stran-chlenov Soveta Ekonomicheskoy Vzaimopomoshchi 1978, (Moscow: Statistika, 1978).

Table 7--Feed expenditures for livestock and poultry on collective and state farms in natural units and feed units, 1965-73 1/

	1965	1966	1967	1968	1969	1970	1971	1972	1973
					Million tons				
Natural units:									
Total concentrates	46.4	50.1	53.7	58.9	67.9	78.8	83.7	84.5	92.2
Mixed feed	11.0	11.2	13.2	14.9	17.4	19.1	21.6	22.9	27.3
Total coarse feed	108.1	108.7	112.5	114.9	114.6	119.0	133.1	151.6	157.5
Hay	45.3	47.2	48.4	49.2	50.0	53.7	55.1	52.7	49.6
Haylage	--	--	--	--	--	--	6.7	22.4	35.3
Straw	62.3	61.5	64.1	65.7	64.6	65.3	71.3	76.5	72.6
Silage	158.7	138.8	139.3	145.8	139.5	148.4	146.4	145.1	150.7
Potatoes	13.1	11.8	10.6	13.1	12.0	10.7	11.1	9.0	11.7
Feed roots and melons, including sugarbeets	21.7	24.8	25.8	30.7	31.7	31.8	33.4	32.3	40.1
Green chop	89.0	96.8	97.8	96.9	102.5	117.5	127.4	123.2	156.5
Food industry byproducts	36.7	36.6	35.0	38.8	39.1	37.0	38.4	39.8	40.4
Whole milk	5.1	5.5	5.9	6.3	6.6	6.9	6.7	6.4	6.5
Skim milk, buttermilk, whey	20.4	20.5	21.3	21.6	20.1	20.9	21.6	21.9	24.1
Meat and bonemeal, fishmeal 2/	0.7	0.7	0.6	0.9	1.0	1.0	1.4	1.5	1.5
Pasture	251.8	269.3	274.3	275.9	267.3	268.9	271.8	266.9	279.8
Feed units:									
Total concentrates	46.2	49.6	52.9	57.7	66.4	77.1	82.3	82.5	89.5
Total coarse feed	35.0	34.3	35.9	36.6	36.7	38.4	42.4	47.6	49.4
Hay	20.3	20.9	21.2	21.7	22.0	23.7	24.3	23.1	21.8
Haylage	--	--	--	--	--	--	2.2	7.5	11.6
Straw	14.7	14.0	14.7	14.9	14.7	14.7	15.9	17.0	16.0
Silage	30.1	26.1	26.1	27.1	25.8	27.5	26.9	26.8	27.8
Potatoes	3.9	3.5	3.2	3.9	3.5	3.2	3.3	2.7	3.5
Feed roots and melons, including sugarbeets	4.0	3.8	4.0	4.7	4.8	4.7	4.9	4.6	5.6
Green chop	16.0	17.3	17.3	17.1	18.1	20.8	22.4	21.9	27.7
Food industry byproducts	3.6	3.5	3.4	3.8	3.9	3.6	3.8	3.6	3.7
Whole milk	1.8	1.9	2.0	2.2	2.3	2.4	2.3	2.2	2.2
Skim milk, buttermilk, whey	2.8	2.8	2.9	2.9	2.8	2.9	3.0	3.0	3.3
Meat and bonemeal, fishmeal 2/	0.5	0.5	0.4	0.6	0.6	0.6	0.8	0.9	0.9
Other feed	1.9	2.6	2.3	2.3	2.3	2.5	2.4	2.3	2.6
Pasture	47.2	51.2	52.5	52.4	50.7	51.0	51.5	50.3	53.4
Total	193.0	197.7	209.9	211.3	217.8	234.7	246.0	248.4	269.6

-- = Insignificant or zero.

1/ Feed units are synonymous with oat equivalents; all data are calendar year.
2/ Includes other feed of animal origin.

Source: Nalichiye i raskhod kormov v kolkhozakh i sovkhozakh v 1973 godu, (Moscow: TsSU, 1974).

Table 8--Concentrates by type fed to livestock and poultry, 1956/57-1978/79

Year	Total grain 1/	Wheat	Coarse grains 2/	Millfeeds	Oilseed meal	Animal byproducts 3/	Grass and clover meal 4/	Feed yeasts	Whole milk	Skim milk and whey
					Million tons					
1956/57	32.5	3.3	29.0	7.0	2.3	.1	--	--	7.9	14.4
1957/58	34.0	15.0	18.5	7.3	1.9	.1	--	--	8.5	16.2
1958/59	39.1	8.2	30.2	7.3	2.3	.1	--	--	8.9	16.8
1959/60	40.0	15.7	23.4	7.1	1.7	.1	--	--	9.2	18.5
1960/61	41.4	9.7	30.6	6.9	2.0	.1	--	5/	8.9	18.4
1961/62	45.3	13.0	30.5	7.4	2.2	.2	--	5/	9.8	19.5
1962/63	43.1	8.2	30.7	8.1	2.5	.2	--	5/	9.4	20.0
1963/64	31.7	2.7	24.9	8.1	2.4	.3	--	.1	8.4	19.1
1964/65	44.5	9.2	30.6	7.6	3.1	.3	--	.1	7.2	20.8
1965/66	56.0	20.4	30.7	7.6	2.7	.4	.1	.1	8.8	26.4
1966/67	59.8	16.2	39.8	7.7	3.0	.4	.2	.1	9.3	26.5
1967/68	63.6	20.3	39.0	7.7	3.6	.5	.3	.2	10.2	27.3
1968/69	71.8	27.1	40.2	7.9	3.2	.6	.4	.2	10.7	27.1
1969/70	82.9	33.5	44.3	8.0	3.3	.6	.5	.2	11.2	25.0
1970/71	92.0	38.6	48.6	8.1	3.5	.6	.9	.2	11.3	25.4
1971/72	93.2	36.4	51.4	8.1	3.7	.7	1.3	.3	10.4	26.4
1972/73	98.3	41.3	52.6	7.9	3.6	.7	1.7	.3	9.1	27.2
1973/74	105.4	30.5	69.6	8.0	4.1	.8	2.4	.4	9.7	33.8
1974/75	107.2	33.7	67.6	8.0	4.2	.9	3.0	.5	10.1	34.0
1975/76	89.3	29.9	56.5	8.0	4.6	1.0	4.1	.6	10.0	33.0
1976/77	112.0	28.2	78.1	8.1	4.2	1.0	5.3	.8	9.9	33.9
1977/78	120.5	42.9	73.1	8.2	4.6	1.0	5.9	.9	10.4	37.5
1978/79 6/	125.0	43.1	77.9	8.3	4.6	1.0	6.9	1.0	10.4	36.3
1979/80										
1980/81										

-- = Insignificant or zero.

1/ Wheat, coarse grains and pulses.
2/ Includes rye, barley, oats, corn, and millet.
3/ Meat and bonemeal and fishmeal.
4/ Technically this is dehydrated fodder but approximately 98 percent is grass and clover meal.
5/ Less than 50,000 tons.
6/ Preliminary.

Table 9--Concentrates fed to livestock and poultry expressed in terms of oat equivalents, 1956/57-1978/79

Year	Total	Total grain 1/	Wheat	Coarse grains 2/	Mill-feeds	Oilseed meal	Animal byproducts 3/	Grass and clover meal	Feed yeasts	Whole milk	Skim milk and whey
					Million tons						
1956/57	50.3	38.2	3.9	33.9	5.0	2.4	.1	--	--	2.7	1.9
1957/58	51.5	39.4	17.9	20.8	5.2	2.0	.1	--	--	2.9	2.1
1958/59	59.0	46.1	9.8	35.5	5.2	2.4	.1	--	--	3.0	2.2
1959/60	58.9	46.5	18.8	26.6	5.0	1.8	.1	--	--	3.1	2.4
1960/61	61.5	49.0	11.6	36.0	4.9	2.1	.1	--	4/	3.0	2.4
1961/62	68.4	54.8	15.6	37.0	5.2	2.3	.1	--	4/	3.3	2.5
1962/63	66.9	52.5	9.8	37.7	5.7	2.7	.2	--	4/	3.2	2.6
1963/64	52.7	38.7	3.2	30.6	5.8	2.6	.2	--	.1	2.9	2.5
1964/65	68.2	54.0	11.0	37.5	5.4	3.3	.2	--	.1	2.4	2.7
1965/66	82.3	67.2	24.5	36.9	5.4	2.8	.3	.1	.1	3.0	3.4
1966/67	87.1	71.2	19.5	46.2	5.4	3.1	.4	.1	.1	3.2	3.4
1967/68	92.7	75.5	24.4	46.1	5.5	3.8	.4	.2	.2	3.5	3.5
1968/69	102.5	85.3	32.5	47.5	5.6	3.4	.5	.4	.2	3.6	3.5
1969/70	116.3	98.9	40.2	52.7	5.7	3.5	.5	.5	.2	3.8	3.3
1970/71	127.4	109.3	46.4	57.4	5.7	3.7	.5	.7	.3	3.8	3.3
1971/72	129.4	110.7	43.6	60.7	5.7	3.9	.6	1.1	.3	3.5	3.4
1972/73	136.1	117.5	49.6	62.8	5.6	3.8	.6	1.4	.4	3.1	3.5
1973/74	147.0	126.0	36.6	83.3	5.7	4.3	.7	2.0	.5	3.3	4.4
1974/75	149.9	128.0	40.4	80.8	5.7	4.4	.8	2.6	.6	3.4	4.4
1975/76	131.2	107.9	35.9	68.6	5.7	4.9	.9	3.4	.7	3.4	4.3
1976/77	157.9	133.7	33.9	93.2	5.8	4.4	.8	4.5	.9	3.4	4.4
1977/78	170.7	144.8	51.5	88.0	5.8	4.8	.8	5.0	.9	3.5	4.9
1978/79 5/	176.8	149.8	51.7	93.0	5.9	4.9	.9	5.8	1.1	3.5	4.7
1979/80											
1980/81											

-- = Insignificant or zero.

1/ Wheat, coarse grains, and pulses evaluated as individual grains.
2/ Includes rye, barley, oats, corn, and millet; each evaluated individually.
3/ Meat and bonemeal and fishmeal evaluated individually.
4/ Less than 50,000 tons.
5/ Preliminary.

Table 10--Roughages and pasture expressed in terms of oat equivalents, 1956/57-1978/79

Year	Total succulants 1/	Corn silage and green chop	Potatoes	Total coarse 2/	Hay	Straw	Pasture
			Million tons				
1956/57	43.6	22.9	8.8	49.4	32.3	17.1	44.8
1957/58	42.4	21.7	7.3	48.1	32.4	15.8	57.0
1958/59	71.1	47.6	7.3	57.2	39.6	17.6	50.0
1959/60	68.5	47.3	7.7	52.7	36.3	16.4	56.5
1960/61	89.9	66.9	6.8	54.8	38.3	16.5	55.7
1961/62	70.0	49.2	6.8	50.9	34.3	16.7	59.5
1962/63	72.2	51.6	5.6	49.3	31.3	17.9	56.6
1963/64	60.6	40.5	5.9	44.2	28.4	15.8	59.0
1964/65	87.8	59.3	8.7	50.9	31.4	19.5	63.5
1965/66	65.2	38.5	7.4	50.7	33.4	17.3	69.3
1966/67	74.1	46.2	7.4	60.9	40.0	20.9	70.9
1967/68	79.3	47.8	9.2	55.5	36.7	18.8	70.4
1968/69	75.4	42.6	11.1	60.0	39.5	20.5	67.9
1969/70	76.0	48.1	7.9	60.4	40.7	19.7	67.9
1970/71	78.1	45.1	9.4	66.3	44.7	21.6	68.9
1971/72	77.3	44.8	8.5	66.8	45.6	21.2	67.4
1972/73	73.2	43.8	5.0	66.5	46.4	20.1	69.6
1973/74	100.7	59.9	12.7	75.6	51.1	24.6	68.9
1974/75	78.1	48.1	5.3	75.5	52.9	22.6	65.7
1975/76	72.2	41.0	8.0	65.7	46.9	18.8	65.2
1976/77	95.1	58.9	7.0	78.1	53.1	25.0	64.6
1977/78 3/	86.8	52.4	6.6	73.6	50.6	22.9	68.0
1978/79 4/	92.5	56.3	7.1	79.9	53.9	23.7	68.0
1979/80							
1980/81							

1/ Includes corn silage and green chop, other silage, potatoes, feed roots and melons, and beet pulp.
2/ Includes hay and straw; may not add due to rounding.
3/ Estimate.
4/ Forecast.

Table 11--Shares of total oat equivalents consumed by type of livestock and product production, 1956/57-1978/79

Year	Total oat equivalents 1/	Beef	Milk	Hogs	Poultry meat	Eggs	Sheep	Horses	Total 2/
	Million tons				Percent				
1956/57	188.1	18.9	31.6	16.0	1.7	4.1	14.3	13.3	100
1957/58	199.0	20.2	32.1	14.8	1.6	4.1	15.1	12.1	100
1958/59	237.3	22.0	31.0	15.1	1.8	4.1	15.3	10.7	100
1959/60	236.7	22.4	31.4	13.8	1.9	4.5	15.6	10.4	100
1960/61	262.0	19.9	32.0	15.7	2.1	4.8	16.1	9.4	100
1961/62	248.8	21.7	31.2	16.3	2.0	4.7	15.5	8.6	100
1962/63	245.1	24.2	29.3	16.9	1.9	4.4	15.3	8.0	100
1963/64	216.6	25.3	33.0	12.2	1.6	4.5	15.3	8.2	100
1964/65	270.3	24.4	33.3	15.8	1.6	4.3	14.0	6.7	100
1965/66	267.6	25.5	32.6	15.9	1.6	4.4	13.7	6.4	100
1966/67	292.9	27.7	32.1	14.8	1.5	4.4	13.6	6.0	100
1967/68	297.9	29.1	32.0	13.2	1.6	4.5	13.8	5.8	100
1968/69	305.8	29.6	31.9	13.3	1.7	4.7	13.1	5.8	100
1969/70	320.7	27.9	31.7	14.4	2.0	5.0	13.7	5.3	100
1970/71	340.6	27.5	30.5	16.0	2.1	5.3	13.5	5.1	100
1971/72	340.9	28.0	30.0	16.3	2.2	5.6	13.0	4.9	100
1972/73	345.5	28.1	31.2	14.9	2.3	5.8	13.1	4.6	100
1973/74	392.1	28.8	30.4	15.2	2.3	5.9	13.1	4.2	100
1974/75	369.3	28.7	29.9	15.5	2.5	6.1	13.2	4.1	100
1975/76	334.4	31.0	30.9	12.4	2.4	6.2	12.9	4.1	100
1976/77	395.7	30.3	30.8	13.4	2.6	6.4	12.8	3.6	100
1977/78 3/	399.1	30.0	30.3	14.1	2.8	6.6	12.7	3.5	100
1978/79 4/	417.2	29.8	30.3	14.6	2.9	6.5	12.6	3.3	100
1979/80									
1980/81									

1/ Total of concentrates, roughages and pasture; may not add due to rounding.
2/ May not add due to rounding.
3/ Estimated share data.
4/ Forecasted share data.

Table 12--Shares of total concentrates expressed in oat equivalents consumed by type of livestock and product production, 1956/57-1978/79

Year	Total concentrates in oat equivalents	Beef	Milk	Hogs	Poultry meat	Eggs	Sheep	Horses	Total 1/
	Million tons				Percent				
1956/57	50.3	9.0	20.5	36.9	4.2	10.3	2.2	17.0	100
1957/58	51.6	10.0	21.6	35.4	4.2	10.4	2.4	16.0	100
1958/59	59.0	10.9	20.9	36.2	4.7	10.7	2.4	14.3	100
1959/60	58.9	11.3	21.5	33.7	5.1	11.8	2.5	14.1	100
1960/61	61.5	9.7	21.2	36.9	5.2	12.2	2.5	12.3	100
1961/62	68.4	10.6	20.6	38.2	5.0	12.0	2.4	11.2	100
1962/63	66.9	11.9	19.4	39.9	4.8	11.1	2.4	10.5	100
1963/64	52.7	13.5	23.9	31.4	4.4	12.5	2.6	11.7	100
1964/65	68.2	12.3	22.7	38.3	4.1	11.2	2.2	9.1	100
1965/66	82.3	12.8	22.3	38.6	4.1	11.4	2.2	8.6	100
1966/67	87.1	14.3	22.5	37.0	4.1	11.8	2.2	8.2	100
1967/68	92.7	15.5	23.2	33.9	4.4	12.4	2.3	8.3	100
1968/69	102.5	15.6	22.8	33.8	4.6	12.8	2.2	8.2	100
1969/70	116.3	14.3	22.0	35.5	5.4	13.3	2.2	7.3	100
1970/71	127.4	13.6	20.4	38.1	5.5	13.6	2.1	6.7	100
1971/72	129.4	13.7	19.9	38.3	5.6	14.1	2.0	6.4	100
1972/73	136.1	14.0	21.1	35.8	5.9	15.0	2.1	6.2	100
1973/74	147.0	14.2	20.5	36.3	6.0	15.3	2.1	5.6	100
1974/75	150.0	14.1	19.9	36.6	6.4	15.5	2.0	5.4	100
1975/76	131.2	16.0	21.8	31.1	6.5	16.8	2.1	5.7	100
1976/77	157.9	15.4	21.2	32.7	7.0	16.8	2.0	4.9	100
1977/78 2/	170.7	14.9	20.4	33.7	7.4	17.1	2.0	4.6	100
1978/79 3/	176.8	14.7	20.2	34.7	7.5	16.6	2.0	4.4	100
1979/80									
1980/81									

1/ Totals may not add due to rounding.
2/ Estimate.
3/ Forecast.

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IV. FOREIGN ECONOMIC ACTIVITIES

UNITED STATES-SOVIET COMMERCIAL RELATIONS SINCE 1972

(By Hertha W. Heiss, Allen J. Lenz, and Jack Brougher*)

CONTENTS

I. Introduction

Seven years have passed since the initial steps toward a more normal trade relationship between the U.S.S.R. and the United States were taken at the first Moscow summit. Comparing the present situation with that in early 1972, we find that there has clearly been a change for the better, qualitatively and quantitatively. At the same time it must be noted that the degree of improvement has fallen far short of expectations. The trade agreement negotiated in 1972 has not yet entered into force and there has been little progress since the passage of the 1974 Trade Act toward resolving the basic issues of nondiscriminatory U.S. tariff treatment and access to official credit facilities for the U.S.S.R. The institutional framework established in 1972 for the development of United States-Soviet trade nonetheless has continued to function, providing a measure of continuity, even though its effectiveness declined as normalization remained out of reach.

The most visible positive change has been the substantial growth in the volume of United States-Soviet trade, which in 1978 was over

*The authors are from the Bureau of East-West Trade, Department of Commerce. This article should not be construed as a statement of Commerce Department policy.

12 times the level of 1971. But this growth has depended predominantly on Soviet grain purchases while nonagricultural trade stagnated in recent years. There has also been a gradual increase in the American commercial presence in the Soviet Union as well as that of the Soviets in the United States. The working environment for American business in the Soviet Union has, on balance, substantially improved despite rapidly rising costs of maintaining offices in Moscow and the adverse effect of the Soviet arrest last year of an American business representative.

The record since 1972 amply demonstrates that the course of United States-Soviet commercial relations cannot be charted without reference to the overall state of affairs between the two superpowers. Because of the overwhelming influence of political factors in recent years, there has been little opportunity to test the real potential of United States-Soviet trade or to come to grips with the economic problems and limitations that circumscribe it in the near term.

When they met in Vienna in June 1979, President Carter and Soviet Communist Party General Secretary Brezhnev reaffirmed the support of their two governments for the further development of trade. The primary event of the Summit, however, was the signing of the SALT II Agreement. In July Senate consideration of SALT opened, a debate that is likely to profoundly influence the future of American-Soviet trade.

II. Level and Composition of United States-Soviet Trade

General Characteristics and Trends

During the 1970's trade between the United States and the Soviet Union has risen far above the insignificant levels of the 1960's, reaching a record turnover in 1978 of $2.8 billion. However, this trade remains a small part of the international commerce and total economic activity of the world's two largest economies. One area where trade has come to play an important role for both countries is grain. Since 1972 one-half of all Soviet grain imports has been of American origin. These Soviet purchases have become an important source of earnings for U.S. farmers and have enabled the Soviets to maintain and enlarge their livestock herds. U.S. exports of nonagricultural goods, which have never grown very large, peaked at $819 million in 1976, but they have made a significant contribution to several important Soviet industrial projects. U.S. imports from the Soviet Union, mostly metals, ores, and fuels, have exceeded the quarter of a billion dollar mark only once. The United States, according to Soviet statistics, was the leading Western exporter to the Soviet Union in 1973 and 1976, but in other years has ranked behind the Federal Republic of Germany and sometimes Japan. Over the period of 1972–77, the United States accounted for 17 percent of all industrialized West exports to the U.S.S.R. but only 7 percent of exports of manufactured goods.[1]

U.S. sales to the Soviet Union far outpaced Soviet exports to the United States during 1972–78. Over this period, U.S. exports have

[1] According to trade statistics of 14 industrialized countries as reported to United Nations. From a table by Office of East-West Policy and Planning, Industry and Trade Administration, U.S. Department of Commerce

totaled $10,355 million and imports—$1,629 million, giving the U.S. a cumulative trade surplus of $8,726 million. The trade deficit with the United States has made up a large part of the substantial deficits that the U.S.S.R. has been experiencing in trade with the West in the 1970's. Although the Soviets cut in half their hard currency trade deficit from 1975 to 1978, they are continuing to run a large unfavorable balance with the United States. In 1978, for example, this deficit accounted for $2 billion of the total Soviet hard currency trade deficit of $3.3 billion.

UNITED STATES-U.S.S.R. TRADE: 1972–78

[Dollar amounts in millions]

Year	Trade turnover total	U.S. exports		U.S. imports, total
		Total	Agricultural (percent)	
1972	$638	$542	79	$96
1973	1,415	1,195	77	220
1974	957	607	49	350
1975	2,087	1,833	62	254
1976	2,527	2,306	64	221
1977	1,857	1,623	64	234
1978 [1]	2,503	2,249	75	254

[1] Excludes gold bullion imports not previously included in trade data.

Source: Table prepared by Office of East-West Policy and Planning, Industry and Trade Administration, U.S. Department of Commerce.

Value and Composition of U.S. Exports

American exports of nonagricultural goods to the U.S.S.R. rose fairly rapidly during 1972–76, climbing from $112 million to $819 million. Since that time, however, these exports have declined to $586 million in 1977 and $562 million in 1978. The steady rise of shipments of U.S.-manufactured goods through 1976 followed the high volume of orders that the Soviets began placing for U.S. equipment after the Nixon-Brezhnev summit in Moscow in 1972. However, in 1975 orders fell and in subsequent years remained well below the peak of 1974. With a lag of somewhat more than a year, actual shipments of U.S. nonagricultural goods began to decline.

A substantial proportion of U.S. equipment sales to the U.S.S.R. has been tied to specific, relatively large Soviet industrial projects, and therefore the composition of American machinery exports has varied greatly, depending upon the shipment schedules for various projects. The major purchases for industrial plants over the 1972–78 period include the following contracts:

1973—More than $350 million in equipment for the Kama River Truck Plant, a $36 million iron ore pelletizing plant, $29 million in equipment for tableware plants;

1974—About $200 million for four ammonia plants, a $45 million acetic acid plant, $35 million in molding lines for the Cheboksary earthmoving tractor plant;

1975—A $52 million iron ore pelletizing plant and a $47 million friction bearing plant;

1976—A $25 million baby formula plant;

1977—A $30 million plant for subsea oil equipment; and

1978—A $148 million drill bit plant.

totaled $10,355 million and imports—$1,629 million, giving the U.S. a cumulative trade surplus of $8,726 million. The trade deficit with the United States has made up a large part of the substantial deficits that the U.S.S.R. has been experiencing in trade with the West in the 1970's. Although the Soviets cut in half their hard currency trade deficit from 1975 to 1978, they are continuing to run a large unfavorable balance with the United States. In 1978, for example, this deficit accounted for $2 billion of the total Soviet hard currency trade deficit of $3.3 billion.

UNITED STATES-U.S.S.R. TRADE: 1972–78

[Dollar amounts in millions]

Year	Trade turnover total	U.S. exports		U.S. imports, total
		Total	Agricultural (percent)	
1972	$638	$542	79	$96
1973	1,415	1,195	77	220
1974	957	607	49	350
1975	2,087	1,833	62	254
1976	2,527	2,306	64	221
1977	1,857	1,623	64	234
1978 [1]	2,503	2,249	75	254

[1] Excludes gold bullion imports not previously included in trade data.

Source: Table prepared by Office of East-West Policy and Planning, Industry and Trade Administration, U.S. Department of Commerce.

Value and Composition of U.S. Exports

American exports of nonagricultural goods to the U.S.S.R. rose fairly rapidly during 1972–76, climbing from $112 million to $819 million. Since that time, however, these exports have declined to $586 million in 1977 and $562 million in 1978. The steady rise of shipments of U.S.-manufactured goods through 1976 followed the high volume of orders that the Soviets began placing for U.S. equipment after the Nixon-Brezhnev summit in Moscow in 1972. However, in 1975 orders fell and in subsequent years remained well below the peak of 1974. With a lag of somewhat more than a year, actual shipments of U.S. nonagricultural goods began to decline.

A substantial proportion of U.S. equipment sales to the U.S.S.R. has been tied to specific, relatively large Soviet industrial projects, and therefore the composition of American machinery exports has varied greatly, depending upon the shipment schedules for various projects. The major purchases for industrial plants over the 1972–78 period include the following contracts:

1973—More than $350 million in equipment for the Kama River Truck Plant, a $36 million iron ore pelletizing plant, $29 million in equipment for tableware plants;

1974—About $200 million for four ammonia plants, a $45 million acetic acid plant, $35 million in molding lines for the Cheboksary earthmoving tractor plant;

1975—A $52 million iron ore pelletizing plant and a $47 million friction bearing plant;

1976—A $25 million baby formula plant;

1977—A $30 million plant for subsea oil equipment; and

1978—A $148 million drill bit plant.

Much of the equipment for these plants has consisted of metalworking and metal processing machinery, and thus this equipment has figured prominently in U.S. exports, accounting for roughly $480 million for 1972–78. The largest single machinery export has been tracklaying tractors for use in pipeline and railroad construction, and open pit mining. These exports, including parts and accessories, amounted to about $300 million in 1972–78. A significant part of American machinery and equipment exports have gone to the Soviet oil and gas industry. These include the plants mentioned above for production of oil and gas equipment, a portion of the tracklaying tractors mentioned above, gas pipeline compressors, tape for wrapping pipelines, a $40 million offshore oil rig, geophysical exploration equipment, and various types of oilfield machinery, most prominently, submersible pumps.

U.S. deliveries of agricultural products (mostly grain) to the Soviet Union have grown dramatically, rising from $31 million in 1971 to a record $1,687 million in 1978. These exports have overshadowed sales of other goods and cumulatively over the years 1972–78 have accounted for $6,995 million of the $10,355 million total U.S. exports, or 68 percent of total U.S. sales to the U.S.S.R. Soviet purchases of American grain fluctuated widely during 1972–75. For example, they rose to $921 million in 1973, dropped to $300 million in 1974, and then jumped to $1,133 million in 1975.

In the last several years the Soviets have placed increasing emphasis on purchases of American corn and soybeans for maintenance of livestock herds. Following the disappointing grain harvest of 1977, for example, the U.S.S.R.'s largest-ever purchase of American agricultural products in 1978 ($1,687 million) included $1,056 million in corn and $200 million in soybeans, and only $356 million in wheat. The 1978 purchases of $200 million of U.S. soybeans was a record and is up from only $3 million in 1975. Soviet purchases of other agricultural products have remained relatively modest. They have included tallow, peanuts, almonds, cattle hides, hops, and lemons.

Value and Composition of U.S. Imports

U.S. imports from the Soviet Union have grown since 1971 but have not reached a significant level. They climbed steadily from $57 million in 1971 to a peak of $350 million in 1974, but since then they have not risen above $254 million. The largest single commodity has been nonmonetary gold, which until 1978 was reported separately from United States-U.S.S.R. trade statistics. In 1977 U.S. imports of gold bullion were $220 million—almost half of total imports from the Soviet Union, and in 1978 U.S. imports of $286 million in gold bullion far exceeded the $254 million total of all other products combined. Semiprocessed commodities have constituted the largest category of Soviet exports to the United States, consisting chiefly of platinum group metals, unwrought nickel, diamonds, titanium, and metal coins. A dramatic jump in shipments of platinum group metals was largely responsible for the record total of Soviet exports in 1974. The year 1978 saw the first shipments of Soviet ammonia ($27 million) to the United States under Occidental Petroleum's superphosphoric acid-for-ammonia/urea/potash countertrade arrangement. These deliveries are expected to grow considerably in the coming years. Petroleum and

petroleum products have consistently made up a sizable part of Soviet exports to the United States, but a very negligible part of total U.S. imports of these commodities.

III. Milestones in United States-Soviet Trade Relations

Great Expectations: The 1972–73 Framework

To put in perspective subsequent developments it is necessary to summarize briefly the reasons for and the nature of the institutional framework created in 1972–73 to aid the development of United States-Soviet trade. Starting with the premise that both sides considered commercial and economic ties "as an important and necessary element in the strengthening of their bilateral relations" [2] the two governments explicitly acknowledged the need for affirmative action on their part in order to bring about normalization of trading conditions and to ease contacts between U.S. business and Soviet foreign trade organizations.

In order to carry out the active role projected for both governments, a framework of intergovernmental agreements and institutional mechanisms was created. These included:

(1) A Joint United States-U.S.S.R. Commercial Commission (JCC) established on May 26, 1972 to negotiate a trade agreement, arrangements for Government credits, business facilities, settlement of commercial disputes and a lend-lease agreement. In addition the Commission was given the continuing function of monitoring the entire spectrum of United States-Soviet commercial relations.

(2) A trade agreement was completed by the JCC on October 18, 1972 at its second session. Its principal provisions dealt with mutual granting of nondiscriminatory tariff treatment (MFN), market disruption and national security safeguards, establishment of a U.S. Government commercial office in Moscow and a Soviet trade representation in Washington and arbitration of commercial disputes. The agreement also called for a tripling of trade during the period 1972–75. Related but separate arrangements took the form of exchanges of letters between Commerce Secretary Peterson and Soviet Foreign Trade Minister N. S. Patolichev. One provided for reciprocal export credit facilities, and became effective after a Presidential national interest determination and execution of an operating agreement between the Export-Import Bank and the Soviet Foreign Trade Bank. Another set forth a Soviet undertaking in principle to permit U.S. business firms to open offices in Moscow subject to established Soviet procedures. A third exchange authorized the establishment of a temporary Soviet Purchasing Commission in New York.

(3) A lend-lease settlement (Oct. 18, 1972). This agreement consolidated the outstanding Soviet lend-lease debts at $722 million and stipulated repayment by the year 2001. It provided for three initial unconditional Soviet payments totaling $48 million to be made by mid-1975. Payment of the balance was tied to U.S. extension of MFN treatment to the U.S.S.R.

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[2] "Basic Principles of Relations Between the United States and the U.S.S.R." Weekly Compilation of Presidential Documents, vol. 8, Nov. 23, June 5, 1972, pp. 943–944.

(4) A maritime agreement (Oct. 14, 1972) which opened 40 ports in each country to the vessels of the other and insured "equal and substantial sharing" of seaborne cargo moving between the two countries.[3]

(5) A science and technology agreement (May 24, 1972) under whose umbrella U.S. firms could work out individual cooperation agreements with Soviet organizations.[4]

(6) A long-term economic, industrial, and technical cooperation agreement (June 24, 1974). At the third United States-Soviet summit held in Moscow President Nixon and General Secretary Brezhnev signed a 10-year agreement to facilitate economic, industrial and technical cooperation (EITCA). Negotiated at the initiative of the Soviet side, this agreement defines economic cooperation in broad terms that include sales and purchases of machinery and equipment, agricultural products, consumer goods, licenses and patents. Its only operational provisions are a business facilitation clause (in which both sides undertake to assist business organizations in the acquisition of office and housing space, issuance of visas, business travel and the like) and the creation of a working group of experts to exchange regularly information on economic, industrial and commercial trends for the purpose of assisting U.S. firms and Soviet foreign trade organizations in identifying fields and projects for economic cooperation. This agreement required no congressional authorization and to date has remained the only valid United States-Soviet agreement covering general trade relations. It comes under the purview of the Joint Commercial Commission.

(7) A double taxation convention governing the levying of taxes on industrial or commercial profits in the source country. Concluded on June 20, 1973, it was ratified by the Senate in late 1975 and entered into force on January 1, 1976.[5]

Waiting for Congress: 1973–74

Within the context of the legislative battle over the Trade Reform Act bill the U.S. Government throughout 1973 and 1974 pursued its objective to obtain congressional authorization to put the trade agreement into effect. Even prior to the conclusion of the trade agreement, linkage of trade with Soviet emigration cast its shadow over this process. This linkage was first made in the Jackson amendment introduced in the Senate on October 4, 1972, following publication in September of a Soviet regulation imposing a substantial education tax on emigrants. Another setback for the prospects of United States-Soviet trade normalization was the public backlash from massive Soviet grain purchases in the United States under the July 1972 Grain Sales Agreement. The large scale of Soviet purchases had not been anticipated at the time this agreement was concluded. The Soviets were able to buy at disproportionally low prices because: The secrecy of their buying tactics concealed the true dimensions of their purchases; the U.S. Government continued to subsidize wheat export

[3] Maritime Developments Involving the Soviet Union, the United States and the West." Joint Economic Print. A Compendium of Papers, 1979. p. 247.

[4] See Theriot, Lawrence H. "U.S. Government and Private Industry Cooperation with the Soviet Union in the Fields of Science and Technology." Joint Economic Print. "Soviet Economy in a New Perspective," 1976. pp. 739–767.

[5] TIAS–8225, June 30, 1973, U.S. Department of State.

prices at a time when rising world demand would have made nonsubsidized exports profitable; and they were able to avail themselves of Commodity Credit Corporation facilities.

Last, but not least, the Soviet purchases started an unforeseen ballooning of demand for grain which contributed to a rise in the U.S. bread price. These factors combined to make the 1972 Grain Sales Agreement look like a bad bargain for the U.S. taxpayer and aroused widespread misgivings about the benefits of doing business with the Soviet Union—reactions which were summed up in the characterization of this episode in United States-Soviet commercial relations as the "Great Grain Robbery".

In mid-1974, against the background of the trade legislation debate, the Arab oil embargo and its implications for U.S. energy policy, concern over the rapidly mounting Soviet hard currency debt, and reports of multibillion dollar United States-Soviet natural gas projects, a "sense of the Congress" resolution effectively suspended Eximbank action on pending credit transactions involving the Soviet Union.

The last quarter of 1974 was marked by intensive but vain Administration efforts with Congress to retain for the President flexibility of action with regard to MFN and credits for the U.S.S.R. A tentative compromise on the MFN-emigration linkage fell apart in mid-December after disclosure of an October letter from Soviet Foreign Minister Gromyko to Secretary Kissinger disassociating the U.S.S.R. Government from any assurances regarding future levels of emigration. On December 19 and 20, respectively, the Congress passed an Export-Import Bank bill and a Trade bill which had the effect of: Making MFN for Communist countries conditional on emigration policy; making MFN a prerequisite for access to U.S. Government credit facilities; setting an overall ceiling of $300 million on additional Eximbank credits for the U.S.S.R.; and limiting or prohibiting use of Eximbank credits for Soviet energy projects.

The Aftermath of the Trade Act of 1974

On January 14, 1975, Secretary of State Kissinger announced that the U.S.S.R. had rejected a trade relationship with the United States based on the Trade Act and that the Soviets would not bring into force the 1972 Trade Agreement.[6] The Soviet Government took the position that the U.S. legislation, by imposing requirements concerning emigration as a precondition to granting MFN, infringed on the principle of noninterference in internal affairs and furthermore contravened the Trade Agreement itself, which called for unconditional extension of MFN.

The trade legislation and the U.S.S.R. refusal to comply with it resulted in termination of Eximbank authority to approve existing preliminary commitments and to consider applications for credits in support of U.S. exports to the Soviet Union. It also ended Soviet access to Eximbank insurance facilities which had, however, been utilized only once up to that point. It did not affect the disbursements

[6] The Trade Agreement contained a provision (art. 9) requiring the exchange of written notices of acceptance before it could enter into effect.

of credits already approved.[7] Commodity Credit Corporation (CCC) financing for Soviet agricultural purchases also became unavailable.[8]

Finally, after making the last of the unconditional payments stipulated by the Lend Lease Agreement on July 1, 1975, the Soviet Union suspended further payments, as permitted under the terms of the Lend-Lease Agreement.

Although the trade agreement did not enter into force there was no question of its renunciation or repudiation by either side. As a practical matter both sides were already complying with individual provisions of the trade agreement that did not require congressional authorization. Inasmuch as some of these provisions reflected generally prevailing conditions and international standards of commercial conduct, continued adherence did not have to depend on the existence of a formal bilateral trade agreement.

Other provisions, however, called for specific actions by both sides. These included permission for each side to establish governmental commercial offices in the other's capital which had already been implemented. In a 1972 exchange of letters the U.S.S.R. also had undertaken to accord private U.S. firms' requests for offices treatment no less favorable than that accorded to firms of third countries. The United States, for its part, agreed to permit the establishment of a Soviet purchasing commission in New York. While no additional documents were exchanged both sides continued to act in accordance with these provisions. A trade agreement was technically not necessary for continuing these arrangements, and neither side challenged their legality. Indeed, they repeatedly received the blessing of subsequent Joint Commercial Commission meetings.

The Joint Commercial Commission was created on the authority of a joint United States-Soviet communique and its existence and terms of reference were therefore not affected by the trade act. However, the general pall cast over United States-Soviet commercial relations by the inability to bring into effect the trade agreement has impaired the productiveness of this mechanism.

Commercial Ties Stabilized: 1975–76

At the fifth Joint Commercial Commission session in April 1975 Secretary of the Treasury Simon, the U.S. Co-Chairman of the JCC, affirmed to Soviet officials in Moscow the administration's "determination to work with the Congress in obtaining enactment of legislation to hasten the normalization of trade and financial relationships."[9]

Three months later a congressional delegation to Moscow led by Senate Majority leader Hugh Scott, which included such other key figures as Senators Humphrey, Ribicoff, and Javits, reinforced these indications of an early administration-Soviet effort to seek legislative authority to normalize economic relations. President Ford on June 27 had addressed to the chairmen of the four congressional committees directly concerned with trade legislation (Senate Finance Committee,

[7] These credits totaled approximately $469 million.

[8] Under the 1972 3-year agricultural sales agreement the Soviet Union utilized $549 million of 3-year CCC credits. Repayments were completed by March 1977.

[9] Joint U.S.-U.S.S.R. Commercial Commission, fifth session. Agreed statement for the press, Moscow, Apr. 11, 1975.

Senate and House Banking Committees, and House Ways and Means Committee) a letter urging revision of East-West trade legislation in order to make possible improved trade ties with the Communist countries. The leaders of the Senate delegation to the U.S.S.R. were authorized to convey to the Soviets the contents of these letters. Following discussions with General Secretary Brezhnev and other high-ranking Soviet officials, several of the delegation's ranking members indicated upon their return to the United States willingness to consider alternatives to the existing East-West trade legislation. But no legislative proposals actually materialized.

However, several developments occurred in the second half of 1975 that exerted a stabilizing influence on United States-Soviet trade relations. Once again unforeseen external circumstances propelled both sides toward significant steps which, in this instance, led to a reinforcement of their precarious commercial arrangements.

First, a disastrous Soviet grain harvest—the second in 4 years—resulted in Soviet willingness to negotiate a 5-year grain sales agreement with the United States in October 1975 on terms which effectively prevented a recurrence of unpredictable and drastic fluctuations in Soviet grain purchases. The agreement, which is valid through 1981, commits the Soviet Union to purchase for cash at prevailing market prices a minimum of 6 million tons of American wheat and corn annually. At the same time it sets an upper limit of 8 million tons for Soviet purchases—a limit which may be exceeded after bilateral consultations, American grain harvest, and reserves permitting. Additionally, the agreement contains an escape clause designed to safeguard American domestic requirements and prices and insure continuing access for other U.S. customers abroad. This allows the United States to make available less than 6 million tons in a given year should U.S. stocks fall below a specified level. The agreement thus insures a substantial and steady outlet for U.S. farmers while providing a measure of protection against sudden drastic price fluctuations.

Concurrently with the grain sales agreement, negotiations were initiated for a new U.S.–U.S.S.R. maritime agreement to take the place of the 1972 agreement which was due to expire at the end of 1975. The new agreement concluded on December 29, 1975, is valid until 1981, and continues the port-access and cargo-sharing provisions of its predecessor. In addition, the 1975 agreement incorporates an agreed method for determining annual bilateral bulk shipping rates at a level which assures that U.S. shipping companies can profitably participate in this trade.

At the time of the grain negotiations the possibility of long-term Soviet oil sales to the United States was also explored. Under discussion were annual Soviet deliveries of up to 10 million metric tons of crude oil and petroleum products to the United States for a 5-year period. Such an arrangement could have contributed to a diversification of American sources of oil while not creating any significant dependency on the U.S.S.R. It would also have led to a better balance in United States-Soviet trade. However, the negotiations which took place in the first quarter of 1976 fizzled out because of differences over pricing and shipping rates.

One Step Forward, Two Steps Back: 1976–79

United States-Soviet trade relations since 1976 have been characterized as being in a holding pattern. This term aptly describes the overall uncertainty and lack of direction but does not quite convey the pattern of zigs and zags, setbacks, and occasional gains which marked this period. There was no progress toward normalization of trade ties, reflecting a deterioration in the balance between positive and negative impulses in the overall United States-Soviet relationship. Commercial relations took a buffeting from the political turbulence created by clashes over Soviet/Cuban activities in Africa, human rights in the U.S.S.R., problems in SALT negotiations and lesser issues. Indeed, the commercial relationship itself developed into a neuralgic area with the Soviets as it became increasingly clear that there would be no early resolution of the legislative impasse. Moreover, whenever political tensions heightened, trade became a prime target for retaliatory measures.

Thus, in the spring of 1976 the United States did not schedule the regular annual (sixth) session of the Joint Commercial Commission which, under the JCC terms of reference, it would normally have hosted at that time. This, along with postponements of other bilateral meetings, was in response to the Soviet/Cuban intervention in Angola. This latter development removed any possibility of a U.S. Government effort to seek new trade legislation—the outcome of which would have been doubtful in an election year, even under better circumstances.

Other factors adversely affecting the outlook for United States-Soviet trade during the second half of 1976 and beyond were the continuing decline in the number of emigrants from the Soviet Union and increasing American domestic concern over economic and strategic aspects of international technology transfer. In the economic sphere itself difficulties raised by the Soviet authorities in the annual maritime negotiations and in operational aspects of United States-Soviet aviation arrangements did not help matters.

While some pre-election statements had seemed to leave open the possibility of decoupling the trade and emigration questions by a Carter administration, the severe chill in United States-Soviet relations which set in during the spring of 1977 over arms control and Soviet dissidents put on the back burner any consideration of trade issues.

The sixth session of the Joint Commercial Commission was finally held in Washington in June 1977, after more than a year's delay, reflecting some improvement in the United States-Soviet climate. The meeting itself, however, did not produce any meaningful progress on the basic issues of United States-Soviet commercial relations. Shortly thereafter the U.S. Government denied an export license application for an advanced Control Data Cyber 76 computer amidst press reports of congressional intervention with the White House. Nonetheless there were a number of developments pointing to an upswing in the cooperative aspects of United States-Soviet relations in the second half of 1977. These found reflection in positive remarks about United States-Soviet trade by the President at Charleston in July and appearances by Secretaries Kreps and Blumenthal at the annual meeting of

the U.S.-U.S.S.R. Trade and Economic Council at Los Angeles in November. However, the U.S. Government did not move so far as to reaffirm clearly the policy to encourage trade with the Soviet Union, and the period of improved United States-Soviet climate turned out to be too short-lived to build sufficient support within the administration for an effort aimed at normalization of trading conditions. In the spring and summer of 1978 United States-Soviet relations deteriorated rapidly as a result of intensified Soviet-Cuban involvement in Africa, the widely publicized arrest of Soviet spies in the United States, the harsh Soviet treatment of dissidents and each side's reactions to these developments. In an unprecedented departure, widely interpreted as a political reprisal, the Soviet police in June roughly arrested and jailed an American resident businessman, Jay Crawford of International Harvester, on unsubstantiated charges of currency violations. With the trials of the prominent dissidents Scharansky and Ginzberg in July relations reached a low point, and the Soviets added more fuel to the fire by trying and sentencing two U.S. reporters for slander and defamation.

In response to these Soviet actions the administration in July used existing controls to deny an export license for a Sperry Univac computer ordered by TASS for use at the 1980 Olympics. In addition, new licensing requirements were imposed for oil and gas equipment; shortly thereafter an interagency debate over the licensing of a U.S. oil drill bit manufacturing plant erupted into the press. The affirmative resolution of the case by President Carter in September was one of the first indications of a calming trend in United States-Soviet relations, as were the release of Crawford after sentencing, and an upturn in Soviet emigration for the first time since 1974. In the commercial sphere the Soviet Union in October agreed in principle to allow American maritime insurance underwriters to participate in primarily insurance on bilateral United States-Soviet cargo. This marked the first concrete step toward a resolution of a relatively minor but contentious problem which had been festering for 6 years.[10]

The year ended on a positive note as the seventh session of the Joint Commercial Commission was held in December in Moscow where Secretaries Kreps and Blumenthal also met with General Secretary Brezhnev.

The congressional climate for consideration of measures to improve United States-Soviet trade relations took a turn for the better toward the end of the first quarter of 1979. Factors contributing to this trend were the satisfactory progress in SALT negotiations, a continuing rise in the Soviet emigration rate and the rapid progress in U.S. economic relations with China.

As the United States and Soviet Union approached a summit meeting in June there were strong indications that an attempt was being made to reach an understanding which would make it possible to put into effect the 1972 Trade Agreement on terms politically feasible for both sides.

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[10] After numerous Government and private attempts to resolve this issue the American Institute of Marine Underwriters (AIMU) in November 1977 filed a complaint against the Soviet Union under section 301(a) of the Trade Act. A Presidential determination in mid-1978 found Soviet insurance practices "an unreasonable burden and restriction on U.S. Commerce."

IV. Current Government to Government Issues

As of this writing (June 1979), U.S. trade with the Soviet Union is restricted in varying degrees by several U.S. laws. The most important of these are:

The Jackson-Vanik amendment to the Trade Act of 1974;

The 1974 amendments to the Export-Import Bank Act of 1945; and

Export Administration Act of 1969, as amended.

The net effect of these laws, which have been exhaustively described and argued elsewhere, has been to deny most-favored-nation treatment and official export credits to the Soviet Union and to restrain the export of certain goods and technologies to the Soviet Union and other Communist countries.

MFN

As noted earlier, Soviet reaction to the freedom of emigration clause (sec. 402) of the Trade Act of 1974 was to reject compliance with its provisions. They would not bring into force the 1972 Trade Agreement as long as this involved assurances on emigration in order to obtain congressional approval for MFN. MFN continues to be an important issue from the Soviet viewpoint both for political and economic reasons and both Governments are now working toward creating the conditions for extension of MFN to the U.S.S.R.

In political terms, U.S. failure to provide MFN discriminates against Soviet exports and the Soviets understandably desire equality of treatment vis-a-vis other international traders that MFN would represent.

From an economic standpoint, the U.S. failure to grant MFN to the Soviets has had some impact on their ability to export to the United States, but studies find it to be relatively minor, indicating that U.S. imports in 1975, for example, might have risen about $19 million (an increase of 7.5 percent from actual levels) had the Soviets had MFN.[11]

Studies based on historical data, however, cannot measure the MFN effects on future trade that ensue from handicapping U.S. participation in large compensation arrangements, such as the Sayansk aluminum project, under which Western plant and equipment exports would be paid for in aluminum produced by the facility created by the Western exports. The 3-cents-per-pound addition to duty resulting from non-MFN rates discourages the import of lower cost aluminum produced with benefit of cheaper energy sources and handicaps participation of U.S. firms in such projects. Since the payback product can be disposed of outside the United States, U.S. firms are not completely eliminated.

Both the econometric studies based on historical Soviet export data and examination of individual proposed projects, however, probably tend to overstate the incremental economic value to the Soviets of MFN treatment over recent years, since the basic limitation on some Soviet exports has been lack of supplies available for export. In such

[11] See "The MFN Impact on U.S. Imports from Eastern Europe" in East European Economies Post Helsinki. Joint Economic Committee. 1977.

cases additional exports to the United States might have been accomplished only by diverting supplies from domestic use or other destinations and would not necessarily have represented additions to total hard currency earnings. This "supply constraint" is likely to continue into the foreseeable future.

The longer term value of MFN to the Soviets could be much more important, however. Current Soviet exports to the industrial West are dominated by raw materials and natural resource products generally not seriously affected by imposition of non-MFN rates. Finished manufactured goods accounted for only just over 3 percent of total 1977 Soviet exports to the industrial Western countries and manufacturers are unlikely to be a major factor in Soviet exports to the West at least through 1985. Nevertheless, because the U.S. market is so large, MFN is important to the long-term Soviet objective of becoming an international trader and exporter of manufactured goods.

Official Export Credits

As with MFN, there are both political and economic reasons why the Soviets desire access to official U.S. export credits. Official credits are considered a normal feature of international trade and therefore are seen by the Soviets as constituting recognition as an "equal trading partner."

Given their recent trade deficits, the Soviets have financed a significant portion of their imports of capital goods with Western government-backed credits. The long-term fixed-rate financing often available from these governmental export credit programs, in many cases, offer significant advantages over the use of commercial bank credits. Thus, lack of U.S. official export credits has clearly resulted in diversion of some Soviet purchases from U.S.-based firms to alternative West European and Japanese sources.

The amount of U.S. export losses stemming from failure to provide official export credits cannot be determined. However, given a limited lending authority and other factors, the amount of credit that the U.S. Export-Import Bank would have extended to the U.S.S.R. in the period 1975 and onward in the absence of legislative restrictions is probably relatively small.[12]

Similarly, even if existing legislative restrictions are satisfied, while official credits would be important from both economic and political standpoints, the amounts made available to the Soviets are likely to be small, both relative to Soviet needs and compared to the volumes of official credits available from other Western nations. Thus, a U.S. extension of official export credits to the U.S.S.R. would likely generate only a moderate expansion of United States-Soviet trade. However, as U.S. experience of 1973–74 strongly suggests, availability of Eximbank financing can act as a catalyst for major extensions of credits by private U.S. sources.

[12] In "The Potential Role of Eximbank Credits in Financing U.S.-Soviet Trade," in Issues in East-West Commercial Relations, Joint Economic Committee, Congress of the United States, 1979, Lenz and Theriot estimate that total U.S. Eximbank lending to the U.S.S.R. through 1979 would probably not have exceeded $1 billion or about $500 million more than the $469 million already extended before restrictions in the Trade Act of 1974 were imposed.

U.S. Export Controls

The Export Control Act of 1969, as amended, institutes controls on the export of goods and technology which would make a significant contribution to the military potential of any nation or nations which would prove detrimental to the national security of the United States. Other policy objectives of the act include the use of export controls for "short supply" and "foreign policy" reasons.

The current act expires on September 30, 1979 and, at this writing, renewal legislation is being formulated. Though modifications are possible, the revised act will almost certainly maintain the three basic objectives of controls.

"Short supply" controls have not been an important factor in United States-Soviet trade and the use of export controls for "national security" purposes is at least tacitly accepted by the Soviets, though decisions on individual licensing cases may have a significant impact on the level of U.S. exports to the U.S.S.R.

The use of controls for "foreign policy reasons" has, however, been a controversial issue in recent months. In August 1978, following a period of Soviet activity in Africa and harsh treatment of Soviet dissidents, by Presidential directive, various items of oil production equipment, services, and technology, previously exported to the U.S.S.R. under general license, were added to the U.S. Commodity Control List governing exports to the U.S.S.R. Procedures subsequently developed included a review by the National Security Council of applications for these items as part of the licensing process. To date, no license applications have been denied for these previously general license categories of oil and gas equipment. However, Soviet sources have indicated frustration with these controls. They have asserted that such controls make the United States an "unreliable supplier," forcing them to turn elsewhere for equipment and technology important to the exploration and development of Soviet oil and gas.

The administration could, at its discretion, remove these controls, which are not mandated by current law. This would probably serve to alleviate Soviet concerns, but even so, renewal of these controls or the implementation of others to serve foreign policy purposes remains a possibility in the near-term future and may continue to inhibit trade between the two countries to some degree.

V. Elements of Continuity

Despite the vicissitudes of overall relations, a number of institutional arrangements and other factors have preserved a sense of continuity in United States-Soviet commercial interaction. Although the Trade Agreement of 1972 has remained in limbo both sides have cooperated in implementing the agreed-upon provisions and guidelines for the establishment of Government and private business facilities.

Growth of the U.S. Commercial Presence

Governmental.—The U.S. Commercial Office in Moscow, which opened in 1974, has been in the forefront of the U.S. Government

effort to support American firms wishing to pursue commercial opportunities in the Soviet market and of the Government's trade promotion program. Sponsored and operated jointly by the Departments of State and Commerce this modern facility is unique in Moscow. An integral part of the Embassy but located in a separate, adjacent building, the Commercial Office (USCO) has substantially expanded and upgraded the assistance available to American businessmen. Services include: commercial counseling and appointment scheduling by USCO staff; conference, exhibit, and reception facilities; temporary office space; telex and office equipment; and reference materials for U.S. business representatives' use. Throughout its existence the Commercial Office has maintained effective working relations with Soviet foreign trade organizations, industrial ministries and other economic entities and has, for the most part, been able to elicit their support for its many trade development activities.

Private.—The increase in the American business presence in Moscow appears to have kept pace with the growth of the Western business community in the Soviet capital. Soviet organizations, including the Ministry of Foreign Trade, the State Committee on Science and Technology, the State Bank and the Ministry of Foreign Affairs since 1973 have authorized 29 American firms to establish accredited offices in Moscow bringing the total number of such offices to 30. While U.S. companies have encountered some difficulties and delays in obtaining adequate office space, housing, and staffing, these problems appear to have been endemic rather than political in nature. The steady increase in the expense of maintaining offices in Moscow coupled with the decline in United States-Soviet nonagricultural transactions has, however, led some U.S. companies in the past 2 years to reduce the size of American staffs at their Moscow offices.

U.S. Government Trade Promotion Program

Since 1973 the U.S. Government through the Department of Commerce has each year sponsored a diversified program of trade promotional events, including commercial exhibitions at Soviet international trade fairs, trade missions by individual firms or associations, technical sales seminars and seminar/exhibits featuring American products and technological know-how. These efforts have helped U.S. companies to initiate or increase their commercial exposure in the Soviet Union and have put them in contact with high-level ministerial officials, end-users and potential buyers of their products. Many of the larger events have generated substantial off-the-floor sales and followup orders.

The number of U.S.-Government-organized promotional activities has increased and currently averages 7 to 11 exhibitions and seminars annually. Over the years around 600 U.S. firms have participated in these events, which have featured machine tools, heavy industrial and construction equipment, building materials, business machines, computers and electronic processing equipment, medical instrumentation, oilfield, gas, and mining equipment and technology, textiles, and chemical processes.

In addition, the Commercial Office has assisted individual companies and national associations in hosting trade delegations and single sponsor shows and seminars.

Soviet Commercial Facilities

From 1972 to 1977 the Soviet commercial presence in the United States has grown substantially. In 1973 the Soviet Embassy's Commercial Counselor's office was transformed into a Trade Representation headed up by a foreign trade official with the rank of Commercial Minister. Its members engage generally in trade promotion activities and development, including provision of information and contact assistance, but do not participate directly in any trade transactions. The Amtorg Trading Corp. in New York, which was formed in 1924, has considerably expanded its staff, composed largely of representatives of Soviet foreign trade organizations. In recent years Amtorg has primarily concentrated on promoting Soviet exports to the United States.

The Kama Purchasing Commission was originally established in 1972 on a temporary basis. It serves as a direct channel to foreign trade organizations charged with procuring equipment and implementing contracts for five major projects currently underway in the U.S.S.R.: the Kama Truck Plant, the Cheboksary Tractor Factory, the fertilizer complex at Kuybyshev, the International Trade Center in Moscow and the Yakutsk natural gas project. Commission personnel have the authority to make purchasing decisions and to negotiate contracts. Since its establishment the Commission has been responsible for placing about $1.2 billion worth of orders with over 300 American firms.

The opening of U.S. offices by Soviet foreign trade organizations is subject to approval by the U.S. Government and personnel ceilings for each Soviet commercial establishment in the United States are mutually agreed upon.

In accordance with these ground rules, offices for several smaller specialized Soviet organizations have been authorized. They include a wholly owned subsidiary of the Soviet shipping organization Sovfrakht, which handles the chartering of bulk cargo carriers in New York. Belarus Machinery, Inc., was founded in 1977 to market Soviet tractors in the United States. Its headquarters are in New York, but it also has service facilities in Milwaukee and New Orleans.

Business Facilitation Mechanisms

Since 1972 the Working Group on Business Facilitation of the Joint Commercial Commission has played an active role in dealing with operational needs of Government commercial offices and matters relating to working and living conditions for American business personnel in the U.S.S.R. and for Soviet commercial establishments in the United States. In 1977 more frequent informal meetings were inaugurated to deal with such issues on an ongoing basis between the annual sessions of the Joint Commercial Commission. These meetings alternate between Washington and Moscow and consist of host country officials and Embassy representatives.

Economic, Industrial, and Technical Cooperation Agreement

Under the auspices of this Agreement three meetings of the Working Group of Experts have taken place to exchange information on economic and commercial trends in both countries. These meetings were

held in conjunction with the sessions of the Joint Commercial Commission. The Working Group has sponsored a number of joint seminars in the United States and Moscow which have provided information to U.S. business firms and Soviet foreign trade organizations on legal and organizational aspects of trade in both countries as well as marketing approaches and techniques.

U.S.–U.S.S.R. Trade and Economic Council

The U.S.–U.S.S.R. Trade and Economic Council (USTEC) is a binational nonprofit private organization devoted to the facilitation of trade between the two countries. It was founded in 1973 pursuant to a protocol signed by Treasury Secretary Schultz and Foreign Trade Minister Patolichev. Armco Chairman William Verity and Deputy Foreign Trade Minister Vladimir Sushkov are cochairmen of the Council which includes over 250 American firms and some 100 Soviet foreign trade organizations and exporting enterprises. The U.S. Secretaries of Treasury and Commerce and the U.S.S.R Minister of Foreign Trade are honorary Directors. Since 1974 the U.S. President of the Trade and Economic Council has reported on the organization's activities and made policy proposals for consideration by the two Governments to the annual meetings of the JCC.

To develop and expand the spectrum of business activities the Council has established special working committees on science and technology, finance, new forms of economic cooperation, tourism, and legal issues. These committees are responsible for developing policies and initiating programs in their respective fields.

The Council maintains offices in New York and Moscow staffed by about 40 persons—approximately half of whom are American and half Soviet. USTEC services for its members include business counseling, sponsorship of seminars to acquaint potential Soviet customers with American products and technologies and of visits by commercial and technical delegations from the Soviet Union to the United States.

VI. A Look at the Future of United States-Soviet Trade

The course of United States-Soviet trade for the next several years may well be set by events of 1979.

Key, direction-shaping events will include outcomes of SALT and initiatives to provide MFN and official credit privileges to the Soviets. These outcomes, of course, will be very much influenced by Soviet domestic and international political activities and by U.S. perceptions of those activities.

Successful conclusion and Senate approval of a SALT agreement would probably provide a U.S. domestic political environment in which the climate for extensions of MFN and credits would be greatly improved. Conversely, failure to successfully conclude SALT could provide an environment in which political relations would further deteriorate to the detriment of trade between the two countries.

Trade between the United States and the U.S.S.R. is unlikely to reach its optimum level so long as political conditions are unfavorable.

On the other hand, however, favorable political conditions alone are not sufficient to build a major trading relationship, which must be economically based.

Soviet import needs are essentially three-pronged: capital equipment, technology, and grain. The United States is well qualified to supply most items of capital equipment and technology and is doubtless a superior source for many Soviet needs, though there are few items or technologies which cannot be purchased from non-U.S. sources in quality and/or state of the art acceptable to Soviet needs.

Vast U.S. grain production and substantial export surpluses also make the United States a basic source for Soviet grain imports and one difficult to replace, particularly for imports of corn.

Soviet ability to sell to the United States is, however, less well defined. Sales of metals to the United States—especially platinum group metals—have already been substantial, but seem unlikely to expand significantly over the next few years, though U.S. imports of aluminum could occur under compensation projects now being discussed.

The recently finalized contract implementing the 20-year agreement between Occidental Petroleum and the U.S.S.R. calls for substantial—perhaps $500 million per year—imports of ammonia, urea, and potash into the United States through the early 1990's. Further inflows of chemical exports into the U.S. market, however, are likely to be small, since the United States is basically self-sufficient and is itself a major exporter.

Similarly, for several other commodity groups which encompass the bulk of Soviet exports (for example, forestry products, coal, cotton) the United States is either self-sufficient or is itself an exporter to the world market. In some other products where the United States is not self-sufficient, imports are procured through well-established ties based on U.S. foreign direct investment in the exporting country.

As previously noted, in the longer term, when the U.S.S.R. has developed a manufactured goods export capability, the United States could be an important market. However, large Soviet manufactures exports appear to be still many years away. The long discussed projects to export liquefied natural gas from Siberia to the United States, could be the basis for a really major increase in Soviet exports to the United States—and for very large increases in Soviet manufactured goods purchased in the United States. Given rising energy prices, lagging performance in exporting to the West, and Soviet hard currency needs, these projects are probably even more attractive to the Soviets today. Two major projects under consideration (North Star and Yakutsk) would tap resources located in remote areas and, based on current energy prices, each would add about $1 billion to Soviet hard currency earnings over a 20–25 year period beginning 5–7 years from the go-ahead-date. If prices continue to escalate as many expect, earnings would be commensurately larger.

At present, however, the prospects for early action are not encouraging. Exploration to prove reserves at the Yakutsk field will require more time—perhaps through 1980. Additionally, the transactions would have to successfully clear all of several difficult hurdles including:

(1) A U.S. policy decision to import more liquefied natural gas at prices that would make the projects economically viable;
(2) Financing of the necessary equipment exports;
(3) U.S. domestic environmental concerns; and
(4) Foreign policy considerations.

Soviet foreign trade policy with the West is no longer bound by a narrow bilateralism that requires an annual balancing of accounts with each trading partner. Nevertheless, the fullest development of U.S.-Soviet trade and U.S. exports to the U.S.S.R. probably can occur only after Soviet exports to the United States increase significantly, and near term sources of large increases in Soviet exports to the United States are not evident at this time.

SOVIET FOREIGN ECONOMIC BEHAVIOR: A BALANCE OF PAYMENTS PERSPECTIVE

(By Paul G. Ericson and Ronald S. Miller*)

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*Research analysts with the Office of Economic Research, Central Intelligence Agency.

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I. SUMMARY

During the last decade the U.S.S.R. has sought in its trade with the West to spur domestic economic development by accelerating imports of Western equipment and technology. The Soviet Union has also turned to the West for the grain needed to cover domestic production shortfalls and for intermediate products like steel to overcome domestic production bottlenecks. The U.S.S.R.'s ability to meet these import requirements simultaneously depended upon its ability to generate foreign exchange.

An analysis of Soviet hard currency balance of payments provides a useful guide to foreign trade decisionmaking and to an understanding of the impact of Western economic events on the U.S.S.R. In this context we have estimated annual Soviet balance of payments accounts for 1970–78. In developing our capital account estimates we have made maximum use of Western financial data; our results indicate that previous estimates have overestimated Soviet debt to the West. Our current account balances include separate annual estimates for gold and arms sales, transportation earnings, and transfer payments, among others.

Moscow was successful in expanding the volume of imports in 1970–78. The Soviet Union managed substantial grain imports to cover harvest failures in 1973 and again in 1975. More recently the U.S.S.R. has come to rely on the West for the feed grains necessary to increase its livestock herds. Meanwhile, Soviet equipment imports have risen rapidly, from $960 million in 1971 to almost $6 billion in 1978; the chemical and automotive industries, in particular, have benefited from Western machinery and technology.

The U.S.S.R. failed to sustain a commensurate growth in hard currency exports. A cumulative hard currency trade deficit of $24 billion was incurred in 1970–78 even though the price of oil, the U.S.S.R.'s major hard currency export earner, climbed precipitously. Soviet exports grew by only 6 percent per year in real terms as Moscow was (*a*) unsuccessful in expanding exports of manufactured prod-

ucts and (*b*) unable (or unwilling) to expand exports of oil, natural gas, and other raw materials to levels required to offset the rapid rise in imports.

The Soviet Union, however, did push up considerably its hard currency sales of arms and gold as well as earnings from its merchant marine. Nonetheless, the U.S.S.R. racked up a cumulative current account deficit in 1970–78 of $4.2 billion.

The mounting bill for imports was largely financed by heavy borrowing in the West. Gross Soviet debt to the West rose from $1.8 billion at the end of 1970 to approximately $17 billion at the end of 1978. Much of the increase took place in 1975–76 when the U.S.S.R. helped cover a cumulative $12 billion trade deficit with an $8.5 billion increase in net debt to the West. The size and character of the 1975–76 borrowing provoked Western concern over Soviet external financial management.

Since 1976 the U.S.S.R. has returned to a more cautious and pragmatic approach to its trade and payments. Trade deficits have been cut, and the current account has been brought into balance. In part this turnabout has been the result of a favorable harvest in 1976 and the Soviet decision to allocate additional oil to hard currency markets. Moscow has also cut back substantially on equipment orders, ostensibly as a result of domestic construction backlogs. Moreover, concern over growing debt has undoubtedly led planners to take a harder look at industry requests for imported equipment. By the end of last year the U.S.S.R. had brought its financial house in order—to the point that Western willingness to lend exceeds Soviet demand. The debt, although large, is manageable; debt service should not constrain import capacity in a significant way in the near term.

The long-term outlook for Soviet trade and payments is much bleaker. Demand for Western equipment, technology, grain, and some intermediate products is expected to mount. At the same time, the U.S.S.R. faces the prospect of having to buy oil for hard currency on a net basis by 1985. The magnitude and duration of the downturn in oil exports are likely to preclude the use of balance-of-payments financing in lieu of adjustments in the current account. Limited potential for increasing arms and gold sales and earnings from transportation and tourism probably will force the leadership to squeeze the merchandise account to compensate for the expected downturn in oil exports.

The leadership will thus be forced to make hard choices in the conduct of its trade in the 1980's. Moscow is understandably loath to commit more raw materials to the export sector in view of the increasing cost of extracting them and rising internal demand. Soviet ability to expand exports of manufactured goods, on the other hand, depends on the willingness of the U.S.S.R. to allow Western participation, particularly quality control, in Soviet production. Failure to be more forthcoming in either of these areas will likely carry the cost of a diminished import capacity. How the U.S.S.R. will determine the relative cost/benefits of export expansion is uncertain. What is clear is that the decline in oil exports will force a readjustment in the merchandise account either by a reduction in imports or by an expansion of the export sector.

II. Background

Although Soviet trade with the West represents but a small portion of overall economic activity, the Soviet leadership has attached increased importance to the role of Western technology, equipment, and grain in Soviet economic growth. Moscow, however, is constrained in its ability to rely on the West by the need to balance its hard currency exchange flows. The choices that the Soviet Union has made regarding its import and export mix and its use of Western credits highlight, sometimes in rather dramatic fashion. Soviet economic deficiencies and the U.S.S.R.'s approach to their solution.

This paper has a threefold purpose. It first seeks to derive the Soviet hard currency balance of payments accounts for the 1970–78 period. Specific attention is paid to: (*a*) data limitations; (*b*) estimating procedures; and (*c*) the degree of confidence that should be placed in the estimates. With the balance of payments statistics as a frame of reference we then examine the conduct of Soviet hard currency trade and payments in this period. In particular, we examine the effect of Western and Soviet economic conditions on Soviet foreign-trade decisionmaking. We also describe how past behavior will likely affect the conduct of Soviet trade in 1979 and beyond.

The last section of the paper is forward looking. It attempts to survey future problems Moscow will face in the conduct of its foreign trade with the West and the likely range of choices the leadership will have to face over the next several years. We do not attempt to project solutions; our aim is to provide a reference for the other, more detailed, analyses contained in this volume.

III. Estimating the Soviet Hard Currency Balance of Payments

A. Data Sources and Limitations

The accuracy of Soviet international balance of payments estimates is necessarily constrained by the limited availability of data. Consistent time series data on commodity trade are provided by the U.S.S.R., but the proportion of such trade conducted in hard currencies must be deduced. Western data sources were used to derive time series on gold sales, transfer payments, credit drawings, and Soviet financial assets in the West. Unclassified Central Intelligence Agency (CIA) publications and journal articles published in the West provided the basis for estimating arms sales, revenues from the service sector, and Soviet hard currency credits to less developed countries. Accurate data on Soviet debt and debt service are particularly sparse; summary reporting is incomplete and not easily combined to derive annual Soviet credit drawings and a schedule of principal and interest repayments. Nonetheless, a reasonably reliable hard currency balance of payments can be compiled for the U.S.S.R. Our estimates for 1970–78 are set out in table 1.

TABLE 1.—U.S.S.R.: HARD CURRENCY BALANCE OF PAYMENTS

[In millions of U.S. dollars]

	1970	1971	1972	1973	1974	1975	1976	1977	1978 [1]
A. Current account balance	22	160	−587	1, 151	2, 014	−4, 714	−2, 931	2	467
Balance on sales and purchases of goods and services	77	217	−521	1, 234	2, 115	−4, 616	−2, 824	127	612
Balance on merchandise trade	−500	−313	−1, 356	−1, 757	−978	−6, 422	−5, 595	−3, 300	−3, 794
Exports, f.o.b	2, 201	2, 630	2, 801	4, 790	7, 470	7, 835	9, 721	11, 345	13, 157
Imports, f.o.b	−2, 701	−2, 943	−4, 157	−6, 547	−8, 448	−14, 257	−15, 316	−14, 645	−16, 951
Sales of nonmonetary gold	0	79	380	900	1, 178	725	1, 369	1, 618	2, 673
Receipts from military sales	100	87	122	1, 345	1, 000	793	1, 108	1, 500	1, 644
Net income from services	477	364	333	746	915	288	294	309	89
Net income from tourism	43	45	53	116	117	136	150	175	200
Merchandise freight balance	397	257	220	480	570	390	470	590	560
Income	400	260	250	640	640	520	640	710	700
Outlays	−3	−3	−30	−160	−70	−130	−170	−120	−140
Net income from other transportation	120	110	120	230	330	330	390	390	410
Investment income balance	−83	−48	−60	−80	−102	−568	−716	−846	−1, 081
Income from direct investment abroad	0	0	0	0	1	2	8	2	3
Interest on outstanding assets in Western banks	NA	87	110	252	405	234	288	292	685
Interest paid on outstanding debt	−83	−135	−170	−332	−508	−804	−1, 012	−1, 140	−1, 769
Government transfer outlays	−55	−57	−66	−83	−101	−98	−107	−125	−145
To the U.N	−44	−46	−54	−59	−88	−98	−107	−125	−145
Settlement of lend-lease debt	−11	−11	−12	−24	−24	0	0	0	0
B. Capital account balance	266	227	−77	522	386	5, 694	2, 952	1, 917	173
Direct investment abroad	0	−6	0	−9	−11	−3	−31	0	0
Borrowing from abroad	291	288	602	1, 340	1, 426	5, 402	4, 694	1, 777	1, 785
Not backed by Western credit guarantees	NA	NA	452	1, 183	746	4, 160	2, 720	191	458
Backed by Western credit guarantees	291	288	150	157	680	1, 242	1, 554	686	1, 041
East European loans for Orenburg							420	900	286
Lending to other countries	−25	−55	−679	−809	−1, 029	295	−1, 711	140	−1, 612
Net increase in Soviet assets held in Western commercial banks	NA	NA	−629	−729	−939	395	−1, 611	240	−1, 512
Net increase in outstanding supplier credits	−25	−55	−50	−80	−90	−100	−100	−100	−100
C. Net errors and omissions	−288	−387	664	−1, 673	−2, 400	−980	21	−1, 919	−640

[1] Preliminary estimates.

Note: Since with complete and accurate accounting net receipts (net outlays) on the current account would be offset by net outlays (net receipts) on the capital account, net errors and omissions (C) can be found by the following identity: C=−(A+B), where A=the current account balance and B=the capital account balance.

Those sources and methodologies employed in estimating each of the line items in the U.S.S.R.'s balance of payments are described in detail below. Where possible, the direction of estimative bias is explicitly stated and the likely magnitude of omitted line items is discussed.

B. The Current Account

1. MERCHANDISE TRADE

Official Soviet foreign trade data are used in estimating Soviet merchandise trade paid for in hard currencies. Our analysis is conducted in U.S. dollars. The dollar value equivalent was determined by applying, for each year, the average monthly official ruble-dollar exchange rate against the ruble values given in the Soviet foreign trade handbook.[1] The Soviet calculation of foreign exchange values for the ruble and their implications for a dollar valued analysis of Soviet trade is discussed in appendix A. The movement in dollar prices not only incorporates Western price inflation but also the movement of the dollar against the foreign exchange ruble.

An extensive examination of the mirror statistics issue by Damian Gullo demonstrates that Soviet, rather than partner country data, are a better indicator of true trade flows.[2] Moscow's multilateral trading partners were determined by partner country reporting to the IMF. This listing is largely consistent with an official list released by the U.S.S.R. in 1976. A detailed listing of multilateral trading partners along with the 1976 Soviet confirmation is provided in appendix B. In 1976, 1977, and again in 1978 the U.S.S.R. reported a portion of its hard currency imports—those items destined for the Orenburg pipeline project—as footnoted items (see appendix C). Since they represent legitimate hard currency expenditures, they have been incorporated into the merchandise account; Soviet reimbursement by other CEMA members is treated as a separate line item.

We have not attempted to estimate that portion of Soviet commodity trade conducted for hard currency under the more general bilateral clearing arrangements. The U.S.S.R., for example, apparently pays hard currency for a portion of its sugar imports from Cuba, and there are various estimates regarding the magnitude of Soviet hard currency trade with Eastern Europe. In all likelihood Moscow runs annual deficits in such trade, probably in the $500 million range. In effect such deficits constitute a form of economic aid.

2. GOLD SALES

There is no single recognized source regarding Soviet hard currency earnings from gold sales. The Soviets provide information neither on their sales strategy nor on annual sales volume or value: Western summary reporting tends to vary. We have used the volume figures as presented in the Annual Bullion Review and applied an estimated annual average gold price to derive annual dollar values for gold sales. Details of the estimate are provided in appendix D. Given the limited

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[1] Vneshnaya torgovlya S.S.S.R., 1970–77.

[2] Gullo, Damian T., "Reconciliation of Soviet and Western Trade Statistics." (Washington, D.S.: Central Intelligence Agency; ER 77–10132, May 1977). See also Mr. Gullo's article in this volume.

number of suppliers to the gold market, substantial Soviet sales probably would not escape the attention of Western specialists. As a result we tend to view the volume data with confidence; the accuracy of the derived value estimates depends on the degree of fluctuation in market prices in any given year and the timing of Soviet sales.

3. MILITARY TRANSACTIONS

The U.S.S.R. has become a major supplier of military equipment to the less developed world. Although estimates have been made on the total value of arms deliveries to the less developed countries, there is limited information regarding that portion of deliveries for which the U.S.S.R. has received hard currency (see table 2). Following the 1973 Arab-Israeli war, the U.S.S.R. was in a strong bargaining position with respect to radical Arab clients who sought to bolster their military strength. The Soviets have made few known financial concessions to such clients in recent years. As a result they reportedly gained roughly $1.5 billion in hard currency from total 1977 arms deliveries of $3.5 billion.[3]

We apply the ratio of hard currency receipts to total arms of deliveries recorded in 1977—43 percent—to the time series for total arms deliveries to derive hard currency sales estimates for 1973–78. Based on known arms customers we estimate that, on average, the U.S.S.R. received hard currency for roughly 10 percent of its arms deliveries in 1970–72.

TABLE 2.—ESTIMATED SOVIET MILITARY DELIVERIES TO LDC's

[In millions of U.S. dollars]

	Total	Hard currency receipts
1970	995	100
1971	865	87
1972	1,215	122
1973	3,130	1,345
1974	2,310	1,000
1975	1,845	793
1976	2,575	1,108
1977	3,515	1,500
1978	3,825	1,644

4. SERVICES: TOURISM

No data on either hard currency earnings or expenditures on tourism have been published by the Soviet Union. Earnings were estimated by adding separate estimates made for three groups of travelers—Finns, who stay for short periods and spend little; U.S. citizens, who have the highest per capita expenditures, in part because they stay longest; and the rest (mostly West Europeans), whose expenditures tend to be less than those of U.S. citizens. Soviet visitors to the West are also assigned a per capita expenditure. Net tourism earnings were generated for the 1970–74 period; estimates of net earnings for 1975–78 are based on extrapolation of past trends.

[3] "Communist Aid to Less Developed Countries of the Free World, 1977"; National Foreign Assessment Center, Central Intelligence Agency, ER 78–10478U, November 1978, p. 1.

5. SERVICES: TRANSPORTATION

The transportation account in the U.S.S.R.'s hard currency balance of payments reflects only earnings by the Soviet merchant fleet and by the Trans-Siberian Landbridge Service and expenditures by the U.S.S.R. for the carriage of grain and other imports on foreign ships. The effects of transactions involving passenger movements by air and overland transit services for freight moving between Europe and Iran are excluded because data are skimpy and the sums involved are believed to be small.

Hard currency revenues from the Soviet merchant fleet derive largely from the delivery of Soviet exports and cross trade cargoes on behalf of shippers who pay for Soviet shipping services in hard currency. Revenues from the carriage of exports were estimated by analyzing data on tonnages exported to hard currency trading partners by sea and arranging them in major commodity groups. The proportion of the tonnage in each commodity group estimated to have been carried on Soviet ships was multiplied by an average freight rate (for the appropriate year for the commodity in question) to obtain the revenue earned.

Revenues in the cross trades were obtained by breaking down total fleet carriage of cross trade cargoes into similar commodity groups. The tonnage in each commodity group carried for hard currency was then multiplied by an appropriate freight rate. Revenue from the U.S.S.R.'s Trans-Siberian Landbridge operation was obtained by multiplying total Landbridge container traffic (eastbound and westbound) in 20-foot equivalent units (TEU) by an estimated average rate for the year.

The U.S.S.R.'s major disbursements of hard currency for foreign shipping services during recent years have been for imports of grain and aluminum ore. The hard currency expenditures required to bring in these imports were obtained by multiplying the tonnages known or estimated to have been carried with payment in hard currencies by an appropriate average annual rate. A similar method was employed in working up an expenditure figure covering imports of other commodities carried with payment in hard currency.

6. SERVICES: INVESTMENT INCOME

The rise in Soviet debt has led to a rapid rise in Soviet interest payments. In calculating annual Soviet interest receipts/payments on commercial loan balances we assume an interest rate of 0.5 percent over the average annual London Interbank Offer Rate (LIBOR) and apply this rate against the net year-end Soviet asset/liability positions estimated below. We applied fixed interest rates in calculating Soviet interest payments on officially supported debt; an average annual rate of 6.5 percent was assumed for credits drawn in 1971–75 while an average annual rate of 7.2 percent was used for credits drawn in 1976–78.

We believe that Soviet credits extended to less developed hard currency trading partners are largely repaid in commodities and thus do not estimate interest payments for this account. Moscow has received dividends from its wholly owned banks in the West and may have

received them from other Soviet firms operating in the West. What data we have on such flows is included as income from Soviet investment. We have limited information regarding Soviet interest receipts stemming from credits which may have been extended as part of arms sales activity; available data are included under "receipts from military sales."

7. TRANSFER PAYMENTS

We are able to identify two categories of Soviet transfer payments. United Nations data provide a time series on annual Soviet contributions in hard currency.[4] We assume additional Soviet contributions to the United Nations are denominated in rubles and do not impact on the U.S.S.R.'s hard currency payments balance. The Soviet Union has also made periodic repayments against its lend-lease debt to the U.S.A. In accordance with an October 1945 agreement, the U.S.S.R. instituted annual repayments to the U.S. Government of $11 million beginning in 1954, and from 1954 to 1971 the U.S.S.R. paid a total of $199 million. In 1972 the two countries agreed that the outstanding Soviet lend–lease debt would be fixed at $722 million and would be repaid over a 30-year period. However, after making payments of $12 million in 1972 and $24 million in both 1973 and 1974, the U.S.S.R.—in renouncing the 1972 Trade Agreement—made additional repayments contingent on access to U.S. Export-Import Bank credits and most favored nation status.

8. OTHER

The U.S.S.R. imports substantial amounts of technology from the West which, in accordance with Western balance-of-payments convention, should be carried as a separate current account line item. According to Gullo's research, Soviet technology imports are subsumed under official Soviet merchandise trade statistics.[5] In determining the Soviet current account balance the treatment of technology imports is trivial; we have made no attempt to break technology out of the merchandise account.

We have no information regarding other current account transactions. Presumably the U.S.S.R. is in surplus vis-a-vis remittances and also enjoys a net hard currency inflow as a result of foreign tours by its theatrical and sports groups. On the other hand Soviet backing of Third World revolutionary activities undoubtedly necessitates hard currency outlays.

C. The Capital Account

The U.S.S.R. does not release information regarding its financial position vis-a-vis Western governments and commercial banks. Estimates on Soviet indebtedness thus must rely on Western financial reporting which continues to be seriously deficient in both scope and quality of coverage. The paucity of data has required numerous, and sometimes tenuous, assumptions in calculating the structure and size of Soviet debt to the West.

Soviet debt can be apportioned between that amount covered by Western government guarantees—officially supported debt—and that

[4] United Nations General Assembly, Report of the Committee on Contributions, Addendum, Supplement No. 11 (data gathered from reports of the 26th, 28th, 30th and 32nd Sessions, estimates were made for contributions in 1977–78).

[5] Gullo, Damian, "Reconciliation of Soviet and Western Trade Data: The U.S. as a Case Study," in this volume.

portion, commercial debt, which has not received such backing. We separately estimate each debt category, including that portion subject to double counting. In each case we start with a basic time series and make the necessary additions, subtractions, and other adjustments to derive a debt structure. In describing the methodology and assumptions used we have attempted, where possible, to explicitly state the confidence which should be attached to and the probable direction of estimative bias of individual line items.

1. ESTIMATING SOVIET COMMERCIAL DEBT

We estimate that Soviet gross commercial debt to the West grew from $400 million at the end of 1971 to over $10 billion at the end of last year (see table 3). During this same period Soviet asset holdings in the West rose to slightly over $6 billion, yielding an estimated net debt of $4.3 billion at yearend 1978. Soviet net borrowing was particularly heavy in 1975–1976; the $5.7 billion rise over the 2-year period accounted for 108 percent of the increase in net commercial debt in 1972–78.

TABLE 3.—SOVIET COMMERCIAL DEBT

[In millions of dollars]

Year	Assets	Liabilities	Assets ne
1971	1,225	407	818
1972	1,854	858	996
1973	2,583	2,041	542
1974	3,522	2,787	735
1975	3,127	6,947	−3,820
1976	4,738	9,667	−4,929
1977	4,498	9,858	−5,360
1978	6,010	10,316	−4,306

These estimates are more properly viewed within a range. As we explain below, little summary data are available on a number of significant debt components, and the possibility of a large overall error must be considered. Soviet gross commercial debt at the end of 1978—which we estimate at roughly $10 billion—could just as easily be $9 billion or $11 billion. Treatment of CEMA bank borrowing is also important; we exclude estimated IIB and IBEC borrowing in estimating Soviet debt. An alternative approach, including CEMA bank liabilities in Soviet debt estimates, would raise the gross Soviet commercial debt estimate for yearend 1978 to between $13.5 billion and $15.5 billion.

Reporting by the Bank for International Settlements (BIS) on the asset and liability positions of Western commercial banks vis-a-vis the U.S.S.R. serves as the basis for our point estimates of Soviet commercial debt. We adjust the BIS series to account for: (1) reported bank lending supported by official credit guarantees; (2) Swiss and Japanese bank positions reported to the BIS but not broken out with respect to the U.S.S.R.; (3) Austrian bank positions not reported to the BIS before 1977; (4) net Soviet borrowing from outside the BIS reporting area; (5) Soviet promissory notes held in the West but not included in BIS reporting; and (6) net borrowing by CEMA's international banks, which Western banks include in their position

vis-a-vis the U.S.S.R. The methodology employed is outlined in table 4 and described below:

TABLE 4.—*U.S.S.R.: Methodology for estimating Soviet commercial debt*

Soviet liabilities equal
- Commercial bank assets vis-a-vis the U.S.S.R. as reported to the BIS
- plus: Austrian bank assets for 1971–1976
- Swiss and Japanese bank assets estimated from the U.S.S.R.-East European residual given in the quarterly BIS reports
- Soviet promissory notes held in the West but not included in reporting to the BIS
- net Soviet borrowing outside the BIS reporting area
- less: member bank assets held with the CEMA international banks
- government supported credits included in member bank submissions to the BIS

Soviet assets equal
- Commercial bank liabilities vis-a-vis the U.S.S.R. as reported to the BIS
- plus: Austrian bank liabilities for 1971–1976
- Swiss and Japanese bank liabilities estimated from the U.S.S.R.-East European residual given in the quarterly BIS reports

BIS reporting.—BIS summary data for 1971–73 consisted of annual reports of the positions of commercial banks vis-a-vis the Soviet-East European group. Our estimate of the Soviet position for this period is based on a previous analysis conducted by Lawrence Brainard.[6] In 1974 the BIS initiated an expanded system of quarterly reports in which member bank positions with respect to the U.S.S.R. are made explicit. In 1974 explicit coverage included the positions of commercial banks located in France, Germany, Italy, Sweden, the United Kingdom, Belgium-Luxembourg, the United States, and Canada. In 1975 the coverage was extended to banks in the Netherlands and to foreign branches of U.S. banks in the Caribbean and the Far East; by the end of 1977 explicit BIS coverage for the U.S.S.R. included, as well, the positions of banks located in Japan, Austria, Ireland, and Denmark.

Austrian bank positions.—The coverage provided by the BIS reporting scheme, when one incorporates estimates of the Soviet positions included in the Soviet-East European group residual, is now fairly complete. However, the positions of banks in Austria, Ireland, and Denmark were not reported to the BIS before 1977, while Dutch bank reporting was not included until 1975. The positions of the banks in the latter three countries vis-a-vis the U.S.S.R. are, in all likelihood, small, and the consistency of the time series is not much affected by their exclusion in 1971–76. This is not the case with Austrian banks, which hold significant assets with the U.S.S.R. To account for this gap we have separately estimated Austrian bank positions for the 1971–76 period.

Swiss and Japanese bank positions.—In the quarterly BIS reports the positions of Swiss and—until 1977—Japanese banks vis-a-vis the U.S.S.R. are included within the residual category for the Soviet-East European group. Beginning in December 1976 the BIS also began to report the maturity structure of member bank lending, including

[6] Brainard, Lawrence J., "Criteria for Financing East-West Trade," Tariff, Legal and Credit Constraints on East-West Commercial Relations, edited by John Hardt (Ottawa, Canada: Institute of Soviet and East European Studies, Carlton University), pp. 10–11.

that of Swiss and Japanese banks, to the U.S.S.R. Slight differences in reporting prevent direct use of the recent data on maturity structures, and we were forced to use relative shares to estimate that portion of the residual in the quarterly reporting which should be allocated to the U.S.S.R. (See appendix E for an explanation of the methodology used).

Promissory note financing.—Part of the supplier credits extended by Western firms is neither reported as commercial bank lending to the U.S.S.R. nor covered by Western government guarantees. Beginning in the early 1970's the U.S.S.R. began to use promissory notes extensively in financing its equipment imports. Soviet foreign trade organizations typically offered 5-year notes carrying fixed interest rates to cover capital goods imports when Government guarantees were unavailable.[7] These notes were either held by the initial exporter or his bank or, more likely, discounted without recourse (à forfait) in secondary financial markets. Because of their relatively high yield they often entered the investment portfolios of nonbank financial institutions, private investors, or commercial bank trust accounts.

Estimates of the total value of Soviet promissory notes outstanding in the West vary. The U.S.S.R. apparently made particularly heavy use of this form of financing in 1974–76, only to cut back significantly when it found that Western commercial bank lending rates to the Soviet Bank for Foreign Trade were being pushed up by the increasing supply of higher yield promissory notes. Our estimates on promissory note financing refer only to the remaining portion, which we assume to be held by Western exporters, nonbank financial institutions, or private investors.

The stability of estimated annual values of promissory notes placed in the West which are neither reported to the BIS nor backed by Western credit guarantees is a function of: (*a*) A growing volume of Soviet equipment imports; and (*b*) the retention of a relatively greater share of new Soviet paper by exporters in 1977–78; balanced off by (*c*) growing Soviet reliance on government-supported credit; and (*d*) ample availability of lower cost direct bank financing since 1976. In calculating debt structure we assume an average length of 5 years. Our estimated series implies an outstanding end-1978 debt on this account of $1.4 billion: in our opinion the true figure could be as high as $2.5 billion or as low as $500 million.

TABLE 5.—*U.S.S.R.: Estimated value of promissory notes placed in the West not held by Western banks or covered by Western official credit guarantees*

[In millions of U.S. dollars]

Year:	*Value*
1971	100
1972	100
1973	200
1974	500
1975	500
1976	500
1977	500
1978	400

[7] For a more complete discussion on supplier credit financing see Large, Andrew: "The Role of Eurocurrencies in East-West Trade"; Money and Finance in East and West. C. T. Saunders (editor); the Vienna Institute for Comparative Economic Studies; Workshop Paper vol. 4; (Springer-Verlag; New York; 1978). See also Neuhaus, Walther; "Quoting for Long Commitment Periods": Euromoney; May 1978; pp. 77–84.

Other Soviet borrowing.—In addition to the promissory note financing described above, the U.S.S.R. has undoubtedly obtained loans from commercial banks, nonbank financial institutions, or foreign governments that are neither reported to the BIS nor included in summary reporting of Government-supported credits. Similarly the U.S.S.R. may have granted hard currency loans to foreign governments or commercial entities that are neither reported to the BIS nor included in our estimates of Soviet trade-related credit extensions.

We estimate that, in all likelihood, the U.S.S.R. is a net debtor with regard to those financial activities outlined above. Our point estimates are necessarily arbitrary and have the U.S.S.R. moving from a net debtor position of $100 million in 1971 to roughly $750 million at the end of last year.

IBEC and IIB borrowing.—Western banks, in general, include their positions vis-a-vis CEMA's international banks in their Soviet position. Given the sizable borrowings of these banks in recent years the treatment of CEMA bank borrowing has a major impact on the calculation of Soviet debt to the West.

Using published International Bank for Economic Cooperation (IBEC) and International Investment Bank (IIB) balance sheets we attempt to estimate that portion of Western bank net assets with respect to the U.S.S.R. that actually represents lending to the two international banks. We substract these amounts from reported Western bank assets vis-a-vis the U.S.S.R. to derive a Soviet commercial debt position excluding contingent liabilities with respect to IBEC and IIB. For 1977 this subtraction reduced Soviet new commercial debt by slightly over $4 billion (appendix F provides a full description of IIB and IBEC balance sheets and our estimative methodology).

Other assumptions regarding Soviet liability for IBEC and IIB borrowing are possible. By invoking the umbrella theory, one could argue that the Soviet Union would undertake responsibility for the solvency of the banks and that, as a result, Western bank liabilities vis-a-vis IBEC and IIB properly belong in the Soviet position. One could also impute a derived legal responsibility. The U.S.S.R. holds a 40-percent share in the two banks and presumably would be legally accountable for 40 percent of the banks' liabilities.

We prefer to treat the banks separately. We estimate that the U.S.S.R. is a nominal borrower with respect to the CEMA banks; in all likelihood, IIB and IBEC have reloaned a major share of their hard currency borrowings to those East European countries that could not borrow in the West at rates as favorable as those the CEMA banks have been able to obtain. CEMA bank liabilities to the West are matched, in effect, by CEMA bank assets vis-a-vis non-Soviet CEMA members, and the hard currency indebtedness of these banks should be allocated to those non-Soviet borrowers.

Double counting.—To our knowledge neither the BIS nor those familiar with Western bank reporting procedures can identify that portion of assets that member banks report to the BIS which are backed by government credit guarantees. Apparently reporting procedures and conventions vary by country. Moreover, various official credit guarantee programs impact differently on member bank accounting practices.

We assume that officially supported credits have not constituted a sizable share of Western bank liabilities reported to the U.S.S.R. There are some indications that a portion of officially supported credits held by French and Japanese banks is reported to the BIS, as are all officially supported nonsterling credits held by British banks and all officially guaranteed U.S. credits. To date, however, U.S. banks have not requested official credit guarantees on their loans to the U.S.S.R., and the amount of United Kingdom loans not denominated in pounds sterling has been minimal. We have estimated that portion of French and Japanese bank reporting that is also counted under our estimates of officially supported Soviet debt. For example, in 1977 we allowed for $700 million in such double counting from these two sources; our feeling is that actual double counting in 1977 probably ranged between $500 million and $1 billion.

Structure of commercial debt.—Since December 1976 the BIS has reported periodically on the maturity structure of bank assets and liabilities for the group of countries contained in the quarterly BIS reports.[8] Although this reporting covers Swiss bank positions vis-a-vis the U.S.S.R., the overall sample of banks is less than that represented in the quarterly BIS reports. In estimating the structure of Soviet commercial indebtedness, we applied the percentage distribution of Soviet debt, by term (obtained from the December 1977 maturity breakdown) to the BIS statistics. Using the imputed December 1978 term structure as a base, we then adjust for double counting, IIB and IBEC borrowing, promissory note financing, Swiss bank positions and other Soviet borrowing to derive a preliminary estimate of the structure of Soviet commercial debt at the end of 1978 (table 6).

TABLE 6.—*U.S.S.R.: Commercial debt structure for yearend 1978*[1]

[In millions of U.S. dollars]

Total liabilities	10, 316
Due in 1979	4, 850
Due in 1980	1, 550
Due after 1980	3, 916

[1] Preliminary; based, in part, on Western bank positions vis-a-vis the U.S.S.R. as of Dec. 31, 1978.

2. ESTIMATING SOVIET DEBT BACKED BY WESTERN GOVERNMENTS

Our estimate of that portion of Soviet debt backed by official Western credit guarantees is based on an analysis of unpublished data. Table 7 presents data on this debt in 1970–78. We are fairly certain of our estimates regarding Government-supported debt. Although the data for yearend 1978 are preliminary, we feel that our annual debt estimates for the period lie within $500 million of the true figures.

The information on commitments apparently refers, in part, to offers of Western credit for specific projects. The estimate of Soviet exposure—as measured by total commitments reported by the West—is inflated to the extent that Western commitments have not been matched by Soviet orders for Western equipment, pipe, or other products that have yet to be delivered. The statistical relationship between past

[8] Bank for International Settlements; maturity distribution of international lending on a country-by-country basis; December 1976, December 1977, June 1978.

Soviet orders and Western equipment deliveries strongly suggests an average order-to-delivery lag of four quarters. Longer term delivery schedules for pipe would lengthen slightly the overall average order-to-delivery lag. As a result, the yearend 1978 estimate of undrawn commitments of $6.8 billion overstates the actual value of the Soviet orders placed but yet to be delivered.

TABLE 7.—U.S.S.R.: DEBT BACKED BY OFFICIAL WESTERN CREDIT GUARANTEES[1]

[In millions of U.S. dollars]

	New commitments	Drawings	Undrawn commitments	Principal repayments	Interest repayments	Yearend positions	
						Outstanding debt	Total commitments
	(1)	(2)	(3)	(4)	(5)	(6)	(3+6)
1970	612	450	691	159	83	1,114	1,805
1971	373	511	616	223	106	1,400	2,016
1972	777	426	1,020	276	119	1,551	2,571
1973	1,415	495	2,704	338	133	1,708	4,412
1974	3,584	1,164	4,959	484	187	2,389	7,348
1975	2,311	1,972	5,394	730	284	3,631	9,025
1976	4,404	2,611	6,395	1,057	424	5,185	11,580
1977	2,892	1,991	7,166	1,305	499	5,870	13,036
1978[2]	2,150	2,500	6,816	1,459	591	6,911	13,727

[1] Values for commitments, drawings, debt, and exposure are uncapitalized. That is to say that they refer only to the principal of the loan and not to the stream of interest payments the U.S.S.R. will be obliged to pay on that principal. This table is not internally consistent because of minor discrepancies in the original data. For example, outstanding debt in 1971 should equal outstanding debt in 1970 plus 1971 drawings less 1971 principal repayments. Since we do not know the reasons for these discrepancies, we have not adjusted our computed series to make them totally consistent.
[2] Preliminary.

3. OTHER CAPITAL ACCOUNT TRANSACTIONS

In addition to our estimates regarding Soviet borrowing from the West we also include in the capital account estimates of the credits the U.S.S.R. has granted to those less developed countries trading on a hard currency basis, direct Soviet investment in the West, and hard currency loans granted by Eastern Europe for the Orenburg natural gas project.

Soviet economic aid.—Soviet merchandise exports backed by long-term credits to less developed, hard currency trading partners have increased steadily over time, reaching $100 million annually in 1976–78. In most cases the assistance was extended on fairly concessional terms. About 45 percent of new agreements called for repayment over 10 to 15 years at 2.5 percent to 4 percent interest; an additional 33 percent was repayable over 10 years at 2.5 percent to 5 percent interest; while nearly 20 percent carried harder terms—5 to 8 years to repay at up to market rates of interest. Only 3 percent of long-term economic aid was provided as grant aid. A major share of these credits are repaid directly by the exports of commodities by the recipient countries to the U.S.S.R. As a result we make no attempt to simulate principal repayments on the capital account and do not estimate annual interest payments.

East European investment in the U.S.S.R.—In 1975–78 the International Investment Bank (IIB) raised $2.5 billion in five consortium loans, ostensibly to cover the hard currency costs of equipment and pipe required for the construction of a natural gas pipeline from the Soviet natural gasfields at Orenburg to the Soviet-Czechoslovakian

border. In return for long-term Soviet natural gas deliveries the East European countries have agreed to finance hard currency costs, presumably receiving the necessary loans from the IIB. The U.S.S.R., however, has been assigned the responsibility for negotiating contracts and purchasing requisite equipment; it also assumes payment responsibilities for imports from the West. We assume that the U.S.S.R is reimbursed by the participating East European countries at the time the goods are imported. In effect these capital transfers exactly offset the hard currency trade deficits subsumed in the merchandise account.

Soviet direct investment in the West.—We have estimated a portion of Soviet direct investment in the West from the financial statements of Soviet-owned banks in the West. These estimates undoubtedly understate overall direct investment because Moscow has established many new commercial operations in the West, and existing firms have expanded as the volume of Soviet-Western trade has grown in the 1970's. We cannot estimate all these flows, however, because financial data are scanty, in part because much investment in new operations comes from previously established Soviet firms in the West rather than from the U.S.S.R. Furthermore, our estimates probably account for only a small portion of the cash provided by the U.S.S.R. to cover the sizable loan losses suffered by Moscow Narodny Bank—particularly its Singapore branch—in the mid-1970's. Our data reflect only an increase in the paid-in capital of Moscow Narodny in 1976 because we have no reliable information on the amount of loans the U.S.S.R. might have made to the bank. (The press has reported Moscow Narodny's loan losses at from $200 million to as much as $400 million.)

D. Errors and Omissions

Errors and omissions reflect several factors. In part, they may reflect errors in our point estimates of individual line items. As previously discussed many of these estimates should be viewed within a range; the probability for errors is particularly great with regard to arms sales in the current account and promissory note financing in the capital account. The cumulative range of individual point estimates could well encompass a good share of the errors and omissions.

It should be noted, however, that errors and omissions do not fall into the random pattern which would be expected as a result of the above factors. With the exception of 1972 and 1976 the errors and omissions indicate a consistent understatement of Soviet expenditures. (Raising our estimates of Soviet debt would only increase the magnitude of this understatement.) Several factors, noted above, could combine to account for such an understatement. For example, we have not attempted to estimate Soviet hard currency trade under the more general bilateral agreements; Soviet outlays for Cuban sugar, Hungarian beef, and so forth, would be recorded as a debit in the errors and omissions column. Similarly, Soviet hard currency support to foreign governments and movements was not estimated nor did we attempt to estimate the value of net credits Moscow may have granted in support of arms sales.

In 1972 and 1976, errors and omissions suggest a failure to account for all Soviet receipts. In these years we may have underestimated Soviet borrowings or, given the large errors and omissions of the opposite sign in 1973 and 1977, have estimated 1973 and 1977 borrowings (or other receipts) which more properly should have been assigned in 1972 and 1976, respectively.

E. Total Soviet Indebtedness

On the basis of the analysis outlined above we estimate a yearend 1978 gross Soviet debt of $17 billion (see table 8). Because of the variability in our estimates this point estimate should be viewed as falling within a probable range of $15.5 to $18.5 billion. We estimate that Soviet hard currency holdings in the West rose to $6 billion at the end of last year, yielding a net Soviet debt of $9.5 to $12.5 billion.

The growth in Soviet debt can be broken into two 4-year periods. In 1971–74 Soviet debt—backed by official credit guarantees—grew steadily to $2.4 billion (table 7). Moscow's commercial financial transactions showed a surplus, yielding a net debt of $1.6 billion at the end of 1974. Beginning in 1975, however, the U.S.S.R. made extensive use of Western commercial credit facilities; net indebtedness on this account grew by almost $5 billion in 1975–78 (table 3). At the same time the Soviet Union increased its use of officially supported credits as outstanding government supported debt rose by $4.5 billion in 1975–78 to $6.9 billion. Most of the growth of both commercial and government backed debt occurred in 1975–76. The rise in indebtedness slacked off considerably in 1977–78 in response to a reduction in the trade deficits an a policy shift toward financial conservatism.

TABLE 8.—U.S.S.R.: TOTAL DEBT TO THE WEST[1]

[In millions of U.S. dollars]

Year	Total outstanding debt		Percentage of net debt covered by Government guarantees
	Gross	Net	
1971	1,807	582	100
1972	2,409	555	100
1973	3,749	1,166	100
1974	5,176	1,654	100
1975	10,578	7,451	49
1976	14,853	10,115	51
1977	15,728	11,230	52
1978[2]	17,227	11,217	62

[1] Excluding transfers for the Orenburg pipeline, Soviet equity capital in the West, and net Soviet credit extensions calling for commodity repayment.
[2] Preliminary.

These estimates of Soviet indebtedness are considerably below the levels of previous estimates made in the West.[9] We are sufficiently

[9] For alternative estimates on Soviet debt see:
Karr, Miriam, articles in Chase East-West Markets; Sept. 20, 1976, pp. 8–9; Mar. 7, 1977, pp. 7–9; and May 15, 1978, pp. 2–3.
Brainard, Lawrence J., "Eastern Europe's Indebtedness: Policy Choices for East and West," Money and Finance in East and West, edited by C. T. Saunders (The Vienna Institute for Comparative Economic Studies, Workshop Papers, vol. 4, Springer-Verlag, Wien-New York), 1978, pp. 79–98.

confident of the methodologies employed and the reliability of the data base to feel that the downward revision is warranted. Two main factors, in our opinion, have inflated earlier estimates. Soviet debt backed by government credit guarantees has been overstated. Our data indicate that actual outstanding Soviet debt in this category comprises no more than half of the amount of outstanding Western commitments. Second, to our knowledge, previous estimates have either underestimated that portion of commercial bank assets reported with respect to the U.S.S.R. that are actually IIB or IBEC obligations or have decided to count the obligations of the CEMA banks as a Soviet liability. As stated above, an argument can be made for including CEMA bank debt in Soviet debt figures. Including them would raise our estimates of yearend 1978 outstanding net Soviet debt to roughly $15.5 billion, with a range on this estimate of between $14 billion and $17 billion.

F. Soviet Debt in Perspective

The size of Soviet debt has little meaning of its own. What matters is the impact of outstanding debt obligations on U.S.S.R.'s ability to continue to import needed goods and services from the West. Pierre Dhonte cogently describes the importance of debt service payments:

> . . . debt service payments matter because they give rise to various types of adjustment problems: debt service pre-empts untied resources. whereas new loans are likely to be "tied" in various ways; service payments are contractural obligations, and the higher their level the greater the potential impact on import capacity of a downturn in foreign exchange earnings; debt obligations may "bunch" over a short period causing a similar problem.[10]

We have calculated several indicators of the Soviet debt burden and present them in table 9 below. The debt service ratio (DSR) is calculated with respect to both total Soviet foreign exchange earnings—exports. arms, gold, tourism, and transportation—and merchandise export earnings alone. The Soviet DSR based on total foreign exchange earnings increased sharply in 1975, but has grown only slightly in the past 3 years.

TABLE 9.—MEASURES OF SOVIET DEBT BURDEN

	1972	1973	1974	1975	1976	1977	1978[1]
Debt service ÷ total export earnings (DSR)[2]	0.12	0.08	0.09	0.15	0.15	0.16	0.17
Debt service ÷ merchandise exports (DSR)	0.16	0.14	0.13	0.20	0.21	0.22	0.24
Gross outstanding debt ÷ total export earnings (DER)	0.63	0.44	0.46	1.02	1.11	1.01	0.92
Net transfer (millions of dollars U.S.)	432	1,008	918	4,598	3,262	−263	−620
Debt service ÷ new drawings	0.51	0.40	0.52	0.25	0.39	1.12	1.21

[1] Preliminary.
[2] Debt service = principal and interest on Government supported debt + interest on gross commercial debt + known principal repayments on medium-term commercial debt.

The DSR, however, does not address the question of future debt burden. Debt-to-export-ratios (DER) are often used as a benchmark estimate of the burden of outstanding debt over time. therefore we have

[10] Dhonte. Pierre. "Describing External Debt Situations: A Roll-Over Approach." vol. XXX. No.1. IMF Staff Papers (Washington. D.C.: International Monetary Fund), p. 163. This section draws heavily from Mr. Dhonte's presentation.

estimated—using total export earnings as a basee—DER's for the 1972–78 period. The DER peaked in 1976 when it amounted to 111 percent of exports. It has since fallen steadily to 92 percent in 1978.

Soviet debt, measured in relation to export earnings, is clearly within reason. Moreover, the U.S.S.R. should not face serious problems in servicing its debt. Recent debt refinancing activities, including the prepayment of a major portion of the $1 billion in Eurocurrency loans syndicated in 1975–76 and the syndication of a $250 million loan at very favorable terms, have largely eliminated the bunching of debt repayments that Moscow would otherwise face in 1979–81. While the U.S.S.R. does have a large short-term debt, Moscow should have little trouble rolling over this portion of its debt as long as it: (*a*) continues present conservative borrowing policies; and (*b*) Western money markets remain liquid. Perhaps most important, the U.S.S.R. is relying more on government supported credits that feature repayment periods of up to 8½ years and interest charges of about 7.5 percent.

Some other debt measures provide additional perspective on the Soviet position. The net transfer measure reflects the incremental (or reduced) capacity of the U.S.S.R. to import real goods and services. We also calculate that portion of new drawings used to service existing debt to measure the extent to which Moscow is rolling over its debt to the West. These two measures move together; a large positive net transfer implies borrowing in excess of rollover requirements while a negative net transfer implies borrowing below the amounts required to meet debt service obligations.

IV. Interplay of Performance and Policy in Soviet Foreign Economic Relations

A. New Emphasis on East-West Trade

Soviet factions have often disagreed over the role of the West in Soviet economic development.[11] But by the early 1970's Party Chairman Brezhnev had accepted increased economic reliance on the West as a way of spurring domestic economic development. In April 1973 his emphasis on East-West trade was endorsed by the Central Committee Party Plenum. (See table 10 for an outline of some of the events pertinent to foreign trade policy.)

Under Brezhnev's leadership the U.S.S.R. rapidly increased its economic interchange with the West. Committed to increased imports of Western equipment and technology, Moscow undertook several actions to insure its ability to obtain the equipment it desired and to arrange for a means of paying for it. During the early 1970's the U.S.S.R. made a concerted effort to sign comprehensive trade agreements with its Western trading partners. Moscow pushed for agreements which would: (1) underscore the mutual importance of industrial cooperation and technological exchange; (2) provide for government-backed credits to finance Soviet imports; and (3) commit Western governments to promoting the import of Soviet products.

[11] For an extended treatment of this issue see Parrott, Bruce, "Soviet Technological Progress and Western Technology Transfer to the U.S.S.R.: An Analysis of Soviet Attitudes," prepared for the Office of External Research, Bureau of Intelligence and Research, U.S. Department of State, July 1978.

TABLE 10.—U.S.S.R.: FOREIGN TRADE POLICY FRAMEWORK

	1972	1973	1974	1975	1976	1977–78
Domestic scene:	Poor harvest			Poor harvest	Construction backlogs mount Oil exports boosted at expense of reserves (1976) Alkhimov becomes Gosbank head Brezhnev stresses compensation	
Foreign economic policy setting:	Detente with the United States	Party endorses Brezhnev's approach to East-West trade Arab-Israeli War				
Western economic conditions:		Oil embargo Gold prices begin climbing	Western recession and subsequent stagflation			
East-West trade highlights:	U.S.S.R. push for bilateral economic agreements		$2.4 billion in compensation deals signed; orders for Western equipment mount	Jackson-Vanik amendment		Equipment orders on the decline
Balance of payments developments:			Arms sales for hard currency on the rise	$6.4 billion trade deficit incurred; net debt rises by $6 billion (1975)	Cost of borrowing rises due to Western concern over debt	Current account brought into balance Debt refinancing (1978)

The need for long-term credits was particularly crucial to Soviet import plans. To this end the U.S.S.R. encouraged competition among potential suppliers and their governments to provide the most favorable credit terms available. Soviet purchasing power was alternatively used as a carrot and a stick; those countries failing to provide competitive rates were threatened with a loss of business, while the prospect of large Soviet orders was used to entice Western governments into providing needed credit support.

The concept of compensation agreements also evolved from Moscow's commitment to increased trade. By obtaining Western participation in long-term agreements, Moscow hoped to guarantee future export markets that would more than repay their initial project-associated costs. With deals calling for Soviet deliveries of intermediate and finished products, the U.S.S.R. also wanted a continuing supply of Western technology and know-how rather than a one-shot infusion.

The Soviet strategy met with mixed success. The U.S.S.R. found most Western countries willing to agree to their credit requests, but they were unable to obtain long-term trade and economic and technical cooperation agreements on their terms. In the main, Western governments refrained from involving themselves in commercial negotiations. Moscow found in the end that trade in the West would be carried on largely according to Western rules; it could not transfer political and military power to the international trade arena.

The dollar value of Soviet hard currency imports grew rapidly in 1971–77, rising from almost $3 billion in 1971 to $14.7 billion in 1977 (see table 11; app. G shows the commodity composition of imports in both current and 1975 dollar values). The growth in real terms was also impressive, averaging nearly 16 percent annually for the period (the reduction in imports in 1974 was due to a substantial decline in imports of Western grain). Roughly two-thirds of Soviet imports in 1971–77 consisted of equipment (34 percent), grain (11 percent), and steel products (16 percent). Soviet grain purchases, which fluctuated with domestic harvests, were particularly heavy in 1973 and 1976. In recent years Moscow's commitment to building its livestock population has led to substantial imports of feedgrains, primarily corn. Imports of large diameter pipe, used primarily in the construction of natural gas pipelines, have accounted for a major share of Soviet steel imports. Domestic shortfalls in steel production, however, resulted in substantial imports of other steel products beginning in 1974.

TABLE 11.—U.S.S.R.: GROWTH IN HARD CURRENCY TRADE [1]

[Annual percentage increase]

	Average, 1971–77	1972	1973	1974	1975	1976	1977	1978
Soviet imports:								
Nominal	31	41	57	29	69	4	−7	21
Real	16	51	28	−6	50	9	−16	N.A.
Soviet exports:								
Nominal	28	7	71	56	5	24	20	16
Real	6	3	18	−13	10	19	2	N.A.

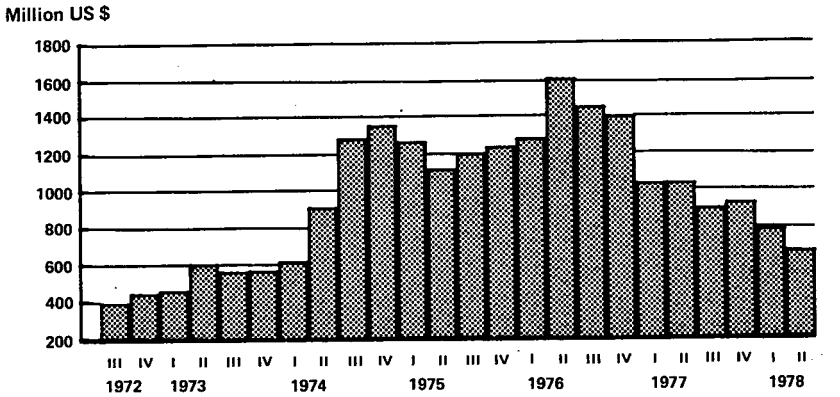
[1] Nominal values are calculated from official Soviet foreign trade statistics; imports associated with the Orenburg pipeline project are excluded from 1976–78 data. Real values were derived by applying price deflators to the nominal data. Where possible the price deflators were determined from Soviet quantity data, in other cases Western price indexes were used.

The Soviet decision to increase its reliance on Western equipment in domestic development is amply demonstrated by the rapid rise in equipment imports from the West. Hard currency equipment imports rose more than sixfold in 1971–78 to $6 billion. The chemical and motor vehicle industries were the major recipients of Western equipment in this period. The rise in imports was particularly rapid in 1975 when deliveries almost doubled to $4.6 billion. Deliveries in 1976–78 averaged roughly $5.4 billion.

The substantial increase in equipment orders placed in 1974–75 led to the large rise in Soviet imports in 1975. A statistical analysis of the relationship between orders and deliveries indicates that most equipment is delivered within eight quarters with an average order-to-delivery lag of four quarters. Judging from the recent downturn in Soviet orders equipment deliveries in 1979 should be below previous levels (see fig. 1 and app. I). The 1977–78 decline in orders was caused partly by mounting backlogs in domestic construction; Moscow has yet to install several billion rubles in imported equipment, a good portion of which was purchased in the West. The cutbacks may also reflect Soviet concern over its debt.

Figure 1

USSR: Moving Weighted Average of Soviet Equipment Orders From the West [1]



1. A five-quarter moving average was employed to smooth the trend in orders. The weights per quarter were 0.1 0.2 0.4 0.2 0.1.

With the notable exception of 1975 when they were hit hard by recession in the West, Soviet exports also rose rapidly in value terms over the period—from $2.8 billion in 1971 to $13.2 billion in 1978 (see app. H). The rise was largely due to higher prices for Soviet energy exports and, in 1975–78, to increased natural gas deliveries. In real terms, total exports rose, on average, by only 6 percent annually in 1971–1977. Although the Soviets have enjoyed some success in expanding their manufactured goods exports, by 1978 they still accounted for only 9 percent of total exports. Higher earnings from oil accounted for 49 percent of the overall increase in the current dollar value of export earnings in 1971–78 and for roughly 43 percent of 1978 export

revenues. In terms of quantity, annual hard currency exports have risen from 700,000 barrels per day in 1971 to roughly 1.1 million barrels per day in 1978. Moscow was able to boost exports in 1976 to 944,000 barrels per day in part by drawing down domestic stockpiles; rising production and domestic conservation have since allowed the U.S.S.R. to maintain hard currency oil exports at roughly the 1976 level (see table 12).

TABLE 12.—U.S.S.R.: EXPORTS OF PETROLEUM AND PETROLEUM PRODUCTS FOR HARD CURRENCY [1]

Year	Volume (thousand barrels per day)	Value (millions of U.S. dollars)
1970	620	$387
1971	706	567
1972	653	556
1973	702	1,248
1974	601	2,548
1975	764	3,176
1976	944	4,514
1977	[2] 1,050	5,275
1978	1,100	5,716

[1] Official Soviet foreign trade statistics.
[2] Estimated.

B. Coping With Rising Hard Currency Deficits

The U.S.S.R. sustained a cumulative hard currency trade deficit of $24 billion during the 1970–78 period, including a $6.4 billion deficit in 1975 and $5.6 billion deficit in 1976 (see fig. 2). To some extent these deficits were unavoidable; equipment deliveries had been arranged in advance, and Moscow had to increase grain purchases following the poor 1975 harvest. Yet, with the exception of boosting oil exports in 1976–78, the U.S.S.R. has been able to absorb these deficits and has not reduced imports or reallocated production in favor of the export market.

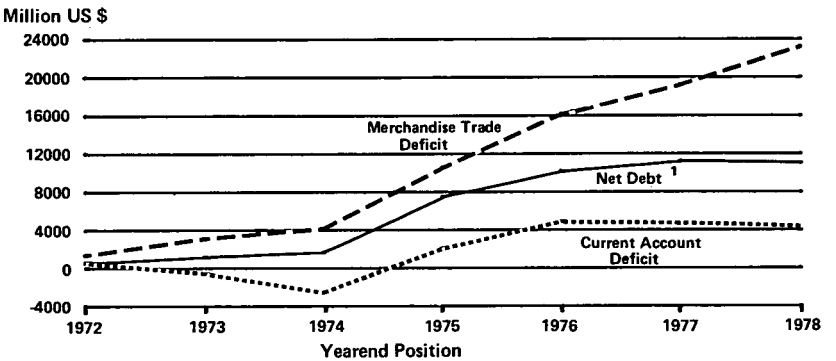
Instead, the Soviets were able to rely increasingly on sales of gold and arms to narrow the current account imbalance. Nonetheless, the U.S.S.R. followed a generally conservative gold sales strategy; gold sales dropped in 1975 although the U.S.S.R. faced a record trade deficit. Sales apparently continued to be influenced as much by market conditions as by short-term hard currency requirements.

Moscow chose to rely basically on Western commercial credits to finance its 1975–1976 trade deficits. We estimate that the Soviet Union increased its gross commercial indebtedness by $4.2 billion in 1975 and by $2.7 billion in 1976. Roughly $1 billion of this amount was raised through 5-year syndicated Euroloans. The major share, however, came from Soviet short-term borrowing and through the extensive use of promissory notes to finance equipment purchases not backed by Government-guaranteed credits.

The Soviet Foreign Trade Bank, responsible for financing Moscow's foreign trade, failed, however, to fully coordinate and control Soviet borrowing. At the same time that it engaged in substantial bank-to-bank borrowing, the bank guaranteed a large volume of promissory notes issued by the Soviet foreign trade organizations. By the end of 1976, many major Western commercial banks had approached

Figure 2

USSR: Comparison of Cumulative 1972-1978 Hard Currency Trade Deficits and Current Account Deficits with Net Hard Currency Debt to the West



1. Net debt estimates exclude (a) yearend 1971 debt of $581 million, (b) Soviet liabilities stemming from East European financing of construction of the Orenburg pipeline, and (c) Soviet assets with regard to less developed countries.

or reached their internal lending limits vis–a-vis the U.S.S.R. and many bankers—while continuing to consider the U.S.S.R. a good credit risk—were showing some concern over Soviet debt management. As the supply of loanable funds contracted, the Foreign Trade Bank faced demands for higher interest rates and found itself competing against the higher yielding Soviet promissory notes that had been discounted by Western exporters on secondary commercial money markets.

In 1977–78, however, the U.S.S.R. to a large extent regained control over its hard currency balance of payments by exercising greater discipline over the general conduct of its international trade and payments. In October 1976, then Deputy Foreign Trade Minister Vladimir Alkhimov, a specialist in international finance, assumed the chairmanship of the U.S.S.R. State Bank, which in turn controls the operations of the State Bank for Foreign Trade. Both Alkhimov's known views indicate and subsequent Soviet policies confirm that the U.S.S.R. has become more conservative in its foreign economic relations.

Since the beginning of 1977 Moscow has regained control of its current account, restrained the growth of its debt, lessened its dependence on Western bank borrowing in favor of Government-backed financing, and moved to offset the impact of substantial debt service payments in 1979–81 resulting from heavy Euroborrowing in 1975–76.

The 1977 trade deficit was cut to $3.3 billion—the net result of a higher volume of oil exports, a slowdown in the growth of equipment imports, and a substantial fall in Western grain deliveries.

The 1977 current account was brought roughly into balance as the U.S.S.R., taking advantage of a buoyant gold market, earned roughly $1.6 billion from gold sales and delivered an estimated $1.5 billion of arms for hard currency.

The rise in gross commercial indebtedness in 1977 was held to 2 percent while total outstanding debt rose by less than $1 billion to $15.8 billion. The U.S.S.R., for example, did not attempt to raise any syndicated Euroloans in 1977.

The new Soviet conservatism continued into 1978 as machinery orders declined for the second straight year. Substantial earnings from gold and arms brought the current account into surplus despite interest payments on existing debt of over $1 billion.

Judging from preliminary financial data, we estimate that the U.S.S.R kept its net debt to the West virtually unchanged in 1978. In particular, the U.S.S.R. reportedly decided to restructure a large portion of outstanding syndicated Euroloans in order to avoid: (*a*) the current high interest costs prevailing on the Euromarket; and (*b*) the bunching of debt service obligations that would have occurred in 1979–81 when payments on these loans were due. At the same time Moscow also took advantage of current Euromarket liquidity to raise two loans for $650 million at favorable rates.

In effect, the U.S.S.R. is sacrificing net transfers of resources to itself in the present period to insure more favorable future conditions for borrowing. Net resource transfers to the U.S.S.R.—new drawings less repayments on existing debt—shifted from a $4.6 billion inflow in 1975 to a $260 million outflow in 1977 (see table 9). For 1978, we tentatively estimate a negative net resource transfer of $620 million as a result of higher interest payments on past debt and Euroloan repayments.

V. Lessons Learned From the 1970's

The leadership is now in a far better position to assess the costs and benefits of trade with the West than it was in the early 1970's. The past several years have increased Soviet awareness regarding the potential for increasing its exports to the West, the gains from imported equipment, and the need to maintain a close control over its balance of payments and debt positions.

By this time the Soviet leadership should harbor few illusions regarding the potential for export growth to the West. It realizes that export success must be achieved in the economic and not the political arena. In particular, Soviet success in expanding exports of manufactured goods will be limited until they are able to satisfy Western demands for production flexibility, appearance, quality, spare parts availability, and after-sales service. They have likewise realized the limits on compensation agreements; in nonenergy areas Western willingness to accept long-term deliveries of Soviet exports will depend on Soviet flexibility with regard to pricing, delivery, and Western quality control.

The U.S.S.R. is also now in a better position to assess the relative merits of importing Western equipment over domestic production. It has had sufficient time to gauge its current ability to absorb imported equipment, use it effectively, and to diffuse the technological gain throughout the economy. In this connection the Soviets should be able to judge their ability to import equipment piecemeal as opposed to signing contracts on a turnkey (or complete plant) basis.

On the financial side the U.S.S.R. seems to have settled into a conservative pragmatic approach to balance-of-payments management.

The increased centralized control over import/export decisionmaking should help the U.S.S.R. with its financial payments. Moreover, it can count on substantial hard currency revenues guaranteed under existing compensation agreements.[12] Thus, the Soviet Union is, on the whole, in excellent financial position at this time. A major share of already ordered but undelivered equipment is covered by long-term Government-supported credits, and the U.S.S.R. can tap a substantial amount of unused Western Government-supported credits. Meanwhile, Soviet assets in Western banks are at an all-time high. Finally, Western commercial bankers still consider the U.S.S.R. to be an excellent credit risk, and Moscow should have little difficulty in expanding its borrowing from commercial banks should the need arise.

But the U.S.S.R. will need more than past experience to handle its hard currency trade as it moves into the 1980's. The rapid downturn expected for Soviet oil production will put severe pressure on Soviet decisionmakers planning the future conduct of foreign trade. The current strong financial position is based, in part, on the ability of the U.S.S.R. to achieve a balance in its current account in 1977–78. In the 1980's Moscow faces the prospect of its major export earner—oil—becoming a major import requirement.

VI. Outlook

A. Sharply Rising Pressures on Foreign Trade Sector

The Soviet leadership must make a series of crucial decisions in the next decade regarding the conduct of its foreign economic relations. Those economic forces expected to drive foreign trade decisionmaking and several of the policy options affecting the foreign sector are discussed in detail elsewhere in this compenedium. We would like to lay out the general nature of the problems facing the leadership and suggest some of the costs and benefits of the decisions that might be taken in the foreign economic sector.

Domestic economic problems will increase the pressure on the U.S.S.R. to expand its imports from the West. A declining growth in the labor force, falling capital productivity, limited investment funds, and increasing costs of developing new raw material sources magnify the need to spur intensive economic growth. Soviet ability to move forward in this direction will depend, in part, on the quantity and quality of technologically advanced equipment the U.S.S.R. is able to import from the West. At the same time the U.S.S.R. faces the need to expand substantially the availability of consumer goods. The leadership rightly perceives that an expanded flow of consumer goods is crucial to upgrading labor productivity; more urgently, it realizes that the availability of consumer goods must be increased to even meet minimal popular expectations. In terms of trade with the West, a consumer-oriented program translates primarily into growing imports of Western grain for the livestock sector. In the absence of hard currency constraints, the U.S.S.R. would probably also in-

[12] See Barclay, Dennis. "U.S.S.R.: The Role of Compensation Agreements in Trade with the West." in this volume.

crease imports of plant and equipment for the consumer sector. Lastly, the U.S.S.R. probably will not be able to close the gap between domestic demand and availability of crucial intermediate products such as steel. Import demand for intermediate products as well as raw materials not available domestically is expected to grow in concert with Soviet industrial production.

But Moscow cannot satisfy its cumulative import requirements without changing its export policies radically. Even under optimistic scenarios regarding domestic oil production and demand, oil exports to hard currency trading partners will fall steadily beginning in the early 1980's. In fact, the U.S.S.R. could well become a net oil importer in its hard currency trade in order to meet anticipated requirements to export oil to other CEMA members. Soviet earnings from gas, chemicals, and other exports stemming from signed compensation agreements will rise rapidly, and some steady increase in traditional nonoil exports can be expected. Nonetheless, the overall growth in export earnings will be severely depressed because of the turnaround in oil; total exports may even fall absolutely in the early 1980's.

B. Prospects for Boosting Exports

The U.S.S.R. has little leeway in attempting to further expand exports to the West. Earlier hopes that export growth could be driven by increasing sales of manufactured goods has apparently given way to the more realistic view that the U.S.S.R. will have to continue to rely on raw material exports for the immediate future.[13] Decisions will have to be made soon, however, if Moscow is to accelerate raw material exports in the early and mid-1980's. West European countries are interested in expanding natural gas imports, and Japanese and U.S. continue to discuss the development of the East Siberian natural gas fields. The Soviets, for their part, appear undecided whether to go forward with new natural gas export contracts or to commit the gas resources in West Siberia and in the Far East to meeting future domestic demand; continued hedging on this issue or prolonged negotiations over pricing, pipeline routing, and other commercial issues could well limit the ability of increased natural gas exports to offset the expected decline in oil exports in the mid-1980's.

Higher Soviet raw material exports in the early and mid-1980's could result from a rapid and satisfactory conclusion of negotiations with Western firms in areas such as offshore oil exploration and development, forestry projects, and deals on raw materials and their products such as copper and aluminum.[14] Western interest in moving forward on such projects hinges on Soviet willingness to accommodate Western commercial demands regarding pricing, production sharing, and onsite participation in exploration and development.

The U.S.S.R. conceivably could also increase exports of manufactured goods for hard currency in the mid-1980's to make up for weakness elsewhere. The major issue in this case is Western demand for quality control. The Soviet leadership should by this time be well apprised of the advantages and disadvantages of allowing for Western onsite managerial control: they are in all likelihood aware that po-

[13] "Soviet Export Strategy," Duesseldorf Handelsblatt, Sept. 15, 1976, p. 8.
[14] For an extended discussion see Dennis Barclay, "U.S.S.R.: The Role of Compensation Agreements in Trade With the West" in this volume.

tentially significant deals have been lost (and will continue to be lost) because of indecision on this issue.

Soviet reluctance to allow basic changes in the way it conducts its foreign economic relations is understandable. The leadership undoubtedly hoped that the U.S.S.R. could capture the economic benefits from increased trade with the West without bending its practices to accommodate Western ideas. But the pressures cited above, in conjunction with Soviet inability to expand exports in traditional fashion, make it increasingly unlikely that this policy will pay off. Moscow is probably well aware that a resumption of vigorous growth in trade with the West could require systemic changes that some have argued could threaten the basic character of the decisionmaking system of the Party and, in particular, the dominance of the Party's role in all economic decisionmaking.[15]

To date the Soviet Government has done no more than tinker with the existing foreign trade system while exhorting the foreign trade cadres to raise efficiency. The current reorganization of the foreign trade apparatus, an example of this administrative approach, is as unlikely to lead to significant changes as earlier "reforms."

According to some indications, the U.S.S.R. may try to resolve the conflict between needed change and a desire to retain the traditional party role by establishing an export sector. In this approach, export production would be confined to a small number of highly specialized firms.[16] The firms most likely would be vertically integrated so as to minimize dependence on—and interaction with—the civilian economy. Operating in a fashion analogous to the military industrial sector, these specialized firms would in theory have priority call on raw materials, manpower, and management. Plants would be provided the freedom to allow Western participation and the flexibility to alter production to changing Western demand. Even under such a plan it would be difficult, however, for the U.S.S.R. to seal off unwanted Western influences. At any rate, discussions of an export sector seem to be still in the talking stage.

C. Potential for Offsetting the Trade Deficits

In contrast to the recent past, the U.S.S.R. will not be able to avoid hard decisions associated with expanding exports by relying on rapid increases in other current account earnings or on a net resource transfer from heavy borrowing in the West. While hard currency arms and gold sales will remain substantial, the prospects for continued rapid growth are respectively limited by the rate of Soviet gold production and Third World demand for arms. Earnings from tourism—with the possible exception of 1980—and transportation should similarly exhibit a steady but constrained growth.

It is unlikely that the U.S.S.R. could, or would even attempt to cover the expected downturn in hard currency earnings from falling

[15] Hardt, John P., "Systemic Changes and the U.S.-U.S.S.R. Balance of Payments," vol. VIII, No. 2, Towson State Journal of International Affairs (Baltimore, Md.: Towson State College), pp. 79, 80, 91, also see Ticktin, Hillel, "The Relation Between Détente and Soviet Economic Reforms," in Soviet Foreign Economic Policy: Its Social and Economic Conditions, edited by Jahn Egbert (New York: St. Martin's Press, pp. 41–56).

[16] Kirilov, A., "Soviet Foreign Trade and Its Urgent Tasks," Foreign Trade, vol. 8, 1978 (Moscow, pp. 28–33. Note: This view has been proposed by other Soviets including Kosygin.

oil exports by heavy borrowing. Although the U.S.S.R., as stated earlier, is in excellent financial position at the present time, Western bankers would be loath to provide massive balance-of-payments financing to cover trade deficits occasioned by a downward trend in oil exports. Moscow probably would not, in fact, try to offset such a downturn by large Eurodollar borrowings, particularly if exports are expected to be a problem over the loan repayment period. More likely the U.S.S.R. would increase its reliance on Government-backed supplier credits, reserving balance-of-payments financing to emergency situations such as a harvest shortfall or a large single year drop in export earnings.

Appendix A

Determining the Ruble-Dollar Exchange Rate

The Soviet method of establishing exchange rates has a direct bearing on the interpretation of official foreign trade statistics. The ruble values are themselves determined by a trade or currency weighting process, and working with ruble valued data is preferred when describing the rate of import or export growth over time. An analysis of the change in the value of Soviet trade that is conducted in a foreign currency equivalent of the foreign exchange ruble should explicitly allow for the appreciation or depreciation of the Western currency against the foreign exchange ruble. The U.S. dollar value of Soviet hard currency exports, for example, rose by 20 percent in 1977. During this same period the dollar depreciated by 2.4 percent against the ruble implying that the true increase in the value of Soviet exports in 1976–1977 was closer to 17.5 percent.

The foreign exchange ruble is an accounting relationship that permits expenditures and receipts initially valued in terms of foreign currencies to be restated in a common unit of account. Originally the foreign exchange ruble was valued in gold but after the Smithsonian accords of December 1971, the wide fluctuations in the market price for gold made this linkage unworkable. The Soviets now state that the foreign exchange ruble is linked to a basket of foreign currencies.

Beginning in January 1972 the Soviet State Bank for Foreign Trade began monthly to adjust the values it assigned to the foreign exchange ruble vis-a-vis Western currencies. Foreign exchange rates are announced at the beginning of each month and remain in effect for the entire period. On nine occasions the U.S.S.R. has felt it necessary to change the exchange rates during the month.

Comparisons of Soviet foreign exchange rates with Western spot rates indicate that the U.S.S.R. establishes its ruble foreign exchange rates so that the cross exchange rates mirror the daily closing spot exchange rates on Western money markets on (or close to) the last working day of the previous month. In all likelihood the normal Soviet procedure is to use a market basket approach to establish a foreign exchange rate for the ruble against a key currency (assumed to be the U.S. dollar) and then apply the key currency's prevailing foreign exchange rates vis-a-vis other Western counrties to derive the ruble values vis-a-vis these same currencies.

During the period under consideration the ruble has substantially appreciated against the U.S. dollar; in December 1971 the foreign exchange ruble—in terms of gold content—was equal to $1.1111; at the end of 1978 the ruble—now tied to a market basket of Western countries—was set equal to $1.49, an overall appreciation of 34 percent. As one would expect the pace of appreciation has varied appreciably from year to year. The annual percentage appreciation is shown in table A–1.

Table A–1.—*Annual ruble appreciation vis-a-vis the U.S. dollar* [1]

1972	9.0
1973	11.0
1974	−2.4
1975	5.2
1976	−4.5
1977	2.4
1978	8.2

[1] Differences between average monthly-ruble dollar exchange rates.

We have attempted to simulate the market basket used by Moscow in deriving ruble dollar ratios. Initially seven currencies—the U.S. dollar, DM, Yen, French Franc, Lira, and Canadian dollar—were used with weights derived from the respective country's share in total Soviet trade among the group of seven countries. In this case the U.S. trade weighted share was roughly 10 percent. Simulations of ruble-dollar rates using this market basket yielded poor results.

We then decided to build a market basket of the four key currencies—the U.S. dollar, DM, Yen, and the French Franc—that account for the major share of Soviet trade. Various combinations of weights were tried in order to derive a weighting system that would best simulate actual ruble dollar movements. For the period 1972–1977 the following weighting scheme was found satisfactory: U.S. dollar (.25), DM (.30), French Franc (.20), and Yen (.25). Calculations of monthly ruble dollar ratio over a 72 month period using these weights provided estimates that, on average, differed by less than 2 percent from the actual ruble dollar value. The range in monthly deviation was between —3.67 percent and 6.98 percent with a standard deviation of 1.66 percent.

The differences between the two time series might be narrowed by applying different weights or by including additional currencies. Our ability to discover the Soviet weighting system is limited, however, by imperfect knowledge of the timing of Soviet exchange rate calculations. The difference in projections due to our use of end-of-month exchange rates and Soviet use of daily closing quotations taken before the end of the month could yield results with a variance far greater than that obtained from our weighting scheme.

Appendix B

U.S.S.R.: Multilateral trading partners, 1970–78

As reported by partner countries to the IMF: [1]

	Confirmed by the U.S.S.R. in 1976 [2]
Developed West:	
EEC:	
Belgium	X
Denmark	X
Federal Republic of Germany	X
France	X
Ireland	X
Italy	X
Luxembourg	X
Netherlands	X
United Kingdom	X
West Berlin	X
Iceland (1977–)	X
Other Europe:	
Austria (1971–)	X
Norway	X
Sweden	X
Switzerland	X
Non-Europe:	
Japan	X
Canada	X
United States	X
Australia	X
New Zealand	X
Republic of South Africa	
Developing countries:	
Europe:	
Malta	X
Portugal	X
Spain	X
Greece (1978–)	
Africa:	
Benin	
Burundi	
Cameroon	X
Central African Empire	X

See footnotes at end of table.

As reported by partner countries to the IMF: [1]—Continued

	Confirmed by the U.S.S.R. in 1976 [2]
Developing countries—Continued	
Africa—Continued	
Peoples Republic of Congo	X
Ethiopia	X
Equatorial Guinea	X
Gabon	
Gambia	
Ghana (1976–)	
Guinea Bissau	
Ivory Coast	X
Kenya	X
Liberia	X
Libyan Arab Republic	X
Malagasy Republic	X
Malawi	
Mauritania	
Mauritius	
Niger	
Nigeria	X
Rwanda	X
Senegal	X
Sierra Leone	X
Sudan	X
Angola (1977–)	
Cape Verde Islands (1978–)	
Tanzania	X
Togo	X
Tunisia (1974–)	X
Uganda	X
Upper Volta	X
Zaire	
Zambia	X
Latin America:	
Argentina	X
Bolivia	X
Brazil	X
Chile	
Colombia	X
Costa Rica	X
Dominican Republic	
Ecuador	X
El Salvador	X
Guatemala	
Guyana	X
Jamaica	X
Honduras	
Mexico	X
Nicaragua	
Panama	
Paraguay	
Peru	X
Trinidad and Tobago	
Uruguay	X
Venezuela	X
Asia and Mid-East:	
Burma	X
Cyprus	X
Indonesia	X
Iraq	X
Israel	
Jordan	X
Kuwait	X
Lebanon	X

See footnotes at end of table.

As reported by partner countries to the IMF: [1]—Continued

Developing countries—Continued Asia and Mid-East—Continued	*Confirmed by the U.S.S.R. in 1976* [2]
Malaysia	X
Nepal (through 1976)	X
Philippines	
Saudia Arabia	X
Singapore	X
Thailand	X
Yemen Arab Republic	X
Yemen People's Republic	X
Hong Kong	X
Macao	
Sri Lanka	

[1] "Annual Report(s) Exchange Restrictions," 1970 (Washington, D.C.: International Monetary Fund). Unless otherwise stated, a multilateral trading relationship was in effect throughout the 1970–78 period.
[2] "Moscow Narodny Bank Press Bulletin," No. 799 (London: Moscow Narodny Bank Limited), p. 4, citing "Foreign Trade U.S.S.R.," 1976.

Appendix C

U.S.S.R.: HARD CURRENCY IMPORTS EXPLICITLY REPORTED AS DESTINED FOR THE ORENBURG PIPELINE PROJECT

[In millions of U.S. dollars]

	1976	1977	1978
Exporter:			
United Kingdom	9.0	22.8	12.9
Italy	98.8	257.6	
West Germany		494.8	240.9
Japan	312.6	112.5	32.0
Total	420.4	887.7	285.8

Source: Vneshnaya torgovlya SSSR 1976, 1977, and 1978.

Appendix D

U.S.S.R.: ANNUAL GOLD SALES

Year	Tonnage [1]	Value in millions of U.S. dollars [2]
1970	0	
1971	60	79
1972	200	380
1973	280	900
1974	230	1,178
1975	140	725
1976	340	1,369
1977	340	1,618
1978	430	3,673

[1] As cited in the "Annual Bullion Review," 1971–78. (London: Samuel Modtagu & Co., Ltd.).
[2] Dollar values calculated by applying estimated average London gold price for the year in question.

Appendix E

U.S.S.R. Allocating the Residual Reported in the Quarterly BIS Reports

Western Bank Assets Vis-a-Vis the U.S.S.R.

1. The yearend 1976 and 1977 reports giving the maturity of outstanding commercial bank assets do not contain residuals. The share of Western bank assets vis-a-vis the USSR compared with assets vis-a-vis the Soviet-East European group as a whole was calculated at: .38703 for 1976; .32107 for 1977.

2. This share was applied to the asset position vis-a-vis the Soviet-East European group as reported in the quarterly BIS reports. We then subtracted assets explicitly reported vis-a-vis the USSR to obtain that portion of the residual to be assigned to the USSR.

Year	Imputed share	Total Soviet-Eastern Europe assets	Imputed Soviet assets	Derived Soviet assets within residual
1976	0.38703	28,973	11,213	868
1977	0.32107	38,323	12,304	691

3. In both 1976 and 1977 the derived Soviet position contained in the residual accounted for .29 of the total residual; derived Soviet positions for 1974, 1975, and 1978 were computed using this percentage:

Derived assets position for 1974=742; 1975=302; 1978=790.

Western Bank Liabilities Vis-a-Vis the U.S.S.R.

We arbitrarily assume that the U.S.S.R. accounts for 30 percent of total Western bank liabilities reported in the residual. We made an exception for 1976, however, when the residual jumped to $1,356 million. In this case we assumed that a much greater percentage was Soviet, possibly due to heavy gold sales towards the end of the year which led to large deposits with Swiss banks. The time series used was as follows:

Year	Total reported liabilities in the residual category	Estimated liabilities vis-a-vis the U.S.S.R.
1974	600	180
1975	688	206
1976	1,356	900
1977	455	136
1978	506	152

Source of Soviet-Related Assets and Liabilities Via the Residual

In effect, these allocations of the residuals serve as proxy estimates for the Swiss banking positions vis-a-vis the U.S.S.R. in 1974–1977 and the Japanese banking positions vis-a-vis the U.S.S.R. in 1974–1976. Swiss and Japanese positions for 1971–1973 are included as part of the Brainard estimates.

Appendix F

Estimated Indebtedness of the CEMA Banks to Western Commercial Banks

The value of time deposits and loans obtained from Western commercial banks by CEMA's International Bank for Economic Cooperation (IBEC) and International Investment Bank (IIB) can be estimated from the balance sheets and annual reports of the two CEMA banks. IBEC's annual reports quote—in transferable rubles—the total of hard currency funds obtained through "time deposits", "loans", and "on current account" (presumably demand deposits). Additional data permit this aggregate to be broken down into its components. IBEC annual reports typically state the amount of hard currency received on current account. The liability line item "Loans Received" carried on the IBEC balance sheet is entirely hard currency since the bank's charter states that IBEC can raise loans only in hard currency (line 2 of accompanying table). By netting the hard currency balance reported as being on "current account" and the "Loans

Received" total against the aggregate of hard currency funds reported by IBEC, we derive the amount of hard currency time deposits placed with IBEC (line 1).

Comparison of IIB's publicized Eurodollar syndications with the totals recorded under "Loans and Borrowings Obtained" in the IIB balance sheet strongly suggests that this entry reflects IIB's hard currency indebtedness (line 3). The totals reported by IIB for its borrowings somewhat exceed the amount of its publicized syndications; however, the bank undoubtedly has obtained medium-term bank-to-bank loans in addition to its known syndications.

In all likelihood, the indebtedness totals arrived at by summing IBEC time deposit liabilities, IBEC loans received, and IIB borrowings (line 4) overstate the net hard currency indebtedness of the CEMA banks to Western banks. Thus (a) there have probably been hard currency loans between the two CEMA banks (b) the national banks of the CEMA member countries probably place some time deposits with IBEC and (c) the CEMA banks presumably place time deposits in Western banks. To account for the upward bias of the amounts in line 4, we estimate the net indebtedness of the CEMA banks to Western banks reporting to the BIS at 75 percent of the line 4 totals (line 5).

[In millions of U.S. dollars] [1]

	1970	1971	1972	1973	1974	1975	1976	1977	1978
1. IBEC hard currency time deposit liabilities	670	544	1,418	1,625	1,856	2,464	2,772	2,906	2,809
2. IBEC loans received (from balance sheet)	31	93	236	264	394	572	426	493	597
3. IIB loans received per balance sheet				50	135	684	1,411	2,139	2,750
4. IBEC, IIB hard currency debt from time deposits and loans (1+2+3)	701	637	1,654	1,939	2,385	3,720	4,609	5,538	6,156
5. Estimated CEMA bank net indebtedness to Western banks [2]	526	478	1,240	1,454	1,789	2,790	3,457	4,154	4,617

[1] The IIB and IBEC balance sheet entries are expressed in transferable rubles. The ruble/dollar exchange rates for the respective years were used to compute the amounts shown in this table.

[2] Estimated net indebtedness to Western banks is assumed to be roughly equal to 75 percent of the gross hard currency debt as presented in line 4.

Appendix G

(PART A)

U.S.S.R.: SELECTED HARD CURRENCY IMPORTS IN CURRENT DOLLARS [1]

[In millions of U.S dollars]

Description	1970	1971	1972	1973	1974	1975	1976	1977	1978
Total imports	2,701	2,943	4,157	6,547	8,448	14,257	[2] 15,316	[2] 14,645	[2] 16,951
Of which:									
Machinery and equipment	927	960	1,282	1,739	2,334	4,593	[3] 5,074	[3] 5,114	[3] 5,969
Of which:									
Transportation	110	103	62	56	94	456	304	230	243
Chemicals	90	150	272	324	339	503	1,084	1,853	1,938
Oil and oilfield	8	24	15	4	6	138	175	110	NA
Motor vehicle manufacturing	224	665	659	141	393	346	260	233	123
Rolled ferrous metals	279	366	489	880	1,892	2,565	2,251	1,750	2,480
Of which:									
Pipe	168	219	251	428	655	1,509	[3] 1,165	[3] 801	[3] 1,269
Nonferrous metals	44	28	33	40	78	113	128	8	74
Chemicals	209	213	257	278	710	742	632	617	831
Of which:									
Plastics	61	63	86	95	337	242	181	183	272
Rubber and rubber products	144	102	85	140	293	217	216	175	187
Textile and textile raw materials	246	239	214	439	507	390	434	535	588
Food	280	405	981	1,841	1,001	3,319	3,401	2,412	3,175
Of which:									
Grain	101	185	770	1,423	509	2,323	2,627	1,354	2,360
Other consumer goods	260	250	235	194	261	436	428	429	340

[1] Vneshnaya torgovlya SSSR, 1970-78.

[2] Includes $420,000,000 in imports in 1976, $888,000,000 in imports in 1977, and $286,000,000 in imports in 1978, which the U.S.S.R. reported, via footnotes as imports associated with the Orenburg natural gas pipeline. These imports consist largely of large diameter pipe and equipment for the Orenburg natural gas pipeline.

[3] Excluding imports associated with Orenburg.

(PART B)

U.S.S.R.: SELECTED HARD CURRENCY IMPORTS IN CONSTANT DOLLARS

[In millions of U.S. 1975 dollars]

	1971	1972	1973	1974	1975	1976	1977
Machinery and equipment[1]	1,611	1,959	2,302	2,759	4,593	4,994	4,807
Rolled ferrous metals (excluding pipe)[2]	230	345	628	1,156	1,056	1,234	978
Pipe[2]	684	697	1,157	1,190	1,509	1,713	2,177
Chemicals[2]	343	410	421	825	742	607	561
Plastics[2]	115	156	167	392	242	175	173
Rubber[2]	157	152	172	210	217	143	110
Textiles[2]	419	369	364	399	390	314	376
Grain[2]	451	2,264	2,952	1,082	2,323	3,219	1,781
Other food[2]	440	370	470	416	996	782	1,096
Total of listed categories	4,450	6,722	8,600	8,069	12,068	13,181	11,056

[1] U.N. unit value indicies for SITC 7 used to depate corresponding dollar values for 1971–76; price rise for 1977 estimated.
[2] Price indices based on official Soviet price and quantity data.
[3] Price index imputed from various trade journals and OECD publications.

Appendix H

(Part A)

U.S.S.R.: SELECTED HARD CURRENCY EXPORTS IN CURRENT DOLLARS[1]

[In millions of US. dollars]

Description	1971	1972	1973	1974	1975	1976	1977	1978
Total	2,630	2,801	4,790	7,470	7,835	9,721	11,345	13,157
Of which:								
Machinery and equipment	184	225	299	340	561	657	797	1,209
Petroleum and petroleum products	567	556	1,248	2,548	3,176	4,514	5,275	5,716
Coal and coke	124	230	134	251	390	368	357	293
Natural gas	20	23	23	86	209	347	566	1,063
Ferrous and nonferrous metals[2]	252	273	455	569	412	459	174	126
Wood and wood products	360	403	709	1,002	712	852	1,029	975
Of which:								
Lumber	147	169	262	407	262	400	437	403
Cotton fiber	81	165	221	355	298	392	514	344
Unspecified:[3]								
Of which:								
Diamonds	257	371	515	545	478	511	606	NA
Platinum	95	187	296	372	201	187	181	230
Nickel	69	35	62	106	53	46	43	85

[1] Vneshnaya torgovlya SSSR, 1970–78.
[2] Excluding exports of platinum, platinum group metals and nickel.
[3] Data on exports of diamonds, platinum, platinum group metals, and nickel approximated from Western trade statistics.

(PART B)

U.S.S.R.: SELECTED HARD CURRENCY EXPORTS IN CONSTANT DOLLARS

[In millions of 1975 U.S. dollars]

	1971	1972	1973	1974	1975	1976	1977
Machinery and equipment[1]	309	344	396	402	561	647	637
Oil and oil products[2]	2,984	2,647	3,284	2,498	3,176	4,030	4,446
Coal and coke[2]	376	387	406	433	390	368	398
Natural gas[2]	67	100	100	165	209	330	432
Logs and other wood products (excluding lumber)[2]	426	459	508	483	450	497	506
Lumber[2]	282	331	369	275	262	385	330
Cotton fiber[2]	131	222	287	255	298	373	350
Ferrous and nonferrous metals[2]	570	678	813	851	666	640	340
Diamonds[3]	435	598	620	545	487	489	500
Total of listed categories	5,580	5,766	6,782	5,907	6,499	7,759	7,939

[1] U.N. unit value indices for SITC 7 used to deflate corresponding dollar values for 1971–76; price rise for 1977 estimated.
[2] Indicies based on official Soviet trade data.
[3] Price series calculated from various trade journals and OECD publications.

APPENDIX I

U.S.S.R.: EQUIPMENT ORDERS PLACED WITH MULTILATERAL TRADING PARTNERS[1]

Year	Value (Millions of U.S. dollars)	Percentage change
1970	500	----
1971	850	70
1972	1,700	100
1973	2,600	53
1974	4,300	65
1975	4,650	8
1976[2]	6,000	29
1977	3,807	−37
1978	2,789	−27

[1] Data on Soviet orders are collected from a variety of sources including trade journals and Western newspapers.
[2] The value for 1976 includes roughly $1,000,000,000 in orders for Western equipment destined for the Orenburg pipeline project. Since these orders represent a Soviet obligation and have since been reflected in Soviet trade statistics, they are included in order series.

ENERGY AND GRAIN IN SOVIET HARD CURRENCY TRADE

(By Daniel L. Bond and Herbert S. Levine*)

CONTENTS

*The authors, D. L. Bond, SRI International and H. S. Levine, University of Pennsylvania and SRI International, are indebted to Linda Fulponi, Vladimir Kontorovich, and Everett Rutan for their invaluable assistance; to SRI International and Wharton Econometric Forecasting Associates for their research support, and to Robert Campbell and Leslie Dienes for their advice on Soviet energy matters.

This paper draws upon and is an extension of two previous SRI International studies done by the authors: H. S. Levine and D. L. Bond. "Soviet Responses to Hard Currency Problems," SRI International, TN–CEPR–5814–1, 1977; and "Hard Currency Implications of Soviet Grain and Oil Problems," SRI International, TN–CEPR–5814–2, 1978.

I. Introduction

In recent years, most Western analyses of the prospects for Soviet economic growth have stressed the problems of diminishing growth of factor productivity, decreasing growth of the able bodied population, decreasing growth of energy production, and the high cost, slow growth, and unreliability of agricultural output. These problems, it is argued, will make it difficult to fulfill Soviet objectives of achieving a steady increase in overall economic strength, military capability, and consumer welfare.

Among the various policies that Soviet leaders and planners have directed toward these problems, a prominent role has been given to hard currency purchases of advanced machinery and technology from the developed industrial nations.

Energy and grain play a dual role in these relationships. They contribute directly to economic growth (especially energy), and to growth in consumer welfare (grain in itself and as an input into livestock and meat production). And they are also major elements in Soviet hard currency trade. Energy (oil and gas) is currently a major export item, accounting for approximately half of Soviet hard currency earnings; while grain has been a major hard currency import.

It is the dual role and the effects of energy and grain on Soviet hard currency trade that form the focus of this paper. The SRI-Wharton Soviet Econometric Model (SOVMOD) is used, with several different estimates of future Soviet oil production and an estimate of future grain imports, to calculate alternate projections of Soviet hard currency trade and financial balances to the year 1990. The paper begins with a brief description of SOVMOD. Special attention is given to the newly developed energy component, and the agriculture and foreign trade sectors. In the next section of the paper, four scenarios involving four different estimates of Soviet oil production are described. In the concluding section, the scenario results, some observations about the hard currency trade problems that the Soviets may face in the 1980's, and the policies they may pursue are presented.

II. SOVMOD

Created by a joint effort of SRI International and Wharton Econometric Forecasting Associates, Inc., the SRI-Wharton Econometric Model of the Soviet Union (SOVMOD) represents one of the first attempts by Western analysts to model a command economy.[1] It is the first maintained macroeconomic model of the U.S.S.R. It was developed over a 3-year period, beginning in mid-1973, and has been refined through subsequent years of further development, testing, and applications studies. The current version (SOVMOD IIIC) is composed of approximately 250 equations (excluding the input-output block of the Model, which is coded separately). Two-thirds of these equations are used to forecast levels of economic activity, and the remaining third are mostly identities which complete the economic ac-

[1] For an extensive description and discussion of an earlier version of the Model, see Donald W. Green and Christopher I. Higgins, "SOVMOD I," Academic Press, New York, 1977. For the current exact specifications of SOVMOD see D. W. Green et al., "The SRI–WEFA Soviet Econometric Model: Phase Three Documentation," volumes I and II, SRI International Technical Note SEC-TN-2970-5 & 6, 1976. See also D. W. Green et al., "An Evaluation of the 10th Five-Year Plan Using the SRI–WEFA Econometric Model of the Soviet Union," in U.S. Congress, Joint Economic Committee, "Soviet Economy in a New Perspective," U.S. Government Printing Office, Washington, D.C., 1976, pp. 301–331.

counting framework. The Model also includes about 60 exogenous variables used in model simulations to introduce world economic conditions and prices, and Soviet policy decisions in areas such as financing of investment, defense and other budget expenditures. The databank upon which the Model is estimated contains over 1,200 variables; 500 of these variables are used directly. In addition, time series of 17 sector input-output accounts, starting in 1959, have been estimated. (A simplified diagram of the relationships among major blocks of equations in the Model is presented in figure 1).

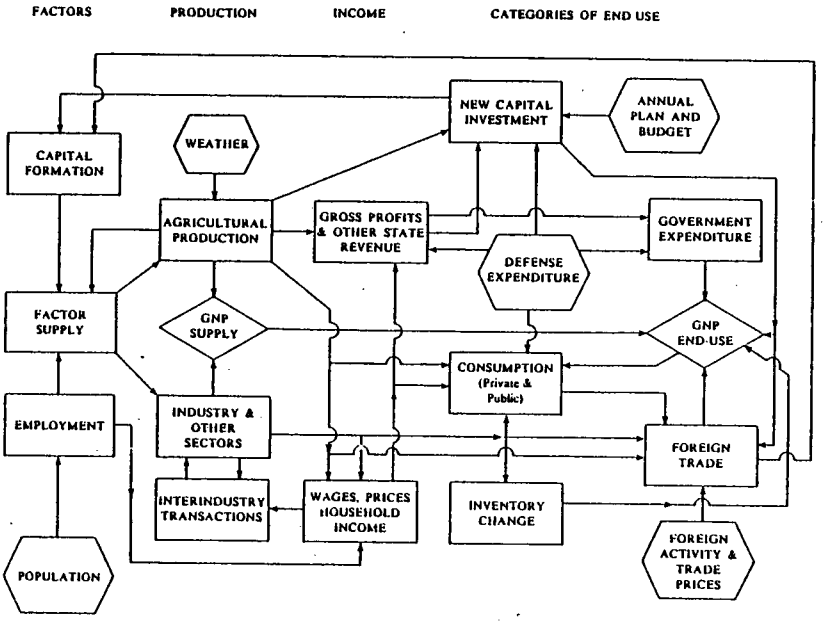


Figure 1

The Structure of SOVMOD IIIC

Theoretical analysis of the Soviet centrally planned economy considers the supply (production) side as dominant in contrast with the emphasis on demand factors in the analysis of Western market economies. Thus, broadly speaking, the direction of major causality in the Model runs from fully employed inputs (capital and labor) through the production process to final uses. The sequence is: first, the supply of labor to sectors of the economy is determined along with the allocation of investment. Then the labor inputs and capital stocks (created by accumulated investment) are combined in production functions to estimate the output of each economic sector. For agriculture, selected weather variables are added. For some industrial sectors, imported equipment is separated from domestically produced equipment. Various methods for using the input-output component in Model calculations have been and are being developed.

In determining GNP from the production side, there are presently six sectors of origin with industry disaggregated into 13 branches:

Aggregate industry (energy, mining, and manufacturing):
- Electrical and thermal power.
- Coal and coal products.
- Oil and petroleum products.
- Gas.
- Ferrous metallurgy.
- Nonferrous metallurgy.
- Chemicals and petrochemicals.
- Machine building and metalworking.
- Forestry products.
- Paper and pulp.
- Construction materials.
- Soft goods and apparel.
- Processed foods.

Agriculture:
- Crops.
- Livestock.

Construction.
Transportation and communications.
Domestic trade.
Government and services.

From the end-use side of the national accounts, the Model includes capital investment corresponding to each sector of production, one category of capital repair and two categories of inventories (domestic trade and nonagricultural). Also, State budget expenditures for financing the national economy, social and cultural expenditures, administration, and defense are included. Finally, given the determination of GNP from the sectoral output and the determination of the above categories of final demand, aggregate consumption can be determined as a residual. Alternatively there is an option for calculating aggregate personal consumption as a behavioral relationship with income as the major explanatory variable (but with explicit supply constraints). Personal consumption is further divided into categories for consumer durables, services, food, and other softgoods.

The Model is also used to calculate income accounts. Nominal annual wages are determined for seven sectors of employment. Total household income includes: money wage income, agricultural income in-kind, and State transfer payments; nonhousehold income is divided into gross profits and depreciation payments in State and collective organizations and into four revenue categories in the State budget.

For the purposes of the present paper, three particular components of or supplements to the Model are of particular importance; namely, those concerning energy demand, agriculture, and foreign trade. A discussion of these follows.

Energy Demand [1a]

The major innovation in this paper in the use of SOVMOD for analytical purposes is the attempt to endogenize projections of energy consumption within the Model. In order to accomplish this, an energy and fuel consumption model was developed and designed to run in conjunction with SOVMOD. A diagram of the major variables and their interrelations, found in this component of the Model, is provided in figure 2.

[1a] For a detailed description of the Energy component of SOVMOD, see D. Bond, "Modeling the Energy and Fuel Sectors in SOVMOD." SRI Technical Note SSC–TN–5943–5, October 1978.

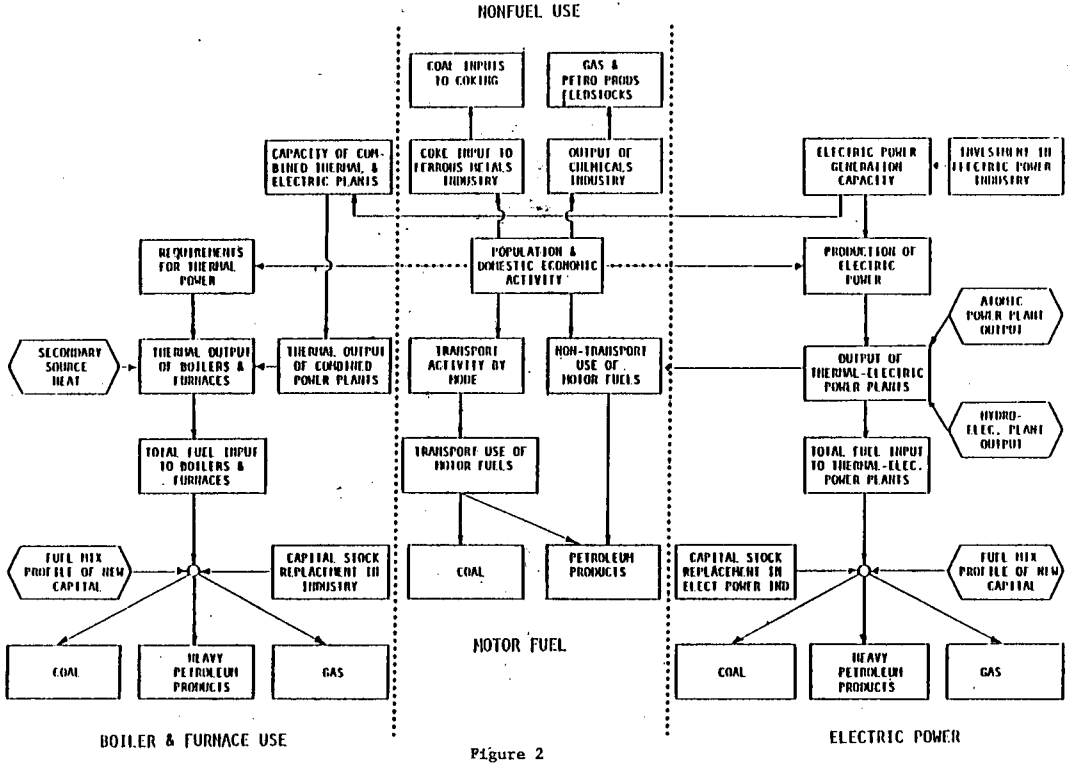


Figure 2

A SIMPLIFIED DIAGRAM OF

THE ENERGY & FUEL CONSUMPTION SECTOR IN SOVMOD III

The determination of fuel demands is made in two stages. First, energy demands are forecast on the basis of production and population levels generated in SOVMOD. Three major classes of energy demand are identified: (1) Electrical power; (2) thermal energy; and (3) direct motor power. Not only are these energy forms distinguishable by the nature of their use, but each can be associated with particular types of equipment needed for their generation. The technical characteristics of this equipment determine both the type of fuels required to generate this energy, and the degree of fuel substitutability that is possible.

There are possibilities for substitution to occur among the various energy types. Electric motors can replace gasoline driven motors, and electric heat can replace boiler and furnace heat [2] in industrial processes and home heating. No attempt, however, is made to explicitly model such substitutions. These changes normally occur very gradually, and any major shifts that are already underway are probably captured in our equations since most have included in them either a time trend variable or some other variable which changes monotonically with time. It is also felt that most Soviet efforts aimed at changing fuel use patterns will be focused on interfuel substitution within each form of energy production, and not at major changes in the forms of energy use themselves.

In the second step referred to above, the issue of fuel substitution is addressed. The major places where substitution among fuels of any significant degree can occur are in the electric powerplants and in boiler and furnace use. Over the past 15–20 years, there have been significant shifts in the fuel mix at these points, and together these uses make up over 70 percent of domestic fuel consumption. It is assumed that direct motor power will continue to be based on the use of light petroleum products.

In modeling interfuel substitution, the so-called "putty-clay" model of input requirements has been adopted. That is, we assume that fuel input requirements of capital stock already in use will not change significantly, and that the fuel mix observed in any given year (which when expressed in terms of shares of total fuel use, are referred to as "average" fuel mix coefficients) is a weighted average of the fuel input requirements of the various vintages of capital stock still in use (where the weights are the shares of each vintage in total capital stock). Faced with changing scarcities of fuels it is expected that there will be an attempt to replace the scarcer fuels with the less scarce. But this can be accomplished only by the introduction of new equipment designed for this purpose, the "vintage" coefficients of which reflect a mix of fuels more economical in terms of the changing conditions of fuel supply. We have not attempted to endogenously determine fuel mix characteristics of new capital stock; it was felt that this required special outside analysis. This information is then introduced as assumptions when making projections.

Demand equations for electric power are provided in the model for each of the major sectors of the economy—industry, agriculture, trans-

[2] Boiler heat is medium- and low-temperature heat for industrial processing or home and communal needs, which is generated in boilers and transmitted in the form of steam and hot water. Furnace heat is high-temperature (greater than 400–600° C.) heat produced in industrial furnaces primarily for processing of ferrous metals and construction materials.

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portation, construction, and urban municipal and household use—and transmission losses. The explanatory variables chosen for the productive sectors represent measures of output, capital intensity of the sector, and an electric power supply constraint. It was expected that electric power use per unit of output (or per capita) would be directly related to the degree of mechanization of the sector, as represented by capital stock to output ratios. Although time series data on electric power use by branch of industry are not available, it was still possible to capture, in the specification for total industry, the impact of differing requirements across individual branches by weighting branch output by 1970 ratios of electric power use to value of output, which are available in Soviet sources.

Output of electrical power is demand determined in the model. That is, total output is calculated as the sum of uses as determined by the above six demand equations, plus exports of electricity. Since four of these equations contain a supply constraint (in the form of the ratio of electric power output to production capacity—with a negative coefficient for this variable), generation capacity of power stations is a determinant of both supply and demand. For the model this information is given in the form of separate variables for electric power generating capacity of thermal-, hydro-, and atomic-powered stations. Since only output of thermal-powered stations is used in determining hydrocarbon fuel requirements for producing electricity, equations are provided for linking the output of the other two types of stations to their exogenously given capacities. Total capacity being a function of capital stock, the capacity of thermal-power stations is given as a residual value. Likewise, output of thermal stations is found as a residual after hydro- and atomic-power station output is subtracted from total electric power demand.

Total hydrocarbon fuel requirements (in standard fuel equivalency units [2a]) for electric power production in thermal-electric plants is determined on a per unit output basis. Because efficiency in generation has changed over time, a log time trend is used to estimate the rate of technological improvement. Another factor which has contributed to increasing fuel efficiency has been the shift from coal to oil and gas. The use of standard fuel equivalency units, as defined in Soviet sources, leads to error since the conversion rate used for coal is too high. In order to correct for both real efficiency differences between coal and other fuels and the statistical bias of Soviet figures, a correction term was added to the fuel requirement equation.

In determining the fuel mix used in electric powerplants we have followed the procedure outlined above; that is, fuel mix is determined by the requirements of the various vintages of capital stock in use at a given time.

Two classes of thermal energy use are distinguished in Soviet statistics and have been used in the energy component: Boiler heat and furnace heat. Demand for boiler heat is forecast on the ratios of thermal energy use to industrial output and urban population, and transmission loss to total output, which are fitted to log time trends. Furnace heat use is forecast using fixed 1970 ratios of thermal power use to output of the ferrous metals and construction materials sectors.

[2a] For a definition of Standard Fuel Equivalency (SFE) units, see notes to appendix table A–3.

The two primary sources of low- and medium-temperature thermal energy are from cogeneration with electrical power in the so-called TET's (*teploelektrotsentral*) electric powerplants and from industrial and municipal boilers. There is also some secondary heat recovery which should also be included as a source. In the model, production of thermal power in the TET's is calculated as a function of their generating capacity, and secondary recovery is an exogenous variable. Output of boilers is then determined as a residual supply.

Since fuel requirements for the TET's are already included in the electric power equations, it is necessary only to calculate the needs for boilers and furnaces. Fuel mix equations for boiler and furnace use are specified in the same manner as for electric powerplants.

Four categories of motor fuel use are identified in the model: (1) automobile use; (2) other transportation sector use of light petroleum products; (3) transportation sector use of coal; and (4) nontransportation sector use of light petroleum products. The specifications employed are very simple since the data available are limited.

The primary nonfuel uses of hydrocarbons are for coke required in the metallurgy industry, and oil and gas feedstocks in the chemical industry. These nonfuel uses were related to output measures of the corresponding sectors. The breakdown of total petrochemical feedstocks into its gas, light, and heavy petroleum components is determined exogenously, with the aggregate value to be used as a control total.

Since all the measures of fuel use considered above are calculated in terms of standard fuel equivalency units, and in most cases, on the basis of data for actual use—that is, excluding losses and internal consumption—a set of identities is provided in the model to convert these values into their respective gross, natural unit values (million metric tons for oil and coal and billion cubic meters for gas).

Agriculture

A full discussion of the agricultural sector of SOVMOD is provided by its principal architect, Donald W. Green, in a separate article in this volume. Therefore, only a brief description will be given here.

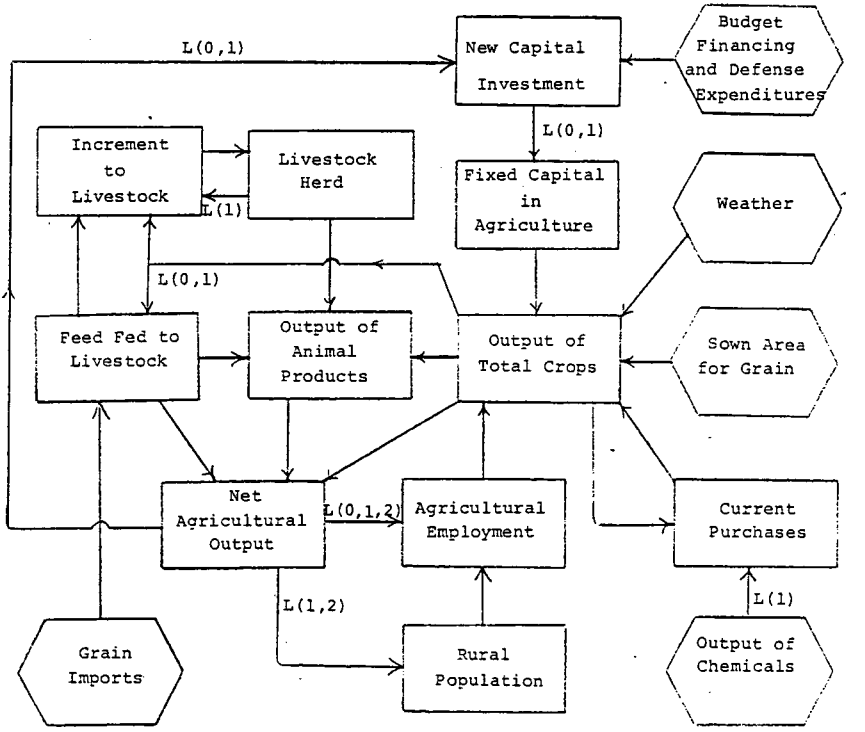
A simplified flow diagram of the agricultural sector is presented in figure 3. Agricultural output is divided into crops and animal products (with further disaggregations into grain and meat, not shown in the diagram). Crop output is determined through a two-step procedure (discussed further below) as a function first of labor, capital, sown acreage, and current purchases; and then of weather. The output of animal products is a function of crop production, feed fed to livestock, and the livestock herd. Two systems of simultaneity are indicated: (1) The interdependence of total agricultural output, current purchases from other sectors, capital stock (through current investment which, in the Model, is affected by agricultural output), and agricultural employment (through rural population and participation rates); and (2) the relationship of the livestock herd and feed fed to livestock in the determination of animal product output and growth of the livestock herd.

The estimation of the agricultural production functions, particularly for the Soviet Union, has often proved troublesome, because of

Figure 3

THE AGRICULTURAL SECTOR IN SOVMOD III

Links are simultaneous unless denoted by the lag operator: L(1,2) indicates a one and two-year lag. Hexagons indicate exogenous variables.



the high correlation in the variation of output and labor in response to the variation in weather. That is, when weather is good, not only is output higher, but more labor services are actually employed in producing the higher crop. This can lead to the calculation of implausibly high output elasticities for labor. In order to avoid this problem in the construction of SOVMOD, a two-step procedure has been employed: (1) an adjusted linked peak series was used to represent "normal" output, determined by labor, capital, sown acreage, and purchases from other sectors; and (2) actual output was estimated as deviations from normal explained by variations in weather (spring-summer precipitation, and winter temperature and precipitation).

In the estimated equations for agricultural output, an interesting pattern of relationships and compensations is observed in the livestock sector. A deficiency in crop output results in an increase in meat production through increased slaughtering. There is, however, a counteracting effect on aggregate agricultural output, from a reduc-

tion in other animal related output, particularly dairy production.

Further, it is worth noting that in the block of equations on labor and capital supply, there is a significant negative effect on agricultural machinery investment from the previous year's harvest and from defense procurement. The year following a disappointing harvest, there is an increase in machinery allocated to agriculture. And when defense procurement of durable items rises, there is a shift in agricultural investment away from machinery toward structures.

Foreign Trade

The foreign trade sector of SOVMOD is disaggregated along both regional and commodity lines. An important distinction made is that between trading relations with the socialist countries as opposed to hard currency trade with the rest of the world. In each category there are two divisions: In the first are included the CMEA trade partners and the "Other Socialist Countries" (Yugoslavia, Cuba, China, Vietnam, and North Korea); in the second the "developed West" and the "Less Developed Countries." The major commodity groups incorporated in the model are: (1) Raw materials and semifabricates (with fuel exports to the West being separately identified); (2) machinery and equipment (with separate treatment of imports of Western metalworking, mining and petroleum, and chemical equipment); and (3) consumption goods (with food imports separate from manufactured consumer goods imports, and both imports and exports of grain identified).

A simplified diagram of the major relationships among variables in the trade sector is provided in figure 4. Domestic and foreign activity variables, and foreign trade prices (CMEA and world) appear in almost all equations. Soviet harvest conditions were found to be significant in equations for food and grain trade with the CMEA and the West. However the fit was poor in the equations for imports of grain from the West (largely reflecting the inconstancy of Soviet policy in this area) so in model simulations this variable is usually set at exogenously determined values.

In CMEA trade, export and import equations are linked in a way reflecting the tendency for bilateral balancing in these relations. The dominant direction of causality is the tying of Soviet imports to achieved levels of exports to CMEA trade partners. In trade with the West, the incorporation of hard currency balance variables is used to link imports and export activity. In particular, a relatively poor hard currency position tends to restrain Soviet imports from the West and is a stimulus to exports. Two indicators of this type are used: one, the difference between Soviet outstanding hard currency debt and holdings; the other, the difference between the actual debt-service ratio and a "target" debt-service ratio.[3] This latter variable serves to represent changing levels of indebtedness that the Soviet leadership is assumed willing to undertake (or that the West is assumed willing to support). For estimation purposes this variable was set at a constant level for the period 1960–67, followed by a gradual rise from 1968

[3] The debt service ratio is defined as the ratio of Soviet payments of interest and principal on hard currency debt divided by the value of Soviet exports to the West.

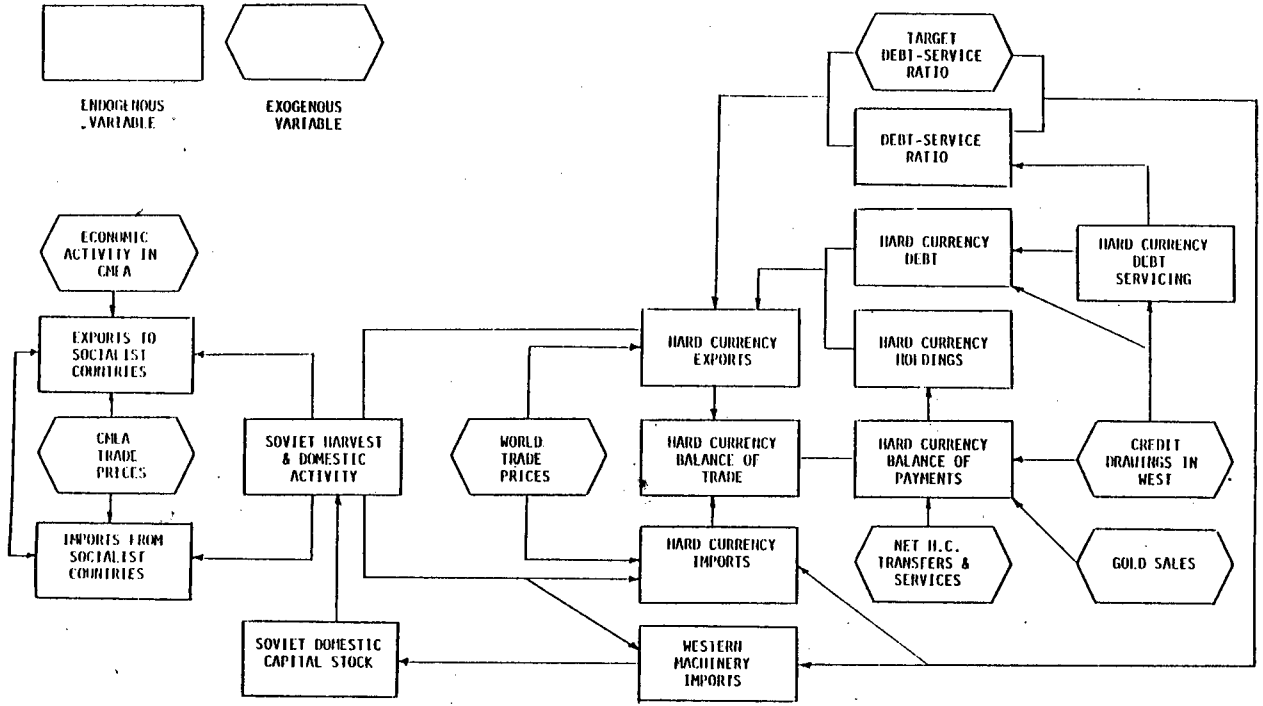


Figure 4

A SIMPLIFIED DIAGRAM OF

THE FOREIGN TRADE SECTOR IN SOVMOD IIIC

to 1971, and then again held constant. In projections, this target is a handle for the analyst to use in studying possible shifts in Soviet foreign trade policy.

The Soviet hard currency balance includes exogenous variables for gold sales, the net balance of services and transfer, and credit drawings in the West (excluding short-term borrowing). Account is made of the necessary payments of interest and principal on these credit drawings, and these values then enter the liquidity balance.

Although a growing and strategic component of the Soviet economy, foreign trade still encompasses only a small portion of that economy. For this reason it is difficult to identify and quantify the impacts that it may have on the domestic economy. As yet, trade flows in SOVMOD are not directly tied into the domestic economy, that is, imports are not directly added to domestic availabilities, and exports are not directly subtracted from domestic availabilities. While, in principle, trade may serve as an avenue of escape from short-term bottlenecks and supply deficencies, in the Soviet Union, except for some major cases such as the role of grain imports in maintaining livestock herds after harvest failures, trade flows are not very significant in the macroeconomic level. Where imports do perhaps play a significant role for macroanalysis is in the stimulus they provide for technological progress in production. This is a most difficult relation to model, both in conceptual and empirical terms. In the development of SOVMOD, a method was devised for simulating some of the impacts from such a technology transfer. In brief, the methodology involved the calculation of a measure of the stock of imported machinery, the disaggregation of total capital into that of foreign and domestic origin, and the statistical estimation of the relative contribution of each part of the capital stock to output in various branches of Soviet industry. By incorporating this feature with the complete macromodel it is possible to estimate the direct and indirect impacts of machinery imported from the West.[4]

Use of an Econometric Model in Scenario Analysis

As we stated in our previous JEC paper,[5] it is important for the reader to be aware of the realities, the weaknesses and the strengths of the use of an econometric model in projective scenario analysis. First of all, the model itself is only one ingredient in the projection process. The elaboration of a model projection is an interactive process between the model and the analyst. Frequently, the skill and judgment of the analyst and the specialists, the analyst consults, are the most important factors in obtaining a valid projection. The model serves as a framework for superimposing regularities observed in the past upon the future while preserving a certain degree of consistency. The analyst

[4] A more detailed presentation and evaluation of this component of the model has been presented in two earlier papers: Donald W. Green and Herbert S. Levine, "Implications for Technology Transfer for the U.S.S.R." in NATO, Economic Directorate, *East-West Technological Cooperation* (Brussels: NATO, 1976); and D. W. Green and H. S. Levine, "Macroeconomic Evidence of the Value of Machinery Imports to the Soviet Union," in J. R. Thomas and U. M. Kruse-Vaucienne, *Soviet Science and Technology; Domestic and Foreign Perspectives* (National Science Foundation, Washington, D.C.; George Washington University, 1977), reprinted in *Survey*, spring 1977–78.

[5] D. W. Green, et al., "An Evaluation of the 10th Five Year Plan Using the SRI–WEFA Econometric Model of the Soviet Union," in Joint Economic Committee, *Soviet Economy in a New Perspective*, U.S. Government Printing Office, Washington, D.C., 1976, pp. 302–305.

must pass judgment on the reasonableness of the projection and thus must decide when past regularities should be relaxed and where additional assumptions and adjustments should be imposed upon the model solution. In this study, where alternative projections have been elaborated covering a 12-year period, a substantial number of assumptions have been made and adjustments imposed on the model solutions.

Second, excessive precision should not be attributed to the results of any econometric model projection. As just stated, any projection reflects, to a great extent, the judgment and insight of the analyst and not merely the mechanical, number-processing power and precision of the computer. Futhermore, all econometric model projections are subject to certain prediction errors which typically increase with the length of the projection.

The major strength in using an econometric model like SOVMOD in the type of analysis in this study is that the results reflect a comprehensive, integrated, internally consistent model of the Soviet economy rather than an analysis of a single sector or several sectors loosely related in aggregate terms. Since the Soviet Model is an interdependent system of technical and behavioral relations, the analysis is able to encompass, in quantitative terms, the indirect as well as the direct effects—the total system impact—of the various assumptions under consideration in the alternative scenario projections. Another benefit, given the particular issues being considered here, is the extensive detail of the foreign trade sector and the hard currency transactions found in SOVMOD.

III. The Scenarios

Pursuing the paper's objective of analyzing the hard currency trade and finance consequences of Soviet energy and agriculture problems, four scenarios were elaborated. The purpose of a scenario is to work out the implications of a set of assumptions under the conditions of past regularities and government policies being by and large retained.[6] Thus scenarios are not forecasts. If they project developments that are clearly unacceptable either to Soviet leaders and/or to other countries, this is an indication that changes in policies or some counteracting behavior are to be expected.

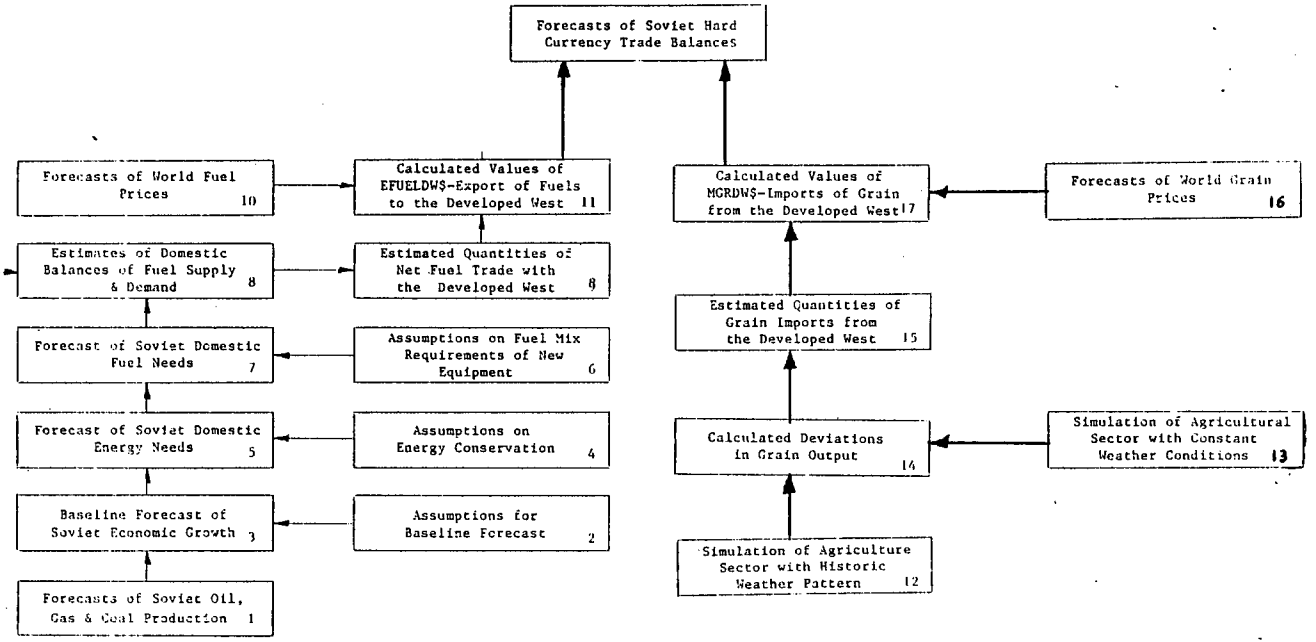
A schematic presentation of the scenario design is given in figure 5. In explaining how the scenarios were constructed, we will follow the numbered boxes in the diagram moving first from below, through the energy sector, and then through the agricultural sector to the analytical objective, "Forecast of Soviet Hard Currency Trade Balances."

Step 1.—In the last few years, there has been extensive controversy, in the West, about the future prospects for Soviet oil production. Four separate scenarios have been constructed reflecting a range of estimates, all of which are far below the official Soviet estimate. They have been derived from the work of different Western specialists on Soviet energy. The first forecast is from the 1977 CIA report on Soviet oil; of the two forecasts they provided, we have used the high

[6] Some adjustments were made in scenario simulations when they appeared warranted because of requirements of sectoral and behavioral consistency.

Figure 5

SCHEMATIC PRESENTATION OF SCENARIO DESIGN



one.[7] The second is from the Oil & Gas Journal. The third and fourth are the low and high forecasts given by Leslie Dienes in a recent study paper.

The scenarios are labeled A–D:

A—CIA high projection.
B—Oil & Gas Journal projection.
C—Dienes low projection.
D—Dienes high projection.

The oil forecasts are presented in table 1 (for a full series of data, see appendix table A–1).

TABLE 1.—FORECAST OF SOVIET OIL PRODUCTION

[In million metric tons]

	A	B	C	D
1975 (actual)	491	491	491	491
1980	590	600	605	605
1985	500	550	605	655
1990	500	550	605	710

Sources:
1. 1975 (actual): Ts.S.U., Narodnoe khoziaistvo SSR v. 1977, Moscow, 1978, p 148.
2. A (CIA high): CIA, Prospects for Soviet Oil Production, April 1977, p. 1. 1990 figure based on assumption of no growth in output from 1985 level.
3. B (Oil and Gas Journal): Oil and Gas Journal, Sept. 18, 1978. 1990 figure based on assumption of no growth in output from 1985 level.
4. C (Dienes low) and D (Dienes high): Leslie Dienes, "Soviet Energy Policy and the Hydrocarbons," Discussion Paper No. 2, in Association of American Geographers project on Soviet Natural Resources in the World Economy, April 1978, p. 44.

Since the main controversy among specialists on Soviet energy concerns oil and not gas and coal, we have used only one estimate for projected output of gas and coal. These are given in table 2.[8] (For a full series, see app. table A–1.)

The rather substantial projected rate of growth of gas output (7.5 percent per year in the period 1975–80, and 6.1 percent per year in the 1980's) has a significant effect on the output growth of petroleum products (oil and gas) compared with oil alone (see fig. 6). This is of some importance in our study because of the increasing role of gas as a Soviet hard currency export.[9]

TABLE 2.—FORECAST OF SOVIET GAS AND COAL PRODUCTION

	Gas (billion cubic meters)	Coal (million metric tons)
1975 (actual)	289	701
1980	415	790
1985	605	880
1990	750	980

Sources:
1. 1975 (actual): Narodnoe khoziaistvo v. 1977, p. 149.
2. 1980–90: Dienes, 1978 (see sources to table 1).

[7] For citations, see the sources to table 1.
[8] For purposes of the energy model, standard fuel equivalency units are used, but in tables 1 and 2 the data are given in commonly used units of metric tons and cubic meters.
[9] See, for example, Oil and Gas Journal, Oct. 16, 1978; and CIA (NFAC), *U.S.S.R. Development of the Gas Industry*, July 1978.

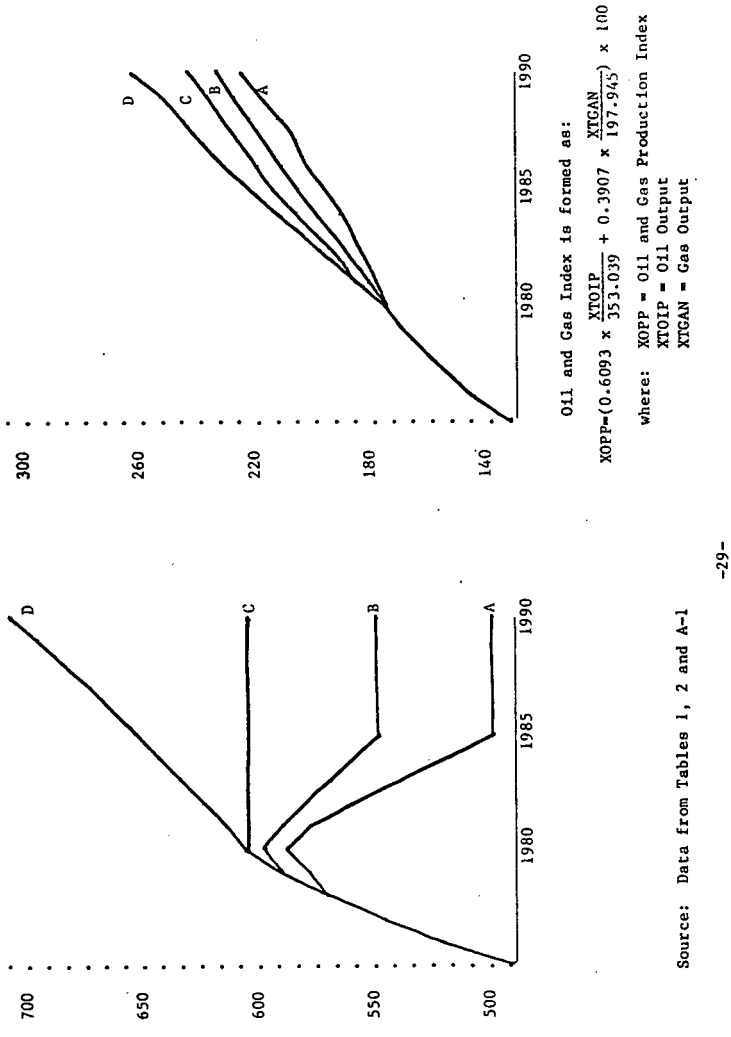


Figure 6

STEPS 2–7.—In steps 2 and 3, a baseline projection was developed for Soviet industry which allows for steady growth in industrial output with no critical bottlenecks. (See app. table A–2.) The values of the major industrial variables in this projection provide the activity information used by the energy sector model to calculate domestic energy and (specific) fuel needs (steps 4–7). Thus, the principle used to define energy neeeds was the energy required to maintain steady industrial growth. The energy model equations embody the assumptions on conservation, and on the fuel mix requirements of new equipment (see discussion of energy model, above). The energy model's projection of Soviet domestic fuel requirements is given in table 3 (for a full series, see app. table A–3).

TABLE 3.—SOVIET DOMESTIC FUEL REQUIREMENTS

	Oil (million metric tons)	Gas (billion cubic meters)	Coal (million metric tons)	Total (million tons SFE [1])
1975	369	279	668	1,328
1980	476	348	667	1,563
1985	532	434	716	1,780
1990	573	527	796	2,005

[1] Standard fuel equivalency units.

Sources:
1. 1975: R.W. Campbell, Soviet Energy Balances, Rand Corp., 1978.
2. 1980–90: Projection values from the energy model.

Steps 8 to 11.—In steps 8 to 11, the value of fuel exports to the developed countries (which cover almost all hard currency fuel exports) is calculated. In step 8, the projection of Soviet domestic fuel requirements are subtracted from the four forecasts of Soviet oil production and the forecasts of gas and coal production to yield the surpluses available for export or the shortfalls requiring imports. In step 9, assumed exports to Eastern Europe are subtracted from both surpluses and shortfalls to yield the quantity of exports to or imports from hard currency countries.[10] In steps 10 and 11, the traded quantities are multiplied by forecasts of world fuel prices, that the U.S.S.R. would receive or pay in trade outside of the CMEA, to yield the value of Soviet hard currency fuel exports or imports. It was decided to use forecasts of world fuel prices (made by experts in the field), and later in the scenario development, forecasts of world grain prices (see step 16), rather than employ constant prices, so as to be able to take account of uneven expected rates of price changes in the final calculation of projected Soviet hard currency trade and financial balances.

Combining the data on the alternative forecasts of fuel output and the fuel requirements from tables 1–3 with the assumptions on Soviet oil and gas exports to CMEA and the forecasts of world fuel prices yields the projections of Soviet oil, gas, and total fuel hard currency exports presented in table 4 (for full series of data on exports, assumptions, price forecasts and values of hard currency fuel exports see appendix, tables A–4 through A–8).

TABLE 4.—PROJECTED VALUES OF SOVIET HARD CURRENCY FUEL EXPORTS

[In millions of current dollars]

	Oil					Total fuel			
	A	B	C	D	Gas	A	B	C	D
1975	4,067	4,067	4,067	4,067	255	4,322	4,322	4,322	4,322
1980	6,468	7,938	8,673	8,673	1,202	7,670	9,140	9,875	9,875
1985	−20,196	−10,296	594	10,494	3,204	−16,992	−7,092	3,798	13,698
1990	−44,902	−29,202	−11,932	21,038	6,384	−38,518	−22,818	−5,548	27,422

Sources: Tables 1–3 and appendix tables A–4 through A–7.

[10] The assumption is made that Soviet oil exports to CMEA will level off at 70 million metric tons and remain at that level to 1990, and that gas exports to Eastern Europe will grow at an average rate of 6 percent per year. Some support for these assumptions can be found in: Edward A. Hewett, *The Soviet and East European Energy Crisis: Its Dimensions and Implications for East-West Trade*, University of Texas at Austin, Center for Energy Studies, Policy Study No. 2, 1978, Part III; CIA (NFAC), "U.S.S.R.: Development of the Gas Industry," July 1978; and "Oil and Gas Journal," Oct. 16, 1978.

Steps 12 to 17.—We now turn to the agriculture part of the study. It is common in model projections to impose the assumption of a constant weather pattern, be that pattern normal, good, or bad. This approach, however, misses some of the important behavioral relationships observable in Soviet agriculture, in particular the network of relationships among variations in grain output, feed fed to livestock, slaughterings and meat production, and size of livestock herds. Furthermore, the weakness of Soviet agriculture lies not so much in its lack of growth over the last 25 years (which has not been too bad), but in its lack of flexibility, its inability to cope with substantial changes in weather. This leads to sharp ups and downs in agricultural, especially grain, output, which in turn has a highly detrimental effect on the growth of meat output. This is a consequence of the network of relationships just mentioned. In the past, when the grain harvest was below expectations, there would be insufficient feed grain to support the planned growth of herds. In that year, slaughterings and meat production might be above plan, but this would reduce the livestock herd, which of course is the "capital stock" that produces an annual flow of meat output. This decrease in capital stock would take time to recoup, requiring a low level of meat output in the interim. In recent years, it is clear that meat has become a high-priority consumer good, in the eyes of the people and of the Government. The Soviet income elasticity for meat has been estimated by the FAO at close to 1.0, substantially above that of most other countries.[11] Thus, as money incomes rise, the demand for meat rises proportionally. Heavy slaughtering in the bad grain harvest year of 1975 was followed by decreased meat output in the two following years. Reflecting their concern about meat shortages. Soviet authorities raised the level of meat imports in 1977 by a substantial 70 percent over 1976 (617,000 tons compared to 361,000 tons) at an increased cost of 85 percent ($707 million compared to $383 million).[12]

Thus, weather variations and the resulting harvest variations are of great significance in the behavior of Soviet agriculture and of the Soviet Government. To capture these elements, it was decided to impose a variable weather pattern on the projection period. The weather pattern chosen was the actual one of the early to mid-1960's (based on the CIA study arguing that Soviet weather will in fact be returning to the less favorable patterns of the early sixties).[13] In step 12, SOVMOD was run with the variable weather pattern of 1962–68 imposed on the projection period 1979–90 (running from 1979 to 1985 and then starting over again in 1986 with the 1962 weather variables). In step 13, SOVMOD was run with constant normal weather and the results compared. Figures 7 and 8 illustrate the differences between the two. Grain output varies sharply and is for the most part below normal. But especially noteworthy is the impact on meat output. Its growth is substantially below what it would have been had weather been at a constant normal level.

Pursuing the analysis, the question was then asked what might be the pattern of Soviet grain imports, if the Soviet leaders wished to

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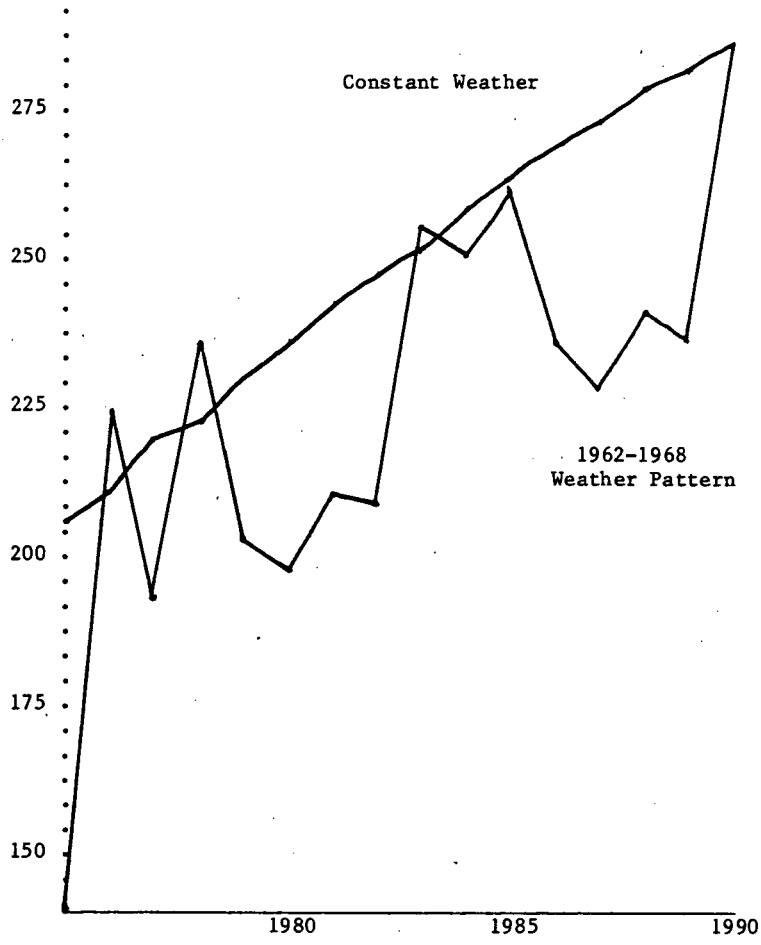
[11] See CIA (NFAC), *U.S.S.R.: Long-Term Outlook for Grain Imports*, January 1979, p. 5.
[12] Ministerstvo Vneshnei Torgovli. *Vneshniaia torgovlia S.S.S.R. v. 1977g*, Moscow 1978, p. 41.
[13] See CIA, *U.S.S.R.: The Impact of Recent Climate Change on Grain Production*, October 1976.

avoid the sharp shortfalls in meat production by bringing (through imports) domestic grain availabilities up to the level of projected normal grain output (which most likely approximates the Soviet plan since it incorporates not only the expectation of normal weather, but also a projection of past input and output relationships).[14] In steps 14

Figure 7

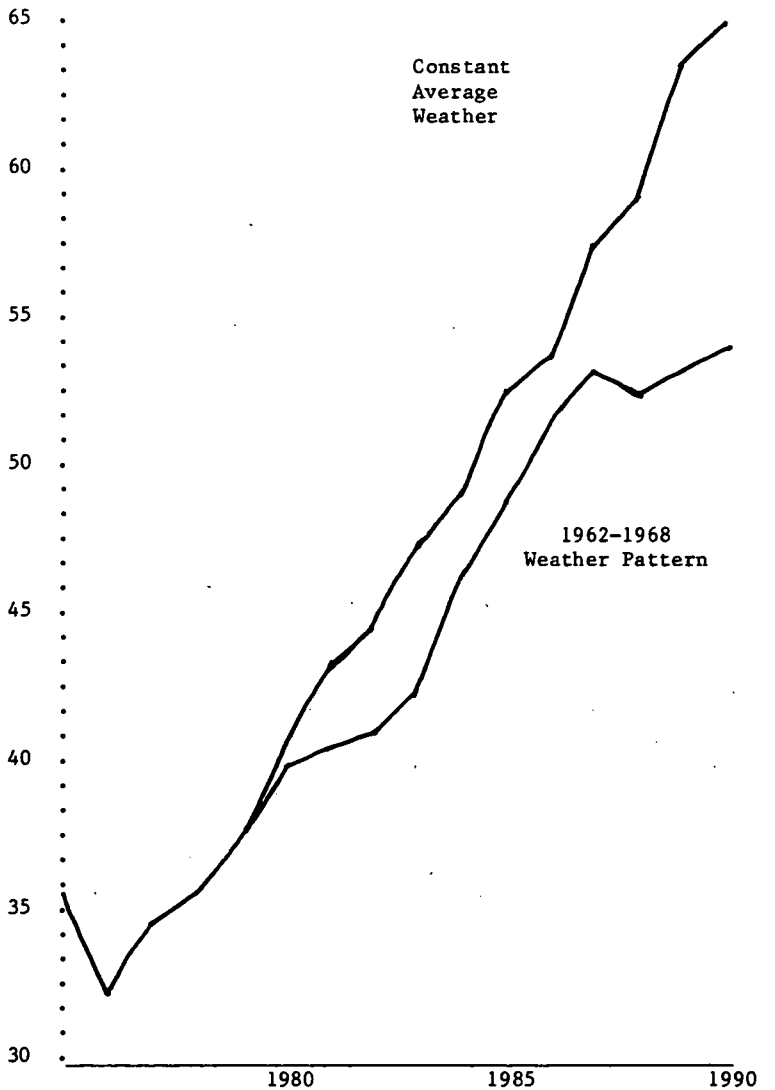


Grain Output (million metric tons)

Constant Average Weather vs. Variable 1962–1968 Weather Pattern

[14] It is, in this regard, interesting to observe that the "normal" grain output (from the SOVMOD baseline projection with constant average weather) in the period 1981–1985 averages 238 million metric tons which is the bottom of the range, 238–243 million metric tons by Brezhnev as the (preliminary) goal for the 11th 5-year plan (*Pravda*, July 4, 1978).

Figure 8



Meat Production (billions of 1970 rubles)
Constant Average Weather vs. Variable 1962–1968 Weather Pattern

and 15, a possible pattern of grain imports was calculated in the following way. The deviations between actual (variable weather) grain output and normal (constant weather) grain output were summed for the projection period 1979–90. It was assumed that on the order of

80 percent of the deficits would be covered by imports and (reflecting Soviet behavior) the imports would be smoothed rather than following the very variable pattern of the deviations. To complete the calculation, in steps 16 and 17, the grain imports in terms of tons were multiplied by a World Bank wheat and corn price forecast to derive the value of grain imports. And a generous 20 percent was allowed for possible Soviet soft currency purchases of grain, leaving a calculated series of Soviet hard currency imports of grain.

The data for all of these steps are presented in table 5.

The final step in the elaboration of the scenarios is to introduce the results of steps 11 and 17—the calculated values of fuel exports to the West and the calculated values of hard currency grain imports—into SOVMOD as exogenous values, run the Model and derive projections of Soviet hard currency trade balances.

TABLE 5.—ESTIMATION OF SOVIET GRAIN IMPORTS

	Million metric tons				Grain import price (current dollars per/ton)	Cost of grain imports (million current dollars)	Cost of hard currency imports (million current dollars)
	Normal grain output	Actual grain output	Grain deficit	Total grain imports			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1970	172	187	15	2.2	62.4	135	100
1971	176	181	5	3.5	61.3	214	157
1972	184	168	−16	15.5	57.2	887	770
1973	190	223	33	23.9	64.7	1,547	1,423
1974	200	196	−4	7.1	99.5	707	509
1975	206	140	−66	15.9	168.0	2,673	1,886
1976	212	224	12	20.6	143.8	2,968	2,343
Estimated:							
1977	219	193	−26	12.3	118	1,450	1,200
1978	223	236	13	21.4	140	3,000	2,800
Projected:							
1979	230	203	−27	15	165	2,475	1,980
1980	236	198	−38	16	193	3,088	2,470
1981	242	210	−32	17	208	3,536	2,829
1982	247	208	−39	17	222	3,774	3,019
1983	252	254	2	18	238	4,284	3,427
1984	258	250	−8	19	255	4,845	3,876
1985	263	262	−1	20	274	5,480	4,384
1986	267	236	−31	21	288	6,048	4,838
1987	272	228	−44	22	302	6,644	5,315
1988	277	240	−37	23	317	7,291	5,833
1989	281	236	−45	24	333	7,992	6,394
1990	285	286	1	25	350	8,750	7,000

Note: Actual values—Grain output from Soviet sources; grain imports from CIA (NFAC), Soviet Agricultural Commodity Trade, 1960–76: A Statistical Survey, September 1978, table 56.

Sources of estimated and forecast values:
Col. 1: Based on production function estimated from data for the period 1959–77 and forecast values of inputs to grain production.
Col. 2: Based on harvest deviation function estimated from data for the period 1962–76 and forecast using weather pattern of 1962–68 for 1979–90.
Col. 3: Col. 2 minus col. 1.
Col. 4: Smoothed estimate (assuming that 80 percent of col. 3 deficits for the forecast period would be covered).
Col. 5: Based on World Bank wheat and corn price forecasts.
Col. 6: Col. 4 times col. 5.
Col. 7: 80 percent of col. 6.

IV. Conclusions

In the actual elaboration of the scenarios, a number of adjustments in the model were made. Two of them warrant comment because of their direct bearing on the scenario results. First, in none of the scenarios was the value of machinery imports from the developed West

allowed to approach zero. It was argued that Soviet leaders would go to great lengths to keep the flow of machinery imports from the West at least above some minimum level due to their implications for economic growth and modernization. Furthermore, it was felt that some rough equivalence should be maintained between imports of industrial materials and imports of industrial machinery.

Second, in the original unadjusted runs of scenarios A–C, Soviet short- and long-term debt mounted precipitously, while at the same time the Soviet gold stock increased steadily. This was totally unrealistic, and so in those three scenarios, gold is sold off at a faster pace than gold production bringing the gold stock by 1990 down to levels of the midsixties.

Some of the major results of the four scenarios are indicated in figures 9–12. (More complete data on hard currency balances are given in appendix tables A–9.)

Scenarios A–C have disastrous implications for the Soviet economy. By 1985 the hard currency results in scenarios A and B are clearly unacceptable: large negative hard currency fuel exports (that is, imports), drastically low machinery imports from the developed West, very high hard currency trade deficits, and debt service ratios of 70 to 75 percent. Scenario C approaches these levels by the end of the decade. Thus, the scenarios where oil output falls to 500 to 550 million metric tons by the mideighties and the one where it levels off at 605 million metric tons through the eighties produce unaccepable results. What the analysis indicates in these scenarios is that if oil production follows these patterns, the Soviet leaders will have to seek counteracting policies.

One such policy could be to increase the intensity of the campaign to expand pipeline capacity to export Soviet gas to the West. Pipeline capacity is currently a constraint on gas exports. This would help in scenario C, but it would still fall far short in scenarios A and B.

The energy demand model, which indicated a growth of energy demand in the period 1980–90 of about 2.5 percent per year (1.9 percent for oil), was run on a baseline projection of the economy involving a growth of industry of over 4.5 percent per year, and of GNP of 4 percent. One likely consequence of the oil output patterns of these three scenarios would be substantially lower rates of economic growth. Another would be a cutback of oil exports to CMEA (which we assumed would remain constant through the 1980's), with the resulting political strains.

On the other hand, a rather interesting and somewhat unexpected result of the analysis is the very favorable hard currency effects for the Soviets in scenario D: not only growing fuel exports to the West, but also rapid increase in machinery imports, steady low hard currency trade deficits, and a debt service ratio that falls to 20 percent by 1990. What is indicated is that if the Soviets are able to maintain something on the order of 1.5 percent per year growth in oil production throughout the 1980's, they might not be in bad shape in regard to hard currency balances, despite substantial grain imports. And at least one Western specialist on Soviet energy implies that such growth of Soviet oil production is not totally out of the question.

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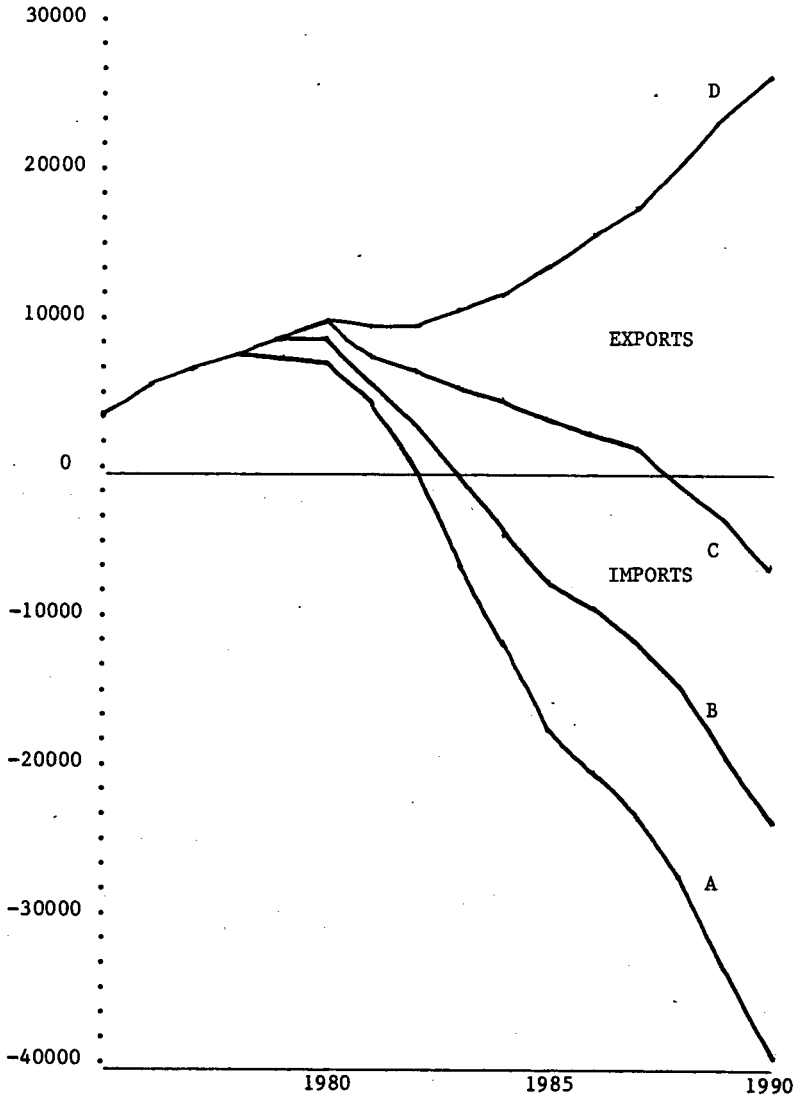
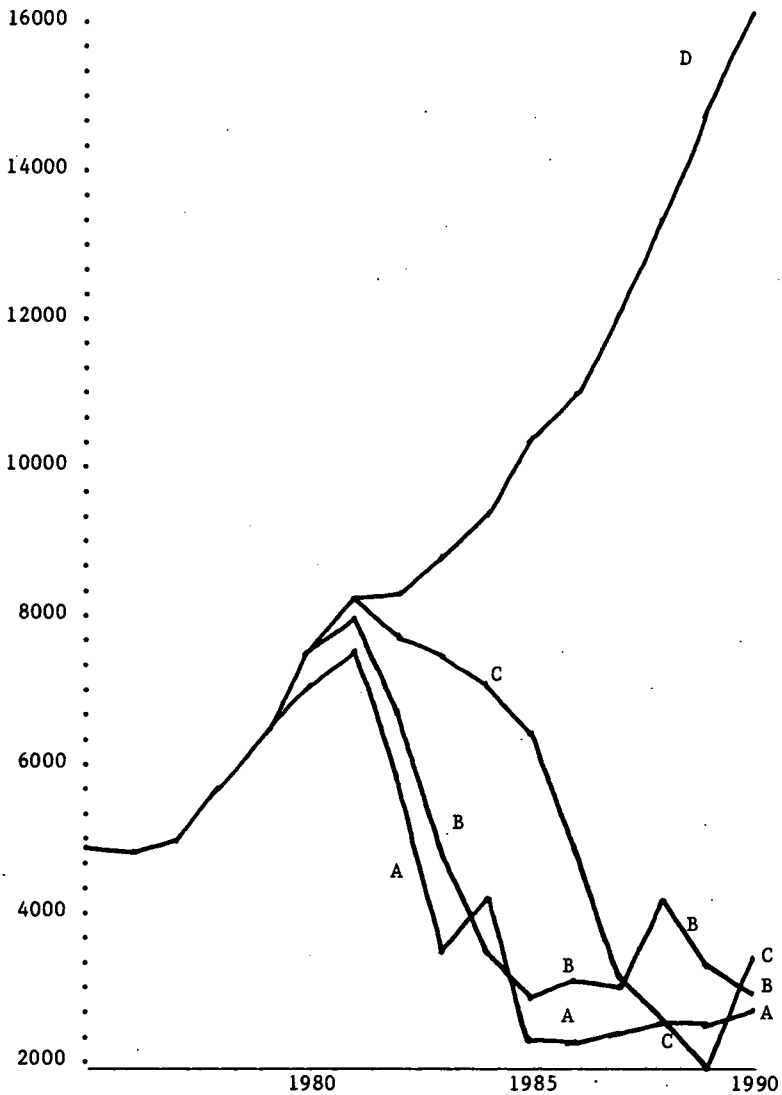
Figure 9



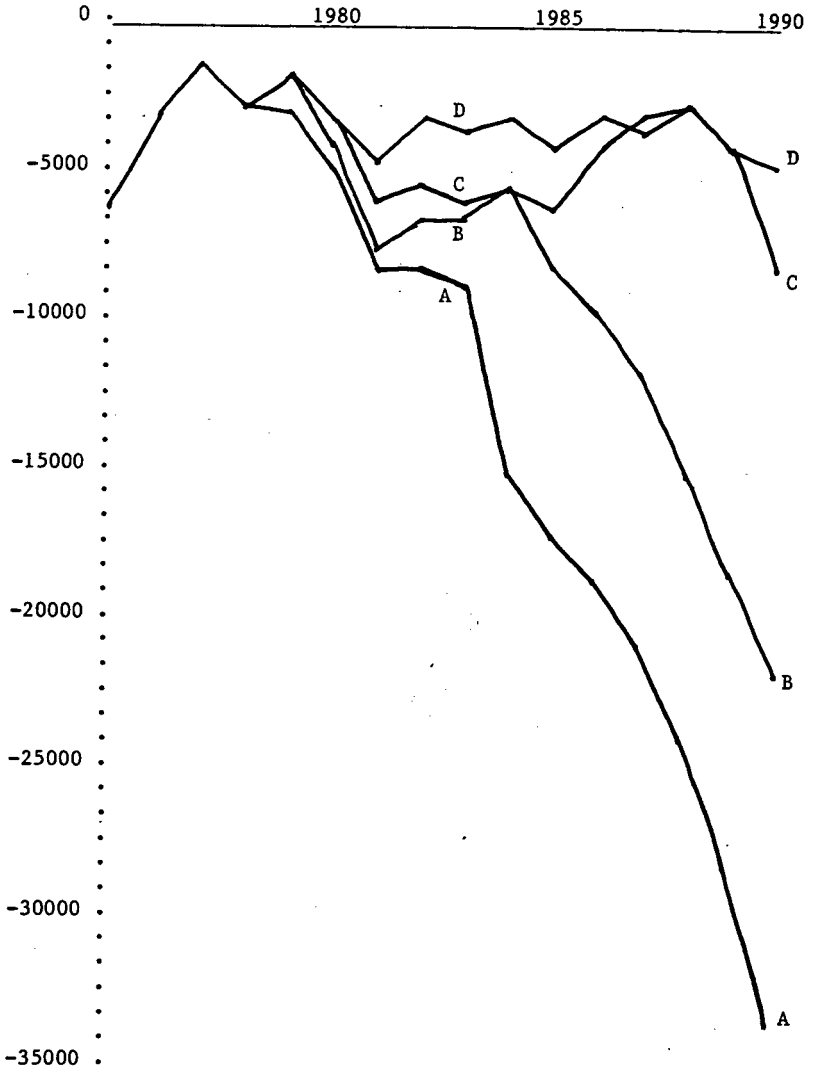
Exports of Fuel to the Developed West
(millions of current dollars)

Figure 10



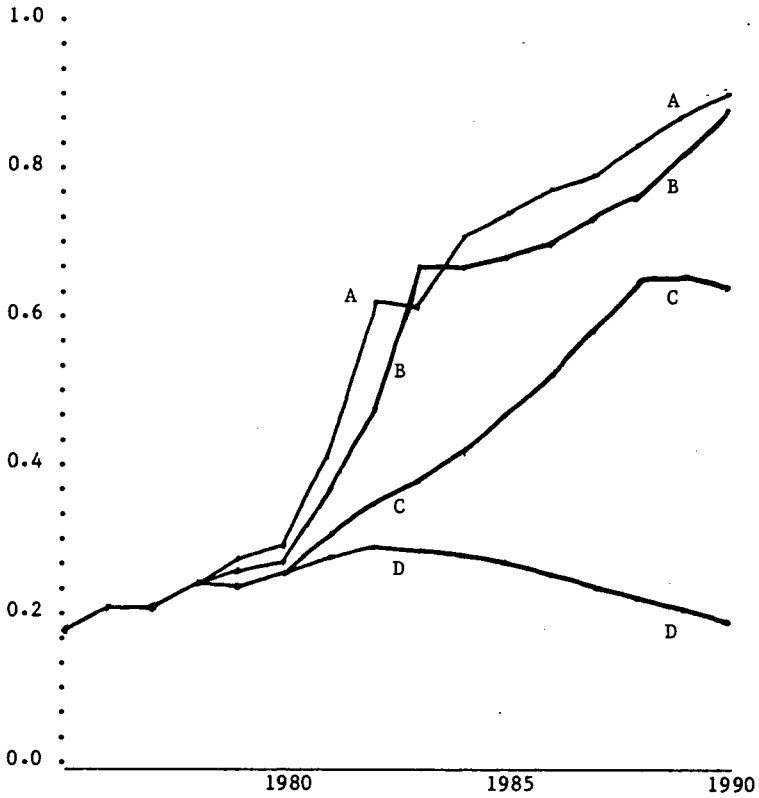
Imports of Machinery from the Developed West
(millions of current dollars)

Figure 11



Net Balance of Hard Currency Trade
(millions of current dollars)

Figure 12



Debt Service Ratio

Appendix

Table A-1

Forecasts of Soviet Oil, Gas, and Coal Production

	Oil (million metric tons)				Gas (billion cubic meters)	Coal (million metric tons)
	A	B	C	D		
1960		148			45	510
1965		243			128	578
1970		353			198	624
1975		491			289	701
1976		520			321	712
1977		546			346	722
1978		572			372	724
1979	580	590	590	590	393	756
1980	590	600	605	605	415	790
1981	580	590	605	615	447	807
1982	560	580	605	625	483	825
1983	540	570	605	635	520	843
1984	520	560	605	645	561	861
1985	500	550	605	655	605	880
1986	500	550	605	666	632	899
1987	500	550	605	676	659	919
1988	500	550	605	687	688	939
1989	500	550	605	699	718	959
1990	500	550	605	710	750	980

Sources:

1. 1960-1977: Ts.S.U., Narodnoe khoziaistvo SSSR v 1977, Moscow, 1978, p. 148.
   1978: Ekonomicheskaia gazeta, No. 5, January 1979, p.8.

2. A (CIA high): CIA, Prospects for Soviet Oil Production, April 1977, p. 1. 1990 figure based on assumption of no growth in output from 1985 level.

3. B (Oil and Gas Journal): Oil and Gas Journal, Sept. 18, 1978. 1990 figure based on assumption of no growth in output from 1985 level.

4. C (Dienes low) and D (Dienes high): Leslie Dienes, "Soviet Energy Policy and the Hydrocarbons," Discussion Paper No. 2, in Association of American Geographers project on Soviet Natural Resources in the World Economy, April 1978, p. 44.

5. Gas and coal forecasts: Dienes, op cit, p.44.

Table A-2

Projected Values of Major Variables
Determining Domestic Fuel Consumption

	1975	1980	1985	1990	av. ann. % change 1975-90
Output:					
Industry (total)	132.8	165.8	208.9	265.9	4.7
Ferrous Metals	120.9	135.9	154.4	178.5	2.6
Machine Building	154.3	218.5	297.4	403.0	6.6
Chemicals	152.7	204.6	282.0	390.6	6.5
Construction Materials	128.9	144.1	163.9	188.7	2.6
Textiles & Apparrel	114.3	132.5	149.6	173.7	2.8
Processed Foods	120.8	133.9	162.1	196.7	3.3
Agriculture	80.7	97.4	112.6	127.7	3.1
Construction	131.3	154.6	173.4	192.3	2.6
Total Freight Turnover	5200	6776	8626	10974	5.1
Capital Stock:					
Industry (total)	313.3	449.7	613.6	825.2	6.7
Ferrous Metals	30.5	41.5	55.8	78.5	6.5
Machine Building	67.7	108.7	160.6	229.0	8.5
Chemicals	29.6	44.7	63.3	84.4	7.2
Construction Materials	19.4	25.9	31.8	37.5	4.5
Textiles & Apparrel	14.2	19.8	28.3	42.3	7.6
Processed Foods	25.8	35.0	45.1	56.8	5.4
Agriculture	125.2	194.1	273.1	365.0	7.4
Construction	28.8	43.9	60.4	76.5	6.7
Income and Consumption:					
Stock of Automobiles	4435	10466	22308	39366	15.7
Urban & military earnings	154.7	181.3	211.7	248.7	3.2

Units of measure:

Output: Indices, 1970=100, except for Agriculture (billions 1970 rubles) and Total Freight Turnover (millions of ton-miles).

Capital Stock: Billions of 1970 rubles.

Stock of Automobiles: thousands.

Urban and military earnings: billions of rubles.

Table A-3

Soviet Domestic Fuel Requirements

	COAL	OIL		GAS		TOTAL
	million metric tons	million metric tons	million barrels /day	billion cubic meters	billion cubic ft /day	million tons SFE*
1960	497	118	2.4	45	4.4	1142
1965	555	180	3.6	126	12.2	1196
1970	629	264	5.3	197	19.1	1257
1975	668	369	7.4	279	27.0	1328
1976	659	397	8.0	293	28.3	1379
1977	656	420	8.4	306	29.6	1425
1978	654	440	8.8	319	30.9	1467
1979	658	458	9.2	333	32.2	1513
1980	667	476	9.6	348	33.7	1563
1981	676	491	9.9	364	35.2	1610
1982	686	503	10.1	382	36.9	1655
1983	697	514	10.3	399	38.6	1699
1984	706	523	10.5	416	40.2	1740
1985	716	532	10.7	434	42.0	1780
1986	730	539	10.8	451	43.6	1821
1987	745	546	11.0	469	45.4	1862
1988	760	554	11.1	487	47.1	1906
1989	778	564	11.3	507	49.0	1957
1990	796	573	11.5	527	51.0	2005

Source: 1960-1975 from R.W. Campbell, Soviet Energy Balances, Rand Corp., 1978.
1976-1985 projection values from Energy Model

Note: 1 metric ton = 7.33 barrels
1 cubic meter = 35.3 cubic feet
(conversion factors correspond to USSR fuel characteristics)

*SFE stands for standard fuel equivalency units, which in Soviet use has a heat content of 7,000 large calories per kilogram. The approximate conversion factors by fuel type are: one ton of coal equal 0.71 ton SFE; one ton of oil equal 1.41 ton SFE; and 1,000 cubic meters of gas equal 1.22 ton SFE.

Table A-4

Soviet Oil Balances

(million metric tons)

	(1) Oil Production				(2) Domestic Oil Requirements	(3) Oil Exports			
1960	148				118	30			
1965	243				180	63			
1970	353				264	89			
1975	491				369	122			
1976	520				396	124			
1977	546				417	129			
1978	571				439	132			
Projection:	A	B	C	D		A	B	C	D
1979	580	590	590	590	458	122	132	132	132
1980	590	600	605	605	476	114	124	129	129
1981	580	590	605	615	491	89	99	114	124
1982	560	580	605	625	503	57	77	102	122
1983	540	570	605	635	514	26	56	91	121
1984	520	560	605	645	523	-3	37	82	122
1985	500	550	605	655	532	-32	18	73	123
1986	500	550	605	666	539	-39	11	66	127
1987	500	550	605	676	546	-46	4	59	130
1988	500	550	605	687	554	-54	-4	51	133
1989	500	550	605	699	564	-64	-14	41	135
1990	500	550	605	710	573	-73	-23	32	137

Units: Million metric tons

Sources: Columns (1) and (2): Based on sources in text.
Column (3): Column (1) minus column (2).

Table A-5

Projected Soviet Oil Exports

(million metric tons)

	Total Exports				Exports to CMEA	Hard Currency Exports			
	A	B	C	D		A	B	C	D
1975	122	122	122	122	59.8	62.2	62.2	62.2	62.2
1976	124	124	124	124	68.4	55.6	55.6	55.6	55.6
1977	129	129	129	129	70.0	59	59	59	59
1978	132	132	132	132	70.0	62	62	62	62
1979	122	132	132	132	70.0	52	62	62	62
1980	114	124	129	129	70.0	44	54	59	59
1981	89	99	114	124	70.0	19	29	44	54
1982	57	77	102	122	70.0	-13	7	32	52
1983	26	56	91	121	70.0	-44	-14	21	51
1984	-3	37	82	122	70.0	-73	-33	12	52
1985	-32	18	73	123	70.0	-102	-52	3	53
1986	-39	11	66	127	70.0	-109	-59	-4	57
1987	-46	4	59	130	70.0	-116	-66	-11	60
1988	-54	-4	51	133	70.0	-124	-74	-19	63
1989	-64	-14	41	135	70.0	-134	-84	-29	65
1990	-73	-23	32	137	70.0	-143	-93	-38	67

Notes: (Total Exports) - (Exports to CMEA) = (Hard Currency Exports)
Total Exports from Table A-4.
Exports to CMEA assumed to level off at 70 million metric tons (see footnote 10).

Table A-6

Soviet Gas Export Assumptions

	Total Exports (billion cubic meters)	Ann. Growth %	Exports to East Europe (billion cubic meters)	Ann. Growth %	Exports to West Europe (billion cubic meters)	Ann. Growth %
1975	19.3	37%	11 2	32%	8.0	47%
1976	25.8	33%	13 4	19%	12.3	54%
1977	29.9	16%	15 5	15%	14.4	17%
1978	33.6	12%	16 9	9%	16.6	15%
1979	37.7	"	18 5	"	19.2	"
1980	42.3	"	20 2	"	22.1	"
1981	47.4	"	22 0	"	25.3	"
1982	53.2	"	24 0	"	29.1	"
1983	59.6	"	26 2	"	33.4	"
1984	66.9	"	28 5	"	38.4	"
1985	75.0	"	31 0	"	44.0	"
1986	81.0	8%	32 9	6%	48.1	9%
1987	87.5	"	34 8	"	52.6	"
1988	94.5	"	36 9	"	57.5	"
1989	102.0	"	39 1	"	62.8	"
1990	110.2	"	41 5	"	68.7	"

Notes: The following information was used to set the 1980 and 1985 estimates: For total 1985 exports a Oil and Gas Journal forecast (Oct. 16, 1978, p. 50) was used. In addition this article states that the contracted levels of gas delivery over the recently completed Soyuz pipeline would be 2.8 billion cubic meters each to Poland, GDR, Hungary, Bulgaria, and Czechoslovakia and 1.5 to Romania. This commitment of 15.5 billion cubic meters on top of the 1977 level of 15.5 represents a minimum level of export to these countries by 1985. A forecast of hard currency exports of $1 billion in 1980 and $2 billion in 1985 (in 1977 prices) is given in CIA(NFAC), USSR: Development of the Gas Industry (July 1978), p. 29. These levels were used to set the 1980 and 1985 volume of exports to West Europe at 22,100 and 44,000 million cubic meters.

Table A-7

Soviet Fuel Export Price Forecasts
(for non-CMEA countries)

	Oil	Gas
	current dollars per metric ton	current dollars per thousand cubic meters
1975	65	32
1976	99	34
1977	104	45
1978	110	48
1979	131	51
1980	147	54
1981	156	58
1982	165	61
1983	176	65
1984	186	69
1985	198	73
1986	213	76
1987	237	80
1988	260	84
1989	287	89
1990	314	93

Note: The assumptions behind the oil price forecasts are as follows: The recent OPEC decision on a 14.5% price increase is spread over two years (1979 and 1980), and to this is added a 6.5% rate of inflation in 1979 and a 6% increase in 1980. The assumed rate of real price increase in the 1980's averages 2.2% per year. On top of this, there is added a rate of inflation of 6% for 1980-85 and 5% for 1986-90.

The real price of gas is assumed to remain constant over the the forecast period, with inflation pushing the current price up by 6% per year in 1980-85 and 5% in 1986-90.

Table A-8

Projected Values of Soviet Hard Currency Fuel Exports

(millions of current $)

	Oil				Gas	Total Fuel			
	A	B	C	D		A	B	C	D
1975	4067	4067	4067	4067	255	4322	4322	4322	4322
1976	5501	5501	5501	5501	415	5916	5916	5916	5916
1977	6136	6136	6136	6136	652	6788	6788	6788	6788
1978	6820	6820	6820	6820	800	7620	7620	7620	7620
1979	6812	8122	8122	8122	986	7798	9108	9108	9108
1980	6468	7938	8673	8673	1202	7670	9140	9875	9875
1981	2964	4524	6864	8424	1459	4423	5983	8323	9883
1982	-2145	1155	5280	8580	1779	-366	2934	7059	10359
1983	-7744	-2464	3696	8976	2164	-5580	-300	5860	11140
1984	-13578	-6138	2232	9672	2637	-10941	-3501	4869	12309
1985	-20196	-10296	594	10494	3204	-16992	-7092	3798	13698
1986	-23217	-12567	-852	12141	3677	-19540	-8890	2825	15818
1987	-27492	-15642	-2607	14220	4222	-23270	-11420	1615	18442
1988	-32240	-19240	-4940	16380	4846	-27394	-14394	-94	21226
1989	-38458	-24108	-8323	18655	5558	-32900	-18550	-2765	24213
1990	-44902	-29202	-11932	21038	6384	-38518	-22818	-5548	27422

TABLE A–9

SRI-WEFA ECONOMETRIC MODEL OF THE SOVIET UNION
SCENARIO A (CIA HIGH)

TABLE 6.00 TRADE & HARD CURRENCY BALANCES

LINE	VAR LABEL		ITEM	1975	1976	1977	1978	1979	1980
1			SOVIET TRADE BALANCE WITH:						
2	ENETCM$	II	CMEA	386.00	1778.20	2054.25	1273.76	1439.71	1254.68
3	IR.M/ETCM	I	-IMPORT/EXPORT RATIO	0.98	0.91	0.90	0.94	0.94	0.95
4	INOT	I	OTHER SOCIALIST	84.	-127.	153.	211.	280.	380.
5	IR.M/ETOT	I	-IMPORT/EXPORT RATIO	0.98	1.03	0.97	0.96	0.95	0.94
6	ENETDW$	II	DEVELOPED WEST	-5034.42	-2894.86	-1014.14	-3080.82	-3187.26	-4800.38
7	IR.M/ETDW	I	-IMPORT/EXPORT RATIO	1.61	1.28	1.08	1.23	1.22	1.32
8	IDEX	I	DEVELOPING COUNTRIES	-1142.	-204.	-23.	237.	342.	257.
9	IR.M/ETLDC	I	-IMPORT/EXPORT RATIO	1.36	1.06	1.01	0.95	0.94	0.96
10									
11			HARD CURRENCY BALANCES,M,$US						
12		I	INFLOWS						
13	IFNETHC$	IB	NET BALANCE OF TRADE	-6281.	-3386.	-1362.	-2884.	-2844.	-4504.
14	IFSERS9	IE	NET BAL. OF SERVICES & TRNSFRS	200.	600.	630.	662.	695.	729.
15	IFCDRS9	IE	CREDIT DRAWINGS	4300.	4450.	4000.	4000.	4500.	4800.
16	IFGSALES	IE	GOLD SALES	1000.	1250.	1700.	2000.	2000.	2000.
17									
18		I	OUTFLOWS						
19	IFINT$	IB	INTEREST PAYMENTS	276.	500.	698.	839.	924.	1012.
20	IFCREP$	IB	CREDIT REPAYMENTS	1272.	1903.	2040.	2631.	3074.	3531.
21									
22	IFOHC$	II	NET INFLOWS	-2329.	511.	2230.	307.	353.	-1518.
23									
24	IFSTK$	II	HARD CURRENCY HOLDINGS,M,$US	-1594.	-1083.	1147.	1454.	1807.	290.
25									
26	IFDEBT$	II	DEBT OUTSTANDING,M,$US	7489.	10036.	11996.	13365.	14791.	16061.
27									
28	IDEBT-CUR	I	DEBT MINUS HARD CURRENCY	9083.	11119.	10849.	11911.	12984.	15771.
29									
30	IFGOLD	II	GOLD RESERVES,TONS	1901.	1917.	1910.	1944.	1993.	2060.
31	IXGOLDT9	IE	-GOLD PRODUCTION,TONS	308.	330.	343.	357.	371.	375.
32	IGSAL	I	-GOLD SALES,TONS	190.	314.	351.	323.	323.	308.
33	IPGOLD9	IE	-PRICE OF GOLD,M$US/TON	5.26	3.98	4.85	6.20	6.20	6.50
34	IPGO	I	-PRICE OF GOLD,$US/OZ.	198.94	150.44	183.33	234.36	234.36	245.70
35									
36	IRVS		GOLD RESERVES-IMPORT RATIO	0.7541	0.5567	0.6888	0.7180	0.7008	0.6776
37									
38	IDBT		DEBT-EXPORT RATIO*	1.1033	1.0344	0.8733	0.8701	0.9002	1.0559
39									
40	IFDSR	II	DEBT SERVICE RATIO**	0.1880	0.2236	0.2204	0.2535	0.2771	0.3041

*(OUTSTANDING DEBT AT END OF YEAR - ACCUMULATED HARD CURRENCY HOLDINGS) / TOTAL EXPORTS TO THE DEVELOPED WEST
**(INTEREST PAYMENTS IN HARD CURRENCY + CREDIT PAYMENTS IN HARD CURRENCY) / TOTAL EXPORTS TO THE DEVELOPED WEST
A PRODUCT OF WHARTON EFA INC, 4025 CHESTNUT ST, PHILADELPHIA, PA 19104, & SRI-WASHINGTON, 1611 N. KENT ST, ARLINGTON, VA 22209

TABLE A–9—Continued

SRI-WEFA ECONOMETRIC MODEL OF THE SOVIET UNION
SCENARIO A (CIA HIGH)

TABLE 6.00 TRADE & HARD CURRENCY BALANCES

LINE	VAR	LABEL	I T E M	1981	1982	1983	1984	1985
1			SOVIET TRADE BALANCE WITH:					
2	IENETCMS	II	CMEA	1882.82	2428.99	2474.27	2934.21	3122.15
3	IR.M/ETCM	I	-IMPORT/EXPORT RATIO	0.93	0.93	0.93	0.93	0.92
4	INOT	I	OTHER SOCIALIST	840.	1264.	1707.	2171.	2660.
5	IR.M/ETOT	I	-IMPORT/EXPORT RATIO	0.89	0.85	0.81	0.79	0.76
6	IENETDWS	II	DEVELOPED WEST	-8708.95	-8964.57	-9338.84	-16566.89	-19010.91
7	IR.M/ETDW	I	-IMPORT/EXPORT RATIO	1.69	2.04	1.97	2.61	2.64
8	IDEX	I	DEVELOPING COUNTRIES	250.	275.	316.	361.	398.
9	IR.M/ETLDC	I	-IMPORT/EXPORT RATIO	0.96	0.96	0.96	0.96	0.95
10								
11			HARD CURRENCY BALANCES,M.$US					
12		I	INFLOWS					
13	IFNETHCS	IB	NET BALANCE OF TRADE	-7928.	-8126.	-8409.	-14849.	-16999.
14	IFSERS$9	IE	NET BAL. OF SERVICES & TRNSFRS	750.	810.	875.	945.	1020.
15	IFCDRS9	IE	CREDIT DRAWINGS	5250.	5500.	9250.	9750.	10500.
16	IFGSALES	IE	GOLD SALES	3051.	3210.	3372.	3545.	3730.
17								
18		I	OUTFLOWS					
19	IFINTS	IB	INTEREST PAYMENTS	1215.	1305.	1391.	1691.	1951.
20	IFCREPS	IB	CREDIT REPAYMENTS	4048.	4349.	4637.	5792.	6782.
21								
22	IFDHCS	II	NET INFLOWS	-4141.	-4260.	-940.	-8093.	-10482.
23								
24	IFSTKS	II	HARD CURRENCY HOLDINGS,M.$US	-3851.	-8111.	-9051.	-17144.	-27626.
25								
26	IFDEBTS	II	DEBT OUTSTANDING,M.$US	17262.	18413.	23026.	26985.	30702.
27								
28	IDEBT-CUR	I	DEBT MINUS HARD CURRENCY	21113.	26524.	32077.	44128.	58328.
29								
30	IFGOLD	II	GOLD RESERVES,TONS	1989.	1917.	1846.	1774.	1703.
31	IXGOLDT9	IE	-GOLD PRODUCTION,TONS	380.	385.	390.	395.	400.
32	IGSAL	I	-GOLD SALES,TONS	451.	457.	461.	466.	472.
33	IPGOLD9	IE	-PRICE OF GOLD,M$US/TON	6.76	7.03	7.31	7.60	7.91
34	IPGD	I	-PRICE OF GOLD,$US/OZ.	255.52	265.73	276.31	287.27	298.99
35								
36	IRVS	I	GOLD RESERVES-IMPORT RATIO	0.6334	0.7376	0.7093	0.4943	0.4391
37								
38	IDBT	I	DEBT-EXPORT RATIO*	1.6858	2.9625	3.3185	4.2223	5.0135
39								
40	IFDSR	II	DEBT SERVICE RATIO**	0.4203	0.6315	0.6236	0.7160	0.7507

*(OUTSTANDING DEBT AT END OF YEAR - ACCUMULATED HARD CURRENCY HOLDINGS) / TOTAL EXPORTS TO THE DEVELOPED WEST
**(INTEREST PAYMENTS IN HARD CURRENCY + CREDIT PAYMENTS IN HARD CURRENCY) / TOTAL EXPORTS TO THE DEVELOPED WEST
A PRODUCT OF WHARTON EFA INC, 4025 CHESTNUT ST, PHILADELPHIA, PA 19104, & SRI-WASHINGTON, 1611 N, KENT ST, ARLINGTON, VA 22209

TABLE A–9—Continued

SRI-WEFA ECONOMETRIC MODEL OF THE SOVIET UNION
SCENARIO A (CIA HIGH)

TABLE 6.00 TRADE & HARD CURRENCY BALANCES

LINE	VAR LABEL	ITEM	1986	1987	1988	1989	1990
1		SOVIET TRADE BALANCE WITH:					
2	ENETCM$	CMEA	3983.44	4807.94	6115.05	7521.01	9316.49
3	R.M/ETCM	-IMPORT/EXPORT RATIO	0.92	0.90	0.89	0.88	0.86
4	NOT	OTHER SOCIALIST	3176.	3721.	4297.	4906.	5772.
5	R.M/ETOT	-IMPORT/EXPORT RATIO	0.74	0.72	0.70	0.68	0.65
6	ENETDW$	DEVELOPED WEST	-20693.69	-22929.27	-26473.41	-31263.21	-36809.52
7	R.M/ETDW	-IMPORT/EXPORT RATIO	2.62	2.64	2.73	2.87	3.00
8	DEX	DEVELOPING COUNTRIES	417.	409.	364.	273.	128.
9	R.M/ETLDC	-IMPORT/EXPORT RATIO	0.96	0.96	0.97	0.98	0.99
10							
11		HARD CURRENCY BALANCES,M.$US					
12		INFLOWS					
13	FNETHC$	NET BALANCE OF TRADE	-18488.	-20508.	-23753.	-28177.	-33352.
14	FSER$9	NET BAL. OF SERVICES & TRNSFRS	1102.	1190.	1285.	1388.	1499.
15	FCDR$9	CREDIT DRAWINGS	12000.	14000.	16000.	18000.	20000.
16	FGSALE$	GOLD SALES	3916.	4129.	4331.	4546.	4777.
17							
18		OUTFLOWS					
19	FINT$	INTEREST PAYMENTS	2196.	2476.	2814.	3194.	3607.
20	FCRP$	CREDIT REPAYMENTS	7713.	8786.	10091.	11570.	13179.
21							
22	FDHC$	NET INFLOWS	-11379.	-12451.	-15041.	-19007.	-23862.
23							
24	FSTK$	HARD CURRENCY HOLDINGS,M.$US	-39005.	-51456.	-66497.	-85504.	-109366.
25							
26	FDEBT$	DEBT OUTSTANDING,M.$US	34989.	40203.	46112.	52542.	59363.
27							
28	DEBT-CUR	DEBT MINUS HARD CURRENCY	73994.	91659.	112610.	138046.	168729.
29							
30	FGOLD	GOLD RESERVES,TONS	1631.	1558.	1487.	1415.	1344.
31	XGOLDT9	-GOLD PRODUCTION,TONS	405.	410.	415.	420.	425.
32	GSAL	-GOLD SALES,TONS	476.	483.	487.	491.	497.
33	PGOLD9	-PRICE OF GOLD,M$US/TON	8.22	8.55	8.90	9.25	9.62
34	PGD	-PRICE OF GOLD,$US/OZ.	310.71	323.18	336.41	349.64	363.63
35							
36	RVS	GOLD RESERVES-IMPORT RATIO	0.4005	0.3602	0.3162	0.2722	0.2345
37							
38	DRT	DEBT-EXPORT RATIO*	5.8010	6.5308	7.3386	8.2259	9.1834
39							
40	FDSR	DEBT SERVICE RATIO**	0.7768	0.8024	0.8410	0.8798	0.9136

*(OUTSTANDING DEBT AT END OF YEAR - ACCUMULATED HARD CURRENCY HOLDINGS) / TOTAL EXPORTS TO THE DEVELOPED WEST
**(INTEREST PAYMENTS IN HARD CURRENCY + CREDIT PAYMENTS IN HARD CURRENCY) / TOTAL EXPORTS TO THE DEVELOPED WEST
A PRODUCT OF WHARTON EFA INC, 4025 CHESTNUT ST, PHILADELPHIA, PA 19104, & SRI-WASHINGTON, 1611 N. KENT ST, ARLINGTON, VA 22209

TABLE A-9—Continued

SRI-WEFA ECONOMETRIC MODEL OF THE SOVIET UNION
SCENARIO B (OIL AND GAS JOURNAL)

TABLE 6.00 TRADE & HARD CURRENCY BALANCES

LINE	VAR LABEL	I T E M	1975	1976	1977	1978	1979	1980
1		SOVIET TRADE BALANCE WITH:						
2	ENETCMS	CMEA	386.00	1778.20	2054.25	1273.76	1454.56	1263.98
3	IR.M/ETCM	-IMPORT/EXPORT RATIO	0.981	0.91	0.90	0.94	0.94	0.951
4	NOT	OTHER SOCIALIST	84.	-127.	153.	211.	280.	380.
5	IR.M/ETOT	-IMPORT/EXPORT RATIO	0.981	1.03	0.97	0.96	0.95	0.941
6	ENETDWS	DEVELOPED WEST	-5034.42	-2894.86	-1014.14	-3080.82	-1897.32	-4168.02
7	IR.M/ETDW	-IMPORT/EXPORT RATIO	1.61	1.28	1.08	1.23	1.12	1.26
8	IDEX	DEVELOPING COUNTRIES	-1142.	-204.	-23.	237.	342.	257.
9	IR.M/ETLDC	-IMPORT/EXPORT RATIO	1.36	1.06	1.01	0.95	0.94	0.96
10								
11		HARD CURRENCY BALANCES,M.$US						
12		INFLOWS						
13	FNETHCS	NET BALANCE OF TRADE	-6281.	-3386.	-1362.	-2884.	-1684.	-3936.
14	FSER$9	NET BAL. OF SERVICES & TRNSFRS	200.	600.	630.	662.	695.	729.
15	FCDR$9	CREDIT DRAWINGS	4300.	4450.	4000.	4000.	4500.	4800.
16	FGSALE$	GOLD SALES	1000.	1250.	1700.	2000.	2000.	2000.
17								
18		OUTFLOWS						
19	FINTS	INTEREST PAYMENTS	276.	500.	698.	839.	924.	1012.
20	FCREP$	CREDIT REPAYMENTS	1272.	1903.	2040.	2631.	3074.	3531.
21								
22	FDHC$	NET INFLOWS	-2329.	511.	2230.	307.	1513.	-949.
23								
24	FSTK$	HARD CURRENCY HOLDINGS,M.$US	-1594.	-1083.	1147.	1454.	2967.	2018.
25								
26	FDEBT$	DEBT OUTSTANDING,M.$US	7489.	10036.	11996.	13365.	14791.	16061.
27								
28	IDEBT-CUR	DEBT MINUS HARD CURRENCY	9083.	11119.	10849.	11911.	11824.	14043.
29								
30	FGOLD	GOLD RESERVES,TONS	1901.	1917.	1910.	1944.	1993.	2060.
31	XGOLDT9	-GOLD PRODUCTION,TONS	308.	330.	343.	357.	371.	375.
32	IGSAL	-GOLD SALES,TONS	199.	314.	351.	323.	323.	308.
33	PGOLD9	-PRICE OF GOLD,M$US/TON	5.26	3.98	4.85	6.20	6.20	6.50
34	PGO	-PRICE OF GOLD,$US/OZ.	198.94	150.44	183.33	234.36	234.36	245.70
35								
36	IRVS	GOLD RESERVES-IMPORT RATIO	0.7541	0.5567	0.6888	0.7180	0.7011	0.6514
37								
38	IDAT	DEBT-EXPORT RATIO*	1.1033	1.0344	0.8733	0.8701	0.7529	0.8581
39								
40	FDSR	DEBT SERVICE RATIO**	0.1880	0.2236	0.2204	0.2535	0.2545	0.2776

*(OUTSTANDING DEBT AT END OF YEAR - ACCUMULATED HARD CURRENCY HOLDINGS) / TOTAL EXPORTS TO THE DEVELOPED WEST
**(INTEREST PAYMENTS IN HARD CURRENCY + CREDIT PAYMENTS IN HARD CURRENCY) / TOTAL EXPORTS TO THE DEVELOPED WEST
A PRODUCT OF WHARTON EFA INC, 4025 CHESTNUT ST, PHILADELPHIA, PA 19104, & SRI-WASHINGTON, 1611 N. KENT ST, ARLINGTON, VA 22209

TABLE A–9—Continued

SRI-WEFA ECONOMETRIC MODEL OF THE SOVIET UNION
SCENARIO B (OIL AND GAS JOURNAL)

TABLE 6.00 TRADE & HARD CURRENCY BALANCES

LINE	VAR LABEL		ITEM	1981	1982	1983	1984	1985
1			SOVIET TRADE BALANCE WITH:					
2	IENETCM$	II	CMEA	1888.18	2433.40	2510.22	2996.60	3314.23
3	IR.M/ETCM	I I	-IMPORT/EXPORT RATIO	0.93	0.93	0.93	0.93	0.92
4	INOT	I I	OTHER SOCIALIST	840.	1264.	1707.	2171.	2660.
5	IR.M/ETOT	I I	-IMPORT/EXPORT RATIO	0.89	0.85	0.81	0.79	0.76
6	IENETDW$	II	DEVELOPED WEST	-8220.08	-7593.48	-7108.87	-5889.21	-8955.58
7	IR.M/ETDW	I I	-IMPORT/EXPORT RATIO	1.59	1.68	1.75	1.59	1.81
8	IDEX	I I	DEVELOPING COUNTRIES	250.	275.	316.	361.	398.
9	IR.M/ETLDC	I I	-IMPORT/EXPORT RATIO	0.96	0.96	0.96	0.96	0.95
10								
11			HARD CURRENCY BALANCES,M,$US					
12		I I	INFLOWS					
13	IFNETHC$	IB	NET BALANCE OF TRADE	-7488.	-6893.	-6404.	-5249.	-7958.
14	IFSER$9	IE	NET BAL. OF SERVICES & TRNSFRS	750.	810.	875.	945.	1020.
15	IFCDR$9	IE	CREDIT DRAWINGS	5250.	6500.	7000.	7500.	8500.
16	IFGSALE$	IE	GOLD SALES	3051.	3210.	3372.	3545.	3730.
17								
18		I I	OUTFLOWS					
19	IFINT$	IB	INTEREST PAYMENTS	1215.	1305.	1453.	1598.	1742.
20	IFCREP$	IB	CREDIT REPAYMENTS	4048.	4349.	4887.	5416.	5938.
21								
22	IFDHC$	II	NET INFLOWS	-3701.	-2027.	-1497.	-274.	-2388.
23								
24	IFSTK$	II	HARD CURRENCY HOLDINGS,M,$US	-1683.	-3710.	-5207.	-5481.	-7868.
25								
26	IFDEBT$	II	DEBT OUTSTANDING,M,$US	17262.	19413.	21526.	23610.	26172.
27								
28	IDEBT-CUR	I I	DEBT MINUS HARD CURRENCY	18946.	23123.	26733.	29091.	34041.
29								
30	IFGOLD	II	GOLD RESERVES,TONS	1989.	1917.	1846.	1774.	1703.
31	IXGOLDT9	IE	-GOLD PRODUCTION,TONS	380.	385.	390.	395.	400.
32	IGSAL	I I	-GOLD SALES,TONS	451.	457.	461.	466.	472.
33	IPGOLD9	IE	-PRICE OF GOLD,M$US/TON	6.76	7.03	7.31	7.60	7.91
34	IPGD	I I	-PRICE OF GOLD,$US/OZ.	255.52	265.73	276.31	287.27	298.99
35								
36	IRVS	I	GOLD RESERVES-IMPORT RATIO	0.6044	0.6814	0.8097	0.8262	0.6722
37								
38	IDBT	I	DEBT-EXPORT RATIO*	1.3501	1.9603	2.8039	2.8314	3.0787
39								
40	IFDSR	II	DEBT SERVICE RATIO**	0.3751	0.4793	0.6650	0.6827	0.6946

*(OUTSTANDING DEBT AT END OF YEAR - ACCUMULATED HARD CURRENCY HOLDINGS) / TOTAL EXPORTS TO THE DEVELOPED WEST
**(INTEREST PAYMENTS IN HARD CURRENCY + CREDIT PAYMENTS IN HARD CURRENCY) / TOTAL EXPORTS TO THE DEVELOPED WEST
A PRODUCT OF WHARTON EFA INC, 4025 CHESTNUT ST, PHILADELPHIA, PA 19104, & SRI-WASHINGTON, 1611 N. KENT ST, ARLINGTON, VA 22209

TABLE A–9—Continued

SRI-WEFA ECONOMETRIC MODEL OF THE SOVIET UNION
SCENARIO B (OIL AND GAS JOURNAL)

TABLE 6.00 TRADE & HARD CURRENCY BALANCES

LINE	VAR LABEL	ITEM	1986	1987	1988	1989	1990
1		SOVIET TRADE BALANCE WITH:					
2	ENETCM$	CMEA	4196.16	5084.30	6420.75	8048.86	10071.98
3	IR.M/ETCM	-IMPORT/EXPORT RATIO	0.91	0.90	0.88	0.88	0.86
4	NOT	OTHER SOCIALIST	3176.	3721.	4297.	4906.	5772.
5	IR.M/ETOT	-IMPORT/EXPORT RATIO	0.74	0.72	0.70	0.68	0.65
6	ENETDW$	DEVELOPED WEST	-10710.00	-12957.06	-16716.98	-20379.22	-23691.57
7	IR.M/ETDW	-IMPORT/EXPORT RATIO	1.91	2.00	2.19	2.34	2.42
8	DEX	DEVELOPING COUNTRIES	417.	409.	364.	273.	128.
9	IR.M/ETLDC	-IMPORT/EXPORT RATIO	0.96	0.96	0.97	0.98	0.99
10							
11		HARD CURRENCY BALANCES,M,$US					
12		INFLOWS					
13	FNETHC$	NET BALANCE OF TRADE	-9511.	-11542.	-14981.	-18391.	-21558.
14	FSERS9	NET BAL. OF SERVICES & TRNSFRS	1102.	1190.	1285.	1388.	1499.
15	FCDRS9	CREDIT DRAWINGS	10000.	11500.	14000.	16250.	18500.
16	FGSALE$	GOLD SALES	3916.	4129.	4331.	4546.	4777.
17							
18		OUTFLOWS					
19	FINT$	INTEREST PAYMENTS	1916.	2142.	2409.	2767.	3178.
20	FCREP$	CREDIT REPAYMENTS	6579.	7435.	8453.	9841.	11445.
21							
22	FDHC$	NET INFLOWS	-2988.	-4301.	-6226.	-8815.	-11405.
23							
24	FSTK$	HARD CURRENCY HOLDINGS,M,$US	-10857.	-15157.	-21383.	-30198.	-41602.
25							
26	FDEBT$	DEBT OUTSTANDING,M,$US	29593.	33658.	39205.	45614.	52669.
27							
28	DEBT-CUR	DEBT MINUS HARD CURRENCY	40450.	48815.	60588.	75812.	94271.
29							
30	FGOLD	GOLD RESERVES,TONS	1631.	1558.	1487.	1415.	1344.
31	XGOLDT9	-GOLD PRODUCTION,TONS	405.	410.	415.	420.	425.
32	GSAL	-GOLD SALES,TONS	476.	483.	487.	491.	497.
33	PGOLD9	-PRICE OF GOLD,M$US/TON	8.22	8.55	8.90	9.25	9.62
34	PGO	-PRICE OF GOLD,$US/OZ.	310.71	323.18	336.41	349.64	363.63
35							
36	RVS	GOLD RESERVES-IMPORT RATIO	0.5886	0.5125	0.4288	0.3689	0.3245
37							
38	DBT	DEBT-EXPORT RATIO*	3.3830	3.7505	4.2936	4.9895	5.7235
39							
40	FDSR	DEBT SERVICE RATIO**	0.7105	0.7359	0.7697	0.8298	0.8878

*(OUTSTANDING DEBT AT END OF YEAR - ACCUMULATED HARD CURRENCY HOLDINGS) / TOTAL EXPORTS TO THE DEVELOPED WEST
**(INTEREST PAYMENTS IN HARD CURRENCY + CREDIT PAYMENTS IN HARD CURRENCY) / TOTAL EXPORTS TO THE DEVELOPED WEST
A PRODUCT OF WHARTON EFA INC, 4025 CHESTNUT ST, PHILADELPHIA, PA 19104, & SRI-WASHINGTON, 1611 N. KENT ST, ARLINGTON, VA 22209

TABLE A–9—Continued

SRI-WEFA ECONOMETRIC MODEL OF THE SOVIET UNION
SCENARIO C (DIENES LOW)

TABLE 6.00 TRADE & HARD CURRENCY BALANCES

LINE	VAR	LABEL	ITEM	1975	1976	1977	1978	1979	1980
1			SOVIET TRADE BALANCE WITH:						
2	ENETCM$	II	CMEA----------	386.00	1778.20	2054.25	1273.76	1454.56	1272.27
3	IR.M/ETCM	I	-IMPORT/EXPORT RATIO----------	0.98	0.91	0.90	0.94	0.94	0.95
4	INOT	I	OTHER SOCIALIST----------	84.	-127.	153.	211.	280.	380.
5	IR.M/ETOT	I	-IMPORT/EXPORT RATIO----------	0.98	1.03	0.97	0.96	0.95	0.94
6	ENETDW$	II	DEVELOPED WEST----------	-5034.42	-2894.86	-1014.14	-3080.82	-1897.32	-3444.27
7	IR.M/ETDW	I	-IMPORT/EXPORT RATIO----------	1.61	1.28	1.08	1.23	1.12	1.20
8	IDEX	I	DEVELOPING COUNTRIES----------	-1142.	-204.	-23.	237.	342.	257.
9	IR.M/ETLDC	I	-IMPORT/EXPORT RATIO----------	1.36	1.06	1.01	0.95	0.94	0.96
10									
11			HARD CURRENCY BALANCES,M.$US						
12		I	INFLOWS						
13	IFNETHC$	IB	NET BALANCE OF TRADE----------	-6281.	-3386.	-1362.	-2884.	-1684.	-3285.
14	IFSER$9	IE	NET BAL. OF SERVICES & TRNSFRS	200.	600.	630.	662.	695.	729.
15	IFCDR$9	IE	CREDIT DRAWINGS----------	4300.	4450.	4000.	4000.	4500.	4800.
16	IFGSALE$	IE	GOLD SALES----------	1000.	1250.	1700.	2000.	2000.	2000.
17									
18		I	OUTFLOWS						
19	IFINT$	IB	INTEREST PAYMENTS----------	276.	500.	698.	839.	924.	1012.
20	IFCREP$	IB	CREDIT REPAYMENTS----------	1272.	1903.	2040.	2631.	3074.	3531.
21									
22	IFDHC$	II	NET INFLOWS----------	-2329.	511.	2230.	307.	1513.	-298.
23									
24	IFST$	III	HARD CURRENCY HOLDINGS,M.$US-------	-1594.	-1083.	1147.	1454.	2967.	2669.
25									
26	IFDEBT$	III	DEBT OUTSTANDING,M.$US----------	7489.	10036.	11996.	13365.	14791.	16061.
27									
28	IDEBT-CHC	I	DEBT MINUS HARD CURRENCY--------	9083.	11119.	10849.	11911.	11824.	13392.
29									
30	IFGOLD	III	GOLD RESERVES,TONS----------	1901.	1917.	1910.	1944.	1993.	2060.
31	IXGOLDT9	IE	-GOLD PRODUCTION,TONS----------	308.	330.	343.	357.	371.	375.
32	IGSAL	I	-GOLD SALES,TONS----------	190.	314.	351.	323.	323.	308.
33	IPGOLD9	IE	-PRICE OF GOLD,M$US/TON----------	5.26	3.98	4.85	6.20	6.20	6.50
34	IPGO	I	-PRICE OF GOLD,$US/OZ.----------	198.94	150.44	183.33	234.36	234.36	245.70
35									
36	IRVS	I	GOLD RESERVES-IMPORT RATIO---------	0.7541	0.5567	0.6888	0.7180	0.7011	0.6515
37									
38	IDRT	I	DEBT-EXPORT RATIO*----------	1.1033	1.0344	0.8733	0.8701	0.7529	0.7838
39									
40	IFDSR	III	DEBT SERVICE RATIO**----------	0.1880	0.2236	0.2204	0.2535	0.2545	0.2659

*(OUTSTANDING DEBT AT END OF YEAR - ACCUMULATED HARD CURRENCY HOLDINGS) / TOTAL EXPORTS TO THE DEVELOPED WEST
**(INTEREST PAYMENTS IN HARD CURRENCY + CREDIT PAYMENTS IN HARD CURRENCY) / TOTAL EXPORTS TO THE DEVELOPED WEST
A PRODUCT OF WHARTON EFA INC, 4025 CHESTNUT ST, PHILADELPHIA, PA 19104, & SRI-WASHINGTON, 1611 N. KENT ST, ARLINGTON, VA 22209

SRI-WEFA ECONOMETRIC MODEL OF THE SOVIET UNION
SCENARIO C (DIENES LOW)

TABLE 6.00 TRADE & HARD CURRENCY BALANCES

LINE	VAR LABEL	ITEM	1981	1982	1983	1984	1985
1		SOVIET TRADE BALANCE WITH:					
2	ENETCM$	CMEA	1910.52	2460.23	2504.69	2976.00	3296.24
3	R.M/ETCM	-IMPORT/EXPORT RATIO	0.93	0.93	0.93	0.93	0.92
4	NOT	OTHER SOCIALIST	840.	1264.	1707.	2171.	2660.
5	R.M/ETOT	-IMPORT/EXPORT RATIO	0.89	0.85	0.81	0.79	0.76
6	ENETDW$	DEVELOPED WEST	-6372.63	-5719.18	-6504.96	-6130.43	-6800.45
7	R.M/ETDW	-IMPORT/EXPORT RATIO	1.39	1.39	1.43	1.44	1.46
8	DEX	DEVELOPING COUNTRIES	250.	275.	316.	361.	398.
9	R.M/ETLDC	-IMPORT/EXPORT RATIO	0.96	0.96	0.96	0.96	0.95
10							
11		HARD CURRENCY BALANCES,M.$US					
12		INFLOWS					
13	FNETHC$	NET BALANCE OF TRADE	-5827.	-5208.	-5861.	-5466.	-6020.
14	FSERS9	NET BAL. OF SERVICES & TRNSFRS	750.	810.	875.	945.	1020.
15	FCDR$9	CREDIT DRAWINGS	5250.	5500.	6000.	7000.	7500.
16	FGSALE$	GOLD SALES	3051.	3210.	3372.	3545.	3730.
17							
18		OUTFLOWS					
19	FINT$	INTEREST PAYMENTS	1215.	1305.	1391.	1490.	1630.
20	FCREP$	CREDIT REPAYMENTS	4048.	4349.	4637.	4978.	5484.
21							
22	FDHC$	NET INFLOWS	-2040.	-1342.	-1642.	-444.	-884.
23							
24	FSTK$	HARD CURRENCY HOLDINGS,M.$US	629.	-713.	-2355.	-2799.	-3684.
25							
26	FDEBT$	DEBT OUTSTANDING,M.$US	17262.	18413.	19776.	21798.	23814.
27							
28	DEBT-CUR	DEBT MINUS HARD CURRENCY	16634.	19126.	22131.	24597.	27497.
29							
30	FGOLD	GOLD RESERVES,TONS	1989.	1917.	1846.	1774.	1703.
31	XGOLDT9	-GOLD PRODUCTION,TONS	380.	385.	390.	395.	400.
32	GSAL	-GOLD SALES,TONS	451.	457.	461.	466.	472.
33	PGOLD9	-PRICE OF GOLD,MSUS/TON	6.76	7.03	7.31	7.60	7.91
34	PGO	-PRICE OF GOLD,$US/OZ.	255.52	265.73	276.31	287.27	298.99
35							
36	RVS	GOLD RESERVES-IMPORT RATIO	0.5927	0.6140	0.6186	0.6234	0.6257
37							
38	DRT	DEBT-EXPORT RATIO*	1.0194	1.2114	1.4481	1.6355	1.8707
39							
40	FDSR	DEBT SERVICE RATIO**	0.3226	0.3581	0.3944	0.4301	0.4840

*(OUTSTANDING DEBT AT END OF YEAR - ACCUMULATED HARD CURRENCY HOLDINGS) / TOTAL EXPORTS TO THE DEVELOPED WEST
**(INTEREST PAYMENTS IN HARD CURRENCY + CREDIT PAYMENTS IN HARD CURRENCY) / TOTAL EXPORTS TO THE DEVELOPED WEST
A PRODUCT OF WHARTON EFA INC, 4025 CHESTNUT ST, PHILADELPHIA, PA 19104, & SRI-WASHINGTON, 1611 N. KENT ST, ARLINGTON, VA 22209

TABLE A–9—Continued

SRI-WEFA ECONOMETRIC MODEL OF THE SOVIET UNION
SCENARIO C (DIENES LOW)

TABLE 6.00 TRADE & HARD CURRENCY BALANCES

LINE	VAR LABEL	ITEM	1986	1987	1988	1989	1990
1		SOVIET TRADE BALANCE WITH:					
2	ENETCM$	CMEA	4186.12	5116.67	6750.40	7820.32	10123.16
3	IR.M/ETCM	-IMPORT/EXPORT RATIO	0.91	0.90	0.88	0.87	0.86
4	NOT	OTHER SOCIALIST	3176.	3721.	4297.	4906.	5772.
5	IR.M/ETOT	-IMPORT/EXPORT RATIO	0.74	0.72	0.70	0.68	0.65
6	ENETDW$	DEVELOPED WEST	-4482.99	-3347.33	-2768.82	-4235.99	-8657.12
7	IR.M/ETDW	-IMPORT/EXPORT RATIO	1.33	1.24	1.23	1.30	1.59
8	IDEX	DEVELOPING COUNTRIES	417.	409.	364.	273.	128.
9	IR.M/ETLDC	-IMPORT/EXPORT RATIO	0.96	0.98	0.97	0.98	0.99
10							
11		HARD CURRENCY BALANCES,M.$US					
12		INFLOWS					
13	IFNETHC$	NET BALANCE OF TRADE	-3912.	-2902.	-2439.	-3876.	-8039.
14	IFSERP$9	NET BAL. OF SERVICES & TRNSFRS	1102.	1190.	1285.	1388.	1499.
15	IFCDR$9	CREDIT DRAWINGS	7750.	8000.	8250.	8500.	8750.
16	IFGSALE$	GOLD SALES	3916.	4129.	4331.	4546.	4777.
17							
18		OUTFLOWS					
19	IFINT$	INTEREST PAYMENTS	1770.	1894.	2006.	2109.	2206.
20	IFCREP$	CREDIT REPAYMENTS	5989.	6430.	6823.	7180.	7510.
21							
22	IFDHC$	NET INFLOWS	1097.	2094.	2598.	1269.	-2729.
23							
24	IFSTK$	HARD CURRENCY HOLDINGS,M.$US	-2587.	-493.	2106.	3375.	645.
25							
26	IFDEBT$	DEBT OUTSTANDING,M.$US	25575.	27145.	28573.	29893.	31132.
27							
28	IDEBT-CUR	DEBT MINUS HARD CURRENCY	28162.	27638.	26467.	26518.	30487.
29							
30	IFGOLD	GOLD RESERVES,TONS	1631.	1558.	1487.	1415.	1344.
31	IXGOLDT9	-GOLD PRODUCTION,TONS	405.	410.	415.	420.	425.
32	IGSAL	-GOLD SALES,TONS	476.	483.	487.	491.	497.
33	IPGOLD9	-PRICE OF GOLD,M$US/TON	8.22	8.55	8.90	9.25	9.62
34	IPGO	-PRICE OF GOLD,$US/OZ.	310.71	323.18	336.41	349.64	363.63
35							
36	IRVS	GOLD RESERVES-IMPORT RATIO	0.6886	0.7620	0.8080	0.7115	0.5449
37							
38	IDRT	DEBT-EXPORT RATIO*	1.9292	1.9575	1.9852	1.8770	2.0396
39							
40	IFDSR	DEBT SERVICE RATIO**	0.5315	0.5895	0.6622	0.6575	0.6500

*(OUTSTANDING DEBT AT END OF YEAR - ACCUMULATED HARD CURRENCY HOLDINGS) / TOTAL EXPORTS TO THE DEVELOPED WEST
**(INTEREST PAYMENTS IN HARD CURRENCY + CREDIT PAYMENTS IN HARD CURRENCY) / TOTAL EXPORTS TO THE DEVELOPED WEST
A PRODUCT OF WHARTON EFA INC, 4025 CHESTNUT ST, PHILADELPHIA, PA 19104, & SRI-WASHINGTON, 1611 N. KENT ST, ARLINGTON, VA 22209

TABLE A–9—Continued

SRI-WEFA ECONOMETRIC MODEL OF THE SOVIET UNION
SCENARIO D (DIENES HIGH)

TABLE 6.00 TRADE & HARD CURRENCY BALANCES

LINE	VAR LABEL	I T E M	1975	1976	1977	1978	1979	1980
1		SOVIET TRADE BALANCE WITH:						
2	ENETCMS	CMEA	386.00	1778.20	2054.25	1273.76	1454.56	1272.27
3	R.M/ETCM	-IMPORT/EXPORT RATIO	0.98	0.91	0.90	0.94	0.94	0.95
4	NOT	OTHER SOCIALIST	84.	-127.	153.	211.	280.	380.
5	R.M/ETOT	-IMPORT/EXPORT RATIO	0.98	1.03	0.97	0.96	0.95	0.94
6	ENETDWS	DEVELOPED WEST	-5034.42	-2894.86	-1014.14	-3080.82	-1897.32	-3444.27
7	R.M/ETDW	-IMPORT/EXPORT RATIO	1.61	1.28	1.08	1.23	1.12	1.20
8	IDEX	DEVELOPING COUNTRIES	-1142.	-204.	-23.	237.	342.	257.
9	R.M/ETLDC	-IMPORT/EXPORT RATIO	1.36	1.06	1.01	0.95	0.94	0.96
10								
11		HARD CURRENCY BALANCES,M,$US						
12		INFLOWS						
13	IFNETHC$	NET BALANCE OF TRADE	-6281.	-3386.	-1362.	-2884.	-1684.	-3285.
14	IFSERS9	NET BAL. OF SERVICES & TRNSFRS	200.	600.	630.	662.	695.	729.
15	IFCDRS9	CREDIT DRAWINGS	4300.	4450.	4000.	4000.	4500.	4800.
16	IFGSALE$	GOLD SALES	1000.	1250.	1700.	2000.	2000.	2000.
17								
18		OUTFLOWS						
19	IFINT$	INTEREST PAYMENTS	276.	500.	698.	839.	924.	1012.
20	IFCREP$	CREDIT REPAYMENTS	1272.	1903.	2040.	2631.	3074.	3531.
21								
22	IFDHC$	NET INFLOWS	-2329.	511.	2230.	307.	1513.	-298.
23								
24	IFSTK$	HARD CURRENCY HOLDINGS,M,$US	-1594.	-1083.	1147.	1454.	2967.	2669.
25								
26	IFDEBT$	DEBT OUTSTANDING,M,$US	7489.	10036.	11996.	13365.	14791.	16061.
27								
28	IDEBT-CUR	DEBT MINUS HARD CURRENCY	9083.	11119.	10849.	11911.	11824.	13392.
29								
30	IFGOLD	GOLD RESERVES,TONS	1901.	1917.	1910.	1944.	1993.	2060.
31	IXGOLDT9	-GOLD PRODUCTION,TONS	308.	330.	343.	357.	371.	375.
32	IGSAL	-GOLD SALES,TONS	190.	314.	351.	323.	323.	308.
33	IPGOLD9	-PRICE OF GOLD,MSUS/TON	5.26	3.98	4.85	6.20	6.20	6.50
34	IPGO	-PRICE OF GOLD,$US/OZ.	198.94	150.44	183.33	234.36	234.36	245.70
35								
36	IRVS	GOLD RESERVES-IMPORT RATIO	0.7541	0.5567	0.6888	0.7180	0.7011	0.6515
37								
38	IDBT	DEBT-EXPORT RATIO*	1.1033	1.0344	0.8733	0.8701	0.7529	0.7838
39								
40	IFDSR	DEBT SERVICE RATIO**	0.1880	0.2236	0.2204	0.2535	0.2545	0.2659

*(OUTSTANDING DEBT AT END OF YEAR - ACCUMULATED HARD CURRENCY HOLDINGS) / TOTAL EXPORTS TO THE DEVELOPED WEST
**(INTEREST PAYMENTS IN HARD CURRENCY + CREDIT PAYMENTS IN HARD CURRENCY) / TOTAL EXPORTS TO THE DEVELOPED WEST
A PRODUCT OF WHARTON EFA INC, 4025 CHESTNUT ST, PHILADELPHIA, PA 19104, & SRI-WASHINGTON, 1611 N. KENT ST, ARLINGTON, VA 22209

TABLE A–9—Continued

SRI-WEFA ECONOMETRIC MODEL OF THE SOVIET UNION
SCENARIO D (DIENES HIGH)

TABLE 6.00 TRADE & HARD CURRENCY BALANCES

LINE	VAR LABEL	ITEM	1981	1982	1983	1984	1985
1		SOVIET TRADE BALANCE WITH:					
2	ENETCM$	CMEA	1928.01	2484.87	2531.41	3000.93	3287.01
3	R.M/ETCM	-IMPORT/EXPORT RATIO	0.93	0.93	0.93	0.93	0.92
4	INOT	OTHER SOCIALIST	840.	1264.	1707.	2171.	2660.
5	R.M/ETOT	-IMPORT/EXPORT RATIO	0.89	0.85	0.81	0.79	0.76
6	ENETDW$	DEVELOPED WEST	-4816.54	-3602.87	-4017.25	-3592.68	-4634.18
7	R.M/ETDW	-IMPORT/EXPORT RATIO	1.27	1.21	1.20	1.19	1.19
8	IDEX	DEVELOPING COUNTRIES	250.	275.	316.	361.	398.
9	R.M/ETLDC	-IMPORT/EXPORT RATIO	0.96	0.96	0.96	0.96	0.95
10							
11		HARD CURRENCY BALANCES,M.$US					
12		INFLOWS					
13	IFNETHC$	NET BALANCE OF TRADE	-4428.	-3305.	-3624.	-3184.	-4072.
14	IFSER$9	NET BAL. OF SERVICES & TRNSFRS	750.	810.	875.	945.	1020.
15	IFCDR$9	CREDIT DRAWINGS	5250.	5500.	5750.	6000.	6250.
16	IFGSALE$	GOLD SALES	2200.	2310.	2425.	2547.	2674.
17							
18		OUTFLOWS					
19	IFINT$	INTEREST PAYMENTS	1215.	1305.	1391.	1475.	1557.
20	IFCREP$	CREDIT REPAYMENTS	4048.	4349.	4637.	4916.	5187.
21							
22	IFDHC$	NET INFLOWS	-1492.	-339.	-602.	-83.	-872.
23							
24	IFSTK$	HARD CURRENCY HOLDINGS,M.$US	1177.	838.	236.	153.	-718.
25							
26	IFDEBT$	DEBT OUTSTANDING,M.$US	17262.	18413.	19526.	20611.	21673.
27							
28	IDEBT-CUR	DEBT MINUS HARD CURRENCY	16086.	17575.	19290.	20457.	22392.
29							
30	IFGOLD	GOLD RESERVES,TONS	2114.	2171.	2229.	2289.	2351.
31	IXGOLDT9	-GOLD PRODUCTION,TONS	380.	385.	390.	395.	400.
32	IGSAL	-GOLD SALES,TONS	325.	329.	332.	335.	338.
33	IPGOLD9	-PRICE OF GOLD,M$US/TON	6.76	7.03	7.31	7.60	7.91
34	IPGO	-PRICE OF GOLD,$US/OZ.	255.52	265.73	276.31	287.27	298.99
35							
36	IRVS	GOLD RESERVES-IMPORT RATIO	0.6305	0.6609	0.6641	0.6564	0.6382
37							
38	IDRT	DEBT-EXPORT RATIO*	0.9004	0.9237	0.9412	0.9159	0.9148
39							
40	IFDSR	DEBT SERVICE RATIO**	0.2946	0.2972	0.2941	0.2861	0.2755

*(OUTSTANDING DEBT AT END OF YEAR - ACCUMULATED HARD CURRENCY HOLDINGS) / TOTAL EXPORTS TO THE DEVELOPED WEST
**(INTEREST PAYMENTS IN HARD CURRENCY + CREDIT PAYMENTS IN HARD CURRENCY) / TOTAL EXPORTS TO THE DEVELOPED WEST
A PRODUCT OF WHARTON EFA INC, 4025 CHESTNUT ST, PHILADELPHIA, PA 19104, & SRI-WASHINGTON, 1611 N. KENT ST, ARLINGTON, VA 22209

TABLE A-9—Continued

SRI-WEFA ECONOMETRIC MODEL OF THE SOVIET UNION
SCENARIO D (DIENES HIGH)

TABLE 6.00 TRADE & HARD CURRENCY BALANCES

LINE	VAR LABEL		ITEM	1986	1987	1988	1989	1990
1			SOVIET TRADE BALANCE WITH:					
2	ENETCM$	II	CMEA----------	4160.88	4987.77	6577.77	7517.73	9313.02
3	IR.M/ETCM	I I	-IMPORT/EXPORT RATIO----------	0.92	0.90	0.89	0.88	0.86
4	INOT	I I	OTHER SOCIALIST----------	3176.	3721.	4297.	4906.	5772.
5	IR.M/ETOT	I I	-IMPORT/EXPORT RATIO----------	0.74	0.72	0.70	0.68	0.65
6	ENETDW$	II	DEVELOPED WEST----------	-3374.37	-3705.57	-2971.67	-4156.14	-4817.11
7	IR.M/ETDW	I I	-IMPORT/EXPORT RATIO----------	1.15	1.12	1.11	1.11	1.11
8	IDEX	I I	DEVELOPING COUNTRIES----------	417.	409.	364.	273.	128.
9	IR.M/ETLDC	I I	-IMPORT/EXPORT RATIO----------	0.96	0.96	0.97	0.98	0.99
10		I I						
11		I	HARD CURRENCY BALANCES,M.$US					
12		I I	INFLOWS					
13	FNETHC$	IB	NET BALANCE OF TRADE----------	-2916.	-3224.	-2622.	-3804.	-4587.
14	FSER$9	IE	NET BAL. OF SERVICES & TRNSFRS	1102.	1190.	1285.	1388.	1499.
15	FCDR$9	IE	CREDIT DRAWINGS----------	6500.	6750.	7000.	7250.	7500.
16	FGSALE$	IE	GOLD SALES----------	2808.	2948.	3096.	3250.	3413.
17		I I						
18		I I	OUTFLOWS					
19	FINT$	IB	INTEREST PAYMENTS----------	1638.	1717.	1796.	1875.	1953.
20	FCREP$	IB	CREDIT REPAYMENTS----------	5453.	5715.	5974.	6231.	6486.
21		I I						
22	FDHC$	II	NET INFLOWS----------	403.	232.	989.	-21.	-613.
23		I I						
24	FSTK$	II	HARD CURRENCY HOLDINGS,M.$US-------	-315.	-83.	906.	885.	272.
25		I I						
26	FDEBT$	II	DEBT OUTSTANDING,M.$US----------	22720.	23755.	24781.	25800.	26814.
27		I I						
28	IDEBT-CUR	I I	DEBT MINUS HARD CURRENCY---------	23035.	23838.	23875.	24915.	26543.
29		I I						
30	FGOLD	II	GOLD RESERVES,TONS----------	2414.	2479.	2547.	2615.	2685.
31	XGOLDT9	IE	-GOLD PRODUCTION,TONS----------	405.	410.	415.	420.	425.
32	IGSAL	I I	-GOLD SALES,TONS----------	342.	345.	348.	351.	355.
33	PGOLD9	IE	-PRICE OF GOLD,M$US/TON----------	8.22	8.55	8.90	9.25	9.62
34	PGO	I I	-PRICE OF GOLD,$US/OZ.----------	310.71	323.18	336.41	349.64	363.63
35		I I						
36	IRVS	I	GOLD RESERVES-IMPORT RATIO---------	0.6309	0.6131	0.5910	0.5692	0.5477
37		I I						
38	IDRT	I	DEBT-EXPORT RATIO*----------	0.8413	0.7727	0.6939	0.6505	0.6265
39		I I						
40	FDSR	II	DEBT SERVICE RATIO**----------	0.2590	0.2409	0.2258	0.2116	0.1992

*(OUTSTANDING DEBT AT END OF YEAR - ACCUMULATED HARD CURRENCY HOLDINGS) / TOTAL EXPORTS TO THE DEVELOPED WEST
**(INTEREST PAYMENTS IN HARD CURRENCY + CREDIT PAYMENTS IN HARD CURRENCY) / TOTAL EXPORTS TO THE DEVELOPED WEST
A PRODUCT OF WHARTON EFA INC, 4025 CHESTNUT ST, PHILADELPHIA, PA 19104, & SRI-WASHINGTON, 1611 N. KENT ST, ARLINGTON, VA 22209

SOVIET GOLD PRODUCTION

(By Michael Kaser)

The study of Soviet gold illuminates the two most astounding politico-economic mechanisms in Stalin's transformation of Russia in the 1930's and their reversal by his successors. One, more political than economic in motivation, and domestic in its effect, was his use of forced labor to develop remote resources of which gold was the most valuable. The other, economic in intention but with political repercussions, was the isolation of the Soviet Union from the rest of the world. Stalin restricted exports to the level required to buy an absolute minimum of essential imports and virtually eliminated tourism and noncommercial payments in both directions. Though de facto inconvertible from 1928, the rouble remained formally on the gold standard and its gold content was actually increased in 1950—to be devalued after Stalin's death. Indeed the Soviet vozhd (leader) seems to have had the same veneration for gold as De Gaulle. He amassed gold to create a huge gold reserve which he virtually never spent; indeed by restricting trade he allowed no occasion on which to lay it out. This vast reserve had the consequence that when the postwar world was struggling with insufficient liquidity for international trade, the easy solution—to revalue gold at least in line with inflation—was precluded by the West's fear that it would benefit the very two countries which politically it was loath to support, South Africa and the U.S.S.R.

The ability of Stalin's successors to dispose of one of the world's biggest gold reserves became in turn a factor in world politics, while domestically Khrushchev's spendthrift use of that reserve was a factor in his downfall. Furthermore, his widespread release of political prisoners both reduced gold output, though by much less than might have been expected, and exacerbated conservative opposition to him; the returned prisoners, above all Solzhenitsyn, themselves made important sections of the party leadership uneasy about political relaxation.

The inhuman conditions of Soviet gold production until 1956 was a factor in the extreme secrecy surrounding its mining; no total production figure has been officially released since 1928. Reserves, like the currency circulation legally related to them, are equally a state secret; in 1947 the death penalty was decreed for anyone revealing information thereon, or even for collecting newspaper clippings which could be collated to reveal such figures.

In the complete absence of official returns a diversity of outside estimates is to be expected. The series adopted in this paper is that compiled by David Dowie and the present writer in a study commissioned by Consolidated Gold Fields (and with whose permission it is reproduced). The company is currently engaged in a very detailed field-by-field examination and the present writer is also undertaking

a survey for the project on Soviet natural resources in the world economy of the Association of American Geographers. Since neither study is yet complete, the production series of the present paper is put forward with all due reservation. The series prepared by the U.S. Department of Commerce Bureau of Mines in its Minerals Yearbook and by the Central Intelligence Agency are also cited.

The importance of estimates of Soviet gold production lies in Soviet bullion policy. In 1978 it is here estimated that the U.S.S.R. by selling all its year's output earned just enough (almost $3bn) to pay for its hard-currency deficit in its balance of trade. If the production is estimated at a lower level—as do the U.S. Government agencies—the U.S.S.R. must have run down its gold reserves. Related to the same aspect of Soviet economic potential is the Western price of gold, for the U.S.S.R. was able to earn a record $2.9 bn in 1978 for its second-highest volume of sales (450 tonnes) because the price was so high. The gold price went through the "psychological barrier" of $250 per fine ounce in February 1979, but when Khrushchev's administration was selling, and certainly running down reserves, the price was a mere $35 per ounce. With approximately one-third of the world gold production, the Soviet Union notably benefits from the Western currency instability which drives up the price of gold.

One of the fastest growing mines in the Soviet Union is at the Zod Pass in the mountains of Armenia. It was for the gold at that very location, below Mount Bezyrnyan, that Alexander the Great conquered Armenia to assure his vast Empire of gold; the Romans, too, minted coinage from Armenian gold. Although those mines were exhausted in antiquity and gold was not again extracted there until 1966 (after years of prospecting), gold has been mined for two millenia elsewhere in the Caucasus. In more recent centuries the Carpathians and the Urals became the principal centers on the territory which is now the U.S.S.R. The foundation of a gold industry was, like much of the westernization of Russia, part of the economic transformation begun by Peter the Great; in this case opening up the Urals for ferrous and nonferrous metallurgy. A lode was discovered in those mountains in the last year of the Czar Peter's life (1725), and the deposit—at Berezov, near Ekaterinburg (now Sverdlovsk)—has been mined continuously since 1745. Byproduct gold had appeared a little earlier from a copper-gold ore deposit near the village of Voytsa in Archangel Province in 1732. Placer deposits were discovered in the Urals in 1771, but were not systematically exploited until 1814. From that time on, extraction from Urals placers and lodes expanded quickly, while placers were opened up in Siberia from the 1830's. The product was chiefly for decorative uses, but in the 1880's and 1890's it was bought up by the state bank to build up reserves for Russia's adherence to the gold standard in 1897. Vishnegradsky and Witte, Russia's industrializing Ministers of Finance, promoted export surpluses to buy bullion abroad to back the planned stable currency. Siberia's biggest strike of Czarist days was on the Bodaibo River, a tributary of the Lena, in 1863, though placers on other tributaries had been worked since 1843. At the time of the 1917 revolutions 39 companies, both Russian and foreign, were working in the Lena basin, among then Lena Goldfields Ltd., a British company, which was to return as concessionnaire when Lenin's "new economic

policy" of 1921–28 readmitted some private enterprises after the sweeping nationalizations of "war communism" (1918–21).

Under war communism, money had been all but abolished; its use as a store of value had been annihilated by a limitless issue of paper money such that Preobrazhensky, a leading economist on the "left wing" of the Bolsheviks, called the Treasury printing press "the machinegun of the Commissariat of Finance, attacking the bourgeois system in the rear and using the currency laws of that system to destroy it." Bukharin, then of the left but later the exponent of a rightist program, in his "Programme of Communists" (1918) described Soviet society as "turning into a huge labor cartel, which produces and distributes what is produced, without gold, metal or paper money * * * The power of money is coming to an end."

Even when such objectives had given way to an orderly use of market relations under NEP, Lenin could still claim (in celebrating the fourth anniversary of the Revolution): "When we are victorious on a world scale, I think we shall use gold for the purpose of building public lavatories in the streets of some of the largest cities in the world." But he went on to say that the young Soviet state had to work with the capitalist system—"When you live among wolves, you must howl like a wolf"—and one of the first steps of the "new economic policy" was a monetary reform and the retying of the ruble to gold (25 per cent of the monetary had to be backed by gold or convertible currency).

In the fiscal year 1922–23 total Soviet gold production was less than had been produced by the Lena alone in 1913 (11.2 against 11.7 ton), but 2 years later it had more than doubled (25.3 in 1924–25). The Lena had already before the war overtaken the Urals as the leading producer, although the latter were still contributing about one-fifth of the total. A new discovery of the NEP period, the Aldan field, was in the thirties to surpass the Lena in its turn and both developed rapidly in the midtwenties. The strike at Nezametny—the name itself means "inconspicuous," the township becoming Aldan in 1939—in 1923 led to the only gold rush of the Soviet period. Its development coincided with the launching of Stalin's 5-year plans—from the autumn of 1928 until the third plan was interrupted by the German invasion—and an urgent need of bullion to pay for the imports of capital equipment. The foreign debt accumulated from commercial lenders in 1928–32 was hence all repaid by 1936. Private concessions in industry and trade had been terminated with NEP and with it the expectation of foreign investment to assist rapid economic development—either from capitalists as tolerated under NEP or from Communist governments on whom Trotsky hoped to rely after proletarian revolutions in the West. The Lena concession was one of the very last to revert to the state. At its peak in the fiscal year 1926–27, it turned out 8.6 tons (the concession stipulated a minimum of 6.5), or 37 percent of total Soviet production. The Soviet Government undoubtedly held its hand until a 17-foot dredge, very large by the standards of the day, had been installed at Bodaibo. It had taken 75 flat trucks to deliver it by rail from the Bucyrus works in Milwaukee to shipment in Baltimore and its journey from the trans-Siberian railhead was an epic in itself—first 200 miles by wagon and sledge

over mountains, then by barge on the Lena and finally 700 miles along the Vitim river in small boats. The dredge, operated at capacity, would have doubled production but a program of harassment began as it was installed, beginning with searches of the offices by the GPU security police and the arrest of Soviet employees.[1]

Solzhenitsyn[2] describes similar expropriations on the home front. The state needed property and gold and there was as yet no Kolyma. The famous "gold fever" began at the end of 1929, only the fever gripped not those looking for gold but those from whom it was being shaken loose. The particular feature of this new, "gold" wave was that the GPU was not actually accusing these rabbits of anything * * * (they) wished only to take away their gold by main force * * *. Only one thing was important: "Give up your gold, viper." The state needs gold and you don't.

Trade in gold and platinum had been declared a state monopoly as early as January 1918 and the dishoarding campaign was not wholly of an extralegal kind. Special shops were established ("Torgsin") at which consumer's goods were available against exchange of gold and foreign currency. But police violence in collecting old gold was of a piece with the widespread use of the labor of political prisoners in mining new. It was above all the Chief Administration of Corrective Labor Camps (GULag) which supplied manpower to Dal'stroy, the Chief Administration for Construction in the Far North, to open up and rapidly develop the remote and inhospitable gold fields of the extreme northeast, first in the Kolyma basin and then along the Upper Indygirka.

Output was recorded as very dynamic during the twenties; the official figures are shown in table 1 with estimates from 1929 to 1940:

TABLE 1.—*Interior production of main-product gold*

	Tonnes		*Tonnes*
1922–23	11.2	1933	77.4
1923–23	20.0	1934	130.6 (120)
1924–25	25.3	1935	(149)
1926–27	23.2	1936	(161)
1928	28.0	1937	(167)
1929	33.4	1938	(163)
1930	44.6 (47)	1939	(155)
1931	52.9 (52)	1940	(125)
1932	61.9 (63)		

NOTE.—Byproduct output was small (see table 2 for 1940 estimate).

Source: 1922–23 to 1928 from Amtorg, "Economic Review of the Soviet Union," vol. III, cited by Sutton, op. cit., p. 96; 1929–34 from A. Arnold, "Banks, Credit and Money in Soviet Russia," New York, 1938, p. 416. U.S. Mint estimates in parenthesis from H. Schwartz, "Russia's Soviet Economy," Englewood Cliffs, N.J., 1963, p. 484.

The increase by two-thirds in 1 year alone, 1934, was indubitably on account of production from forced labor, in this case particularly to the entry into production at the end of 1933 of the major Bilibino deposit on the Upper Kolyma. Jasny, a Russian emigré economist whose contemporary estimates of Soviet farm output were later proved right when the true figures were officially published after Stalin's death, considered (rightly in view of later evidence) that some 200,000 lab-

[1] A. C. Sutton, "Western Technology and Soviet Economic Development 1917–1930," Stanford, Calif., 1968, p. 98.
[2] Solzhenitsyn, "The Gulag Archipelago," London, 1974, pp. 52–3.

orers were engaged in gold mining in the Magadan area in 1940,[3] though his estimate of gold production there—about 100 tons—was thought by a former prisoner—though not involved in the area, Swianiewicz, to have been exaggerated.[4] Our estimate for 1940 is 68 tons.

The only Soviet statement found which relates to byproduct output is that the volume of auriferous ore processed increased by more than six times between 1933 and 1940, but no estimate of ore output in either year has been feasible. Mentioning that increment, the organ of the U.S.S.R. Ministry of Nonferrous Metallurgy observed that this was chiefly because from 1936 onward quartz ores were mined to supply fluxes to nonferrous metallurgical plants.[5]

Our estimates put gold output, from all sources, in the year before the German invasion at 137 tons. The peak year was 1940, both for Dal'stroy and for all-union production. Mining by forced labor continued throughout the war—prisoners' accounts are the most numerous for that period—and while the Kolyma was run down (1956 was "1.8 times lower" than in 1940),[6] the Aldan field in Yakutia expanded (1950 was 1.7 times above 1942).[7]

The law on the 5-year plan 1946–50 spoke of "extensive gold prospecting with a view to building new mines," and by 1950, on our estimates, output would have been about the same as in 1940.

Swianiewicz notes a statement by a Deputy Procurator-General of the U.S.S.R. that in May 1957 the number of prisoners was 30 percent of the number held when Stalin died, in March 1953,[8] but the release of political prisoners, mainly in 1956, was not as serious for gold output as might be thought. Some mechanization had already begun, for the first dredge was installed on the Kolyma river in 1950. The increasing contribution of ore-mining was little affected by the amnesties, because skilled free labor was being used, and some of the placer production lost by the liberation of prisoners was offset by the work of private prospectors. Private miners had been forbidden entry to the northeast between 1932 until the liquidation of Dal'stroy in 1956.

Some prisoners may still be found in gold-mining, but the expansion of the 20 years since the mass releases has been due to intensive mechanization—above all of placer production, but with a much higher capital endowment even in ore-mining, notably by the sinking of deeper shafts, or of reopening workings to mine a lower level. In the placers the suddenness of the influx of machinery may be illustrated by the receipt by the Northeast Gold Trust of 2,158 bulldozers in the period of the eighth 5-year plan (1966–70), since the total in stock at the end of that plan was 2,475. In a description of the progress made under that plan, the U.S.S.R. Minister of Nonferrous Metallurgy, P. F. Lomako, stated in the organ of his Ministry that the Chief Administration for Gold and Platinum Mining (Glavzoloto) had reduced its production personnel by 4,900, while increasing output by 42 percent and labor productivity by 53.6 percent.[9] The figures imply a decline in total production staff from 64,470 in 1965 to 59,570 in 1970. He quoted

[3] N. Jasny, Journal of Political Economy, October 1951, pp. 405–19.
[4] S. Swianiewicz, "Forced Labour and Economic Development," London, 1965, p. 292.
[5] Tsvetnye metally, No. 10, 1967.
[6] "Dal'ny Vostko," Moscow, 1966, p. 448.
[7] Yakutiya za 50 let v tsifrakh," Yakutsk, 1957, p. 26.
[8] Ibid., p. 50.
[9] "Tsvetnye mentally," No. 1, 1971.

similar data for the group exhibiting the biggest decline, the Lenzoloto Combine (output rose 26 percent while productivity rose 66 percent and production staff fell by 1,300), showing that the work force in the Lena Fields was cut from 5,400 to 4,100. The Yakutzoloto Association made a 4-percent reduction in its manpower but, by raising output 35 percent, improved labor productivity by 41 percent. On Dowie's production estimates for Consolidated Gold Fields, one worker produced 2.24 kilograms in the Lena Combine in 1965 and 3.73 kilograms in 1970. A similar productivity in the neighboring Yakut Association would have required a work force of some 16,200; on other evidence, Dowie puts it at 14,500, and the reduction can be taken to be of the order of 600 staff. Other gold and platinum enterprises would thus have cut production employment by around 3,000. That this policy was to be continued under the ninth 5-year plan (1971–75) was clear from the Minister's further statement that his Ministry as a whole would increase output without any increment in productive personnel. His additional remark that the 1975 output level would need 260,000 more workers if productivity did not rise, taken in conjunction with the stated targets in the text of the plan for 40 percent increments both in production and in productivity, indicates a 1970 employment of 650,000 production staff. Dowie in the same study for the company indicates a source for a total employment by the Ministry of Nonferrous Metallurgy in 1974 of "about 1 million." [10]

The ninth 5-year plan seems to have been underfulfilled, notably because the rising trend of the initial 4 years was checked by a complex of coincident production difficulties in the terminal year. Whereas the target may have been 440 tonnes, the estimated output for 1975 was 408 tonnes.

In the 10th plan (1976–80), the focus of dynamism has shifted away from the Soviet Far East to central Asia. An immense open-cast mine is working deposits at Muruntau in the Kyzyl Kum Desert. Metal was discovered in 1958 and the first ingot was poured in July 1969. The significance of the project, which is still expanding, is that the quartz veins are both fine and close to surface, while the refining adopts a system never used anywhere; namely, the resin-in-pulp method elsewhere employed in processing uranium. Muruntau is destined to become the U.S.S.R.'s largest single producer; together with the continuing enlargement of the Zod mines, the center of gravity of Soviet gold production is clearly shifting to central Asia. That movement is accentuated by the enlargement of byproduct output, since the chief centers of polymetallic ores with gold are in Kazakhstan.

Table 2 links our postwar estimates with 1940 as estimated in table 1. The series were worked back from estimates of 15 regional producing areas of private prospectors' output and of byproduct yield in 1970; and the close approximation of the two estimates for 1940 offers some assurance of the correctness of the estimation procedure.

Estimates made by the officials of the U.S. Government are reproduced in table 3: the data are close to those published by the Bureau of Mines in its Minerals Yearbook, and are from a table reproduced by the Central Intelligence Agency.[11] The differences are small—thus,

[10] Ibid., No. 10, 1967.
[11] "Handbook of Economic Statistics 1977" (ER 77–10537), table 44; ibid., 1978 (ER 78–10365), table 46.

the Minerals Yearbook gives 5.7 mn ounces for 1967, whereas the CIA shows 5.53 and it gives 7.8 mn ounces for 1974 whereas the CIA states 7.97 mn ounces.[12]

TABLE 2.—POST-WAR PRODUCTION OF GOLD

[In tonnes]

	As main product	Including by-product		As main product	Including by-product
1940	127.5	136.9	1964	211.1	237.4
1950	125.1	139.2	1965	226.4	253.7
1951	126.3	141.1	1966	239.1	268.5
1952	127.5	143.0	1967	251.3	282.7
1953	127.6	144.0	1968	264.1	298.5
1954	128.1	145.3	1969	287.7	324.9
1955	127.6	145.7	1970	306.0	346.7
1956	128.0	146.7	1971	318.2	359.8
1957	133.8	153.2	1972	336.0	378.9
1958	141.6	161.7	1973	353.9	398.2
1959	153.6	173.8	1974	375.0	420.7
1960	158.8	180.7	1975	359.9	407.9
1961	173.8	196.8	1976	393.0	443.6
1962	186.2	210.3	1977	* 392.9	444.0
1963	197.3	222.6	1978	* 400.8	* 452.9

Sources: Estimates compiled for Consolidated Gold Fields (London), except for those asterisked.

TABLE 3.—U.S. GOVERNMENT ESTIMATES OF GOLD PRODUCTION AND RESERVES

[Million troy ounces]

	Production	Reserves		Production	Reserves
1965	4.95	29.03	1972	7.17	55.95
1966	5.30	33.31	1973	7.72	52.98
1967	5.53	37.81	1974	7.97	54.78
1968	5.85	42.57	1975	8.20	57.10
1969	6.14	47.52	976	8.39	52.79
1970	6.40	52.66	1977	8.68	49.38
1971	6.66	56.14			

Source: Central Intelligence Agency, "Handbook of Economic Statistics 1978" (ER 78–10365) p. 49.

The divergence between the present estimates and those of the U.S. Government agencies is wide and widening. For 1965, the former give 254 tonnes, or 47 percent above the latter's 154 tonnes, but for 1967 the former gives 444, or 64 percent above the latter's 270 tonnes. The latter series was used in the previous compendium in this series on the U.S.S.R. for the Sovmod projection.[13] The 1980 output projection there stated was 268 tonnes, but the reserves series of the model was calculated by cumulating the excesses of output over sales for hard currency, thereby ignoring the consumption of gold for decorative or industrial uses, or in sales to Comecon members as coin and medals. The longer term analyses being undertaken by the present writer will attempt to update the calculations made for 1964–71.[14] The 1971 estimate was of 55 tonnes in these uses, representing 15 percent of the output estimated in table 2 (360 tonnes) or 27 percent of that estimated in table 3 (207 tonnes).

[12] Ibid., 1967, vol. IV, p. 725; and 1974, vol. IV, p. 735 respectively.
[13] Donald W. Green et al., in "Soviet Economy in a New Perspective," U.S. Government Printing Office, Washington, D.C., 1976, p. 325.
[14] M. Kaser, in D. Lloyd-Jacob and Peter Falls, "Gold 1971," Walker, New York, 1971, p. 228.

SOME THEORIES OF THE HARD CURRENCY SHORTAGES OF CENTRALLY PLANNED ECONOMIES

(By Franklyn D. Holzman*)

CONTENTS

SUMMARY

Centrally planned economies have experienced persistent balance of payments pressures in western markets. These have been expressed partly as deficits and rising debt, but have been partly repressed. To some extent these pressures have resulted from systemic factors inherent in central planning. In terms of the theory of comparative advantage, one might say that the CPE's have a comparative disadvantage in selling. Among other things, central planning leads the CPE's to overestimate the saleability of their manufactured products which, for systemic reasons, tend to be of relatively low quality. The term "quality" here stands as a proxy for all nonprice dimensions of products, such as: Servicing, packaging, style, level of technology, availability of spare parts, et cetera. A second systemic disadvantage is "inability to devalue" in order to get into balance of payments equilibrium. A third is the endemic practice of "taut" planning which automatically generates external excess demand. Finally, CPE balances of payments have proved very vulnerable to cyclical fluctuations of demand from the West. Since 1974, this has been the major factor behind the rising hard currency debt.

I. INTRODUCTION

Since East-West trade began to expand in earnest about a decade ago, a major concern of governments, business men, and economists in the West (as well as in the East) has been the fact that the socialist nations (Eastern Europe and the U.S.S.R.) appear to want to import

*Tufts University. This paper benefited from the comments of Abram Bergson on two earlier drafts. Much of the material in Parts IV–VI appeared in Holzman, 1979.

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more from the West than they can pay for with current exports plus reserves and credits. Of course, they often manage to keep their payments within these bounds by the exercise of rigid trade controls but this barely disguises their obvious excess demands reflected, in part, in constant requests for credits and in rapidly increasing debt service/export ratios.[1] At the moment, there seems to be no solution to this problem in sight. I would like to argue here that the hard currency payments difficulties faced by the socialist nations are, in fact, likely to continue for a long period of time. This is because they are due to certain systemic features of the Stalinist model of central planning as presently practiced in Eastern Europe and the U.S.S.R. and are unlikely to disappear in the absence of rather drastic reforms in planning methods.[2] Such reforms, I feel, are unlikely to be implemented in the near future.

The discussion will begin with a brief outline of three well-known features of the Stalinist central planning model which are relevant to the foreign trade problem. This will be followed in section III by the impact of planning on the quality and competitiveness of Communist bloc products and implications are drawn in the framework of comparative advantage theory. Beginning with section IV, an attempt is made to demonstrate why central planning with direct controls leads to persistent deficits (or repressed deficits) with the West. It will be argued that the planners suffer from three illusions, each of which leads them to make ex ante foreign trade plans which cannot be fulfilled and which result in unplanned deficits and/or repressed demands. These illusions are termed: A "saleability" illusion (related to the discussion in sections III), a "terms of trade" illusion, and a "macro-balance" illusion.[3] The "terms of trade" illusion results from the inability of Socialist nations to use devaluation to improve their balances of payments.

II. Some Major Features of Central Planning Under Communism [4]

Virtually all industrial enterprises in the Communist bloc are owned by the state and operated by managers appointed by the government. The planners set output, sales, and profit targets as well as prices

[1] Cf. Farrell (1973), Snell (1974), Brainard (1976), and Zoeter (1977).

[2] Some LDC's have chronic balance of payments problems as do some advanced industrial nations. Many of the factors behind the socialist nations' problem presented below are unique to them, however. Other than systemic factors may also be responsible, of course. For example, the recent readier availability of western investments and credits on reasonable terms and the willingness of CPE's to entertain such relations with the West is one such factor.

[3] While not precisely comparable, parallels with western experience may be drawn for illustrative purposes. A communist country with a "saleability" illusion is one which faces balance of payments problems similar to those faced by a capitalist nation in "structural" disequilibrium. Nations which run deficits because their exportables have recently become obsolete or have been exhausted (raw materials) are cases in point. The "terms of trade" illusion is experienced by western nations with overvalued exchange rates. Western nations with full employment and inflation are apt to experience balance of payments problems related to those of communist nations with what we have called a "macro-balance" illusion.

[4] The characteristics of central planning which are described directly below and foreign trade behavior described in later sections are a quite accurate description of present practice in all of the nations of the Soviet Bloc except Hungary which has undergone substantial economic reforms over the past 5 years. It is probably most descriptive of the situations in the U.S.S.R., Rumania and Bulgaria and somewhat less so of Czechoslovakia. Poland, and East Germany. Nevertheless, it should be stressed that as a result of recent reforms, central planning in all of the Eastern nations is somewhat less rigid than described below.

for most enterprises, determine delivery dates, and tell each enterprise from whom it is to buy a large part of its nonlabor inputs and to whom it is to ship its products. Since there is, in effect, no real market through which supply and demand can seek an adjustment, this particular chore which is accomplished anonymously by "invisible hands" in the West, must be handled explicitly by state planning organs. This is a laborious process which requires the establishment, for literally thousands of products (in the U.S.S.R.), of "material balances" in which all sources of a commodity are listed on one side and uses or shipments on the other. If the supply and demand for a product do not balance, or balance is upset by some unpredicted event, substantial difficulties are encountered because of the complexity of interindustry relationships. Suppose, for example, that the steel balance shows a 1 million ton deficit, and a decision is made to increase steel output by this amount. The steel industry will have to be allocated more coal, limestone, machinery, labor and so forth—upsetting the balances for each of these latter commodities. Further, in order to produce more coal, limestone, and machinery, it is necessary to have more steel (and machinery, labor, etc.) than the original million extra tons desired; this requires still more coal, limestone, and machinery; and so forth in a many-staged regress. Alternatively, if it had been decided to solve the balance problem by cutting back on shipments of steel (rather than increasing steel output), similar adjustments would have to be made as various enterprises found themselves with less steel than anticipated, were forced to cut back shipments to other enterprises, and so on.

In practice, central planning has always been overfull employment planning. As some scholars have put it, the plans are "taut" envisioning higher levels of economic activity than can possibly be sustained given the available resources, including labor. Enterprises are given targets which cannot all be fulfilled despite the fact that each manager has strong bonus-type incentives to reach his individual target. The result is that there are always more demands for goods than goods available, sellers' markets are pervasive, inventories are inadequate and badly distributed because of hoarding, planners' balancing problems are aggravated, and there is repressed inflation—more money than goods.

Partly as a consequence of central planning with direct controls, prices in the CPE's (centrally planned economies) have always been disequilibrium prices which would not equate demand and supply if the economy were "freed" and which do not bear rational relationships to each other. Prices do not, of course, have to equate supply and demand since this is accomplished directly by the planners through their method of "balances." There are other factors behind price irrationality. Until recently, enterprise accounts have not included proper charges for rent, interest, and profits—only labor has been adequately accounted for. Furthermore, many enterprises have received subsidies selling their products below labor cost; others, mainly those in the consumer goods industries, have had very large excise taxes levied on their products. The overall picture is one of great confusion with each bloc nation having its own individual set of irrational prices, incomparable with its neighbors'. This is frankly admitted as the following statement by three Polish economists testifies:

* * * Because of the autonomous system of domestic prices in each country, an automatic and purely internal character of the monetary system and arbitrary official rates of exchange which do not reflect relative values of currencies, it is impossible to compare prices and costs of production of particular commodities in different countries.[5]

III. Bloc Competitiveness and Comparative Advantage Theory

The static comparative advantage model tells us that every nation can produce some products *relatively* more cheaply than other nations and presumably these are the products which are likely to be exported. To be useful in interpreting the real world, of course, the model has to be modified for actual conditions such as costs of transport, tariffs, and so forth. In the case of the centrally planned economies (CPE's) modification is necessary for a unique reason; namely, their relative inability to "sell" products to the West except for relatively homogeneous raw materials. This inability to "sell the product" is expressed in the difficulties in adapting to the special requirements of western buyers and to the generally low quality of most industrial products. In the words of Imre Vajda, until his death Hungary's leading expert on East-West trade, the lack of competitiveness of CMEA's exports is attributable to lack of innovation and to deficiencies in "performance, reliability, * * * appearance, packing, delivery and credit terms, assembling facilities, after-sale services, advertising, * * * selling itself * * *, *primarily factors other than price* * * *" (Vajda, p. 53, my italics).

These deficiencies are all rooted in central planning as it has been practiced over the past two decades. For most enterprises, sales of goods in domestic markets depend on direct allocation of products via the plan rather than on "salesmanship". Products are really "distributed" rather than "sold". Management incentive to do a good job is further weakened by overfull employment planning and the perennial sellers' markets which this has generated. Buyers are generally so glad to get the deliveries planned for them that they are unlikely to complain if product quality is not up to specification. In effect, the usual beneficial effects of competition under capitalism are not experienced in internal Socialist markets. Nor does competition play a significant role in intrabloc foreign trade. Trade flows between pairs of socialist nations are determined in large bilateral bargaining sessions. Not only does each enterprise export into a protected predetermined market but, in fact, there is usually no contact between the producing enterprise of the exporting nation and the consuming (using) enterprise or person in the importing nation. The major form of contact is between exporting and importing state-trading enterprises in the two nations and, under these circumstances, the feedback from consumer to producer is either absent or very weak.

The net result of distribution via plan, perennial sellers' markets, and insulation of a seller from buyer in foreign trade is low quality and a reduced ability to sell manufactured products in competitive

[5] Cited by Fallenbuchl, 1974, p. 104 from a 1971 Polish source. For a similar statement by two Soviet economists, see Alekseev and Borisenko, 1964, p. 47.

Western markets.[6] To have a comparative disadvantage in "selling" is much more of a handicap than having a comparative disadvantage in the production of certain products because it cuts across a wide range of products (below).

A second factor which adds to the comparative disadvantages of the Socialist nations is their relative weakness in innovation and technological change. This weakness has been documented many times [Wasowski, 1970] and was a major impetus for economic reforms, mostly unsuccessful, undertaken in the late 1960's and still in process. Many institutional factors can be adduced which explain these problems in innovation. One of the major factors is the same lack of competition due to distribution by plan and sellers' markets that was responsible for "inability to sell" discussed above. Further, enterprise incentive systems inadequately reward managers for introducing new technology in comparison with the rewards for just fulfilling output and distribution targets. Since introducing new products and new techniques upsets traditional supply channels and disturbs established production routines, managers view innovation as inherently risky. Another impediment: While R. & D. expenditures in the Socialist nations are relatively large, the tie between producing enterprises and R. & D. establishments is not the intimate one that exists in Western industry and in a significant sense the productivity of these establishments appears to be quite low, and so forth.

In the days of the so-called permanent dollar shortage, it was argued by some that U.S. superior ability to generate and apply new technology was a major cause of our balance of payments strength. It was argued, in effect, that an equilibrium based on traditional static comparative advantage was constantly upset by the destabilizing dynamic influence of U.S. innovations. The wheel was turned full circle by Raymond Vernon's product cycle theory in which it was argued that innovators quickly lose their markets to lower cost (usually lower wage) imitators and after a short time are forced to import the products they formerly exported—and from the same nations [Vernon, 1966]. Balance between innovator and imitator is maintained when the innovators substitute a new product for the old.

Now, not only are the Socialist nations poor innovators, but, for the same basic reasons, they are also poor imitators. What this suggests then is that insofar as technology, innovation, and imitation are important factors in the determination of world trade flows, and that they are important is now fairly well established (see, for example, Vernon, ed. 1970), the Socialist nations tend to be in a constant moving disequilibrium with the West.

The comparative disadvantages suffered by the CPE's would not be as serious as they are were it not for the fact that manufactured products comprise such a large and increasing part of world trade. Between 1938 and 1969, their share in world trade rose from 39 to 64

[6] Inability to compete in Western markets is further aggravated by "commodity inconvertibility" to be discussed in section V. In effect, the Eastern nations find it difficult to make unplanned exports because of the disruptive effects on the central plan. This prevents them from taking advantage of many marketing opportunities and also often means that potential Western importers face longer than usual delivery times and may decide to buy elsewhere.

percent in constant 1963 prices, and from 46 to 64 percent in current prices. Commodities in the SITC categories 5 through 8 (manufactured goods) constituted, in 1969, 74.5 percent of the exports of the developed market economies.[7] To be limited in ability to export products to the West which are the major fare of world trade is a serious limitation, indeed. The Soviet bloc nations do produce respectable amounts of industrial and manufactured products. As Paul Gregory [1970, pp. 175, 180] has demonstrated, the speed with which they have oriented their economies toward industry and manufacturing is unprecedented. This foreign trade with each other also reflects the predominance in their economies of industry and manufacturing: In 1967, 70 percent of their trade with each other was in SITC categories 5 to 8, that is, in manufactured goods. This figure would undoubtedly have been even higher had intrabloc trade not included the large raw material shipments to the other nations from the U.S.S.R. The comparable figures for the percentage of manufactured goods in total exports of EEC and EFTA in 1967 were 80 and 79 percent, respectively—not too much higher in light of the aforementioned Soviet raw material exports. The problem of the CMEA nations in earning hard currency is reflected by the fact that the percentage of their exports of manufactured goods to EEC and EFTA were only 21 and 41 percent of totals to these nations (contrast with 70 percent intrabloc), whereas corresponding imports were 90 and 84 percent, respectively.[8]

Before leaving this section, it is important to square the above observations with received theory. At least two trade theories can be adapted to explain or throw light on the predicament of the Communist countries due to the factors elaborated above.

(1) Static comparative advantage theory, as noted above, is usually phrased in terms of relative production costs. The nations of Eastern Europe undoubtedly have the capability of producing and do produce many industrial and manufactured products "relatively" more cheaply than many Western nations. The several U.S.–U.S.S.R. purchasing power parity studies which have appeared show a wide range of ruble-dollar ratios in manufactured goods and reveal that the U.S.S.R. produces many industrial products in which it appears to have a clear comparative cost advantage vis-a-vis the United States (Becker, 1959 and 1973; CIA, 1960). It is a long step, however, between producing cheaply and being able to compete successfully in world export markets. It is easy to ignore or assume away the "ability to sell" when this collection of traits (quality, service, advertising, packaging, et cetera) is relatively evenly distributed among nations. In the case of the centrally planned economies, this easy assumption is no longer possible. Comparative production costs no longer determine trade flows; salesmanship in all its many variants is also important. Problems in selling manufactured goods are compounded by relative inabilities to innovate and imitate. A static theory of comparative advantage modified to incorporate marketing and innovation activities would say that CPE's do

[7] All figures estimated from United Nations, 1971, pp. 71–72. It is important to note that the rise in oil and other raw material prices over the past 5 years would reduce the percentage that manufactured goods are of total world trade.

[8] All of the above figures are from United Nations, 1970A, pp. 102–105. In 1968 the ratio of Western European imports from Eastern Europe relative to exports to Eastern Europe was .32 for all manufactures and .19 for engineering products. Corresponding ratios for the U.S.S.R. were .13 and .11. Cf. United Nations, 1970B, p. 75.

have comparative advantages in production of many manufactured goods but lack the "factors" for comparative advantages in marketing and innovation. Such a theory would predict that in a properly functioning trading system, the CPE's would want to import from the West marketing and related services, high quality goods, and technology. Such import behavior is, in fact, observed and is steadily increasing. Unfortunately, the mechanism for importing marketing and other such skills are insufficiently developed to enable the CPE's to realize their potential comparative advantages in production of many manufactured products.[9]

(2) Linder's theory of trade and transformation on the face of it does not appear to fit the experience of the Communist nations in East-West trade. Linder argued that the Heckscher-Ohlin differential factor proportions theory of comparative advantage fails to explain the intensity of trade between developed industrial nations. Among such nations, trade is more intense in manufactured products, the more alike (rather than different) such nations are in factor proportions, per capita income,[10] and so forth. Similarity between two nations means that each has (1) the ability to produce the kinds of products demanded by the other as well as (2) a demand for the products produced by the other. Trade then takes place as a result of minor differences in tastes and of product differentiation—trading Chevrolets for Fiats. Intrabloc trade appears to have developed along these lines. For example, exports of manufactured goods increased from 53.5 to 70.4 percent of total intrabloc exports between 1957 and 1967. On the other hand, over the same period bloc exports to EEC changed from 26.7 to 26.6 percents, and to EFTA increased from 32.2 to only 40.6 percents.[11] How can East-West trade be squared with Linder's theory? To generalize this theory, one would have to account for the characteristics of nonmarket economies. A broader formulation would have greater intensity of trade in manufactured products, a function not only of similarities of factor proportions and per capita income, but of type of economic system as well.[12] Under these circumstances, systemic differences would lead one to predict less trade in manufactured goods as a percent of total trade in East-West than in either West-West or East-East trade.

IV. The "Saleability" Illusion

The main point of the preceding section is that the Socialist nations have a comparative disadvantage in "selling" and in "developing technology" and that this makes it difficult for them to compete in that 75 percent of world markets in which industrialized nations trade. It is now necessary to show how this factor and other systemic problems (below) have affected their balances of payments.

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[9] Prof. Edward Hewett who independently has developed similar views argues that "structure of organization" can be viewed as a "factor endowment" which differs among systems. CPE organization tends to be bureaucratic. Since production activity is more bureaucratically organized than marketing or R. & D., the CPE's will tend to have a comparative advantage in the former and disadvantage in the latter two. A brief summary of this view is contained in Hewett. 1974.

[10] Closeness in per capita income will usually involve capital-labor ratios which are not too far apart, hence similar factor proportions.

[11] On the import side, the increments were 11 and 16 percents, respectively, from EEC and EFTA, and were at the higher levels indicated above.

[12] Following Hewett's formulation, one could argue simply that factor proportions are different—since he views "structure of organization" among the factors.

Historically, it is useful to distinguish between the period before, say, 1955 and the years after 1965. Excess demand for Western goods certainly existed in the early period but it was small compared with the recent period. Several factors are responsible. First, Western controls on exports of strategic materials to the Socialist nations were extremely severe in the first decade after World War II and there was relatively very little of interest available for import by the Eastern nations. Second, there was considerable political pressure within the group of Socialist nations to foster intrabloc trade (as opposed to East-West trade) to the greatest extent possible. Therefore, even though the Eastern nations did engage in some trade with the West, they, undoubtedly repressed their desires for Western goods far below the level which was possible even with Western controls.

Developments in recent years have had, in Johnson's (1968) terminology, a "pro-trade-bias" for Western products.[13] Several factors were responsible. First, the decline of the cold war and development of détente led to a substantal reduction in Western trade controls. As more goods became available, Eastern interest in Western products expanded. Second, the severity with which the Eastern nations repressed demand for Western products was eased. This was due in part to the developing détente with the West and in part to the fact that the U.S.S.R. was simply neither willing nor able to exercise the same degree of political control over the bloc after Stalin's death. Hence, demand for Western products was no longer repressed to the same extent. Third, as the Eastern nations developed, they became more interested in consuming high-quality high-technology products than before. Fourth, this interest which existed earlier, was intensified by the dramatic decline in growth rates throughout Eastern Europe and the U.S.S.R. since about 1960. This decline is quite generally attributed by both Eastern and Western economists to the fact that the major gains from extensive growth have been exhausted and that further rapid growth will have to be intensive. This will have to be achieved by raising productivity through the use of higher quality machinery and equipment and, in particular, products embodying advanced technology and generally available almost exclusively in the advanced Western industrial nations.

Now, in order to satisfy this both increased and less-repressed demand for Western imports, the Socialist nations have attempted to increase their exports to the West. They have succeeded in doing so but all indications are that the increase in exports has consistently lagged behind the increase in demand for imports. This in itself should not necessarily lead to deficits (although some deficits may be planned in advance to the extent that reserves or credit are available). For, to the extent that the CPE's are fully aware of their selling difficulties, they can tailor their planned imports to the amounts which can be financed through exports. "Saleability" problems, in this case, would simply reduce the level of trade. To some extent, this has probably occurred.

Apparently, however, the planners also suffer from a "salability" illusion which leads them to overestimate the amount of exports they

[13] A "pro-trade-bias" on the import side means that the "income (output) elasticity of demand for imports" is greater than unity.

can sell each year in the West. When ex ante export plans are not fulfilled, the ex ante balanced trade plan becomes an ex post deficit (with unplanned drawing down of reserves or unplanned credits) and/or import plans cannot be fulfilled. Support for the hypothesis that a "salability" illusion exists can be found in the Eastern literature. For example, the eminent Hungarian economist, the late Sandor Ausch (p. 109) has stated:

> In many cases . . . the extent of exports "planned" by individual CMEA countries exceeds what the capitalist market in question is able to absorb . . .

Speaking on the same issue, the U.N. Economic Commission for Europe (1970, p. 115) puts the problem as follows:

> . . . East-European planners and exporters experience considerable difficulties in assessing their possibilities for sales of manufactured goods to the industrialized countries of western Europe and also in selling their goods on the markets in question once decisions to export have been taken. These difficulties stem from uncertainty concerning terms of access to the markets, the small volume of present exports, the long-standing ties between west European enterprises, the keen competition in industrial goods in general and in technologically advanced products in particular, and the lack of experience on the part of east European economic organizations in western forms of marketing.

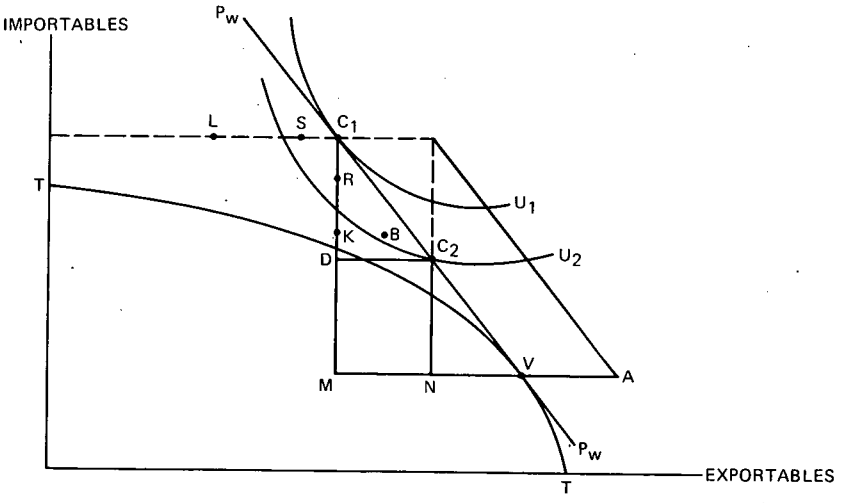
One would think that the "salability" illusion would eventually disappear. At least four reasons can be given which may explain its persistence. First, and most important, Western markets account for no more than about 4 percent of Soviet-bloc sales (domestic and foreign), in the case of the U.S.S.R. less than 1 percent. The planners think that their products are salable in the West on the basis of the continuing experience that 96 percent of their products are salable either at home or in intrabloc trade. This experience is undoubtedly so overwhelming that it is difficult for the planners and especially plant managers to adapt in practice fully to the idiosyncracies (to them) of Western markets. Second, some attempts are undoubtedly made by bloc producers and salesmen to improve the "quality" and "salability" of their products. But the quality, technology, et cetera "gaps" are probably perceived by bloc planners as stationary goals when in fact they are moving targets. When bloc products and techniques are improved, planners perceive equality but, in fact, a "gap" remains at a new and higher level. Third, many bloc foreign trade organization representatives undoubtedly do realize that the products they are trying to sell are deficient by Western standards. It is one thing to recognize the problem; it is another, however, to force producing enterprises, advertisers, packagers, servicers, et cetera to meet higher specifications when they have little or no motivation to do so. Finally, the foreign trade plans may be chronically too "taut" just as the national domestic economic plans are and for analogous reasons. Possessed of a great desire for imports from the West, the planners attempt to sell more to the West than is feasible; and the more they wish to buy from the West, the greater the temptation to try to export products which may be unsalable.

We have argued above that bloc exports to the West tend to fall short of plan because of their poor quality. No such market impediments exist on the import side. Imports are geared to the plan and transactions are consummated on the expectation that export earnings will be available. When it turns out that export earnings are falling be-

hind, a deficit results and/or imports are repressed. It is, of course, hard to repress imports especially of intermediate products because negative repercussions on plan fulfillment can be very expensive possibly costing many times the market value of the import.

The problem generated by the "salability" illusion is presented diagrammatically in chart 1. Let T be the CMEA transformation curve, with the X axis representing exportables, the Y axis representing importables. In order to simplify the presentation, we assume that the only exportable is a low-quality low-technology manufactured product. Our importable can be any product that CMEA wishes to buy from the West. Clearly, we have in mind here primarily high-quality high-technology manufactured products. Let P_w represent the world price line, and V the production point. P_w is shown as tangent to T at V; it need not be, of course, and probably is not—but the argument is not affected by the assumption. Let the U's represent the set of CMEA community indifference curves in a choice between domestically-produced goods, including those trade within the bloc (called internal trade), and goods imported from the West.[14]

Chart 1. CMEA's Trade with the West



In effect, then, the CMEA nations establish plans which envisage exports totaling VM in exchange for imports totaling MC_1. They are frustrated in their attempt to carry out these plans because of the quality of their product and their inability to "sell." They find that at world price, P_w, they can only market VN of exports which brings in only enough foreign exchange to import MD ($=C_2$) worth of goods. This leaves them with an excess demand for hard currency imports of DC_1. This excess demand may be satisfied through borrowing or drawing down reserves of hard currency or gold by an amount VA. Rapidly rising debt-service/hard currency export ratios (Farrell.

[14] T and U are taken to represent CMEA rather than a representative CMEA nation in order to abstract from intrabloc trade. Alternatively, we might have either assumed a Communist nation which conducted all of its trade with the West; or added another dimension to the diagram to include intrabloc trade.

1973; Snell, 1974; Brainard, 1976; Zoeter, 1977) indicate that borrowing has been resorted to on a fairly large scale and much of this was "unplanned." The excess supply of exportables, MN, is not likely to be observable, however, since these are rapidly absorbed into the domestic economy when they prove unsaleable at the going world price. The rationale for this statement is presented in Section 6 below.

V. Inability To Devalue and the "Terms of Trade Illusion": An Import-Export Asymmetry

In the previous section, we sidestepped the question as to whether or not bloc currencies were overvalued. As we shall demonstrate shortly, bloc currencies cannot be viewed as overvalued in the usual western sense. Nevertheless the foreign trade behavior as described in section IV which results in either unplanned deficits or the need to suppress planned imports does suggest the equivalent of overvaluation.

Another factor suggests the existence of (the equivalent of) overvaluation. We refer to the fact that the socialist nations can be viewed as a high-cost, low-variety, low-quality economic region relative to the rest of the world. In addition to factors cited in section III, this is due to their relatively small size (in world trade), to the fact that they concentrate their trade among themselves, and represent in effect the socialist version of a highly trade-diverting customs union.[15] As is well known, trade diversion implies higher costs; and a trade-diverting customs union is one in which members produce and sell to each other at higher than world prices. If one views the socialist nations as a high-cost enclave in the world economy, a situation perpetuated by implicit discriminatory quotas, then it follows that any relaxation of controls or mutual reduction of East-West barriers will lead to a tendency toward more imports by East than by West, a situation which will continue so long as East-West barriers exceed East-East and West-West barriers.

While under capitalist institutions, the above circumstances would spell currency overvaluation and would call for devaluation as a remedy, under present socialist institutions the same cannot be said. Bloc currencies are totally inconvertible and, in international trade, serve none of the usual functions of money (medium of exchange, store of value). By the same token, devaluation of these currencies (that is, changing official nominal values) has no impact whatsoever on bloc foreign trade. This peculiar state of affairs is a result of central planning with direct controls. One aspect of this problem has been dubbed "commodity inconvertibility." Commodity inconvertibility means that foreign buyers are not allowed to come into a centrally planned economy and shop around freely for goods as in capitalist countries. That is to say, foreign buyers are not allowed to compete with local enterprises for goods which have been allocated under the national plan since such competition would disrupt the carefully drawn fabric of the plan and lead to the undesirable repercussions noted earlier. Further, given irrational domestic prices, foreigners might purchase commodi-

[15] This is suggested by the following fact. Before World War II, they traded very little with each other—around 15 percent or less: the comparable percentages since about 1952 have been between 55 to 80 percent. Second, trade/GNP ratios have been much lower than they would have been had these nations not turned socialist and embraced each other as trading partners (Pryor, 1968). Trade creation implies rising trade/GNP ratios.

ties at a price below the real cost of production—heavily subsidized commodities, for example. For these reasons, foreign importers are restricted largely to the commodities offered by the foreign trade associations as established in the State plan and usually under long-term agreement. Further, the Socialist nations don't allow foreigners to hold their currencies—in any case there wouldn't be any takers because of uncertainties as to what the money could buy, when, and at what price.

Inconvertibility is also a necessary consequence of the fact, described earlier (section II), that each Socialist nation has a set of irrational prices which differs unsystematically from that of other Socialist nations and from world prices. Obviously, an exchange rate which links a set of irrational prices to other sets of prices, rational or irrational, can have little meaning or function. The existence of commodity inconvertibility and irrational prices has forced these nations, as a last resort, to trade with each other (and with the West) at world prices or at some approximation thereto, and to settle their trade imbalances [16] either by deferred shipments of goods or by payments of convertible currency or gold.[17] That is to say, their currencies do not function as means of payment and their official exchange rates do not serve as real prices.[18] Now, while the use of world prices and convertible currencies effectively circumvents the need to use Socialist currencies and exchange rates, it does by the same token deprive these nations of an important instrument variable for improving their balances of payments, namely, devaluation.[19] Inability to devalue is a substantial handicap in the struggle to achieve payments balance.

Unable to devalue, Soviet bloc foreign trade planners largely trade with the West at a set of world prices which makes them deficit prone just as are Western nations with overvalued currencies. Under capitalism, maintenance of an overvalued exchange rate leads to deficits because the individual importers and exporters receive misleading signals and the capitalist nation, taken as a whole, operates under a "terms of trade" illusion. Importers are provided, in effect, with hidden subsidies which makes foreign goods look cheap and which leads them to import more than is consistent with payments balance; and exporters are saddled with the equivalent of a hidden tariff which makes foreign competing products look cheap and prevents them from selling as much as is consistent with trade balance. Western authorities become aware of overvaluation when deficits are incurred. Devaluation by the proper amount then eliminates implicit subsidies and tariffs and restores payments equilibrium.

Soviet bloc planners depend, like western authorities, on deficits to signal disequilibrium or the equivalent of overvaluation. Although they cannot devalue to eliminate a deficit, is it possible to simulate devaluation? The answer is yes particularly for exports but it is not clear that such a policy will be blessed with success.

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[16] World prices provide the only consistent set of relative values upon which they can agree.

[17] In intrabloc trade, an attempt is made to avoid imbalances and trade is usually within a few percent of perfect bilateral balance in world prices.

[18] This is not strictly true for Hungary at present.

[19] Evidence that past Soviet devaluations have not affected either the quantities or selling prices of exports or imports is presented in [Holzman, 1973]. The reasons for these devaluations are discussed in [Holzman, 1968].

Devaluation can be simulated on the export side by simply reducing below world prices the prices at which exports are offered.[20] There are several difficulties with such a policy. First, the question of "fairness." An Eastern ministry of foreign trade could hardly fail but be miffed at having to sell its exports at below world prices while having to pay world prices for its imports. World prices are looked upon, in the European socialist world, as representing an approximation to "fair" prices and it is these prices which are used, with some adjustments, in intrabloc trade. A bloc ministry of foreign trade would undoubtedly be reluctant to incur "discrimination" against its exports on such a wholesale basis.

Second, while pricing exports at below world prices is possible when the Eastern nation is exporting a product to a Western nation which does not produce that product domestically, it may not be possible where domestic competition exists because of antidumping rules. Given irrational prices and disequilibrium as well as nonfunctioning exchange rates, it is virtually impossible for a Socialist nation to refute a dumping charge even when the product in question is not being sold at a true loss. Because of the obvious difficulties in adjudicating such antidumping charges, the U.S.S.R. agreed, in its recent (now annuled) trade agreement with the United States, to withdraw any export which causes distress to a local U.S. producer. The United Kingdom and the original EEC nations also have agreements with the Eastern European nations which forbid the latter from exporting at below local domestic prices. These arrangements are much more restrictive than the antidumping laws themselves since the decision automatically favors the domestic producer against the exporter. In effect, some Socialist exporters are not allowed to compete effectively, if at all, in domestic markets in many Western nations and products.

So far, we have assumed that the Eastern nation or nations cannot eliminate excess demand for hard currency imports because they lower their terms of trade either by devaluation or by simply lowering the price of many of their exports because of Western market disruption laws. They can, however, lower the prices of some exports because some nations don't apply market disruption laws and others do not produce domestically some of the products imported from the East (and elsewhere). What sort of behavior and response might be expected?

Assume as before (chart 1) that a nation (or CMEA) plans to export VM with which to buy MC_1 of imports at world prices, P_w. At P_w, only VN can be exported and, therefore, only MD imported. Suppose that in order to increase exports, the nation lowers the price of unsold exportables. In the real world, some separation of markets might be possible and the prices of some of these goods might be lowered without affecting the prices of exportables in general. In terms of the assumptions of chart 1, however, the lowering of the price of our exportable product must be viewed as equivalent to a devaluation. In other words, from the standpoint of the nation lowering its prices, the slope of P_w shifts downward and to the left with its pivot remaining, in the short run, at V. The important question for the

[20] Other products might be offered for sale at world prices which previously would have been offered only if world prices had been higher.

exporter is: How much of a reduction in prices is required in order to clear the market? If, for example, the market can be cleared by a shift in P_w to VR (not drawn), then it is very probable that prices would be reduced since the nation would end up on a U curve which is above U_2. If, on the other hand, market-clearing involves a P_w=VK or any other price line below U_2, then the nation would clearly be worse off for lowering prices. In this case, prices might be lowered enough to sell part but not all of the unsold exports, if by this means additional exports can be sold and a position above U_2 achieved (say, B). If what we have said above (section III) is true, Western demand may be very inelastic with respect to price changes in CMEA exportables and it may be impossible to sell much more even at lower prices. We have already quoted Imre Vajda on this point—that lack of competitiveness of CMEA exports is due primarily to "factors other than price . . ." (Vajda, p. 53). If this is the case, then it may be impossible to export much more than VN at any acceptable price. Buyers in the advanced Western nations are either not interested at all or require an enormous price cut before they will buy automobiles which can't be easily serviced, machinery which breaks down frequently, equipment which is obsolete, and other relatively inferior manufactured products. The problem is exacerbated by Western antidumping laws and market disruption agreements. We pointed out that the short-run goal of lowering export prices is to clear the market of unsold exportables, MN. The achievement of this goal, it should be noted, would not enable the nation to fulfill its import plan because of poorer terms of trade. Thus, even if all exports are sold, imports will rise to MK or to MR but not to MC_1. If the planners are determined to achieve their import goal and to finance it by increased exports, then over the longer-run exports must be raised above VM. This assumes that the nation was able to profitably sell all of its exportables in the first instance by lowering prices—reaching a point like R. As with the short-run goal, success depends on whether the further lowering of export prices falls within the elastic range. If it does, then a point like S might be reached in which the import goal MG_1 is just reached by exporting more than VM. If on the other hand, achievement of the import goal requires the terms of trade to dip to, say, VL which is below U_2, the planners will not attempt it (if they are rational and have sufficient information). Finally, recall that the possibilities of lowering prices (rather than devaluing the currency) are severely limited by antidumping laws and market-disruption agreements.

The situation described above is akin to that of Western nations that have experienced so-called structural disequilibrium in their balances of payments (Kindleberger, 1968, pp. 487–488). This term has been used to describe nations whose exportables have been, among other things: First, products which have become obsolete, in some sense, and can no longer compete in world markets; or second, resources which have been exhausted; or third, temporarily reduced by wartime destruction and disruption (Europe after World War II). At the same time, nations in the first two categories have become accustomed to a certain level of imports either as crucial intermediate inputs into industry or as final products in the standard of living or, if in the third category, need imports for reconstruction, and find it difficult

to cut back imports to the lower levels currently permitted by exports. Under these circumstances, devaluation is not likely to increase exports in the short- or medium-run—not until substitute exportables can be developed. Devaluation would, of course reduce expenditures on imports if demand were sufficiently elastic—which may not always be the case. Hence strong balance of payments pressures may exist for some time.

We have discussed simulation of devaluation on the export side but not with regard to imports. Simulation on the import side is more difficult since if it is to be accomplished it must be done so in terms of shadow prices rather than real prices. Let me explain. Devaluation raises the actual prices of imports to buyers in the devaluing nation and this serves as a strong disincentive to importing as much as before. This cannot be simulated by a Socialist nation—that is to say, no nation would insist on paying more than the going price for imports. What the nation can do, however, is to raise the minimum level of profitability at which imports are allowed.[21] Such an effort is likely to be less than perfectly satisfactory. With prices as messed up as they are, profitability measures are unlikely to be taken very seriously.[22] It will be difficult, indeed, to reduce the level of desired imports when their ostensible hard currency cost has not changed. An overvaluation-type illusion that imports are cheaper than they really are undoubtedly remains under these circumstances. This illusion is fostered by the antimercantilistic approach to foreign trade taken by the CPE's. Central planners have been much more interested in importing than exporting, looking upon the latter activity as a necessary evil to acquire currency for imports.[23] This would give them a tendency to be overzealous importers and underzealous exporters particularly in the absence of clear terms of trade signals.

VI. The "Macro-Balance" Illusion

Overfull employment planning has already been mentioned as the cause of sellers' markets in the Socialist nations and indirectly, therefore, a cause of the reduced ability to export to the West. It also operates directly on the balance of payments. As noted, overfull employment planning means that planned demands exceed available supplies. Under these circumstances, as with inflationary pressures in Western nations, domestic producers and consumers compete for exportables and demand more imports and in the process create pressures which, if successful, cause deterioration in the balance of payments, including that with the West. These forces are most easily

[21] Actually, many of the CPE's are reported to use foreign trade effectiveness indexes as a guide regarding what to import and export. In their simplest form, these are ratios of local currency prices of exports or import substitutes over foreign trade prices in foreign currencies. They tell the planners how much in domestic resources is required to earn a dollar of foreign exchange through exports of different products; and how much in domestic resources are saved by a dollar's worth of imports of different products. It should be profitable to export commodities with low ratios and to import commodities with high ratios. Simulation of devaluation means raising the maximum ratio at which exports are promoted and raising the minimum ratio at which imports are allowed.

[22] Discussions with a number of Eastern and Soviet foreign trade specialists in June 1976 confirmed to me that in most of the CPE's, these indexes are either not used extensively or provide only one of many kinds of information upon which import and export decisions are based.

[23] In contrast, Western capitalist nations are mercantilist or neomercantilist largely because of their interest in freeing their domestic economic policies from balance of payments constraints.

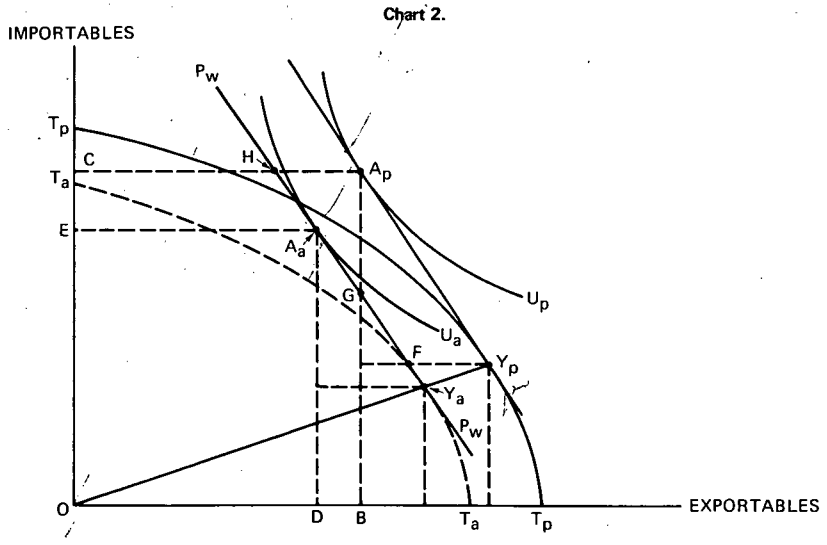
envisaged in terms of the "absorption" approach which, as is well-known, tells us that even a devaluation is unlikely to improve a nation's payment balance under these conditions. The usual algebraic formulation of the absorption analysis is:

$$X-M=Y-A$$

where X and M denote exports and imports, respectively; Y denotes output and A is absorptive or expenditures (for C + I + G). Clearly, if a nation spends more than it produces, this is A>Y, then it must run a deficit, M>X.

The situation can be demonstrated diagrammatically as follows (chart 2). Assume a nation on an actual transformation curve, T_a with domestic output at Y_a and an after-trade equivalent absorption, A_a. Assume that this nation planned to be on T_p with before-trade goal of Y_p and after-trade goal of A_p. If the nation actually ends up at A_a instead of planned A_p it will experience excess demand equal to BD of exportables + CE of importables [24] (or some equivalent combination at some other point such as the traditional A_pG *of* importables). Plans may be fulfilled by either dishoarding foreign exchange reserves or obtaining credits of an amount measured as either A_pG of importables or HA_p $(=FY_p)$ *of* exportables.

Chart 2.



In the discussion of overfull employment planning, we have abstracted from the balance-of-payments problems discussed earlier in connection with inability to sell and to innovate and with being in a high-cost customs union. In fact, these are different causes of excess

[24] This is illustrated by a Polish economist writing in 1968 regarding the situation in Poland in 1966–67. He states that industry, particularly the machine building industry "* * * did not have at its disposal the necessary production capacity and therefore was unable to meet its obligations for exports within the group of commodities including machinery and equipment, and which also could not meet the demand of the domestic market. The result of the latter failure was that the plan of imports of machinery and equipment for the same period was exceeded * * *" (Gruzewski, 1968–69, p. 22).

demand even though, as indicated earlier, overfull employment planning is a contributing cause of the inability to sell. The balance-of-payments problem connected with inability to sell is a structural problem, one in which exportables cannot be converted into imports on the desired scale, leaving the nation with an excess demand for imports. Given favorable price elasticities, this problem, along with that connected with being a high-cost customs union, can be resolved in theory, though as we have seen not in practice, by devaluation. The excess demand generated by overfull employment planning cannot be resolved (without making special assumptions regarding real balance effects, et cetera) by devaluation.

VII. Rigidity in Face of the Western Business Cycle

It has long been a matter of faith that one great advantage of trade under central planning is that it tends to insulate the economy from the vagaries of Western markets, especially the Western business cycle. To some extent this is true. So, for example, with internal prices divorced from world prices, and with nonfunctioning exchange rates, clearly the CPE's are in little danger of importing Western inflation. But this may be as far as it goes. Soviet experience during the Great Depression provided ample evidence, ignored until recently, that: (1) A decline in economic activity in the West can cause an unplanned drop in CPE exports; and (2) changes in terms of trade can cause unexpected and unavoidable gains or losses from trade—in the 1930's, large losses. Soviet exports would have dropped by even more than they did in the 1930's had not Stalin determined to sell at all costs and at almost any price. Peasants starved so that grain would be available for export. Imports continued high for a few years to meet 5-year plan goals and then these also were abruptly cut back. Stalin had enormous power to generate exportables and control imports.

The Soviet experience of the early 1930's was repeated during the Western recession which began in 1974 and was shared by all of the CMEA nations. Each Eastern country experienced a sharp decline in its upward trend in exports; in fact, despite inflation, exports actually declined in 1975 in comparison with annual increases in the previous 2 years of approximately 40 percent. Moreover, CMEA raw material importers also experienced sharp deterioration in terms of trade. Since imports could not be reduced as rapidly as exports, very large hard currency deficits were incurred. These factors led to a doubling of hard currency debt over a few-year period.

In these respects, the CPE's proved themselves as vulnerable, if not more so, than capitalist nations. Vulnerability, as in the first 5-year plan, was partly due to inability mixed with unwillingness to cut back, on short notice, imports of intermediate products on which plans depended. To cut back such imports often involves very large losses—losses which can be many times larger than the cost of the imports. But vulnerability, this time, is also due to the fact that Eastern consumers are used to a rising standard of living and Eastern leaders are, unlike Stalin, unwilling or unable to disappoint them. Unplanned austerity is no longer in fashion in planned economies.

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VIII. Export and Import Incentives at the Enterprise Level

A final factor, related to those mentioned in III above, is outlined briefly. Basically, there is a special asymmetry between exports and imports from the standpoint of equilibrium in the balance of payments. Producing enterprises whose products are exportable are usually paid in domestic currency and at the same price regardless of whether their products are sold in domestic, intrabloc, or Western markets. Therefore they are indifferent, on price grounds, as to which market their products are sold. However, they often prefer domestic or intrabloc markets as less demanding upon them and less risky.

Some enterprises which can use importables, on the other hand, have a strong preference for foreign goods, especially those from the West.[25] They are not concerned about the cost of the imports, especially the foreign exchange cost, since they are charged in local currency and often at the local price equivalent. The much higher quality of many imported inputs is a further inducement to managers to incur the higher costs of importing, if necessary.

The net result of the model just described is that there are stronger inducements to import than to export particularly to the West.[26]

IX. Concluding Remarks

How persistent is the socialist hard currency deficit likely to be? Is it a chimera like the permanent dollar shortage or will it continue into the foreseeable future?

With the political détente of the past 10 years, two classes of attempts have been made to grapple pragmatically with the problems. First, a considerable number of cooperation agreements have developed between Eastern European and Western enterprises in which the Western partner undertakes to assist in the production and marketing of products produced in the Eastern countries. Second, and related, there has been considerably more Western investment in Eastern Europe in recent years and, in fact, the proposed U.S. investments in Siberian energy resources are on an unprecedented scale anywhere. Further, these are to be repaid largely in kind, thereby presumably avoiding the convertible currency transfer problem.

It seems unlikely that the cooperative production and marketing agreements could ever develop on sufficient scale to overcome the socialist quality and inability to sell problems. Further, the technique is an inefficient way of earning hard currency since the Eastern European country loses a large share of the earnings to its Western partner—earnings which otherwise would accrue to it. Western investments in the socialist nations must also be viewed as suboptimal in terms of the problem at hand. The volume of investment which will flow under a repayment in kind constraint is bound to be much less than if repayment could be made in convertible currency. Further, repayment

[25] Many managers, on the other hand, are not interested in imported equipment because of the weak ties between improving enterprise performance and management bonuses.

[26] It has been argued that this model no longer applies at all to Hungary (Kover, 1971, pp. 174–75) and applies to a lesser extent than suggested above in some of the other smaller socialist nations. In particular, some exporting enterprises in some of the nations have been encouraged to export to the West by regulations which allow them to keep for their own (enterprise) use part of the foreign exchange earned.

in kind has typically been most acceptable to Western enterprises in the case of products like oil and gas which could be expected to easily generate hard currency in the future. In this sense, repayment in kind provides no real relief from the convertible currency deficit, though the investment it induces may, if employed effectively.

Ultimately, it seems to me, hard currency balance of payments pressures of the socialist nations will not be eliminated until measures are taken to eliminate the root causes mentioned above. This would require a reform in which: The operation of the economy would be decentralized; prices would be freed; internal markets would be opened to foreign traders; exchange rates would become operational and internal and external prices would be organically connected; and overfull employment planning would be ended. The elimination of overfull employment by itself would reduce balance of payments pressures in the absence of other reforms but this appears a most unlikely possibility [Holzman, 1970; Grossman, 1971]. A reform embodying the features noted above would increase ability to sell, to generate and adopt technology, and eliminate commodity inconvertibility thereby making it possible to effectively devalue a currency. It seems unlikely that such reforms are in the offing. In fact, current eastern interest in importing technology is widely viewed in the West as a substitute for full scale reform. A major reason why full scale reforms are unlikely to be undertaken is that they would lead fairly quickly to the near liquidation of the Soviet bloc preferential trading area. The reform would involve shifting the trading decisions of the nation from the central planning boards and foreign trade monopolies to thousands of enterprises. Faced with many more profitable opportunities to buy and sell in the West for reasons mentioned earlier, these enterprises would shift many of their transactions from East to West.

The big question is whether the U.S.S.R. would be willing to allow such a development. At this point in time it seems unlikely. For one thing, the Soviet internal reform has been extremely conservative and in fact, is presently backward-looking. Radical reforms, with the characteristics described above, would have a significant impact on the loci of power in government and society and is undoubtedly opposed by many of those currently in power [Burks, 1974]. Further, the Soviet trade/GNP ratio is, like that of the United States, relatively small and the gains from a geographical restructuring of trade therefore of much less significance to them than to the smaller socialist nations. Their major concern, however, would be the possible weakening of political ties which might result from sharply lowered levels of intrabloc trade. However, the U.S.S.R. should be able to maintain political control over Eastern Europe without monopolizing the latter's foreign trade.

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THE DISTRIBUTION OF ECONOMIC COSTS AND BENEFITS IN U.S.–SOVIET TRADE

(By Thomas A. Wolf*)

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I. Introduction

U.S. trade with the Soviet Union has always been highly politicized, and it is likely to remain relatively sensitive to political vagaries for the foreseeable future. As long as the U.S.S.R. is seen as our principal adversary, economic relations with that country will continue to be employed as an instrument of national policy to a degree not matched in U.S. relations with other countries. Having to accept the existence of continued superpower rivalry, however, does not mean that we should forgo the opportunity to improve U.S. East-West trade policymaking. On the contrary, the premise of this paper is that by reexamining the major issues in trade with the Soviets, and particularly the question of the distribution of economic benefits between the two sides, policy can be improved and U.S. benefits increased.

Trade between the United States and the Soviet Union has not expanded as rapidly in recent years as many had predicted in the early 1970's. At the same time, recent attempts to use trade leverage to attain noneconomic concessions from the U.S.S.R. have not, in general, been successful. Indeed, it has been the emphasis on leverage, by both the executive branch and the Congress, which has made U.S. East-West trade policy relatively volatile, and has reduced the growth possibilities for American trade with the Soviet Union. The continued stress on leverage, whether it be tying most-favored-nation (MFN) tariff status to Soviet emigration policies, or making specific export sales dependent upon tactical Soviet concessions on human rights, has if anything only reduced U.S. trade, and consequently U.S. gains from trade, with the U.S.S.R.

A more realistic and consistent U.S. trade policy can only be developed if we eliminate some of the confusion surrounding our economic

*Associate professor of economics, Ohio State University, and faculty associate, Mershon Center. Financial support for research relating to this paper was provided by the Department of State, Office of External Research, contract 1722–620180. The author assumes sole responsibility for all interpretations and any errors or omissions.

dealings with the Soviet Union. It is necessary to distinguish much more clearly among four basic issues: (1) The extent to which trade with the U.S.S.R. directly enhances its military capabilities; (2) the equity of the distribution of net trade benefits between the United States and the Soviet Union; (3) the pros and cons of attempting to use economic leverage in order to achieve noneconomic concessions; and (4) the use of trade policy as a reflection of basic moral and humanitarian concerns, independently of the possible existence of U.S. leverage. By separating out these issues in a dispassionate way, and dealing with each on its own terms, there is no reason why the United States cannot in the 1980's achieve an expansion of mutually advantageous trade with the Soviet Union, safeguard its basic military security objectives, avoid directly contributing to Soviet violation of basic human rights, and more realistically assess the possibilities for effective linkage of economic and noneconomic foreign policy issues.

This paper has three major objectives: First, in section II we attempt to differentiate the four basic concerns of U.S. East-West trade policy: National security, equity, leverage, and morality. Second, in the same section we show how perceptions of the distribution of bilateral trade benefits fundamentally affect our assessment of the equity and leverage issues in United States-Soviet trade. Finally, in sections III–VI we examine in some detail the various distributional issues, drawing in many instances on the reasoning and evidence of existing studies. For most of these cost-benefit issues the available evidence is only fragmentary, and in some cases lively debates continue unabated. Consequently, our summary and conclusions in section VII, regarding the distribution of costs and benefits in United States-Soviet trade, must be seen as largely tentative.

II. National Security, Equity, Leverage, and Morality [1]

The principal concern that the United States should have in trading with an adversary, with whom armed conflict is possible, is whether and to what extent such trade strengthens the adversary's military capabilities. Most would agree that it would be silly, if not downright perverse, to sell the adversary up-to-date weaponry. Furthermore, presumably few would advocate transferring strategic technology to the adversary. Such technology could be considered "strategic" either because it significantly lowers the resource cost to the adversary of developing a particular weapon or weapons system component, or because it is "capability enhancing" in the sense of permitting the adversary to achieve a higher technological plateau simply not attainable in a given time frame on the basis of domestic resources alone.[2] Under continued pressures from American business to reduce the scope of export controls and to streamline their administration, considerable progress has been made in recent years in at least conceptually defining so-called critical technologies and distinguishing among various means by which technology is transferred and their relative effectiveness.[3]

[1] The basic ideas in this section appear in abbreviated form in the author's prepared statement in Committee on Foreign Affairs (1979).
[2] This and other useful distinctions are developed by Klitgaard (1974).
[3] See Office of the Director of Defense Research and Engineering (1976); and Mountain (1978).

Complex technical assessments aside, economic and political judgments inevitably play a role in determining what is strategic and what is not. All trade, if entered into rationally, will benefit the adversary by permitting it to import products at a cost lower than the domestic opportunity cost of production. Furthermore, to the extent that there is some substitutability in domestic resource allocation and production, trade could lower the resource cost to the adversary of achieving important noneconomic objectives.[4] Some observers have criticized U.S. grain sales to the U.S.S.R. on this basis, claiming that such exports only have the effect of permitting the Soviets to persist in their rapid military buildup at the expense of continued neglect of agriculture.[5]

Pursuing the above reasoning to its logical conclusion, it could be argued that (virtually) all trade with the adversary should be embargoed. This presumably was one of the the rationales for the total embargo on trade with the People's Republic of China between 1950 and 1971 and the near embargo on exports to most other Communist countries from the late 1940's to the late 1960's. Fully consistent with an embargo on exports is an embargo on imports, so as to minimize the adversary's foreign exchange earnings and thus its ability to import from others.[6] Better yet would be to persuade other countries to refrain from all trade with the adversary, a policy the United States pursued with partial success, through CoCom,[7] until after the Korean war.

Because of the lack of demonstrated results from such a policy of generalized economic containment in the past, one must be skeptical of such a policy in the future, when U.S. economic dominance promises to continue to decline. But once maximal economic warfare is rejected as an effective policy, we are back to the difficult question of where to draw the line between exports that simply enrich the adversary and strategic exports that in some fundamental sense reduce our military advantage. The withering away of the collective embargo since the mid-1950's does not simplify this decision. It is, of course, true that to the extent that Western Europe and Japan are more than willing to provide most products and technologies to the U.S.S.R., the United States would just be cutting off its nose to spite its face by refusing to sell essentially similar items. Consequently, the issue of foreign availability is important. But the basic question in a military security context remains as to which items the United States should push most strongly for a collective embargo within CoCom and, to the degree that the United States does have a monopoly over a particular technology or product, where the military security line should be drawn.

Depriving the adversary of strategic products and technologies believed to contribute directly and significantly to its military capabilities is one concern. Another important national security consideration should be to avoid a high degree of economic dependence on the adversary, so as to deprive it of blackmail opportunities in the event of direct confrontation or simply to minimize its more general po-

[4] Holzman (1973).
[5] For example, see Costick (1976).
[6] Wolf (1973), chapter 5.
[7] "CoCom" stands for the Coordinating Committee, of which all NATO countries (except Iceland), and Japan are members.

tential for leverage.[8] There are at least two basic dependencies to be avoided. The first would be dependence upon the adversary for a high proportion of imports of critical fuels, raw materials, or other intermediate products. The second would be dependence upon the adversary as an important export market for a domestic industry employing great numbers of people. Based on past and probable future trade trends, neither type of dependency is likely to become important even with greatly expanded trade with the Soviet Union. Possible exceptions might be some of the rare metals currently imported from the Soviet Union. Imports from the U.S.S.R. of platinum and chromium ores and concentrates amounted to 20.6 and 29.9 percent respectively of total U.S. imports of these products in 1976.[9]

Some other Western countries are much more dependent on the Soviet Union for imports than is the United States. In 1976, for example, the U.S.S.R. accounted for 20.7 percent of Austria's imports of crude petroleum, from 24 to 41 percent of total imports of distillate fuels for Switzerland, the Netherlands, and France, 31.5 percent of Swedish imports of residual fuel oils, over 25 percent of Austrian and Swedish imports of coal, 96.5 percent of Austrian natural gas imports, 34.6 percent of total imports of radioactive elements for France, and 39.7 percent of West German imports of chromium ores. For most Western countries the issue, in terms of overall trade dependence, would seem to be more one of import than export dependence. A possibly little recognized fact, given the continuing emphasis on Soviet and other Eastern country hard currency trade deficits, is that 8 of the 14 leading industrialized Western trade partners of the U.S.S.R. incurred bilateral trade deficits with that country in 1976.[10] Nevertheless, although the issue of import dependence on the Soviet Union has been taken seriously in many of these countries, as yet there have been few public expressions of alarm.[11]

For some Western countries, notably West Germany, dependence on the Soviet Union as an export market might be seen as a greater threat. It is well known, for instance, that Soviet orders of capital goods were an important countercyclical force in several West German industrial branches in the 1974–76 period. In 1976, Federal Republic of Germany exports of machine tools to the U.S.S.R. accounted for 13 percent of total West German exports of this branch. The Soviet market was equally important for some branches of the West German iron and steel industry.[12] For West Germany, the East's largest Western trade partner, exports to the centrally planned economies (CPE's) as a group are three to four times as high, in proportion to total exports, as they are for the United States, including U.S. grain sales. Nevertheless, despite periodic discussion of sectoral export dependence in the press, the West Germans show surprisingly little concern over this issue. Indeed, much of the West German discussion has focussed less on the question of the degree of dependence per se, than on the severe asymmetry of West German-Soviet exchanges. In 1976 manufactures

[8] On the concept of defensive economic warfare considerations, see Wolf (1973).
[9] Based on data provided by the Office of East-West Policy Planning, Bureau of East-West Trade, U.S. Department of Commerce.
[10] Bureau of East-West Trade (1978), p. 9.
[11] On the question of economic dependence, and methodological issues regarding its measurement, see Müller (1976).
[12] Bethkenhagen (1977).

accounted for 97 percent of West German exports to but only 14 percent of Federal Republic of Germany imports from the U.S.S.R.[13] The fear of some is that such a developed-developing country pattern of complementarity, with negligible intrabranch specialization, may lead to heightened tension in East-West economic relations paralleling that now encountered in a North-South context.[14] Somewhat less dramatically, the asymmetry in the commodity composition of trade is frequently pointed to as simply a constraining factor in the future expansion of trade with the Soviet Union.[15]

The question of national security aside, trade with a CPE raises an additional set of issues. Academic and other observers have long emphasized various incompatibilities and potential trade policy problems regarding trade between market and centrally planned economies.[16] With the recent growing involvement of the United States in trade with the CPE's, several close observers have developed a catalog of economic risks in East-West trade. Centralized economic controls, state monopolies of foreign trade, and propensities toward secrecy are seen as giving CPE's a unique ability to capture monopolistic or monopsonistic profits in trade with U.S. firms, and as potentially destabilizing the world economy.[17] By contrast, it is argued, inequities or disproportions in trade among market economies tend to roughly balance out, when the whole spectrum of their mutual economic relations is taken into account. This is because trade among market economies is carried out by innumerable competing firms, and most Western countries are parties to international agreements and members of international organizations which set more or less equitable rules of the game (GATT, IMF, and so forth).[18] Because of the alleged maldistribution of net economic benefits in trade with CPE's, and particularly in trade with the Soviet Union, some have argued that the U.S. Government should intervene in various ways to eliminate this asymmetry.

If a CPE is also perceived as an adversary, it would then be entirely reasonable to be concerned with both the military gains that the adversary obtains from trade and the distribution of trade benefits between the two partners. In actual discussions of United States-East-West trade policy, however, particularly regarding trade with the U.S.S.R., the typical concern amounts to more than a dispassionate analysis of both issues. Pique at the possible maldistribution of trade benefits turns into anger when it is perceived that the disproportionate gains are going not to just any trade partner, but to our principal adversary. Furthermore, precisely because the Soviet Union is a CPE, some observers attribute to it an uncanny ability to take all social costs and benefits into account when making foreign trade decisions. Soviet planners are seen as internalizing all externalities in a way that private U.S. firms would neither have the interest in nor ability to effectuate. The vision is of a Soviet foreign trade bureaucracy which is

[13] Ibid.
[14] See, for example, Müller (1978).
[15] Slama and Vogel (1975).
[16] The classic study, which focuses on trade relations with the Soviet Union, is Gerschenkron (1945). Other early studies include Viner (1943) and Ellis in Ellis and Metzler (1950).
[17] In particular, see Vernon (1974); Vernon and Goldman (1974); Comptroller General of the United States (1976); and Goldman (1977).
[18] Vernon and Goldman (1974).

able to jointly maximize the economic and political benefits from each transaction with U.S. firms.[19] Moreover, not only is the perceived distribution of trade benefits in accord with our worst possible fears, but it is particularly galling that our adversary is believed to be able, by virtue of the very centralized system that generates the inequitable distribution in the first place, to adequately take all economic and political considerations into account, while we are not.[20] The remedy, as seen by some, is to attempt to mirror Soviet practices in some of our bilateral dealings, so as to deny them the supposed advantages of being a centrally planned economy.

This particular perception of U.S. economic relations with the Soviet Union has, quite subtly but significantly, increased the attractiveness of leverage, or "economic diplomacy" as an appropriate element in United States-East-West trade policy.[21] U.S. economic leverage depends upon: (1) How policymakers on both sides perceive the bilateral distribution of trade benefits; (2) how they choose to weight or evaluate this distribution against other policy objectives; and (3) the ability of U.S. policymakers and diplomats to actually find appropriate (i.e., feasible) quid pro quos. U.S. leverage will normally be greater the more the adversary appears to be gaining from trade relative to the United States. Our leverage will also be greater the more highly the adversary values these relative gains and would be willing to pay a noneconomic price to preserve them.

There is no reason, however, why our adversary's perceptions of trade benefits and the significance it attributes to them, should necessarily correspond to ours. Indeed, it can be argued that one important reason U.S. attempts at economic leverage have not been very successful with respect to the U.S.S.R. in the past is that the Soviets are unlikely to perceive the distribution of trade gains as being so lopsidedly in their favor; and whatever their perceptions, they have probably attributed less significance to the issue than have American leverage proponents. In short, we tend to overstate the relative benefits which the Soviets derive from trade with us. Furthermore, we tend to exaggerate the significance of this equity issue in the first place, because of the adversary relationship. This quite naturally leads us to be excessively optimistic about Soviet willingness to make concessions in noneconomic areas—such as human rights—in order to preserve or obtain economic advantages.

In relations with the Soviet Union, grain exports at first glance appear to be our ace in the hole, given the commitment of the Soviet leadership to stepped up meat production and associated feed grain availability. Upon closer reflection, however, it is not so clear that the distribution of economic benefits from this trade is so lopsidedly in favor of the Soviets. U.S. agricultural interests have made well known their economic opposition to embargoes on food exports. Furthermore, despite periodic problems of hunger and possible starvation among the Soviet people, it is by no means clear that Soviet leaders must be as responsive to such problems as Congress and the President must be

[19] Vernon (1974)
[20] This vision of the Soviet Union as both our principal adversary and a unitary actor in international relations is stressed by Huntington (1978).
[21] See Huntington (1978).

to the demands of American farmers.[22] It is ironic that this powerful, authoritarian regime, the very nature of which causes us to redouble our determination to exact from it noneconomic concessions, may be least vulnerable to economic leverage.

In a period of public opposition to direct military intervention abroad, congressional constraints on indirect military assistance, and administration frustrations at the ineffectiveness of moral indignation in international power politics, "economic diplomacy" appears to have become for some a last resort in the attempt to halt the spread of Soviet influence abroad and the violation of human rights at home. Unfortunately, it is all too easy to exaggerate the possibilities for leverage in an environment in which it is fashionable to overstate both the Soviets' relative gain from trade and the relative significance which the Soviet leadership attaches to such gains.

Observers from both East and West frequently characterize U.S. East-West trade policy as erratic and as hindering the gradual development of longer run business relationships between U.S. firms and their Soviet counterparts. The continued volatility of U.S. policy could simply have the effect of making the United States more or less of a residual supplier to the Soviet Union in the longer run, covering its grain shortfalls in the event of harvest failures, and providing the U.S.S.R. with selected nonstrategic technology not available elsewhere in comparable quality. Western Europe and Japan, meanwhile, would continue to develop stable, more lasting and possibly more lucrative trade and ecoperation relationships with the Soviets.

A related cost of leverage, more political than economic, would be that to the extent that U.S. trade with the U.S.S.R. is destabilized and depressed by an active leverage policy, the scope for more subtle, longer run influence on the Soviet economic and political systems, for example through imitation of American management practices, could be seriously diminished. One must be skeptical about the inevitability of spillovers from the economic to the political dimension, but such effects cannot be ruled out entirely.

A third cost relates to Soviet perceptions of and responses to American motives. Some have argued that an active policy of leverage will only strengthen the hand of the hardliners within the Kremlin, and in this way will be counterproductive. Another, not necessarily conflicting view, is that to the extent that Soviet leaders perceive the U.S. emphasis on leverage to be unrealistic, as well as having inconsistent implications for bilateral trade and other relations, they will be less likely to be motivated to reassess the premises of their own foreign policy.[23]

Leverage, in any international context, should not be ruled out a priori. In diplomacy, leverage is in general neither immoral nor impossible. Our attitude should rather be pragmatic. Will it work? That is, do we have leverage? What are its short- and long-run costs? If economic leverage has been conspicuous by its failure in the past, at least in the United States-Soviet context, one must be somewhat skeptical about leverage in the future. This is particularly so if more of

[22] See Holzman and Portes (1978); and Brookings Institution (1978).
[23] This last point, in reference to United States-Soviet relations more generally, is made by Ulam (1979).

an attempt is not made to look at the possibilities for economic diplomacy in a more dispassionate manner.

The often indifferent and in some cases critical reactions by West Europeans to American attempts to pursue leverage and to coordinate Western East-West policies are not easily understood.[24] To explain West European lack of support and cooperation only in terms of the freerider theory is too facile. A deeper analysis would attempt to explain why the West Europeans appear to have more a European than a global view, with a concomitant greater psychological commitment to détente and expanded peaceful interaction across Europe than evidenced by Americans. Undoubtedly their point of view is somewhat explained by long memories of wartime destruction and postwar feelings of relative impotence on the global stage. Furthermore, the West Europeans may well be more pragmatic in their general attitude toward the Communist countries. Consequently they may be more easily able to avoid the emotionalism with which Americans respond to perceived inequities in East-West trade. Moreover, most West Europeans appear to be rather skeptical of just how much leverage the United States really has regarding the Soviet Union.

Perhaps even more fundamental, however, is the fact that the West Europeans are more economically dependent upon trade with the U.S.S.R., and with Eastern Europe, than is the United States. Furthermore, some countries, such as West Germany, trade more with the CPE's as a group than they do with the United States. Rather than perceiving the net economic benefits as accruing disproportionately to the Soviet Union, many West Europeans may well, at least implicitly, consider the distribution of trade gains to be more or less balanced, or possibly as being even in their own favor. This would affect not only their perceptions of "equity", but also their assessments of their own leverage. There undoubtedly is some "cheering on the sidelines" regarding U.S. attempts to obtain human rights and geopolitical concessions from the Soviets. But many West Europeans probably live with the fear that while their own shares in Eastern markets may benefit in the short- and medium-run from erratic U.S. policy, their own longer run trading relationships, and associated economic gains, could be adversely affected by a fundamental deterioration in United States-Soviet relations.[25]

Skepticism about the prospects for U.S. economic leverage on the Soviets suggests that rigid, blunt instruments such as MFN denial by the Congress should be repealed. It can be argued, however, that Presidential discretion with respect to the use of trade policy instruments for "foreign policy" purposes should be retained, for several reasons. First, lack of evidence of leverage in the past does not preclude its existence, even in bilateral United States-Soviet relations, in the future. Second, although the United States may not have leverage with respect to the Soviet Union, it may have considerable leverage in specific instances in relations with other countries. Therefore, disappointment

[24] The difficulties of multilateral coordination of East-West trade policies are discussed by Downey (1978).

[25] This is not to say that leverage is unheard of in the context of intra-European East-West relations. One of the more celebrated instances, of the "carrot" (rather than the "stick") variety, was the 1976 agreement whereby the FRG provided subsidized credits in return for Polish assurances regarding the ability of ethnic Germans to emigrate to the West.

with past East-West leverage attempts should not lead us to disavow use of the leverage option across the board.

Finally, there may be times when we may want the Government to restrict or even embargo certain types of trade on humanitarian or moral grounds, independently of whether it is believed that the United States actually has leverage. For example, even if it is apparent that we cannot force or persuade a foreign government to stop torturing or spying on its citizens, we may still on moral grounds refuse to sell it equipment directly related to such activities.[26] An example of such a restriction on the import side was the embargo on the import of crabmeat from the U.S.S.R. in the 1950's on the grounds that it was partially produced by forced labor.[27]

Having attempted briefly to differentiate among the basic issues in U.S. trade policy toward the Soviet Union, the rest of this study will look specifically at the question of the distribution of net benefits in United States-Soviet trade. This issue is of critical importance not only because of the concern that trade gains be more or less "equitably" divided. In the Soviet-American rivalry it takes on additional significance because perceptions of the distribution of trade benefits, "equity" considerations aside, are an important determinant of American opinions as to how much leverage the United States has in relations with the Soviet Union.

III. The Distribution of Static Gains From Trade

Citing the existence of the Soviet state monopoly of foreign trade—that is, a number of more or less noncompeting state-owned and controlled foreign trade organizations, FTO's—it is frequently suggested that the U.S.S.R. is in an exceptionally good position to "whipsaw" American companies and otherwise exact monopoly-monopsony profits in bilateral trade. It has also been alleged that U.S. firms have a propensity to engage in "loss leader" sales to the CPE's, thereby settling for very low profits or possibly losses on initial sales in order to "crack" these markets and establish a preferred longrun market foothold that unfortunately never materializes.[28] This point of view took on considerable currency after the Soviet "great grain robbery" of 1972–73, in which case it became clear that the Soviet foreign trade monopoly had indeed managed to buy millions of tons of sorely needed grain at bargain prices.[29] In order to offset Soviet monopoly practices, various proposals have been put forth, including the establishment of a Government grain board and other Government organized trading companies, the setting of so-called "upset" prices to insure that U.S. firms obtain the "correct" price when selling to the Soviets, and permitting individual firms to collude when trading with Soviet foreign trade organizations.[30]

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[26] This additional rationale for leaving the President some discretion with respect to export controls for "foreign policy" purposes is stressed by Representative Jonathan Bingham in Committee on Foreign Affairs (1979).

[27] Pisar (1970), p. 101.

[28] See Vernon and Goldman (1974); and Goldman (1977).

[29] For a highly readable account of the 1972–73 grain sales to the U.S.S.R., see Goldman (1975).

[30] On the issue of establishing a countervailing power to the Soviet foreign trade monopoly, see Goldman (1977); Committee on Commerce (1977), pp. 53–61; and Bureau of East–West Trade (1976).

As yet there has been no systematic evidence presented of the U.S.S.R. capturing monopoly and monopsony rents in East-West trade. Complaints of "whipsawing" and other monopolistic machinations are usually based on anecdotal evidence, and even U.S. businessmen directly involved in East-West trade have rendered different judgments as to the severity of the whipsaw problem, depending upon whether they were directing operations from the U.S. corporate headquarters or from West European export offices. Moreover, the views of U.S. businessmen on this issue appear to fluctuate somewhat over time.[31]

The popular view of the Soviet Union brazenly exercising monopoly-monopsony power on world markets is less persuasive the more we examine the implicit assumptions underlying it, and the more closely we look at actual cases of obvious disproportionate Soviet gains from trade. To begin with, many Soviet FTO's may not be noncompeting, strictly speaking. Therefore in reality the view of the Soviet foreign trade system as a perfect internal monopoly may have to be modified.[32] Second, even if for all practical purposes the Soviets can be considered as having an institutional, internal monopoly over foreign trade, this says nothing about their degree of external market power on Western markets.[33] The U.S.S.R. as exporter does account for a significant share of total industrialized West (IW) imports of certain products from non-IW countries. In 1975, for instance, this share amounted to 63.7 percent for sunflower seed oil, 47.6 percent for sawlogs, 43.1 percent for platinum, 37.5 percent for distillate fuels, and 30.1 percent for chromium and other ores.[34] In some of these cases, however, world markets are either effectively cartelized or the products have close substitutes. Consequently, such market-share figures may overstate Soviet market power and potential for earning monopoly profits. Further research is necessary, however, before more definitive judgments will be possible.[35]

Whether the U.S.S.R. has significant monopsony power in importing from the West is even more problematical. It is clear that at least in years of Soviet harvest failures the U.S.S.R. does become a price-maker on world grain markets. In many transactions involving the importation of plant and equipment, particularly turnkey facilities, it undoubtedly is also not a pricetaker. The issue in the latter cases, however, is whether in a bargaining context the Soviet foreign trade monopoly effectively has more bargaining power than a comparable "Western" buyer of such capital goods.

This leads to a third issue. Assuming in a particular case that the U.S.S.R. can affect the price at which it buys or sells, how will it behave? The popular monopoly spectre view implicitly assumes that the Soviets will behave more or less like the profit maximizing monopolist-monopsonist, restricting its trade offer in such a way as to maximize monopoly profits at the trade partner's expense. Alterna-

[31] On the conflicting views of U.S. businessmen regarding this issue, see Wolf (1978a) and Bureau of East-West Trade (1977).
[32] On this point see Hanson (1976b).
[33] See Wolf (1978b) and Brookings (1978).
[34] Wolf (1977).
[35] The author is currently carrying out such a study supported by the Department of State: "An Empirical Analysis of Soviet Market Power and Price-Sensitivity in East-West Nonagricultural Trade."

tively, by maintaining secrecy about its real export offer or import needs, the U.S.S.R. can "bluff" its Western trade partners into accepting lower prices for their exports and higher prices for their imports. This would seem to correspond to the popular view of past United States-Soviet grain deals. At a more theoretical level, a CPE would indeed be expected to emulate the trade practices of the profit maximizing monopolist-monopsonist if the central planners were omniscent and were as sensitive to relative prices in their production and consumption decisions as are individual consumers and producers in the ideal market economy.[36]

In spite of having an internal price system which does not accurately reflect relative scarcities, it is quite possible that the Soviet Union does trade broadly in accordance with its real—in Western terms—comparative advantage.[37] Gradually to shift trade patterns over time in accordance with underlying changes in domestic and world market opportunity costs is one matter. Quite another is to take advantage, in the short and medium run, of such changes in a way that maximizes Soviet monopoly profits in world trade. To the extent that Soviet planners are insensitive, on the margin, to changes in domestic real relative costs and changes in world market relative prices, in both their consumption and production allocations, the Soviet interest in and scope for monopolistic terms of trade manipulation is seriously reduced. Such insensitivity seems probable in an economy with an official Marxian ideology which denies the validity of marginalism as a decisionmaking criterion. Furthermore, the U.S.S.R. is characterized by a rigid system of planning and management fundamentally conditioned by the historical political and economic development priorities which evolved in the 1920's. As a result, the planners have tended to set consumption and production targets with little attention being given to marginal rates of substitution in either sphere. In the extreme case, in which the planners simply allocate increments in real income between consumption and investment goods and among consumption goods on a basis of predetermined proportions rather than in accordance with the preference schedules of the populace, and in which the production mix is fixed for long periods, the planners would be totally insensitive to changes in world market conditions. Although possibly having external market power, the Soviet foreign trade monopoly would tend to act as a price taker, unless Western demand for its exports were price inelastic, which is unlikely.[38]

Neither the extreme price-sensitive nor the extreme price-insensitive model of the CPE is likely to be perfectly adequate as a characterization of the U.S.S.R. It is likely, however, that historical Soviet foreign trade behavior would conform more closely to the price-insensitive model. To the extent that Soviet foreign trade decisionmakers are price insensitive in this sense, Soviet responses to changes in world market conditions will be more predictable, and their vulner-

[36] For a rigorous theoretical model of such a price-sensitive CPE, see Batra (1976).
[37] For conflicting views on this subject, see McMillan (1973) and Rosefielde (1974) and subsequent exchanges between them in the ACES Bulletin.
[38] For a more elaborate discussion of the price-insensitive CPE, see Wolf (1978c); also see Wolf (1978b).

ability to Western oligopolistic profit-maximizing behavior will be greater than for the price-sensitive CPE.[39]

The Soviet "great grain robbery" of 1972–73 is not necessarily inconsistent with the view of the U.S.S.R. as a relatively price-insensitive CPE. The basic problem in that case was the existence of the Department of Agriculture wheat export subsidy and the fact that the subsidy was permitted to be calculated at the time that the wheat was actually shipped, rather than having to be calculated on the basis of the wheat futures price on the day that the export contract was made. The peculiar basis for calculating the subsidy meant that U.S. grain exporters felt no particular pressure to immediately hedge against future wheat price increases at the time they signed contracts with the Soviets. This, combined with Soviet secrecy which was in the best tradition of capitalistic market behavor, kept the enormous scale of Soviet purchases from being immediately reflected in futures prices. Even as these prices finally began to soar, the—growing—per bushel export subsidies were maintained, which precluded a deterioration in Soviet terms of trade.[40]

Had there been no subsidy scheme in the first place, or had it been designed so as to use the full information potential of the futures market, Soviet terms of trade would almost certainly have deteriorated in trade with the United States. The extent of deterioration would have been greater, the more price inelastic the Soviet demand for grain.[41] Given the circumstances, Soviet demand was probably relatively inelastic although, as discussed in section II, whether it was so inelastic as to suggest a Soviet willingness to make important noneconomic concessions, is less clear. In other words, Soviet leaders might have been much more willing to pay a high economic than noneconomic "price" to maintain minimum food consumption levels.

The above discussion suggests that there is as yet little theoretical basis nor empirical evidence for the view that the Soviet Union is obtaining a disproportionately high share of the gains from trade because of the exercise of monopoly power. Indeed, it is more likely that the U.S.S.R. gains more, at least relative to its national income, precisely because it may approximate more closely a "small"—or price taking—than a "large" country in trade with the West. It is a well-known theoretical proposition in international trade that "small" countries gain more than "large" countries in mutual trade because they are likely to benefit from a greater divergence between autarkical and "free trade" relative prices than large countries. In the Soviet case, decades of relative isolation from the Western world market has undoubtedly preserved some important real price divergences. Relative to national income, however, the elimination of such differentials is not likely to give the U.S.S.R. as much "gain" from expanded trade with the West as it does many of the smaller CPE's. Furthermore, to the extent that Soviet FTO's face oligopolistic multinational corporations in their trade with the West, the usual "small" country gains from trade may be significantly reduced.

In summary, the monopoly-based argument for disproportionate Soviet static gains is as yet unpersuasive. Consequently, the case for

[39] Wolf (1978c).
[40] On the 1972–73 grain sales, see Committee on Government Operations (1974); Goldman (1975); and Brookings (1978).
[41] See Wolf (1978c).

government-organized trading companies or for the setting of so-called "upset prices" on monopoly grounds is weak, not to mention the technical difficulties in administering such programs.[42] In any event, the U.S. Government is not forcing companies to do business with the Soviet Union against their will, and presumably if such trade is indeed unprofitable or only marginally profitable, firms will soon realize it and pull out. Furthermore, it is not clear that the Government has a responsibility, as a general principle, to protect companies from the consequences of their own miscalculations. Regarding the "equity" of the distribution of static gains, it is difficult to see why the possibly larger gains that accrue to the "small" country are inequitable; certainly this issue is not raised regarding U.S. trade with the more than 100 other "small" countries in the international economy. Moreover, the mere existence of the Communist countries as additional export markets in a period of high domestic unemployment should be seen as having some positive macroeconomic impact in the United States.[43]

IV. The Distribution of Dynamic Gains From Trade

A stronger case might be made for the Soviet Union receiving disproportionate dynamic benefits from the net import of capital—that is, hard currency deficits—a relatively high rate of capitalization of static gains from trade, the import of advanced Western technology, and increased international competition for domestic industry.

By running hard currency trade deficits the U.S.S.R. is able, ceteris paribus, to raise the level of investment and its rate of economic growth.[44] In the Soviet case, however, the magnitude of Soviet hard currency borrowing is unlikely to exceed more than 1 to 2 percent of annual Soviet gross investment.[45] Consequently, the stimulus to accelerated growth is likely to be small, independent of the effects of technology imports. A recent preliminary study has also questioned the fundamental productivity to the Soviet economy of borrowing in the West, again independent of imported technological advances. The discounted rate of return to incremental domestic investment is found to be very low relative to market terms on credits obtained in the West.[46] These results are undoubtedly very sensitive, however, to the underlying econometric model used as a basis for simulation. In particular, the model used is based on the type of constant elasticity of substitution production function that yields in the Soviet case strong diminishing returns to capital. Furthermore, to the extent that market rates of interest paid on Western credits are not adjusted upward to fully reflect higher rates of inflation in the West, and Soviet terms of trade do not deteriorate, the relative real rate of return on hard currency borrowing may not be so unfavorable for the U.S.S.R.[47]

A second relative dynamic gain to the Soviet Union is said to arise from the much greater Soviet propensity to capitalize its static gains from trade.[48] The basic premise of this argument is that Soviet plan-

[42] On the difficulties of establishing an "upset price" program, see Wolf (1974).
[43] One does not want to exaggerate, however, the employment impact of exports to the U.S.S.R. See Hanson (1978b).
[44] This "gain" from trade has been emphasized, for example, by Holzman and Legvold (1975); Desai (1978); and Brzeski (1978).
[45] See Holzman and Legvold (1975).
[46] Desai (1978).
[47] See Lenz and Kravalis (1977) and Brzeski (1978).
[48] Brzeski (1978).

ners have a higher marginal propensity to consume producers—versus consumers—goods out of increments in real income than do market participants, collectively, in the West. Whether this is so in the case of Soviet gains from East-West trade, inclusive of grain purchases, is an open question. Agricultural trade aside, however, the argument does carry a high degree of plausibility, given the history of Soviet planners' priorities. It should be noted, however, that while the Soviets may thus obtain a greater spur to economic growth from a given level of East-West trade than does the West (abstracting from both net international borrowing and technology transfer), this gain may not be seen as so large by most Soviet citizens who undoubtedly apply a higher discount rate to future consumption than do Soviet leaders.

The import of advanced Western technology has of course received the most attention of all the presumed dynamic benefits to the Soviets from expanded East-West trade. This is because of the obvious implications for the overall distribution of trade benefits, with both equity and leverage implications, but also because of the possible consequences of technology transfer for the future military and geopolitical competition between the two superpowers. Few would dispute the importance of Western technological imports in the earlier Soviet drive to industrialize and the more recent drives to modernize and to offset various factors that are dragging down the Soviet growth rate.[49] The Soviet reliance on such imports is, however, frequently exaggerated. Since 1955, Soviet imports of machinery and transport equipment from the West, in which most of Western technology transfer is believed to be embodied, have been estimated as accounting only for between 1.6 and 5.6 percent of annual Soviet machinery investment.[50] Possibly significant, however, is the rising share of total U.S.S.R. machinery and equipment imports originating in Western countries over the past decade.[51]

Some observers have questioned whether the volume of machinery and equipment (SITC 7)[52] trade is really a satisfactory proxy for technology transfer. On the one hand, it is argued that only certain four- and five-digit SITC 7 items, as well as a few types of instrumentation, really contain what could be called "high technology".[53] A recent study, based on this more limited definition of "high technology products," has concluded that the share of high technology products in total IW exports to Communist countries (12.6 percent in 1976) is similar to the high technology products share in IW exports to the world more generally (10.9 percent). The proportion is a little more disparate in the case of IW exports to the U.S.S.R. (14 percent in 1976), however, and the difference was even more striking in some earlier years.[54] Whether these percentages are "similar" or different doubtless depends upon what one's initial expectations were.

Other observers remind us that technology transfer is not always "embodied" in measurable exports, and may take place by way of trade

[49] The impact of Western technology has been probably most comprehensively examined in the series of volumes by Sutton (1968–73).
[50] Calculated by Hanson (1978b).
[51] Zaleski (forthcoming).
[52] SITC—Standard International Trade Classification.
[53] See Young (1978).
[54] *Ibid.* According to this study, in 1974 the comparable percentages for the U.S.S.R. and the world were 16.6 and 9.9 percent respectively; in 1972, 17.5 and 10.7 percent.

fairs, exchanges of technical documentation and technical advisory groups, activities which may or may not be directly related to sales of products.[55] Such "disembodied" technology transfer may well be of smaller relative significance in the East-West context, however, because of the still relatively restricted East-West movement of literature and people across national boundaries compared with the volume of scientific and technical interchange within the West.[56] To summarize on this point, it is extremely difficult to say to what degree the eastward flow in East-West economic relations is technology intensive relative to trade within the West.

The most lively controversy regarding technology transfer to the U.S.S.R. concerns the relative impact of imported versus indigenous technology. Careful case studies of the development of particular Soviet industries suggest that the import of Western plant and equipment and associated technology can have a significant productivity and output impact.[57] The debate about the more general effects revolves very much on a fundamental issue underlying Western attempts to explain the slowdown in Soviet economic growth—the selection of the most appropriate aggregate production function for the Soviet economy. Using a Cobb-Douglas specification, one study concludes that the marginal product of imported Western machinery is 15 times the marginal product of indigenous machinery.[58] Other studies by the same authors yield a marginal product for Western machinery from 8 to 14 times as great as that for domestic machinery.[59] But other investigators question this finding that imported machines have a disproportionately productive effect on the Soviet economy.[60] Any conclusion on this issue would appear to be extremely sensitive to econometric specification of the Soviet production function.

Our knowledge about Soviet capabilities to absorb and diffuse internally Western technology should make us somewhat skeptical of claims that imported capital is vastly more productive than indigenous technology.[61] The experience of Japan is often cited by way of suggesting that the Soviets are simply unable to fully take advantage of these imports. Furthermore, the "resource demanding" nature of large, high-priority investment complexes based on Western equipment and technology has been pointed to as possibly making such imports less productive, on balance, than they might appear at first glance. The opportunity costs to the Soviet economy could be significant, to the extent that the best human and physical resources must be transferred from other projects to make the import-related complexes operational.[62] The issue, however, would appear to be whether it costs more, in terms of domestic resources, to develop a given high-priority complex alone or with the help of Western technology. Such a calculation would have to take into account not only the relative commitment of domestic resources directly to the project, but also the discounted cost

[55] Mountain (1978).
[56] Young (1978).
[57] In particular, see Hanson's study (forthcoming) of the impact of imported technology on the Soviet chemical industry.
[58] Green and Levine (1976).
[59] Cited in Hanson (1978b).
[60] See Weitzman (1978) and Hanson (1978b) and references therein.
[61] The domestic environment for technological advance in the Soviet Union is analyzed in Berliner (1976).
[62] See Hardt and Holliday (1978) and Hanson (1978b).

to the economy of the real exports required to pay off associated hard currency indebtedness.

A further possible dynamic benefit to the U.S.S.R. is that through expanded trade with the West, domestic enterprises may be subjected to greater competition and be spurred to greater efficiency.[63] For "modified" CPE's such as Hungary since 1968, such dynamic competitive effects could come to be important consequences of domestic economic reform combined with a greater export orientation. Whether expanded trade alone will induce greater efficiencies in Soviet industry, without accompanying profound changes in the foreign trade system and in particular increased direct linkages between industrial enterprises and foreign markets, is doubtful.

On balance, given the asymmetrical commodity composition of Soviet East-West trade and the still relatively small westward flow of technology from the U.S.S.R., and despite the lack of definitive evidence of the superior marginal productivity of imported Western technology, it does seem reasonable to conclude tentatively that the Soviet Union gains relatively more than the United States in a dynamic sense.[64] Observe, however, that this would be expected to occur in U.S. trade with any developing or semideveloped country that concentrates on imports of technology and producers goods. In this perspective, therefore, it is not clear that disproportionate gains in this regard should be viewed as particularly "inequitable".

V. Competition and Stability

Large-scale technology transfer to the Soviet Union in recent years has also raised the issue of whether the U.S.S.R. will use this technology to enhance its future export competitiveness vis-a-vis the United States, and take away American industry's markets, whether in the United States itself, other Western industrialized countries, the Third World, or in other CPE's. One study of this issue, completed in 1976, concluded that the United States had little to fear from the Soviet Union as a future competitor, based on past and current eastward technology flows.[65] This conclusion was based on case studies of the semiconductor, commercial aircraft, construction machinery and equipment, and synthetic fiber industries. Only in the latter industry, involving nonspecialty fibers, and possibly with respect to construction equipment sales to developing countries, was the U.S.S.R. seen as potentially an important competitor. This conclusion is not surprising, given the lack of Soviet commitment in the past to developing export markets for their finished manufactures. Soviet weaknesses with respect to technological innovation, responsiveness to users' needs, manufacturing efficiency and after-sales support services are also cited by this study in support of its assessment of future competitive prospects.

A more likely possibility is that the Soviet Union may become an important competitor in mass-produced products sold in the West on the basis of long-term compensation agreements. Recently, fears have been expressed both in Western Europe and the United States that in

[63] Holzman and Legvold (1975).
[64] On the westward flow of technology, see Kiser (1976).
[65] Levine, et al. (1976).

the chemical industry in particular, buy-back agreements signed in the past few years in connection with sales of plant equipment to the U.S.S.R. will make the Soviet Union a destabilizing force on some world chemical markets in the 1980's.[66] Such products are sold very much on a basis of price, once minimum quality standards are met, and because of the well-known vulnerability of CPE's to dumping charges, it can be expected that this will be a frequent complaint against Soviet exporters of some mass-produced products in the coming decade. Indeed, West European concern with the costs and benefits of East-West trade has historically been focused more on the threat of cheap imports than on allegations of CPE price gouging.[67] Up to now, however, the Soviet Union has had less trouble with this issue than the East European countries, primarily because Soviet exports have been concentrated in relatively capital-intensive primary and semimanufactured products.

The celebrated Polish golf cart case has already made alleged CPE dumping an important and sensitive issue in U.S. East-West trade policymaking. As ongoing discussions with Poland have demonstrated, however, this is essentially a commercial policy issue (as opposed to a "foreign policy" issue) which, given enough good will on both sides, is probably amenable to solution through some mixture of bilateral and multilateral negotiations.[68] Soviet acceptance of language regarding "market disruption" and other commercial policy issues in the aborted 1972 United States-Soviet trade agreement suggests that these issues need not become points of serious bilateral conflict once trade relations are normalized. In any event, given the past and probable future commodity structure of Soviet exports to the West (only 4.1 percent were finished manufactures in 1976), expanded trade with the U.S.S.R. is unlikely to generate serious labor dislocations in the United States. In 1976 only about 2 percent of all Soviet exports to the West were in so-called sensitive branches.[69] Soviet competitive practices in world shipping, however, should be closely examined, particularly given the obvious military and strategic significance of merchant fleets.

In addition to questions of "market disruption" and dumping, greater integration of the Soviet Union into the world economy raises other stability issues. To the extent that the U.S.S.R. does become a destabilizing force, this can be seen as an additional cost to the United States, and to the West more generally, of expanding trade with the CPE's. These other instability arguments fall into two broad categories, what we shall call micro- and macro-instability.

The basic microlevel argument is that because of the enormous size of the U.S.S.R., in particular, entire industries or subbranches of export industries in Western countries may become dependent upon the U.S.S.R. for a high proportion of their sales and profits. From a purely economic standpoint, of course, this is not necessarily bad. Nor should it be a particular concern from a political standpoint, aside from the issue of possible Soviet leverage. The argument is, however, that the centralized nature of the Soviet planning apparatus and its

[66] In particular, see Central Intelligence Agency (1978).
[67] See Pinder and Pinder (1976).
[68] For an analysis of the CPE dumping issue, see Marer (1979).
[69] Taylor (1978). "Sensitive" products are defined in that study on the basis of the frequency of import restraint petitions initiated by a given industry.

ability to rather rapidly change basic development priorities, lends an inherent instability to its import structure. Thus a given producers goods industry in the West may be encouraged by mammoth Soviet orders to make new investments and expand the industry's scale. If 5 to 10 years later the U.S.S.R., having imported hundreds of millions of dollars of equipment in the interim, suddenly refocuses its development priorities, Soviet imports of such equipment could virtually disappear and Western industry would be thrown into disarray.[70] Given, for example, the aforementioned considerable dependence of some West German industrial branches on exports to the East, such a possibility should not be taken lightly. There is so far little evidence, however, that Soviet postwar buying has been so erratic,[71] and in any event, we should really be comparing the stability of the Soviet market with the stability of other export markets, and not be asking simply whether Soviet purchases tend to be more lumpy or erratic than we would like them to be. The possibility exists, for instance, that East-West trade has some countercyclical effects. This certainly appears to have been the case for the West Germans, as discussed earlier in section II.

This leads to the issue of the macrostability effects of expanded East-West trade. The now classic case of this concern is the controversy surrounding the massive U.S. grain sales to the Soviets in 1972 and 1973. The narrow gains-from-trade issue aside (see section III) the popular impression was that these grain sales had an important upward impact on the price of bread sold in the United States, and made a significant contribution to the rising inflation rate. We should recognize that the particular source of the disturbance (in this case, the Soviet harvest failure) had little bearing on the ultimate economic effects, at least in a truly world market. Would we have been so outraged had massive harvest failures occurred elsewhere, say in wheat-exporting Canada? Furthermore, it can be argued that if we had refused to sell so much grain directly to the Soviets, and had even barred transshipment of our wheat through third countries, to some extent the same short-run domestic inflationary impact might have resulted, as grain dealers in other producing countries imported more from the United States to cover domestic consumption needs, while exporting more of their own production to the U.S.S.R.[72] More generally, by focusing on the possible short-run domestic inflationary consequences of expanded exports, what is ignored is the fact that the balance of payments is benefited and higher export prices (if not offset by export subsidies) mean a terms of trade improvement for the United States and increased purchasing power over foreign goods and services. In any event, with the exception of exports of grain, in which Soviet import needs can indeed account for a significant proportion of world demand at any point in time, the macroeconomic effects on the United States of increased trade with the Soviet Union are likely to be insignificant for the foreseeable future.[73]

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[70] This argument is developed in Vernon and Goldman (1974).
[71] See Hanson (1975, 1976b).
[72] The limitations of transshipment prohibitions in East-West trade policy are explored in Wolf (1973), chapter 2.
[73] For a discussion of CPE's as possible generators of economic disturbances, see Lawson and Wiles (1978).

VI. Private Gains and Social Costs

Aside from questions of relative bargaining power, dynamic gains from trade and potential competition and instability, some observers have also asked whether expanded trade, while profitable for the firms involved, might be significantly less profitable from the standpoint of the U.S. economy as a whole.

One frequently mentioned example of divergence between private and social gain is the possibility that many U.S. firms are selling to the Soviets, at low prices, products and technology which have zero or only low marginal costs of production, but which involved sizable social costs in the form of federally funded R. & D. in their initial development. While the transaction may well be profitable to the American company, because the low price still covers associated variable costs, from one perspective the transaction is unprofitable for the U.S. economy. Furthermore, the loss for the United States is seen as even greater because in most cases the price charged the Soviets is alleged to be less than the Soviet's own opportunity cost of production.[74] The classic case of this type of loss was the sale of space suits to the U.S.S.R. for $150,000 apiece that cost the U.S. Government approximately $20 million per unit to develop.[75] Some observers have concluded on the basis of this line of reasoning that the U.S. Government should establish an upset pricing mechanism to insure that U.S. companies (or the Government) capture the full social costs of exports to their Soviet customers.[76]

While this argument and its policy implications may seem attractive at first glance, upon further reflection it is less persuasive. First, there is as yet no systematic evidence that U.S. firms are selling machinery and technology to the Soviets at such low prices. Indeed, as argued in section III, the Soviet foreign trade monopsony may be particularly vulnerable to the exercise of market power by large Western sellers of technology. Second, unless the Soviets' own costs of production and their expected return from imports were higher than the purchase price, there would be little basis for exchange in the first place. Implicitly, the attempt to price American technology and know-how at its real opportunity cost to the U.S.S.R. would be to try to tax away the entire Soviet static and even dynamic gain from such trade. If we do not attempt to do this in trade with other countries, why should we do so when dealing with the Soviets? Finally, the question is whether this problem, if it indeed exists in United States-Soviet trade, is significant relative to similar transactions that take place with other Western countries on a much vaster scale. If upset pricing has a rationale, and this is doubtful,[77] it would probably be more useful in trade with Japan, Western Europe, and many developing countries than in trade with the U.S.S.R.

A related issue is the proper role for Export-Import Bank (Eximbank) credit support for exports to the Soviet Union. To the extent that U.S. export credits are guaranteed or insured by Eximbank and

[74] This particular issue was first emphasized by Vernon and Goldman (1974).
[75] Goldman (1975), p. 244.
[76] Vernon and Goldman (1974).
[77] See Wolf (1974).

its affiliates, or Eximbank participates directly in credits at less-than-market interest rates, there is a subsidy element in U.S. exports. The degree to which the subsidy accrues to the U.S. exporter or to the foreign importer is dependent upon a number of factors. The fact that the Eximbank competes in capital markets for financial resources does imply a certain social cost arising from its operations. On the other hand, Eximbank is an instrument of U.S. foreign economic policy, and given the high priority given to domestic employment and balance-of-payments objectives, together with the need to compete with foreign official credit support agencies, the benefits of Eximbank activity may well more than offset the full social costs.[78]

Official export credit support competition is intense on export markets throughout the world, and the problem of lack of coordination among the principal suppliers of such credit is certainly not unique to East-West trade. The role of the Eximbank in East-West trade should therefore be seen primarily as just one aspect of the overall problem of credit competition. If binding rules of the game are impossible to enforce generally, why should credit competition in selling to the CPE's be singled out as a particularly serious problem?[79] Cutthroat competition to sell plant and equipment to Communist countries is less a reflection of Communist cunning than a symptom of overproduction problems within capitalism itself.

A balancing of gains in United States-Soviet trade is seen by some as requiring increased U.S. Government intervention and/or greater collusion among U.S. companies. To the extent that we attempt in this way to mirror the Soviet foreign trade system, however, we may only create additional social costs rather than remove them completely. Increased collusion, with or without the active participation of the Government, could be accompanied by relaxed antitrust regulations, increased concentration in certain American industries, and a further deterioration in the arms-length tradition between American Government and business.[80] Given the lack of evidence that the U.S.S.R. is obtaining wildly disproportionate gains in bilateral trade with the United States, and remembering that this trade still accounts for only about 1 percent of total U.S. trade turnover, proposals for policy and/or systemic changes designed to mirror the Soviet foreign trade system should be viewed with considerable skepticism.

VII. Summary and Conclusions

In this paper we have argued that only by differentiating among the basic issues, or dimensions, of U.S. East-West trade policy, and by analyzing these issues as dispassionately as possible, can we evolve a more realistic and consistent trade policy toward the Soviet Union. In section II, four basic issues were identified: National security, equity, leverage, and morality. Each dimension was discussed in some detail, and in particular we stressed the critical importance of per-

[78] An extensive discussion of the pros and cons of Eximbank activity in East-West trade, and a comparative analysis of official credit support programs in various countries, can be found in Marer (1975).

[79] On the issue of the need to multilaterally coordinate export credit terms in an East-West context, see Hewett (1974); various studies in Marer (1975); Hanson (1978a); and Downey (1978).

[80] On the role of government in East- West trade, see Hewett (1974).

ceptions of the distribution of net trade benefits between the United States and the U.S.S.R. in the formulation of American opinions regarding the equity and leverage issues. Popular and even some experts' perceptions of the distribution of benefits in United States-Soviet trade tend to be emotionally colored by the fundamental adversary relationship between the two countries. We have argued that consequently there is a tendency within the United States to exaggerate the degree to which the Soviet Union disproportionately benefits from trade with the United States. This has frequently led to complaints about inequitable Soviet gains, and to widespread overestimation of U.S. leverage.

The actual distribution of costs and benefits in United States-Soviet trade is examined in some detail in sections III to VI. Despite the Soviet state monopoly of foreign trade, we found little theoretical or empirical support for the claim that the U.S.S.R. is systematically capturing monopoly profits at the expense of U.S. firms and U.S. consumers. In many respects, the Soviet Union is not significantly different, in its trade with the West, from many other countries with very small shares of world trade. Although Soviet market power may be significant in some products, in general it is likely to remain negligible for the foreseeable future.

It is quite possible that Soviet imports of Western technology give it a dynamic benefit from East-West trade not matched by its Western trading partners. The evidence on how significant a net benefit they so derive is mixed, and there is reason to believe that systemic inefficiencies in absorbing and diffusing technology cause these gains to be less important than they would be for a comparable market economy. Other supposed dynamic benefits, including the increment to the Soviet rate of economic growth made possible by net hard currency borrowing, are probably of lesser significance.

There would appear to be little cause to be concerned about the U.S.S.R. taking away Western markets, although Soviet competitive practices in world shipping markets may be an important exception. Other than the world grain and chemical markets, the world economy would seem to be relatively invulnerable to Soviet-induced economic instability in the near future. It should also be observed that Soviet export potential in chemicals is being developed in large part through presumably profitable chemical plant and equipment sales by Western firms. (To the extent that such firms are also chemicals producers, equipment export prices may have discounted somewhat expected future Soviet competition.) It is even possible that on balance expanded Soviet trade with the West could have important countercyclical effects.

Perhaps of least importance are the presumed social costs in trading with the U.S.S.R. Indeed, with respect to this as well as most of the other issues involving the distribution of trade costs and benefits, we should ask three basic questions. First, is there a sound theoretical and empirical basis for concluding that the Soviets are in fact obtaining a disproportionately high share of the net trade benefits? The answer to this question has direct bearing on the issue of how much leverage the United States has on the Soviet Union. Second, is the distribution of costs and benefits in some sense "inequitable"? This is an even more

difficult question to answer, because it involves various complex value judgments. Is it inequitable for a "small," technologically backward country to reap relatively sizable static and dynamic benefits from trade with a large, advanced industrial society? Finally, if we do determine that the distribution is inequitable, is the situation really unique to trade with the Soviet Union, or is it a more general problem? If it is a more general problem, we should seriously reconsider the wisdom of devoting limited human and other resources to its solution in the Soviet case, when the inequities may be much larger in bilateral trade relations with, say, other Western countries. (How many would be willing to argue that economic benefits in bilateral United States-Japanese relations are roughly "balanced"?)

As noted previously, any conclusions about the distribution of costs and benefits in United States-Soviet trade must be rather provisional, given that most available evidence is fragmentary. We tentatively conclude that while on balance the U.S.S.R. probably derives greater economic gains than does the United States from mutual trade and technology transfer, whatever imbalance that does exist is not so obvious and not so large as to suggest an "inequitable" distribution nor a great potential for the use of economic leverage to obtain noneconomic concessions from the Soviet Union.

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EXPORT SPECIALIZATION AND IMPORT DEPENDENCE IN THE SOVIET ECONOMY, 1970–77

(By Michael R. Dohan*)

CONTENTS

TABLES

*The author is Associate Professor of Economics at Queens College of the City University of New York. The author is indebted to Patricia Logan, Gail Frenkel, and Anjum Bhatia for statistical compilations and to Blanche B. Dohan for editorial assistance.

This study examines the question of export specialization and trade dependence of the U.S.S.R. in the 1970s within the methodological framework developed by the author in his study of Soviet trade specialization in the 1960's: "Foreign Trade Specialization and Its Determinants in the Post-War Soviet Economy, 1950–1970," Chapter 5 in Economic Development in Eastern Europe and the Soviet Union, Vol. II Sector Analysis, Zbigniew M. Fallenbuchl, ed., New York: Praeger, 1976, pp. 90–132 cited, hereafter, as Michael R. Dohan, "Foreign Trade Specialization." Readers are referred to this study.

I. Introduction

Foreign trade has been among the most rapidly growing sectors of the Soviet economy in the 1970's, thereby continuing a trend established over the past two decades. This study addresses two issues which concern both Soviet leaders and U.S. policymakers. First, to what extent has the rapid expansion of foreign trade relative to output increased the dependence of the Soviet economy on foreign trade. Second, what is the nature of this dependence, and to the extent it exists, in what areas of the economy and why has this dependence arisen? In light of our answers, we ask what implications this dependence may have for U.S. and Soviet foreign policy.

II. Gains of Trade and Economic Independence in the Soviet Economy

A. The Issues

Some U.S. policymakers believe that the gains from trade are important enough to the Soviet economy to attempt to limit trade or certain types of trade and lending as a means to: (1) retard the growth of Soviet military and/or economic power; and (2) to make the Soviet leaders responsive to U.S. pressure through our foreign trade policy. Indeed, these views have been embodied in U.S. legislation and U.S. foreign policy.[1] On the other side of the argument are those who believe that U.S. foreign trade policy, acting independently of other Western industrial nations, can have little impact on the Soviet economy.[2] They argue that, for most products, there are alternative suppliers, buyers, and lenders among other Western industrial nations. Underlying these arguments are the more fundamental questions about the commodity interdependence of the Soviet economy with the foreign sector and the magnitude and nature of these gains of trade to the Soviet economy arising from foreign trade with Eastern Europe, the industrialized West, and developing countries. A "minimal impact" view assumes that the Soviet economy is relatively independent of foreign trade or, at least, of foreign trade with the West.

B. Soviet Gains From Trade

Foreign trade contributes to the Soviet economy in ways unique to the needs of Soviet-type economic systems as well as through the more

[1] For a discussion of these issues, see Ronda Bresnick, "The Setting: The Congress and East-West Commercial Relations," and John Hardt, "United States-Soviet Trade Policy," both in Issues in East-West Commercial Relations (Washington, D.C.: Government Printing Office, 1979), pp. 1–11, 267–285.

[2] Franklyn D. Holzman, "East-West Trade and Investment: Past and Future Policy Issues," in his Foreign Trade Under Central Planning (Cambridge: 1974), pp. 192–229.

conventional gains from comparative costs. Understanding the nature of this contribution is crucial in evaluating the sensitivity of the Soviet economy to various developments in the world economy whether stemming from deliberate policy actions towards the U.S.S.R. or from world economic conditions.

First, Soviet gains from trade arise from occasional need for short-term imports as supply deficits arise because (*a*) actual output falls short of planned output or (*b*) planner's investment priorities suddenly shift. For example, the massive grain imports after the 1972 and 1975 grain crop failures reflected intensive short-term needs eliminated by the next good crop and perhaps further investment in agriculture. The sudden large-scale imports of chemical equipment in the mid-1960's and mid 1970's permitted rapid implementation of new priorities not possible within the existing machine-building capacity at the time.

Second, the U.S.S.R. has a continual need for advanced technology to increase factor productivity and modernize the economy in terms of capital and output.[3] The pressure to increase capital productivity through new technology has increased greatly over the past decade as the U.S.S.R. continues to encounter sharply diminishing returns when expanding investment along its traditional "extensive" pattern based on existing Soviet technology.[4] Most advanced nations depend on each other for technological progress and Soviet planners increasingly recognize that it is inefficient both to reinvent and to embody every innovation in domestically produced equipment.[5] Thus, the U.S.S.R. realizes that a most efficient way to achieve this goal is to import products and licenses embodying new technology.

These two gains from trade create a demand for imports—and therefore a need to export to finance such imports—which is independent of long-term differences in comparative costs of commodities. For these benefits alone, the U.S.S.R. may be expected to expand export industries. As a result we may find high export-output ratios without any corresponding systematic long-term reliance on imports to supply specific products. Such long-term commitment to export production reflects an effort to seek the least-cost methods of providing exports to finance short-term and technology imports. Indeed, these two factors along with the raw material and energy needs of Eastern Europe account for growing export specialization from 1950 through 1970 noted in an earlier study.[6]

Since the mid-1960's, however, Soviet leadership has increasingly stressed fuller utilization of the "international division of labor" as a means for increasing productivity and the Soviet standard of living.[7] Presumably they are referring to utilizing the traditional gains of

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[3] George Holliday, "The Role of Western Technology in the Soviet Economy" in Issues, 1979, pp. 46–58.

[4] Rush V. Greenslade, "The Real Gross National Product of the U.S.S.R. 1950–1975" in The Soviet Economy in New Perspective (Washington, D.C.: U.S. Government Printing Office, 1976). pp. 228–229.

[5] For the Soviet view see, for example, Vneshniaia torgovlia SSSR: itogi deviatoi piatiletki i perspektiviy (Moscow: Mezhdunarodnye Otnosheniia, 1977). Hereafter cited as Vnesh. torg. SSSR itogi.

[6] Michael R. Dohan, "Foreign Trade Specialization and its Determinants in the Post-War Economy, 1950–1970." Chapter 5 in Economic Development in Eastern Europe and the Soviet Union, Vol. II Sector Analysis, Zbiniew Fallenbuchl ed. (New York: Praeger, 1976). pp. 90–132.

[7] Marshall I. Goldman, "Autarchy or Integration—the U.S.S.R. and the World Economy" in Soviet Economy in New Perspective, pp. 81–96.

trade arising from differences in comparative costs (as well as continuing to exploit the technological advances of the West). These arise from economies of scale, differences in natural resource endowment, differences in factor proportions, locational advantage, and noncompeting imports (coffee, citrus, et cetera). As the U.S.S.R. moves to take advantage of these gains, import-supply ratios should rise as it relies on imports to supply an increasing share of domestic demand rather than using domestic resources. Despite such policy pronouncements, the Soviet leadership remains sensitive to any interpretation of such import growth as being a sign of inferiority of the Soviet economy vis-a-vis capitalist economies or as making past achievements, current output, or future growth as being dependent on foreign trade.[8]

Economies, however, that develop along lines of comparative advantage, become interdependent on the world economy. Commodity interdependence arises from (1) dependence on imports to supply significant portions of basic commodities measured by import-consumption ratios; and (2) development of an industry for export significantly beyond near-term domestic demand measured by export-output ratios.[9]

This study focuses on measuring the Soviet economy's interdependence with the world economy. In particular, we are interested in the extent to which Soviet leadership has been willing to exploit long-term gains from trade by allocating investment resources to develop capacity to produce significantly above domestic needs, and to forego the development of industries and branches in favor of supplying those products through imports. What factors influenced the development of these sectors and to what extent has it made the Soviet economy more dependent on the world economy?

III. Methodology and Qualifications

This study approaches these questions on several levels. After estimating aggregate measure of trade specialization (trade/GNP ratios), we then compare trade, output, and consumption of selected categories and specific commodities. The conventional measure of export specialization for a given industry—the ratio of gross exports to output—overstates export specialization when there are imports of similar products and understates export specialization when export products are used in the production of other exports. Both phenomena are widespread in Soviet trade. To correct for these problems, "extended" export-output ratios are computed and include net direct exports plus some portion of those other exports for which this product is a major input (using in essence a physical input coefficient times the quantity of exports). Similar measures are computed for import-consumption ratios (output plus net imports). Extended trade specialization ratios for several major exports and imports are presented in tables 4, 5, 6. 9, and 10 along with time series of output, direct exports, and total direct and indirect exports. The distinctive pattern of Soviet machinery trade—direction and composition—are evident in tables 7 and 8. All these tables, located after the text, present important findings

[8] Vnesh. Torg. SSSR. itogi, p. 36.

[9] In the U.S.S.R. some products with high export-output ratios, e.g., automobiles, reflects a willingness to restrain domestic demand rather than to commit resources beyond domestic needs.

of this study. The sources and methods used for all tables are described in the appendix.

The nature of Soviet foreign trade and output statistics introduces considerable uncertainty in any analysis. Several problems were particularly troublesome in this study: inconsistent prices, a large and growing unspecified component of exports (probably precious metals, diamonds, and armaments), unspecified components of machinery exports, omission of many major traded items, reexport of purchases on Soviet account but delivered to a third country, and the incompleteness of domestic output and price data.[10] In particular, the different prices used for identical products in trade with socialist and market economies distort the value structure of exports and imports, and the separation of the domestic price structure from foreign prices introduces problems in comparing foreign trade values with domestic values.[11] Rising world prices in the 1970's and unreported domestic price increases implemented during new model introduction in the U.S.S.R. further complicated any comparison of world and domestic values. Nevertheless, we feel such comparisons, while not precise, do indicate trends. Lack of reliable output data is particularly acute for nonferrous metals and some minerals, and here our output estimates should be used with caution; the export-output ratios, however, are of the correct order of magnitude. A growing problem in the 1970's is the marked deterioration of Soviet trade statistics. By 1977 the unspecified exports comprised 15 percent of total exports (table 2). In 1972 grain data were omitted and in 1976 and 1977, many items were consolidated (for example, nonferrous metals) while quantity data were omitted on many others (grain, metals, fuels, and so forth). Only limited account has been taken of these factors.

IV. Comparative Trends in Foreign Trade and Aggregate Output

A. Growth of Trade and GNP

The rapid post-war growth of Soviet foreign trade continued on into the 1970's (table 1). In 1938 Soviet exports were only 31 percent of 1913 levels and accounted for about 0.5 percent of GNP.[12] But after World War II, exports grew rapidly and surpassed 1913 levels by 1951. Between 1950 and 1960 export volume grew 11.5 percent per year, and import volume 13.7 percent per year, or almost double the 6.1 percent growth rate of GNP. In the 1960's exports and imports grew more slowly (9.4 percent and 6.7 percent per year), but still exceeded the 5.3 percent per year growth of GNP.

From 1970 to 1975 export growth slowed a bit to 7.1 percent per year while import growth accelerated to 11.7 percent; GNP, however, grew only 3.8 percent per year in this period. After 1975, three was a

[10] For a discussion of these problems see, Paul Marer, "Soviet East European Foreign Trade, 1946–1969" (Bloomington: Indiana University Press, 1972), Barry L. Kostinsky, "Description and Analysis of Soviet Foreign Trade Statistics," U.S. Department of Commerce, Foreign Economic Reports FER–No. 5 (July 1974).

[11] Martin J. Kohn, "Developments in Soviet-Eastern European Terms of Trade, 1971–1975," in "The Soviet Economy in New Perspective," pp. 67–80.

[12] Franklyn D. Holzman, "Foreign Trade" in Abram Bergson and Simon Kuznets, eds. "Economic Trends in the Soviet Union," (Cambridge: Harvard University Press, 1963), pp. 283–231.

acceleration of export growth to 8.5 percent per year; GNP grew at about 4 percent during the 1975–77 period. Over the period 1950 to 1970 exports ranked among the fastest growing uses of output and imports among the fastest growing source of goods in the Soviet economy. The rapid growth of trade in specific commodity groups is evident in tables 2 and 3 and many of these trends continued into the mid-nineteen seventies.

B. Trade Participation Ratios

As a result, the role of foreign trade in the economy grew rapidly as measured by trade participation ratios. Based on estimates of exports and GNP in 1970 domestic ruble factor prices (shown in table 1) the share of exports in GNP rose from about 2.7 percent in 1950 to 3.6 percent in 1960, 5.4 percent in 1970, and 6.7 percent in 1977. The share of imports in GNP rose from about 2.9 percent in 1950 to 5.9 percent in 1960, 6.4 percent by 1970 and as much as 9 percent in 1977—approximately the same as the United States in the 1970's. These aggregate measures of trade participation point to a normalization of the role of foreign trade in the Soviet economy since World War II and contrast sharply with the Soviet position at the end of the 1930's.

Does this continued growth reflect a fundamental shift in Soviet policy with respect to adapting its economy to world trade and economic independence? In an earlier analysis of the growth of Soviet foreign trade in the 1960's, it was concluded that systematic export specialization has in fact occurred in the USSR.[13] With the Soviet's increased emphasis on the use of trade in the late 1960's and 1970's, do we find even greater export specialization and a growing import dependence?

V. Export Specialization and Import Dependence in Energy and Materials

To what extent and in what sectors has such export specialization occurred from 1960 to 1977?

A. Export Specialization in Minerals and Fuels to 1970

In the 1960's raw material and energy exports grew rapidly so that by 1970 a significant share of output was directly or indirectly exported, much of it to Eastern Europe. (These trends are clearly seen in table 4.) In the earlier study we found that net exports of coal and coal-based products rose from 4 percent of output in 1960 to almost 9 percent of output in 1970. Iron ore exports rose from 10 percent of output in 1950 to 18 precent by 1970. The extended export-output ratios for iron ore (including ferrous metals) rose from 11 percent in 1950 to 27 percent in 1970 and about 41 percent of the added ore output between 1959 and 1967 ended up embodied in exports. Net exports of oil products grew from net imports in the early 1950's to 20 percent of crude oil output in 1960 and 28 percent in 1968. About 40 percent of the added output was exported between 1960 and 1968.

[13] Michael R. Dohan, "Foreign Trade Specialization," pp. 109–115.

Similar trends in export specialization occurred for many other minerals and metals during the 1960's. Large shares of added output of many minerals, fuels, and metals were exported so that by 1970 many export-output ratios for mining and metallurgy products had become quite high. It appears that in the post-war period the expansion of mining and metallurgy had been closely related to the expansion of exports.

The degree of export specialization in 1970 was less extensive in other industrial sectors. For example, the extended export-output ratio for raw industrial timber hauled rose steadily from less than 1 percent in 1950 to about 10 percent in 1970, while gross exports of pulp and paper together rose to about 16 percent of pulp output and of paper alone to 11 percent of paper output. But paper imports also grew rapidly and net exports turned out to be relativey small. Have such trends continued into the 1970's?

B. Export Specialization in the 1970's

Looking at export-output ratios for the 1970's in table 4 we note a startling slowdown and in some cases a reversal of export trends in energy and minerals.

Energy exports.—In coal, gross exports grew very slowly, and looking at "extended net exports" of coal and equivalents—allowing for coal imports and the indirect import of coal in steel—we find that net exports of coal equivalents actually declined owing to a decline in net exports of steel products—and hence in coal used for producing that steel. And as a result the extended export-output ratio for coal fell from 9 percent in 1970 to 6 percent in 1976.

Crude oil exports grew at only 7.4 percent per year from 1970 to 1976, about the same rate as output and much slower than the fast 12 percent in the previous decade. As a result, the share of output going to exports in 1976 was about 28 percent or about the same as in 1970. In volume, it grew about the same as exports so that oil's rising importance in the Soviet export structure has been due largely to its rapid price increase. Electricity exports grew 14 percent per year between 1970 and 1977 but still only equaled about 1 percent of output. After being a net importer of natural gas from Iran in 1970, the U.S.S.R. rapidly expanded natural gas exports so that by 1976 net exports equaled about 4 percent of output. Looking at total national fuel balances, it is estimated that net direct exports of fossil fuels and electricity was about 12.5 percent of net total fossil fuels extracted in 1970 and about 14.3 percent in 1976.[14]

Ferrous metals.—Ferrous metals show similar trends. Iron ore exports stagnated in 1971, grew at about 6 percent per year through 1974, and then stagnated and actually declined in 1977. If we look at net exports of iron ore and equivalents—iron ore plus the iron ore equivalents embodied in net exports of pig iron, scrap, and steel products, but not machinery, we find that net exports of iron ore and equivalents in 1976, and probably in 1977 were actually slightly below

[14] If, however, we consider the decline in net ferrous metals exports (and hence the energy utilized for such exports), the share of energy resources devoted to export production may have in fact declined. Narodnoe Khoziaistvo SSSR za 60 let, 1917–1977 Iubileninyi statisticheskki ezhegodnik (Moscow: Statistika, 1977), p. 83.

1970 levels. As a result the extended net export-output ratio declined from about 28.5 percent of output in 1970 to somewhere less than 22 percent in 1977. Thus the Soviet warning to Eastern Europe that it could no longer act as the prime supplier of raw materials has had its reflection in actual export policy in the 1970's. Behind this stagnation and decline of iron ore exports have been problems in expanding iron ore output which grew at only 2 percent from 1974 through 1977. Should such trends continue into the 1980's the U.S.S.R.'s role as a major supplier of iron ore and other metals will diminish.

A comparison of net exports of ferrous metals (pig iron, scrap, and rolled steel) with output of new pig iron smelted from ore (new ferrous metal), shows that despite a 23 percent increase in pig iron output from 1970 to 1976, net ferrous metals exports actually fell. As a result, the share of new iron metal ending up in net exports declined from 12.6 percent in 1970 to about 5 percent in 1976. Rolled metal exports also stagnated in the 1970's while rolled ferrous metals imports, especially pipe, increased rapidly so that net exports of rolled ferrous metals declined from 5.6 million tons in 1970 to around 2 million tons in 1976 or somewhat less than 2 percent of output compared with 7 percent in 1970. In sum, we note a distinct stagnation in the absolute level of ferrous metals exports in the 1970's and a reduced share of production capacity being used to supply exports.

Exports of manganese and equivalents showed little distinct trend in the 1970's. In 1977 about 20 percent of manganese output was exported. Exports of chromite ore have actually declined over the period, and the export-output ratios have fallen from 75 percent in 1970 to 51 percent in 1976, based on an approximate estimate of output.[15] Sluggish world demand seems to be a factor here.

Nonferrous metals.—In basic non-ferrous metals, the U.S.S.R. has long shifted from extensive domestic dependence on imports in 1913 to having developed a nonferrous metals industry which is capable of meeting all its own needs as well as providing large export surpluses. Indeed, up through 1974, a large portion of the additional investment in aluminum and copper has gone toward export capacity. In addition the U.S.S.R. also exports a large but unknown portion of its precious metals and diamonds output.[16] Total nonferrous metals exports expanded rapidly in the early 1970's as a larger share of growing output was diverted to Eastern Europe and, in the case of copper and aluminum, to hard currency markets. Using conservative smelter output estimates, net export-smelter output ratios of copper reached about 35 percent of output in 1973–74, net aluminum exports hovered around 40 percent of output (25 percent using higher CIA figures).[17] But about 40 percent or more of aluminum was produced with imported bauxite and alumina in the 1970's. Thus, the investment resources committed to such large aluminum exports are limited to the refineries and associated energy sources. The U.S.S.R.'s aluminum consumption is by the same fact less dependent on imported raw ma-

[15] Commodity Yearbook, 1978.

[16] Allen J. Lenz and Hedija H. Kravalis," An Analysis of Recent and Potential Soviet and East European Exports to Fifteen Industrialized Western Countries" in East European Economies Post-Helsinki (Washington, D.C.: U.S. Government Printing Office, August 1977), pp. 1061–1075, hereafter cited as Lenz and Kravalis, "Analysis."

[17] Theodore Shabad, "Raw Material Problems of the Soviet Aluminum Industry" Soviet Economy in New Perspective, pp. 661–676.

terials—from Hungary, Guinea, Greece, and Yugoslavia—than would be suggested by the high import-supply ratios for alumina and bauxite (table 4). Zinc exports in the 1970's were a reexport of Polish and Korean zinc to other Eastern European countries. Thus, the net export-output ratio was a relatively low 13 percent when net exports peaked in 1973. Net exports of lead, however, dropped in the 1970's as the growing automobile industry required more lead.[18] Net export-output ratios fell from 12 percent in 1970 to 4 percent in 1974, and 9 percent in 1975.

After 1974, exports of copper, aluminum, and zinc fell sharply and net export-output ratios also fell back to or below 1970 levels. Growing domestic demand and depletion of suitable ores pose a major barrier to further expansion of nonferrous metals exports.[19]

Other minerals and fertilizers.—By 1970 the U.S.S.R. had invested considerable resources in export capacity in other minerals; export-output shares were: 34 percent for magnesium, 36 percent for asbestos, 35 percent for phosphate rock, 32 percent for potash, and significant shares for most alloying metals. During the 1970's exports of phosphate rock and phosphate fertilizer did not grow; as a result, the share of output devoted to exports diminished to 27 percent. Exports of processed phosphate fertilizers were only a few percentage points of output and exports of nitrogen fertilizers, while rising rapidly in the 1970's, still used only a small portion of output. On the other hand, one-third of potash output was exported in the early 1970's, but potash exports ceased growing after 1974, and export–output ratios fell. Nevertheless, with output continuing to grow rapidly, it seems likely that the U.S.S.R. will continue to attempt to develop these sectors for export—the barrier to future exports may be world demand rather than domestic supply.

In sum, by 1975–77, we find that, in general, net exports of many raw materials were growing more slowly than output and in some cases—coal, ferrous ores and nonferrous metals, and phosphate rock—had declined. As a result, net export-output ratios remained constant or have fallen. Overall the U.S.S.R.'s minerals, metals, and energy sectors appear to be becoming less export-oriented in the mid-1970's.

C. Semiprocessed Materials

Chemicals.—Specialization among the chemical industries of CMEA has been a major goal of the U.S.S.R. and in the 1970's the U.S.S.R. was a growing exporter and importer of chemical products, in addition to fertilizer. Most trade is with its CMEA partners (tables 2 and 3).[20] Despite its professed goal of greater cooperation, the trade and output data reveal little change in either import-supply or export-output rates in the 1970's and our study suggests that the U.S.S.R. relies less and less on imports for its chemicals, even in the newer plastics and resins (table 4). This is not surprising in light of the large scale investment in the chemical industry in the 1970's.[21] Thus net

[18] Vnesh. Torg. S.S.S.R. itogi, p. 64.

[19] Lenz and Kravalis, Analysis, p. 1071, and VV. Strishkov, "The Mineral Industry of the U.S.S.R." In the U.S. Department of Interior's Minerals Yearbook: Area Reports: International (Washington, D.C.: U.S. Government Printing Office, various years).

[20] "Vnesh. Tork S.S.S.R. itogi," p. 103.

[21] Francis W. Rushing, "Soviet Chemical Industry—A Modern Growth Sector" in "Soviet Economy in New Perspective," p. 535–557.

imports of artificial resins, caustic soda, and soda ash fell in the 1970's and the import-consumption ratios declined to about 2 percent for caustic soda and 5 percent for soda ash in 1976. The already low import dependence for certain new chemical products in the late 1960's was reduced even further in the 1970's. Pesticide imports, around 271,000 tons in 1965, fell to 42,000 tons in 1970 and grew relatively little in the 1970's, so that with rising output, the import-supply ratio fell from 58 percent in 1965 to 6 percent in 1977. Similarly, imports of artificial fiber fell during the 1970's while output grew so that import supply ratios fell from 26 percent in 1960 to 14 percent in 1970 to less than 3 percent in 1977. Synthetic fiber imports, 15 percent of supply in 1970, doubled by 1977, but output almost tripled, so that import-supply ratios fell to around 11 percent by 1976. Natural rubber imports have fluctuated between 230,000 tons (1972) and 315,000 (1974) from 1965 to 1977. But net exports of synthetic rubber have also been growing so that net import of natural plus synthetic rubber have actually declined despite great increases in the output of tires and other automotive products. Natural rubber, synthetic fibers, and pesticides were largely hard currency purchases—and hence prime areas for import substitution, especially in light of the U.S.S.R.'s large natural resource base for their domestic production.

Forest products.—The Soviet Union is well known as a major supplier of lumber, pulp, and paper to Eastern Europe and world markets. The steady export growth of the 1960's continued through 1973, but then exports stagnated (table 4). Forest products accounted for 5 percent of total exports in the mid-1970's. Considering its importance in exports, a relatively small share of industry capacity is devoted to exports. Through the 1970's about 10 to 12 percent of commercial timber hauled ended up as exports either directly in timber, lumber, and plywood exports or in pulp, paper, and cardboard exports. Sawn lumber exports exhibited no growth during the 1970's, and output actually fell slightly so that export-output ratios remained around 7 to 8 percent in the 1970's. Plywood exports after showing rapid growth in the 1960's grew much more slowly in the 1970's with export-output ratios averaging around 11 percent. In part the slow growth of exports in the 1970's was due to lagging demand in traditional Soviet export markets.[22]

Pulp and paper.—On the other hand, pulp exports, especially on a net exports basis, grew rapidly in the 1970's and the share of net exports rose from 3 to 6 percent of a rapidly growing output. The U.S.S.R. also imported much pulp from Finland over the past decade; thus its large exports to Eastern Europe and to a lesser extent to Western Europe represents a "reexport." In paper products we find considerable (and growing) intrabranch specialization—not between the U.S.S.R. and Eastern Europe—but rather in three-way trade with both Western and Eastern Europe. In the 1970's paper imports were about two-thirds of its exports, so that net paper imports are a relatively small portion of output in 1977 (3 percent) even though gross exports equal about 14 percent of paper output. Newsprint exports to Eastern Europe and developing countries account for more than one-half of paper exports; another one-third is wrapping paper; only a small amount is higher quality papers. The paper and cardboard

[22] "Vnesh. Torg. S.S.S.R. itogi," p. 106.

imports in contrast are mostly high quality and special use papers largely from Finland and also Great Britain, Norway, France, and Sweden. A similar pattern exists for cardboard. The Soviet paper trade illustrates well how the U.S.S.R. uses the foreign trade sector to upgrade domestic product quality and selection while continuing to expand production and exports of products to which their economic system, institutions, and resources seem best adapted.[23]

VI. Transition From Agricultural Exporter to Agricultural Importer

In the 1970's the U.S.S.R. completed its transition from its historical heritage of being a major exporter of agricultural goods in which large shares of its marketed output was shipped abroad (in 1913 and the NEP) to becoming a large net importer of many agricultural products.

A. Agricultural Exports—Historical Perspective

Tsarist Russia exported a large quantity of many agricultural products including (as a percent of output): 13 percent of grain, 88 percent of flax, 38 percent of butter, 31 percent of eggs, 10 percent of sugar, and 44 percent of oilseed.[24] Agricultural exports were 75 percent of total exports in 1913, 65 percent in the NEP (1926/27), and 40 percent as late as 1950 (table 2).

In the post-war period, the U.S.S.R. was unable to restore most of its traditional agricultural exports despite considerable investment in agriculture. For example, after World War II, the U.S.S.R. tried to reestablish net grain exports which reached a peak of 7.7 million tons in 1962 (compared with 9.6 million tons in 1913), or about 7 percent of a record 1961 grain crop. Two years later, however, net grain imports after a poor harvest were 3.8 million tons. By the late 1960's gross grain exports made up a small and diminishing portion of total exports (4 percent in 1970 compared to 33 percent in 1913). On the other hand gross cotton fiber exports rose steadily in the 1960's; the gross export-output ratio of 28 percent in 1970 suggests that cotton output had been greatly expanded for exports, but adjustment for the large (fluctuating) imports reduces this to 12 percent. Exports of sunflower seed and oil grew steadily and extended export-crop ratios rose from 4 percent in 1960 to about 17 percent in 1967. Flax exports, on the other hand, declined during the 1960's and export-crop ratios declined from 12 percent in 1959 to 4 percent in 1970. Net butter exports were erratic but higher toward the end of the 1960's when they averaged about 7 percent of output. Many other major 1913 export products such as hemp, oil cake, bran, eggs, and bacon, however, were now exported in relatively small amounts or not at all (table 5). Wool and hides exports grew considerably during 1950–70, but the U.S.S.R. remained a large net importer of wool and hides. Sugar exports far exceeded the substantial 1913 levels—these, however, were a reexport of raw sugar imported from Cuba for refining.

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[23] Ibid., pp. 68–69, 108.
[24] See Michael R. Dohan, "Soviet Trade in the NEP Economy and Soviet Industrialization Strategy," Ph. D. thesis, MIT, 1969, pp. 649–652.

Thus, of the six main agricultural exports in 1970—grain (usually), butter, cotton, flax, sunflower seed and oil, and sugar—only the net exports of cotton and sunflower seed and oil are significantly higher than in 1913. And in fact, by 1970 the U.S.S.R. was well on its way to becoming a large net importer of agricultural goods.

B. Agricultural Transition in the 1970's

Most adverse trends in agricultural trade observed in the 1960's were further accentuated in the 1970's.

Grain.— The most outstanding development in the 1970's, has been the conversion of the U.S.S.R. to a regular large net importer of grain, especially in 1972–73 and 1975–76.[25] Imports provided as much as 16 percent of net grain supply (after deduction for harvesting losses and seed) in 1972–73 and about 23 percent of net grain supply in 1975–76. The grain problem was so acute that Soviet grain exports to Eastern Europe declined in the 1970's and in 1976 the U.S.S.R. actually was a net grain importer from Eastern Europe. These grain imports could be attributed to the continuing difficulties in expanding grain production despite large scale investments in capital and fertilizer, and greatly improved economic incentives. On the other hand, spending large sums of hard currency on grain imports—largely for livestock feed—reflects the Soviet's commitment to provide more meat and animal products in the Soviet diet. For this very reason, the *strategic* economic dependence of the U.S.S.R. on imported grain is relatively small despite the high import-consumption ratios. As the experience of the 1970's shows, the U.S.S.R. also remains quite willing to reduce livestock herds to partially cushion poor crops.[26]

Sugar.—The second major shift in the 1970's is the emergence of the U.S.S.R. as a major net importer of sugar. During the late 1960's the U.S.S.R. imported an average of 1.5 to 2 million tons of raw sugar a year, but then refined and reexported a large portion of that sugar. In 1972 such sugar reexports ceased, dropping from 1 million tons in 1971 to 50,000 tons in 1972. Imports of raw sugar, on the other hand, fluctuated around 2 million tons in 1972–74 and then rose sharply to 4.4 million tons in 1976. Thus, the net import-consumption ratio estimated on a 1-year lagged-basis rose from about 5 percent of net supply in 1970 to about 42 percent of domestic consumption in 1977. Consumption hovered around 10 million tons per year in the 1970's.

Oilseed.—The problem in grain supply in the 1970's spilled over into the export of oilseed and oilseed products, in part because oilseed yields and grain yields respond to the same weather conditions and in part because oilseed can be used for feed in place of grain. Thus, as seen in table 5, exports of sunflower seed alone fell sharply after 1970. Indeed, the U.S.S.R. probably became a net importer of oilseed in the 1970's.[27] Much sunflower seed is exported in the form of sunflower seed oil. Taking this into account, exports of oilseed and equivalents

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[25] See Judith G. Goldich. "U.S.S.R. Grain and Oilseed Trade in 1972–77" in the volume.
[26] Michael E. Zahn, "Soviet Feed Grain/Livestock Economy," in this volume.
[27] This is inferred from the difference between ETN 720 and the detailed items reported underneath. The large unspecified balance coincides with the large grain imports. These feedstuff imports are equal to if not greater than oilseed exports in these years, as seen in table 5.

fluctuated between 890,000 tons and 1,210,000 tons or about 17–21 percent of the previous year's harvest. After the 1975 crop failure, exports fell sharply in 1976–77 to about 10 percent of the crop.

Other traditional Soviet agricultural exports were also in disarray during the 1970's. For example, long a net exporter of butter, the U.S.S.R. cut butter exports sharply in the early 1970's and in fact became a large net importer in 1973. Imports provided as much as 15 percent of butter supply in the year after the 1972 grain crop failure. Since then butter exports were nominal, and again in 1977 the U.S.S.R. became a large net importer of butter. Similarly the U.S.S.R. became a net importer of tobacco after World War II, and increased imports to about 29 percent of supply in 1970. Imports and supply increased little in the 1970's suggesting that there is adequate supply of tobacco products at current domestic prices. In 1913 over 300,000 tons of flax was exported or about 88 percent of the crop. Postwar flax exports peaked at only 37,000 tons in 1973 and have declined steadily thereafter. The 1977 crop was not much larger than the 1960 crop and only about 3 percent was exported. In sum, a number of important export resources in agriculture failed to grow and in fact declined in the 1970's—further reducing the share of agriculture in exports.

Cotton fiber.—Cotton fiber is the outstanding exception to declining exports and rising net imports of agricultural goods. In 1913 Russia imported 47 percent of cotton fiber supply; by 1960 the U.S.S.R. had become a major net exporter of cotton even while simultaneously importing a substantial amount, and cotton exports continued to grow during the 1960's.[28] In the 1970's this growth accelerated from 561,000 tons to over 1 million tons in 1977 while cotton imports declined. Net exports utilized about 13 percent of the harvest in 1970 and as much as 33 percent of cotton fiber crop in 1977. Part of the success in expanding exports is that domestic demand for cotton fiber is more limited than for grain. The income elasticity of demand for clothing and cotton goods—in terms of quantity if not quality—is relatively low. Large clothing imports and the switch to synthetic and artificial fibers further reduced the domestic demand for cotton fiber in the 1970's. Indeed, cotton cloth output (table 7) grew only 1 percent per year since 1965 and the amount of cotton being utilized for domestic consumption remained constant, but fiber output grew 3.7 percent per year in the 1970's. These factors permitted the U.S.S.R. to divert an increasingly large share of cotton fiber output to export. In contrast the demand for grain is relatively unlimited under the current Soviet policy of improving the quality of the Soviet diet through more meat and livestock products.

Three other products with which the U.S.S.R. continued to export with modest success in the 1970's were furs, fish, and sunflower seed oil (tables 5 and 9).

Hides and wool imports.—The U.S.S.R. has always imported a substantial quantity of hides, skins, and leather which supplies a significant but unknown share of total leather needs. The policy of increasing domestic meat production over the past decade, however, also yields an increased supply of hides and skins, thereby reducing

[28] This was in part a reexport of cotton received as repayment for technical assistance, or in part as an upgrading of Soviet cotton quality with high quality Egyptian fiber.

the demand for imports. In the 1970's we see the impact of these domestic trends on imports. For example, net hide imports declined in the 1970's, dropping sharply in 1973 and again in 1976–77 after crop failures forced a reduction in livestock herds. Leather imports, largely from the West, rose steadily throughout the 1970's, however; this expenditure of hard currency reflects the desire to upgrade the quality of raw materials and ultimately their shoe output.[29] The U.S.S.R. also has long imported fine wool and exported low quality wool to upgrade the quality of the fiber to be used in fabric production. Such exports have almost ceased, while wool imports continue to grow and now provide about 20 percent of consumption in 1977, up from 14 percent in 1970.

C. Soviet Dependence on Agricultural Imports in the 1970's

In the 1970's the U.S.S.R.'s long tradition as a major agricultural exporter has really come to an end as a result of the lagging productivity in agriculture, several crop failures, and a commitment by Soviet leadership to improve the diet of its citizens. By 1977 the U.S.S.R. had become a large net importer of agricultural products (compare tables 2 and 3). In 1977 Soviet agricultural exports were 2.1 billion rubles or about 6 percent of total exports compared with 1.6 billion rubles and 15 percent of total exports in 1970. Adjusting for price increases, it is likely that the volume of agricultural goods, actually fell in the 1970's. By 1973 agricultural exports—other than cotton fiber—were only 3 percent of total exports.

Agricultural imports climbed from 2.4 billion rubles in 1970—22 percent of imports—to 7.2 billion rubles in 1977—24 percent of imports. As a result net imports rose from 0.8 billion rubles in 1970 to 4.8 billion rubles in 1977. In the mid-1970's imports provided a large share of domestic supply of grain, basic foodstuffs such as sugar and butter, wool, and the specialty foodstuffs such as fruits, vegetables, meat, wine, and tobacco—these consumer goods are discussed in the next section. Thus a primary gain from foreign trade in the 1970's has been to accelerate and maintain the improvements in the quality of the Soviet diet and consumer goods without a correspondingly large increase in investment of capital in agriculture, especially of those products which rely on technical improvements, breeding, and personal incentives.

Although grain and several noncompeting foodstuffs are purchased from hard currency, most other agricultural products are imported from Eastern Europe, Cuba, and developing nations—often in bilateral exchange for Soviet exports—thereby reducing the vulnerability of their agricultural import policy to hard currency shortages. Nevertheless it is clear that Soviet access to Western grain was crucial to its consumer policy at several times in the 1970's.

VII. Specialization in the Soviet Machinery Trade

A. Growing Role of Machinery Imports

In our earlier study we concluded that despite the rapid growth of machinery imports during the 1960s, the overall dependence of the U.S.S.R.'s investment capability on imported machinery in a strictly

[29] Vnesh. Torg. SSSR itogi, p. 94.

production capacity sense remained relatively small because net imports were much smaller than gross machinery imports and the Soviet machine building industry was highly diversified to all branches (tables 6, 7, and 8). Of course, some branches—chemical, food, textile, automotive equipment—were weaker than others, and several major projects such as chemicals and automotive plants were critically dependent on imported equipment. Import's contribution to investment capability can be estimated roughly by comparing the value of domestic investment in equipment with the value of gross machinery imports, despite the problem of domestic foreign price differentials and rising foreign prices over the period.[30] In 1970 Soviet investment in equipment and inventory was 24.4 billion domestic rubles (dom R), imports were 3.7 billion foreign trade rubles (ftR) and exports were 2.5 billion ftR (table 6).[31] Gross machinery imports supplied about 15 percent of machinery installed, but allowing for machinery exports, net imports provided only about 5 percent of the total available for domestic use—assuming rough parity of the domestic rubles and foreign trade ruble in purchasing machinery capacity.

But in the 1970's Soviet machinery imports accelerated, growing at 20 percent per year in value from 1971 to 1977 while exports grew at 14 percent over this period.[32] By 1976 machinery imports were 10.2 billion rubles—38 percent of total imports—and exports were 5.4 billion rubles—or 18.8 percent of exports. In 1976 equipment installation was 37 billion domR so gross machinery imports were providing as much as 28 percent of installed equipment. On the other hand, 16 percent of machinery output was exported. Nevertheless, net machinery imports rose from 1.3 billion rubles in 1970 to 4.8 billion rubles in 1976 (see tables 2 and 3) and net machinery imports provided about 13 percent of total equipment installations in 1976—much greater than 1970. As a result net machinery imports were playing a significant role in the overall supply of equipment for the first time since the early 1930's and enabled the U.S.S.R. to raise investment levels significantly over the capacity of its own machine building industry in general rather than only in specific branches. The role of added imports in expanding domestic investment is much greater. Between 1970 and 1976 equipment installations rose 13 billion domR while gross imports of equipment rose almost 6.6 billion ftR. Therefore, on a gross basis, increases in machinery imports supplied about 500 out of each 1,000 rubles increase in investment in machinery between 1970 and 1976. Of course, the overall strategic dependence was much lower because the U.S.S.R. also exported an increasing share of domestic output. On a

[30] There is considerable indirect evidence that de facto domestic machinery prices were also rising as new models of old machinery were introduced at higher prices. See Morris Bornstein, "Soviet Price Statistics" in Vladimir G. Treml and John P. Hardt (eds.) Soviet Economic Statistics (Durham, N.C.: Duke University Press, 1972), pp. 355–96. In 1959, it was estimated that the purchasing power ratio of foreign trade rubles spent on machinery was 1.07 in terms of domestic rubles. A. Efimov and L. Berri (eds.), Metody Planerovaniia Mezhotraslevvikh Proportsii (Moscow 1966).

[31] Nar Khoz. SSSR, p. 433, 1969 prices. Data for installations include annual inventory accumulation, and therefore, overstates installations relative to actual installations and understates the share of imports.

[32] The difference between import and export growth rates stems in part from the differences in pricing practices in CMEA and the capitalist economies. Machinery trade with CMEA, which accounts for about four fifths of Soviet machinery exports, is conducted at prices which lag world prices by a considerable period, while machinery imports from the West which account for about one-half of machinery imports is carried out at current world prices which were rising rapidly in the 1970's. Martin Kohn, op. cit.

net import basis, about 200–250 of each 1,000 ruble increase of investment in equipment depended on increased imports. Furthermore, the growth in net imports was largely in machinery from the West. Soviet imports from Eastern Europe are about equal to total Soviet machinery exports (table 7).

B. Patterns of Specialization in Soviet Machinery Trade

Soviet machinery trade had a distinctive composition and direction in 1970, and this pattern changed little as machinery trade expanded rapidly in the 1970's (table 8). In 1977 Soviet machinery imports of 11.4 billion rubles fell into two distinct categories: equipment for factories and mass produced items. Production equipment came largely from Western industrialized nations—and to a lesser extent the German Democratic Republic and Czechoslovakia—and in 1977 included the following industries (in millions of ftR): chemical (1,722), automotive and other machine building (1,059), light industry (675), and machinery for steel and iron making, paper and pulp, and many minor industries such as glass and printing. Most mass-produced items and transportation equipment came from Eastern Europe and included ships (918), vehicles and parts (719), electric motors, transformers, and so forth. (416), lifting and transporting equipment (631), agricultural machinery, railroad equipment, and roadbuilding. Soviet machinery exports were increasingly dominated by automotive vehicles (1,400)—almost a fifth of all machinery exports in 1977. The other principal equipment exports were for energy production (527), steelmaking (often in the form of complete plants), metalworking, mining, air transport, tractors and parts, roadbuilding, and to a lesser extent automotive production equipment, motors and transformers, food industry, textiles, chemical construction, agricultural, railroad equipment, and ships. Most Soviet machinery exports went to Eastern Europe and developing nations as is clearly evident in table 8.

In general, the U.S.S.R. still either imports or exports machinery of a specific subbranch. During the 1970's, however, the overlap between exports and imports within a subbranch increased, especially in five subbranches: automotive vehicles, iron and steelmaking, metalworking, oil drilling equipment, and railroads, and to a lesser extent in electric motors, automotive equipment, mining, food, textiles, and chemical construction. What factors determined this pattern and direction of machinery trade and the growing intrabranch specialization and what are their implications for Soviet dependence on machinery imports and specialization for exports?

C. Dependence on Machinery Imports

Consider two types of machinery imports—production equipment for equipping factories, and automobiles, trucks, farm machinery, tractors, construction equipment, pumps, electric motor, and ships. The former tend to be uniquely produced, high technology, and so forth, and the latter products are mass produced with assembly line techniques and large batches. Our earlier hypothesis about com-

parative advantage in Soviet-type economic systems predicted that such economies will produce and export (1) mass produced items, and (2) equipment for historically high priority industries and will import the specialized, low volume, and new technology items from Western industrialized economies.[33] And indeed, as shown above, the origins of the different types of Soviet machinery imports conform to this pattern. Almost all the mass-produced machinery—automobiles, railroad cars, and so forth—come from Eastern Europe; such imports, while contributing to the capital stock, contributes little to increasing the productivity of capital and other resources elsewhere in the economy. This is true even when such equipment is modern, in Western terms.[34] Thus, the gains from this Soviet-CEMA machinery trade, shown in tables 7 and 8, are largely limited to the conventional gains of trade from comparative costs and economies of of scale—that is, by reducing the resource costs of obtaining these products.

The modernization of Soviet production facilities—often called intensive investment—depends on imports from the West and to a lesser extent from East Germany and Czechoslovakia. Comparing available import and output data for these product groups suggests that in the 1970's imported equipment provides significant portions and in some branches a major portion of the equipment for new facilities. Often, as our hypothesis suggests, the Soviet contributions to new production facilities in these sectors is limited to fairly standard equipment.[35] In some branches—chemicals, automobiles, trucks—the crucial dependence of new facilities on imported equipment is well known.[36] Imports provided as much as 50 to 70 percent of installed equipment in the chemical industry in 1977. Less well known is the increasing role of Western equipment in reequipping, upgrading, and expanding many of the lower priority and group B industries as part of the Soviet program to improve product quality and productivity. One reason for this sudden reliance on Western equipment is that these industries presumably received less support in research and development of new machines over the past years compared with metallurgy and energy branches. In textile machinery, for example, machinery imports rose from 20 percent of supply in 1970 to almost 40 percent in 1976, based on value, in the shoemaking industry from 35 percent in 1970 to 64 percent in 1976, in the papermaking industry from 53 percent in 1970 to 61 percent in 1977. Soviet estimates indicated that imported machinery provided 25 percent of the installed equipment in light industry and food processing, and more than 40 percent of chemical equipment in the 9th FYP.[37] Imported equipment played a major role in the reconstruction and expansion of the paper and pulp, and woodworking industries. According to Soviet estimates, in 1973 43 percent of pulp, 26 percent of paper, and 45 percent of cardboard was produced with imported equipment.[38]

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[33] See Michael R. Dohan "Foreign Trade Specialization," pp. 126–128 for a discussion of this hypothesis.
[34] The exception is forklifts and other intraplant material handling equipment which have been a basic weakness in Soviet production facilities.
[35] John P. Hardt and George D. Holliday, "Technology Transfer and Change in the Soviet Economic System" in Issues, pp. 80–90.
[36] Vnesh. Torg. SSSR itogi., p. 47.
[37] Ibid., pp. 43, 52, and Vnesh. Torg. No. 10, 1974, p. 45.
[38] Vnesh. Torg. SSSR itogi, p. 49 and Vnesh. Torg. No. 12, 1974, p. 42.

The U.S.S.R. is unlikely to develop extensive machinery production capability for these branches because of the low volume, the complexity and high technology of these products. Future imports, however, will be volatile for they depend on investment plans for the 1980's and the leadership's priorities. The volume of potential domestic demand—along with military considerations—seems to be a good predictor of Soviet likelihood on developing domestic productive capability rather than high technology characteristics. For example, the large potential volume of standardized computers increased the economic effectiveness of investing in research and development, foreign licenses, and ultimately their own production capacity within the U.S.S.R. and CMEA while at the same time continuing to import special purpose computers, entire systems, and integrated facilities.[39]

D. Import Dependence in Specific Items

Judging from available data, import-dependence for mass produced machinery is limited and occurs mainly in items traded with CMEA countries. Table 6 indicates some of these ratios based on quantity units. Some large ratios in 1975–77 were mowers (31 percent), seeders (16 percent), railroad cars (27 percent), railroad cranes (13 percent), buses (14 percent), trolleys (35 percent). These high ratios often reflect specialization agreements among CMEA, for example, in the production of agricultural machinery.[40] Despite specialization agreements, some import-supply ratios fell sharply, for example, for combines, electric locomotives, excavators, and lifts during the 1970's. Many others were low or insignificant.

E. Export Specialization

Soviet machinery exports in the 1970's expanded along the pattern set in the 1960's—namely, export of mass-produced items and of equipment from subbranches which supplied historically high priority sectors such as energy and metallurgy. Since machinery exports grew faster than output, gross export-output ratios rose slightly (table 6) but even in 1977 most of these were relatively modest. Some unusually high export-output ratios for mass-produced items (based on units) are for harrows (up from 8 percent in 1970 to 60 percent in 1977), automobiles (28 percent in 1977), road graders (12 percent in 1975), tractors (8 percent in 1976, 15 percent including parts), and trucks (5 percent in 1976). The large export of truck and automobile parts to Eastern Europe raises the share of output utilized for exports. Exports of equipment for the traditional growth industries in the U.S.S.R. were also a major use of output in the 1970's. According to Soviet estimates, exports were about one-sixth of energy equipment production (turbines, generators, et cetera) and one-sixth of steelmaking and other metallurgical equipment production in 1975 including more than 30 percent of Soviet steelmaking furnaces and 10 percent of rolling mill equipment (table 6).[41] The large but unknown export of

[39] Vnesh. Torg. SSSR itogi, pp. 51–52, 87–88; Deborah Shapely, "New Chips Shed Light on Soviet Electronics" in Science, vol. 204, Apr. 20, 1979, pp. 283–284; and John P. Stein, "Estimating the Market for Computers in the Soviet Union," the Rand Corp., R–1406–CIEP/ARPA, May 1974.

[40] Vensh. Torg. SSSR itogi, pp. 54–55 and 89–90.

[41] Ibid., pp. 82–83.

armaments, often for hard currency, fit well into the overall pattern predicted by our basic hypothesis.[42] In many other subbranches, however, export-specialization is more modest or insignificant, and hence would not show up on table 6 which is biased toward machinery entering into trade.

F. Growing Intrabranch Specialization

A growing phenomenon during the 1970's, however, was that Soviet exports of production equipment—textile, chemical, metallurgical, metal working—expanded rapidly at the same time growing imports were providing an increasing share of added domestic investment in this equipment. For example, in terms of value, the export-output ratios for metalworking equipment rose from 8 percent in 1970 to 12 percent in 1977, from 6 percent to 16 percent for textile equipment, 15 percent to 17 percent for food processing equipment, and 15 percent to 16 percent for chemical equipment. Yet these items were imported in large quantities. We also find growing intrabranch specialization for mass-produced items—agricultural equipment, automobile parts, et cetera.[43] The rising level of intra subbranch specialization and the composition and direction of intrabranch and subbranch specialization in CMEA can partly be interpreted in terms of our basic hypothesis about Soviet comparative advantage. One basic pattern of intra subbranch specialization is imports of (advanced) equipment from the West and export of (standard) Soviet equipment from the same subbranch to Eastern Europe and to developing countries. This is true even for subbranches producing equipment for the traditional high-priority industries such as metalworking and the iron and steel industry. Here, for example, despite the traditional priority placed on metal cutting equipment and the rapid growth of its output in the 1970's, the value of imported metal-cutting equipment grew even more rapidly so that the share of gross imports in supply rises from 15 percent in 1970 to 27 percent in 1976.[44] (Including complete metalworking lines and equipment in automotive factories would raise the share even further; see table 8.)

Note that the import share based on "units imported" did not change in the 1970's. Indeed, the number of imported units only rose from 9,200 in 1970 to 12,600 in 1976. The unit value of imports, however, rose from 14,700 ftR in 1970 to 31,400 ftR in 1976. The export unit value in 1970 was 6,500 ftR and rose to 11,300 ftR in 1976. This rise in unit values reflects both qualitative improvement and inflation but the persistent difference between the low unit values of exports and the high unit values of imports points to the expected qualitative differences between the simpler export units and the more advanced import units. This unit price differential for simultaneously exported

[42] Gur Ofer, "Soviet Military Aid to the Middle East—An Economic Balance Sheet," in "The Soviet Economy in New Perspectives," pp. 216–242.

[43] Joseph Pelzman, "Soviet-COMECON Trade: The Question of Intra-Industry Specialization," in Weltwirtschaftliches Archiv, band 114, heft 2, 1978, pp. 297–304.

[44] Comparing value of output of metal-cutting and metal forming equipment with import value of ETN 100 metal cutting, ETN 101–103 metal forming, and 104 "lines of metal working equipment."

and imported equipment items is widely observed throughout Soviet machinery trade, even with GDR and Czechoslovakia, and reflects the effective use of the foreign sector as a means of upgrading the quality (and diversity) of domestically consumed products while continuing to produce somewhat simpler and perhaps outmoded versions—once described as "planner's inertia" (table 8).[45] As a result of this policy we also observe both large imports of metallurgical equipment from the West and large exports to Eastern Europe and developing economies. This is true also for a number of other subbranches—textiles, chemical, et cetera.

Such simultaneous exports and imports has important implications for economic independence by reducing overall dependence of investment capacity on imports. Nevertheless, such trade is important for it permits an upgrading of the technological level of equipment investment in the U.S.S.R. more rapidly than they are able to upgrade the overall technical level of Soviet machinery production. Indeed, Soviet analysts are often defensive about the growing role of imports in Soviet investment projects, but justify these imports by stressing the contribution of imported machinery in increasing the productivity of Soviet resources in these plants.[46]

The second pattern is intra-CMEA specialization at the branch and subbranch levels to take advantage of economies of scale and differences in comparative costs. For example Bulgaria specializes in fork lifts for the U.S.S.R., while the U.S.S.R. supplies much of the construction equipment.[47] Such specialization is increasing in the automotive industry and for electrical equipment such as motors.[48] We find considerable intrabranch specialization with high ratios for example in railroad equipment. In 1975 the U.S.S.R. exported 13 percent of its subway cars and imported 9 percent of its freight cars, 27 percent of its passenger cars and 35 percent of its trolleys. The only railroad items in which exports overlapped with imports was locomotives. Looking at individual products, only in a limited number of cases did we find simultaneous import and export of the same item, for example, trucks at the five-digit level. Similar intrasubbranch specialization occurs in agricultural machinery (although the U.S.S.R. imports much more than it exports). As CMEA specialization expands, import-supply and export-output ratios should rise—but as of the mid-1970's high ratios were relatively few.[49] Such specialization with CMEA, however, does not represent politically the same type of dependence that would exist if this trade were with the West.

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[45] In 1976 metal cutting tools exported to GDR were 6,678 rubles per unit while imported units were 33,715 rubles; for Czechoslovakia export unit values were 9,694 and import unit values were 22,476 where both export and import values are f.o.b. For a discussion of "planner's inertia" see Michael R. Dohan Foreign Trade Specialization," p. 127. Igor Birman calls this "planning from an achieved level." See his article by the same name in Soviet Studies XXX, No. 2, April 1978, pp. 153–172.

[46] For Soviet recognition of these benefits, see Vnesh. Torg. SSSR itogi, p. 45.

[47] Mark Allen, "The Bulgarian Economy" in "East European Economies Post-Helsinki" (Washington, D.C.: U.S. Government Printing Office, 1977) pp. 692–93.

[48] Imogene Edwards and Robert Fraser, "The Internationalization of the East European Automotive Industries" in "East European Economies Post-Helsinki," pp. 396–419 and Arthur J. Smith "The Council of Mutual Economic Assistance in 1977: New Economic Power, New Political Perspectives and Some Old and New Problems" in the same volume, pp. 152.

[49] Lack of detail in trade statistics, however, may conceal other trade which would invalidate such conclusions.

VIII. Growing Dependence of Soviet Consumption Standards on Foreign Trade

A. Growth of Consumer-Oriented Imports

Consumer oriented imports (table 3) grew at a fast rate—14 percent per year during the 1970's—and about 37 to 40 percent of imports were directly or indirectly used for consumer goods, thereby continuing a trend established in the late 1960's.[50] Imports continued to be used as a major policy instrument to move the U.S.S.R. toward a more consumer oriented economy, to upgrade living standards, and to improve incentives. In the 1970's these imports have come to play an increasingly important role in both the quantitative and especially the qualitative improvement in Soviet standard of living—a development little noted in the West. Soviet writers estimate that imports of consumer goods accounted for about 10 percent of consumer demand during the ninth FYP—an estimate that is confirmed by data in this study.[51] Such an estimate, however, understates the central role of imported consumer goods of maintaining incentives by meeting the rapidly growing demand for high-quality, diversified goods for Soviet consumers who have already met their basic needs. Since consumer-oriented exports (other than abundant cotton, and small consumer durables) grew slowly in the 1970's, net imports of consumer goods grew faster. This growing commitment of scarce import resources, often in hard currency, to improve the lot of Soviet consumers represents perhaps the most dramatic change from the Stalinist foreign trade policy of the 1930's and the 1950's.

B. Foodstuffs: Basic and Specialty

The rapid increase in grain, sugar, wool, and occasionally butter imports in the 1970's has already been noted. Imports, however, also provide a large portion of many important specialty foodstuffs including all noncompeting goods such as coffee, cocoa, coconut, olive oil, and most tropical fruits. From 1970 to 1975, imports of these noncompeting foodstuffs, which often require hard currency, increased about 50 percent (table 9). But after the 1975 crop failure, such imports were trimmed sharply as the Soviet Union sought to reduce the hard currency trade deficit caused by the massive grain purchases. Imports also supply an increasing share of products which are also produced domestically. Tea imports jumped from about

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[50] Sum of fiber, agricultural raw materials, grain and oilseed, sugar, foodstuffs, and consumer manufactures on Table 3.

[51] Vnesh. Torg. SSSR itogi, p. 14. Estimating the share of imports in the value of consumption of individual groups is difficult in the absence of having domestic sales prices for imported goods. While it is thought that for most imported consumer products, the domestic ruble price is considerably more than both the foreign trade ruble costs, and occasionally the domestic ruble price of similar domestically produced goods, the relationship varies from good to good, and from year to year as foreign prices and domestic prices change. It is not clear how higher prices affect the domestic sales prices of the imported goods.

Nevertheless, it is useful to see the approximate contribution of this good to domestic consumption. Thus, we have constructed a very rough approximation of domestic value of imports for selected goods using a purchasing power ratio (ppr) using domestic and foreign ruble prices (presumably in 1959): the ppr for imports of producer goods is 1.07 and for consumer goods 3.44, and for agricultural goods 4.17, and for exports of producers' goods 1.12, for consumer goods 1.67 and for agricultural goods 1.32. From Efimov and Berri, op. cit. We have not allowed for increased foreign prices or changes in domestic prices.

13,000 tons in the late 1960's to about 60,000 tons during the mid-1970's, and net imports of tea represented about 10 percent of consumption in the mid-1970's (30 percent according to Soviet estimates).[52] Increasing simultaneous import of tea from India and export of Soviet tea to Eastern Europe and Great Britain could upgrade the quality and diversity of tea offered to the Soviet consumer. Large tobacco and cigarette imports, mostly from Bulgaria, provided about 30 percent of tobacco and tobacco products available to the Soviet consumer in the mid-1970's. Imports also provided a large share of fruit, including 80 percent of the citrus and tropical fruits, 75 percent of dried fruits such as figs and prunes, and a significant portion of the ordinary fruits such as apples, 27 percent of canned vegetables, 20 percent of wine and canned fruits, a large portion of nuts and similar products and a smaller but still significant share of canned meats, poultry, fresh frozen meat, and canned jams and compotes. Imports of these specialty up-scale foodstuffs (excluding grain and sugar) grew at an annual rate of 15 percent from 1970 to 1977 (other foodstuffs on table 3). Most of these latter imports of quality foodstuffs for the Soviet diet came from Eastern Europe or from the developing countries and in some cases may represent repayment of earlier technological assistance or current Soviet export (of machinery) in bilateral trade agreements.[53]

C. Consumer Manufacturers

Soviet trade in manufactured goods grew rapidly in the 1970's and continues to show the interesting dichotomy analyzed in an earlier study. The U.S.S.R. is a large importer (and small exporter) of cloth, clothing, shoes, furniture, medicines, and cosmetics. At the same time it is a large exporter of many small consumer durables (as well as automobiles).

According to Soviet estimates, imports provided about 12 percent of nonfoodstuffs consumer goods in 1974.[54] This share continued to rise through 1977. Some rough comparisons of imported goods valued in domestic rubles and the domestic purchases of these products, in table 10, along with quantitative comparisons reveal that during the 1970's imports provided growing portions of many major consumer soft goods. By 1977 imports comprised as much as 12 percent of the knitted wear, 10 percent of shoes, 13 percent of sewn clothing, 20 percent of total furniture and rugs. Such comparisons ignore well-known qualitative differences. Soviet estimates of the share of imports in sales during the ninth 5-year plan are in some cases much higher (21 percent of knitted wear, 15 percent of sewn articles, 27 percent of leather shoes in marketed supply in 1973).[55]

Cloth imports increased in the 1970's but comprised a small portion of cloth consumed; the highest import-consumption ratio was for the

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[52] Vnesh. Torg. SSSR itogi, p. 70.

[53] For example, the agricultural agreement between Hungary and the U.S.S.R. called for added agricultural exports to the U.S.S.R. in exchange for Soviet raw materials. See Z. Edward O'Reilly, "Hungarian Agricultural Performance and Policy during the NEM" in East European Economies Post-Helsinki, p. 365.

[54] Vnesh. Torg. SSSR itogi, p. 72.

[55] Ibid., pp. 72–73. These higher estimates suggest even higher purchasing power ratios than used in this study.

synthetic silk-type cloth.[56] As with the specialty foodstuffs, Soviet imports of manufactured soft goods came largely from Eastern Europe and the developing countries such as Egypt, India, Pakistan, and relatively small amounts from Western industrial countries.

Two paradoxes emerge. First, the U.S.S.R. is a large importer of clothing, haberdashery, and shoes, but only a small importer of cloth, and actually a net exporter of cotton cloth. Second, for many of these imported products adequate supplies of competing domestic goods appear available in the 1970's. Indeed, there are reports of large inventories of clothes, shoes, and similar products remaining unsold because of poor styling and quality.[57] One explanation is related to our earlier hypothesis—namely, that the Soviet system as currently organized has a comparative advantage in mass producing goods with standard design and a few simple quality indicators and a comparative disadvantage producing goods at the high-quality end of the spectrum where craftsmanship, design, variety, color, and finishing are essential components of the products' utility to a buyer.[58]

Small manufactured durables.—In contrast the U.S.S.R. was a large net exporter of many small mass-produced consumer durables—sewing machines, refrigerators, bicycles, watches, cameras, radios, and televisions—in 1970. Often these are relatively simple models compared with similar products in the West. Most of these exports grew relatively rapidly during the 1970's so that by 1977 almost 20 percent of bicycle production, 20 percent of watches, and more than 25 percent of camera output were exported. Television exports grew from 123,000 in 1970 to over 500,000 in 1977 (out of a production of 7 million). Only sewing machine exports did not grow, and by 1977 gross exports had fallen from 9 percent to 7 percent of output. The U.S.S.R. also imported a significant quantity of sewing machines. Again comparing unit value of exports and imports, the higher unit value of imported sewing machines suggests that simultaneous imports and exports are being utilized to upgrade the variety and quality of consumer goods.

Despite well-publicized efforts to expand exports of these products, especially to the West, they make up only 1 percent of total exports to the West; and despite large export-output ratios, they represent a relatively small commitment of investment resources compared with those in natural resources. Indeed, as noted in our earlier study, the continued expansion of output and exports of these products in the 1970's resulted more from "planner's inertia" and the desire to show positive growth rather than from deliberate development of these industries for export (along, say, the Japanese model)—for many of these small consumer durables are in oversupply in the USSR.[59] Eastern Europe and the developing nations continue to purchase large portions of these exports.

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[56] Traditionally the U.S.S.R. has been a small net exporter of cotton cloth (simultaneously exporting and importing a small but significant quantity). In 1970, gross exports were about 4 percent and net exports only 2 percent of output. During the 1970's cotton cloth exports declined, imports rose, so that by 1977 the U.S.S.R. had almost ceased being a net exporter of cotton cloth, thereby losing another traditional export resoruce.

[57] Gertrude Schroeder and Barbara Severin, "Soviet Consumption and Income Policies in Perspective" in Soviet Economy in New Perspective, pp. 632–35.

[58] Michael R. Dohan, "Foreign Trade Specialization," pp. 126–127.

[59] Schroeder and Severin, op. cit. For an explanation of the Soviet success in producing and exporting these products, see Michael R. Dohan, "Foreign Trade Specialization," pp. 110, 126–29.

IX. Simultaneous Import and Export: Its Interpretation

Simultaneous import and export of identical goods continued to be a distinctive feature of Soviet trade in the 1970's. Such simultaneous imports and exports in part are due to a number of factors specific to the Soviet economic system, its foreign economic policy, and its conduct of foreign trade. While Western industrial economies often import and export the same type of manufactured goods, such trade is much more unusual for basic raw materials. Particularly striking in Soviet foreign trade is the large scale simultaneous imports and exports of coal, gas, oil, rolled ferrous metals, zinc, lead, grain, soda ash, plastic raw materials, artificial resins, rubber, pulp, paper, cartons, cotton, tobacco, wool, tea, hides, grain, probably oilseed, sugar, and cotton cloth, and of course, many machinery items. Two questions are of interest. First, why do we observe such large reexport trade in basically similar commodities and second, how does it affect the Soviet Union's interdependence with the world economy?

A large part of the Soviet reexport trade seems to arise from bilateral trading and economic arrangements with CMEA and with developing countries which in essence places the U.S.S.R. in the position of a broker. In some cases the U.S.S.R. never receives the goods, even though they are recorded in Soviet trade statistics as in the case of grain in 1972–73 and probably oil.[60] Simultaneous trade in agricultural and other products (such as lead) in the 1970's arose from the U.S.S.R. honoring long-term supply contracts with Eastern Europe despite growing domestic shortages.[61] In the 1970's, however, simultaneous trade of agricultural products diminished as a result of the continuing decline in exports of grain, sugar, wool, and hides and in imports of cotton. Simultaneous import and export also results from the lack of multilaterality in Soviet trade relations in a situation where the U.S.S.R. already has adequate domestic supplies of the goods available for export by a bilateral trading partner—coal, zinc, cotton, caustic soda, and rolled metals. Here the U.S.S.R. acts in essence as a broker by importing the goods in payment while exporting similar commodities to third countries (e.g., importing cotton fiber and natural gas from Afganistan and zinc from Poland).[62] A related reason is the resale of commodities received in payment for earlier technical assistance to developing countries (e.g., oil from Iraq and Algeria).[63]

A major reason for simultaneous trade, however, stems from the institutional-historical context; namely, planner's inertia and systematic technological lag. This factor is particularly evident in machinery trade as discussed above, in which the U.S.S.R. simultaneously exported and imported metal cutting tools, metallurgical equipment, and trucks. It also extends to other semiprocessed materials such as paper and rolled metals. In the case of rolled metals, planners continued to produce traditional rolling mill products at the same time Soviet demand was shifting toward products requiring more advanced technological skill, for example, in metal products for automobiles

[60] Valentine Zabijaka, "The Soviet Grain Trade 1961–1970: A Decade of Change," ACES Bulletin 16, No. 1 (Spring 1974), pp. 3–16. Vnesh. Torg. SSSR za 1976, p. 308.
[61] Vnesh. Torg. SSSR, itogi, p. 110.
[62] Ibid., pp. 106, 115–143, 181.
[63] Ibid., p. 60.

and large diameter pipe.[64] Another major reason for simultaneous import and exports is the need to upgrade the quality of raw materials—cotton, wool, leather, hides—and of consumer goods by adding variety and style.[65]

In recent years traditional reasons for simultaneous trade have also become more important. The Soviet leadership lays great stress on developing long-term agreements for multilateral and bilateral interbranch and intrabranch specialization in machine building and many other products within CMEA and also with developing countries.[66] Locational advantage and economizing on transportation costs is another traditional factor in "reexport trade." Natural gas imports from Iran to southern Russia and coal imports from Poland into northwest Russia are the prime examples of such trade.[67] As economic activity increases in eastern Siberia, locational advantages will become a larger factor in Soviet "reexport" trade. Sugar imports for processing and reexports were an important factor in the Soviet sugar trade in the 1960's, but reexport of refined sugar has more or less ceased by the mid-1970's.

What are the implications of reexport for economic dependence on trade? In terms of strategic dependence, a large share of reexports in trade tends to reduce the dependence of the economy on foreign trade because a larger share of domestic requirements can be met from domestic sources than indicated by gross import data. Of course, adjustments to a reduction in imports usually requires reallocating the domestic supply network. Indeed, the inability to quickly shift domestic supply to regions dependent on imports can severely disrupt production even though surpluses are available elsewhere (as was dramatically illustrated in early 1979 when the Iranian crisis cut supplies to southern Russia).

X. Conclusion and Summary

This review of trade specialization of the Soviet Union in the 1970's suggests that while imports play an increasingly large role in the Soviet economy, it has not significantly increased the dependence of the Soviet economy on imports in a short-term strategic sense even though the overall trade participation ratios are similar to those of import-dependent 1913 Russia. The Soviet gains from trade with the West continue to come from importing of technology, commodities to cover domestic shortfalls, and machinery and commodities to enable planners to implement new priorities more rapidly. The gains in product upgrading, cost savings through intrabranch specialization, and improvement of living standards come largely from trade with the socialist and developing countries (grain imports being the important exception). To a large extent the expansion of imports has been focused on the final product sectors of the economy—investment goods and consumer goods—rather than on the supply of intermediate goods. This is consistent with the idea that the Soviet economy system's comparative advantage lies in the production of

[64] Ibid., pp. 63–64.
[65] Ibid., pp. 70–74.
[66] Ibid., pp. 115–143.
[67] Ibid., p. 61.

standardized goods. In terms of raw materials imports and the basic capacity to produce most types of machinery, the Soviet Union remains perhaps unique among world powers in being able to supply almost all of its own raw material needs—especially those required for capital and military goods—as well as maintaining a capacity to supply most of its capital equipment.

Growing imports does not seem to have led to a reduction in domestic output in any major field, but this is to be expected in a rapidly growing economy.[68] The impact of growing imports on allocation of investment goods are hard to discern with certainty, for one would have to know Soviet priorities in the absence of imports. For example, one major impact of imports has been to enable the U.S.S.R. to quickly improve (or maintain) the living standards of the Soviet consumer beyond the economic capability of the Soviet economic system. This capability to rapidly increase net imports of agricultural goods may have reduced investment in agriculture below levels that would have been undertaken without access to foreign trade. But the other response may have been simply to postpone their goals. Growing machinery imports clearly reduced the investment resources in machine building necessary to produce the greater amount of equipment, yet it is not clear how overall allocation of investment to the investment goods industry has been affected by the possibility of increased net imports. The overall effect of increased imports most certainly was to increase the resource allocation options from which Soviet leaders can choose—the importance of this increased flexibility to the Soviet leadership should not be underestimated.

In the 1970's, some trends in export specialization, which had emerged in the 1960's, reversed themselves. During the 1960's a number of raw materials, fuels, and heavy industry branches were developed to directly or indirectly provide exports (as reflected in a large share of output utilized for exports). In the 1970's, however, these shares ceased to grow, and indeed, in some cases, actually declined, reflecting a slowdown in export growth relative to output growth. The causes of the slow export growth are varied. Export supply difficulties played a major role in hindering export expansion of energy, iron ore some nonferrous metals, and most agricultural products, while slack world markets may have slowed expansion of manganese ore, timber, and other exports. Nevertheless, the expansion of exports in the 1970's continued to require substantial increases in capital and labor, especially for the petroleum, metals, and minerals industries, and to a lesser extent for timber, paper, cotton growing, and several machine building branches.[69] Soviet machinery exports came from the expansion of branches producing equipment for the traditional high priority industries (metallurgy, energy, tractors). Similarly, expanding exports of household consumer durables reflects continued expansion of

[68] Except perhaps sugar beets and leather.

[69] To shift some of this investment burden to the importing countries, the U.S.S.R. has increasingly sought "cooperation agreements" with other members of CMEA and "compensation agreements" with Western corporations in which equipment and technical assistance is obtained in exchange for raw materials exports on advantageous terms in future years. See Vnesh. Torg. SSSR itogi, pp. 115–144; Edwin M. Snell, "East European Economies Between the Soviets and the Capitalists," John R. Haberstroh, "Eastern Europe: Growing Energy Problems," Carl H. McMillan, "East-West Industrial Cooperation," all in East European Economies Post-Helsinki, pp. 12–53, 379–395, and 1175–1224.

long-established branches, possibly to the point of overproduction. In both cases, export capability was based on past high priority branches and resulted in part from "planner's inertia" or "planning from an achieved level."

More generally, we found that the pattern of export specialization and import demand continues to reflect both natural resource endowment and the unique set of institutional, political, and historical factors peculiar to the centrally planned Soviet economic system. Where specialization has occurred, it has not necessarily increased vulnerability to pressure from the West. Often, the observed trade specialization has been in trade with Eastern Europe which presumably poses less political risk than trade with the West. In addition, the large-scale simultaneous import and reexport of similar or identical products suggests that the growing trade participation ratios overstate underlying specialization and strategic dependence of the Soviet economy on foreign trade. Such simultaneous trade, however, does yield important conventional gains of trade and permits a qualitative upgrading of investment goods and consumer goods otherwise not obtainable within the current economic system. Looking back, we may well conclude that the major contribution of foreign trade to the Soviet economy in the 1970's was that trade enabled the U.S.S.R. to achieve two urgent economic goals—increased productivity of its resources and increased standards of living—without being forced to adopt internal economic reforms necessary to achieve these goals from within.

TABLE 1.—U.S.S.R.: AGGREGATE TRENDS AND TRADE PARTICIPATION RATIOS IN FOREIGN TRADE, 1913–77, SELECTED YEARS

[Billions of rubles]

Year	Current prices			Volume indexes (1970=100)		Price indexes (implicit)		U.S.S.R. GNP 1970 factor cost	1970 domestic prices		Participation ratios (percent)	
	Exports	Imports	Balance of trade	Exports	Imports	Exports	Imports		Exports	Imports	Exports	Imports
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1913	1,192	1,078	114	[13]	[18]	(•)	(•)	(•)	(•)	(•)	(•)	(•)
1926–27	633	560	73	[5]	[7]	(•)	(•)	(•)	(•)	(•)	(•)	(•)
1931	636	867	−230	[10]	[15]	(•)	(•)	(•)	(•)	(•)	(•)	(•)
1938	230	245	116	[4]	[6]	(•)	(•)	(•)	(•)	(•)	(•)	(•)
1950	1,615	1,310	305	13	15	(•)	(•)	115	2.5	3.4	2.1	2.9
1955	3,084	2,755	329	24	27	(•)	(•)	154	4.4	6.1	2.8	4.0
1960	5,007	5,066	−59	41	55	106	87	204	7.4	12.0	3.6	5.9
1965	7,357	7,253	104	62	73	103	94	261	11.1	15.9	4.3	6.1
1966	7,957	7,122	835	71	72	97	94	277	12.8	15.7	4.6	5.7
1967	8,687	7,683	1,004	77	78	98	93	290	13.8	17.0	4.8	5.9
1968	9,571	8,489	1,082	85	87	98	92	306	15.3	19.0	5.0	6.2
1969	10,490	9,294	1,196	94	93	97	95	315	16.9	20.3	5.4	6.4
1970	11,520	10,565	995	100	100	100	100	340	18.0	21.8	5.3	6.4
1971	12,426	11,231	1,195	103	106	105	100	354	18.5	23.1	5.2	6.5
1972	12,734	13,303	−569	106	124	104	101	360	14.1	27.0	5.3	7.5
1973	15,801	15,549	257	121	142	113	104	387	21.8	30.4	5.6	8.0
1974	20,738	18,829	1,909	137	147	132	121	401	24.6	32.0	6.1	8.0
1975	24,034	26,670	−2,636	141	174	148	145	411	25.3	37.9	6.2	9.2
1976	28,022	28,732	−710	152	185	160	156	[428]	27.3	40.3	6.4	9.4
1977	33,252	30,097	3,155	166	188	174	151	[443]	29.8	40.9	6.7	9.2

[ ] indicates estimates differing from original series.

(•) indicates no estimate made.

TABLE 2.—SOVIET EXPORTS BY COMMODITY GROUPS, 1913–77, SELECTED YEARS

[Millions of rubles]

Year	Total exports (1)	Machinery (2)	Fuels energy (3)	Metals ores minerals (4)	Chemicals fertilizer rubber (5)	Construction products (6)	Forest products paper (7)	Fibers (8)	Agricultural raw materials (9)	Grain and oilseed (10)	Sugar (11)	Other foodstuffs (12)	Cloth clothing shoes (13)	Small consumer durables (14)	Other consumer manufacturing (15)	Not Classified (16)
1913	1,192	3	41	35	13	1	130	106	130	414	22	222	42	0	13	0
1926–27	633	1	74	53	3	1	63	23	114	154	24	97	21	0	5	0
1931	636	4	102	23	9	2	89	34	78	120	26	85	46	0	16	0
1950	1,615	191	63	198	65	3	50	181	62	209	14	53	[36]	[3]	40	447
1955	3,084	540	296	573	85	15	157	312	60	264	22	78	[46]	[5]	42	589
1960	5,007	1,027	811	1,080	147	15	275	323	[103]	429	23	191	62	40	43	440
1965	7,357	1,471	1,265	1,704	209	35	534	379	[100]	254	44	317	[61]	[55]	61	868
1966	7,957	1,655	1,305	1,764	198	43	560	414	[136]	227	60	436	59	59	73	968
1967	8,687	1,833	1,399	[1] 1,790	279	45	548	394	81	442	59	500	74	74	78	1,091
1968	9,571	2,067	1,541	1,943	316	57	615	431	107	388	80	505	77	87	94	1,350
1969	10,490	2,360	1,647	2,219	325	63	651	363	101	486	86	526	76	96	100	1,391
1970	11,520	2,459	1,797	2,483	400	74	749	394	117	378	93	478	82	102	127	1,787
1971	12,426	2,776	2,237	2,650	422	74	778	410	94	553	99	480	87	106	167	1,493
1972	12,734	2,979	2,254	2,746	420	61	777	483	108	282	50	434	94	113	187	1,746
1973	15,801	3,424	3,034	3,049	474	86	1,020	515	130	380	43	480	102	130	242	2,692
1974	20,738	3,942	5,267	3,550	747	129	1,438	696	127	631	32	789	112	194	295	3,420
1975	24,034	4,448	7,547	[1] 4,109	841	138	1,378	702	128	381	18	497	125	269	351	3,102
1976	28,022	5,404	9,612	4,291	841	143	1,500	802	160	160	19	445	125	312	404	2,464
1977	33,252	6,221	11,671	4,361	931	165	1,691	1,065	171	379	18	469	123	300	475	5,212

[1] Denotes change in items in category.

[ ] based on summed items and estimates of omitted data.

TABLE 3.—SOVIET IMPORTS BY COMMODITY GROUPS, 1913–77, SELECTED YEARS

[Millions of rubles]

Year	Total exports (1)	Machinery (2)	Fuels energy (3)	Metals ores minerals (4)	Chemicals fertilizer rubber (5)	Construction products (6)	Forest products paper (7)	Fibers (8)	Agricultural raw materials (9)	Grain and oilseed (10)	Sugar (11)	Other foodstuffs (12)	Cloth clothing shoes (13)	Small consumer durables (14)	Other consumer manufacturing (15)	Not Classified (16)
1913	1,079	179	76	83	85	11	35	198	73	22	0	207	58	27	26	0
1926–27	560	123	6	68	51	3	24	166	53	6	1	53	2	1	7	u
1931	867	468	1	193	28	11	6	66	31	6	0	51	2	1	5	0
1950	1,310	282	151	198	90	18	51	102	25	14	41	[156]	73	[1]	[23]	85
1955	2,755	833	225	459	94	18	84	150	60	21	77	[450]	104	[5]	[23]	152
1960	5,066	1,507	214	860	304	41	94	328	112	50	118	492	698	25	148	75
1965	7,253	2,423	[1]181	721	450	49	135	322	71	358	275	[874]	672	[15]	[343]	364
1966	7,122	2,308	171	630	456	50	137	337	206	443	226	787	761	16	391	203
1967	7,684	2,625	169	688	469	53	169	309	204	135	303	838	1,005	22	479	216
1968	8,470	3,127	169	791	508	30	176	331	134	99	213	909	1,101	27	558	297
1969	9,296	3,485	195	935	576	43	197	397	169	29	162	1,067	1,162	27	577	275
1970	10,556	3,706	211	1,131	602	46	230	505	204	121	364	1,178	1,302	29	602	325
1971	11,231	[1]3,719	303	1,212	606	56	235	506	212	193	186	1,317	1,480	37	740	429
1972	13,303	4,506	399	1,313	652	65	238	439	298	765	225	1,387	1,623	36	815	542
1973	15,544	5,231	528	1,679	667	68	250	575	311	1,221	483	1,407	1,630	31	810	652
1974	18,829	5,971	659	2,742	1,186	76	358	766	359	539	617	2,048	1,908	22	819	763
1975	26,670	8,866	1,040	[1]3,349	1,253	94	573	638	368	1,987	1,572	2,441	2,375	29	1,036	1,049
1976	28,732	10,255	1,034	3,356	1,235	110	504	672	362	2,555	1,557	2,407	2,451	33	1,136	1,065
1977	30,097	11,289	1,083	3,063	1,324	111	532	800	513	1,053	1,839	3,078	2,584	42	1,257	1,529

[1] Denotes a change in the coverage of the category.

[ ] based on summed items and estimates of omitted data.

TABLE 4.—U.S.S.R.: EXPORTS, IMPORTS, AND OUTPUT OF INDUSTRIAL PRODUCTS, 1913–77, SELECTED YEARS

Q=domestic output in units
X=simple exports
XX="embodied" in related X
M=simple imports
MM="embodied" in related M
net X=X−M (net exports)
net XX=XX−MM (net embodied exports)
net M=M−X (net imports)
net MM=MM−XX (net embodied imports)
S=total supply=Q+M or Q+MM
C=consumption=Q+net M or Q+net MM

()=net imports
0=less than ½ unit
n=no data
°=small exports
m=small imports
[ ]=different datum source or assumption
EQ shows series which adjusts for commodity "embodied" in related items
*Net imports compared with consumption M (output plus net imports)
▲ Output data are very approximate
p=Preliminary
(•)=not estimated

Year	Coal and EQ (million metric tons (standard units))					Crude oil & EQ[m] (million metric tons)			Natural gas (10^9 cubic meters)			Electricity (10^9 kwh)	
	Q	X	XX	net XX	net XX/Q*	Q	net XX	net XX/Q*	Q	net X	net X/Q*	Q	X
1913	36	0.1	0.2	(9.3)	(21.0)%	9	1.1	12%	0	0	0 %	2.0	0
1931	56	1.6	1.7	(1.0)	(2.6)	22	5.8	26	1.0	0	0	13.0	0
1950	205	1.1	3.8	(6.3)	(2.4)	38	(1.6)	(4)	5.8	.1	1.7	91.2	0
1960	373	12.3	23.9	14.8	4.0	148	30.0	20	45.3	.2	.4	170.2	.3
1965	413	22.1	37.1	26.1	6.3	243	64.4	27	127.7	.4	.3	506.7	1.5
1970	433	24.3	53.4	39.1	9.1	353	94.0	28	197.9	(.3)	.2	544.6	1.6
1971	442	24.9	55.4	38.9	8.8	377	101.0	27	212.4	(3.8)	(1.8)	800.4	6.7
1972	449	24.4	52.9	34.0	7.6	400	100.6	25	221.4	(5.9)	(3.0)	857.4	7.1
1973	455	24.5	55.9	34.3	7.5	429	106.3	25	236.3	(4.6)	(2.0)	914.6	9.7
1974	463	26.2	56.9	30.9	6.7	459	113.8	25	266.6	2.1	.8	975.8	10.9
1975	472	26.1	55.8	24.4	5.2	491	125.9	26	289.3	6.9	2.4	1,038.6	11.3
1976	479	26.9	58.1	31.4	6.6	520	144.5	28	321.0	14.0	4.4	1,111.4	11.6
1977	n	n	n	n	(•)	546	n	(•)	346.0	n	(•)	1,150.0	11.5

Year	Iron Ore and EQ (million metric tons)					Manganese Ore[m] and EQ (million metric tons)			Chromite Ore[m] and EQ (thousand metric tons)			Vanadium (thousand tons contained metal)	
	Q	X	XX	net XX	net XX/Q	Q	XX	XX/Q	Q	XX	XX/Q	Q	X
1913	9.2	0.5	0.6	0.1	0 %	1.3	1.2	95%	26	0	0 %	(•)	(•)
1931	10.6	11.1	1.2	(1.7)	(14)	.9	.7	84	94	29	31	(•)	(•)
1950	40.0	3.2	5.2	4.3	11	3.4	[.3]	8	n	(96)	(•)	(•)	(•)
1960	106.0	15.2	24.0	21.0	20	5.9	1.1	18	918	477	52	(•)	(•)
1965	153.0	24.1	41.0	37.8	25	7.6	1.1	15	1,424	804	57	(•)	(•)
1970	169.0	36.1	61.0	55.1	29	6.8	1.6	23	1,751	1,290	74	3.8	1.8
1971	203.0	36.5	62.0	56.1	28	7.3	1.8	24	1,796	1,185	66	2.9	1.4
1972	208.0	38.4	64.0	56.1	27	7.8	1.7	22	1,851	1,198	65	3.7	1.8
1973	216.0	41.4	67.0	57.0	26	8.2	1.7	21	1,905	1,293	68	4.2	1.9
1974	225.0	43.3	67.0	53.6	24	8.2	1.9	23	1,951	1,223	63	3.2	1.9
1975	233.0	43.6	67.0	53.7	23	8.5	1.9	21	2,078	1,259	61	3.5	(1.0)
1976	239.0	43.1	68.0	53.4	22	8.6	1.7	20	2,120	1,073	51	[3.5]	(1.0)
1977	240.0	40.9	n	n	(•)	p8.5	1.7	20	n	n	(•)	n	n

Year	Pig iron and ferrous metals (million metric tons)				Semiprocessed ferrous metals (million metric tons)				Pipe (thousand metric tons)			Ferrous alloys (thousand metric tons)
	Q	XX	net XX	net XX/Q	Q	XX	net XX	net XX/Q	X	M	net M/Q	X
1913	4.2	0.1	(0.1)	(3)%	3.4	0.1	(0.1)	(3)%	0	13	17%	(22)
1931	4.8	0	(1.6)	(25)	4.1	0	(1.6)	(38)	0	114	4	(3)
1950	19.2	1.1	.6	3	18.1	0.6	.4	2	62	143	10	41
1960	46.8	5.0	3.2	7	43.7	2.8	1.8	4	204	578	6	118
1965	66.2	9.3	7.6	11	61.7	2.2	1.4	2	266	767	5	205
1970	85.9	13.9	10.8	13	80.6	7.3	5.6	7	341	1,300	7	365
1971	89.3	14.4	10.9	12	84.1	7.1	5.0	6	473	1,400	7	374
1972	92.3	14.1	9.2	10	87.5	6.9	4.3	5	373	1,500	8	414
1973	95.9	14.2	8.7	9	91.4	6.7	3.5	4	344	2,000	10	434
1974	99.9	13.4	5.7	6	93.4	6.6	1.2	1	322	2,200	11	424
1975	103.0	12.8	5.6	5	98.7	6.6	2.2	2	338	2,700	13	412
1976	105.4	13.9	5.7	5	101.0	6.9	1.9	2	594	2,980	12	417
1977	107.0	n	n	(•)	102.0	n	(•)	(•)	n	n	(•)	8

TABLE 4.—U.S.S.R.: EXPORTS, IMPORTS, AND OUTPUT OF INDUSTRIAL PRODUCTS, 1913–77, SELECTED YEARS—Continued

Year	Copper and EQ (thousand metric tons)				Lead (thousand metric tons)				Zinc and EQ (thousand metric tons)				Tin (thousand metric tons)	
	Q[a]	X	net XX	net XX/Q	Q[a]	X	M	net X/Q	Q[a]	X	net XX	net XX/Q	net M	net M/S
1913	[31]	0	(7)	(18)%	[2]	0	58	(97)%	[3]	(26)	(26.0)	(57)%	6.0	100%
1931	[44]	0	(27)	(37)	[15]	0	42	(73)	[9]	(24)	(24.0)	(73)	4.5	100
1950	[247]	30	24	10	[144]	7	n	(•)	[12]	9	(16.3)	(12)	5.2	30
1960	300	73	(33)	(10)	[260]	70	40	12	[360]	91	18.2	5	3.6	18
1965	460	106	100	22	[350]	103	48	16	[540]	134	63.8	12	5.8	23
1970	620	147	136	22	440	92	39	12	610	97	37.5	6	8.3	24
1971	665	193	174	28	450	93	43	11	650	139	77.1	12	4.4	13
1972	700	229	205	31	460	93	50	9	650	136	67.2	10	4.2	13
1973	740	260	241	35	470	97	77	4	680	149	89.5	13	4.0	12
1974	764	267	246	33	480	96	77	4	680	117	48.1	7	5.2	15
1975	800	225	194	25	480	99	56	9	690	103	35.0	5	9.7	24
1976	825	n	(•)	(•)	n	n	(•)	(•)	n	n	(•)	(•)	n	(•)
1977	n	n	(•)	(•)	n	n	(•)	(•)	n	n	(•)	(•)	n	(•)

Year	Aluminum (thousand metric tons)			Aluminum—Shabad (thousand metric tons)		Alumina and bauxite (million metric tons, Al_2O_3 content)				Magnesium[m] (thousand metric tons)		Cement (million metric tons)	
	Q[a]	net X	net X/Q	Q	X/Q	M	Q	S	M/S	X	X/Q	Q	X/Q
1913	[0]	(1.8)	(100)%	n	(•)	n	n	n	(•)	n	(•)	1.5	(10)%
1931	[0]	(20.3)	(100)	n	(•)	n	n	n	(•)	n	(•)	3.3	1
1950	[200]	9.5	5	n	(•)	n	n	n	(•)	n	(•)	10.2	1
1960	[640]	73.0	11	n	(•)	n	n	n	(•)	1.3	5%	45.5	1
1965	[840]	266.0	32	1,000	26%	0.7	0.3	2.0	15%	3.5	11	72.5	3
1970	1,120	500.0	44	1,700	29	2.1	1.3	3.4	38	16.8	34	95.2	3
1971	1,180	525.0	44	•	(•)	2.2	1.5	3.7	41	19.9	37	100.3	3
1972	1,250	577.0	46	n	(•)	2.4	1.6	4.0	40	23.3	41	104.3	2
1973	1,360	633.0	47	n	(•)	2.5	1.7	4.2	40	27.9	47	109.5	3
1974	1,430	645.0	45	n	(•)	2.7	1.7	4.4	39	11.4	19	115.1	3
1975	1,500	602.0	40	2,400	25	2.9	2.8	5.7	49	n	(•)	122.0	3
1976	1,600	n	(•)	n	(•)	n	2.8	n	(•)	n	(•)	124.2	2
1977	1,630	n	(•)	n	(•)	n	n	n	(•)	n	(•)	p 130.8	3

Year	Asbestos[m] (thousand metric tons)			Phosphate rock and EQ (million metric tons, 18.7 percent P_2O_5 content)			Phosphate Fertilizer (million metric tons)		Potash (thousand metric tons, K_2O content)			Pesticides (thousand metric tons standard units)		
	Q	X	X/Q	Q	X	X/Q	Q	X	Q	XX	XX/Q	Q	M	net M/S
1913	25	12	48%	(•)	0	0%	0.1	(0.43)	0	0	0%	n	1	(•)
1931	65	13	20	(•)	0	0	.7	(.04)	0	0	0	n	2	(•)
1950	n	39	(•)	4.2	.8	20	2.9	.00	312	290	93	n	0	(•)
1960	600	146	24	11.4	3.8	35	6.4	.20	1,084	260	24	63	19	24%
1965	745	248	33	22.0	7.4	35	12.2	.20	2,370	340	14	198	271	58
1970	1,065	385	36	35.0	12.0	36	19.1	.65	4,090	1,290	32	292	42	9
1971	1,150	433	38	37.2	12.8	36	20.3	.57	4,807	1,622	34	273	38	9
1972	1,220	433	35	38.8	13.5	36	21.1	.49	5,433	1,706	31	299	40	8
1973	1,280	449	35	41.5	14.1	35	22.7	.49	5,918	1,997	34	338	44	8
1974	1,360	528	39	44.3	12.8	30	26.1	.51	6,586	2,330	35	387	42	6
1975	1,900	613	32	47.8	12.5	27	29.5	.49	7,944	2,496	31	438	50	7
1976	n	n	(•)	n	n	(•)	n	.53	8,310	2,330	28	456	51	7
1977	n	n	(•)	n	n	(•)	n	.62	n	2,496	(•)	p489	52	6

Year	Caustic soda (thousand metric tons)			Soda ash (thousand metric tons)			Artificial fiber (thousand metric tons)			Synthetic fiber (thousand metric tons)			Rubber (thousand metric tons)	
	M	net M	net M/Q	M	net M	M/Q	Q	MM	MM/S	Q	MM	M/S	Natural, net M	Synthetic, net X
1913	4	0	1%	2	2	2%	0	0	50%	0	0	0%	13	0
1931	0	0	0	0	0	0	3	0	0	(•)	0	0	28	0
1950	14	14	4	57	23	6	23	7	23	1.3	0	0	87	2
1960	105	90	11	185	165	8	102	29	22	9.0	0	0	191	(5)
1965	209	186	13	268	180	6	330	59	15	78.0	7	9	271	(16)
1970	170	147	7	573	503	12	450	72	14	167.0	38	18	316	44
1971	165	124	6	403	314	8	473	58	11	203.0	44	18	246	37
1972	165	132	6	465	391	9	507	39	7	239.0	49	17	231	50
1973	174	142	6	271	207	5	543	26	5	287.0	37	12	260	67
1974	209	178	7	459	404	8	569	21	4	318.0	48	13	315	61
1975	194	155	6	568	505	9	590	21	4	365.0	54	13	235	68
1976	106	63	2	551	491	5	612	24	4	408.0	51	11	n	n
1977	n	n	(•)	n	n	(•)	p628	26	4	472.0	60	11	n	n

TABLE 4.—U.S.S.R.: EXPORTS, IMPORTS, AND OUTPUT OF INDUSTRIAL PRODUCTS, 1913–77, SELECTED YEARS—Continued

Year	Commercial timber and EQ (million solid cubic meters)				Sawn lumber (million cubic meters)			Plywood (thousand cubic meters)		
	Q	X	net XX	XX/Q	Q	net X	X/Q	Q	net X	X/Q
1913	74	6.3	14.6	20%	14	5.9	42%	203	n	(•)%
1931	104	4.9	11.6	11	23	4.6	19	420	87	21
1950	161	0.7	1.6	1	50	(.1)	(2)	657	[48]	7
1960	262	4.4	12.3	5	106	4.6	5	1,354	109	8
1965	274	11.1	23.6	9	111	7.7	7	1,756	140	8
1970	299	15.3	28.9	10	116	7.7	7	2,045	231	11
1971	298	14.6	28.6	10	119	7.6	7	2,083	214	10
1972	298	14.9	29.6	10	119	7.7	7	2,110	225	11
1973	304	18.7	34.4	11	116	7.9	7	2,142	254	12
1974	304	18.2	33.5	11	115	7.6	7	2,160	248	12
1975	313	16.8	31.3	10	116	7.5	7	2,196	246	11
1976	303	17.9	34.4	11	113	8.2	8	2,774	242	11
1977	297	17.8	34.4	12	109	8.0	8	P2,341	266	11

Year	Chemical pulp and EQ (thousand metric tons)					Paper (thousand metric tons)				Cardboard (thousand metric tons)	
	Q	X	M	net XX	net XX/Q	Q	X	M	net X/Q	X	net X/Q
1913	n	13	26	(127)	(•)	269	2	126	(34)%	0	(34)%
1931	n	0	68	(91)	(•)	505	1	29	(5)	0	(1)
1950	1,100	68	3	69	6%	1,180	30	18	1	n	(•)
1960	2,280	244	83	169	7	2,334	123	70	2	n	(•)
1965	3,230	262	197	230	7	3,231	204	145	2	n	(•)
1970	5,110	448	287	157	3	4,185	475	417	1	247	7
1971	5,410	467	265	202	4	4,407	490	393	2	233	6
1972	5,670	501	221	280	5	4,613	542	411	3	237	6
1973	6,060	519	237	282	5	4,908	606	335	6	254	6
1974	6,320	491	198	293	5	5,040	650	394	5	263	6
1975	6,820	515	244	271	4	5,215	617	485	3	307	7
1976	7,200	632	197	435	6	5,389	590	420	3	370	6
1977	P7,530	680	200	480	6	5,458	622	449	3	394	7

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TABLE 5.—U.S.S.R.: EXPORTS, IMPORTS, AND OUTPUT OF AGRICULTURAL COMMODITIES, 1913–77, SELECTED YEARS

Q=domestic output in units
X=simple exports
XX="embodied" in related X
M=simple imports
MM="embodied" in related M
net X=X—M (net exports)
net XX=XX—MM (net embodied exports)
net M=M—X (net imports)
net MM=MM—XX (net embodied imports)
(●)=not estimated

( )=net imports
0=less than ½ unit shown
[ ]=datum based on different source or assumption
n=no data
EQ shows series which adjusts for "embodied" or related items
a Net XX/Net Q
b Net MM/(Net Q+Net MM)
c Large output and export of oilseed, especially linseed
p=Preliminary
d Exports

A. ANALYSIS OF GRAIN IMPORTS AND EXPORTS

(millions of metric tons)

Year	Output estimated			Calendar year			Agricultural year July 1 to June 30			Export/output a (Import/consumption b)	
	Gross output Soviet data	Estimated barn Q	Net Q excluding seedd	XX	MM	net XX (net MM)	XX	MM	net XX (net MM)	Calendar year	Agriculutral year
1913		81–93	[65–74]	9.5	0.5	8.1				11–12%	(●)
1926–27		72	[57]				2.0	0	2.0		3%
1931		66	[53]	4.8	0	4.7				9	(●)
1938		71	[57]	.6	.1	.5				1	(●)
1950	81.2	81	[61]	3.0	.3	2.7				4	(●)
1960	125.5	93	69	6.9	.8	6.1				9	(●)
1965	121.1	100	73	4.6	7.0	(2.4)			(4.0)	(3)	(5)
1966	171.2	140	113	5.0	8.4	(3.4)			[1.0]	(3)	1
1967	147.9	122	96	6.6	2.9	3.8			[4.0]	4	4
1968	169.5	135	109	6.1	2.2	3.9			[6.0]	4	4
1969	162.4	128	101	7.9	1.3	6.6			[5.0]	7	5
1970	186.9	150	125	6.6	2.8	3.8			7.0	3	6
1971	181.2	148	123	9.4	4.2	5.2	6.7	8.0	1.3	(4)	1
1972	168.2	134	109	5.0	16.1	(11.1)	1.7	22.6	(20.9)	(9)	(16)
1973	222.5	[172]	145	5.6	24.4	(18.8)	5.9	11.1	(5.2)	(11)	(3)
1974	195.7	[157]	130	8.0	7.7	.4	5.0	5.4	(0.4)	0	(0)
1975	140.1	[111]	84	4.3	16.7	(12.4)	.5	25.9	(25.4)	(13)	(23)
1976	223.8	[172]	[145]	2.2	21.5	(19.3)	3.0	10.2	(7.2)	(12)	(5)
1977	195.5	[156]	[129]	n	[11.8]	n	2.0	19.2	(17.2)	(●)	(12)

TABLE 5.—U.S.S.R.: EXPORTS, IMPORTS, AND OUTPUT OF AGRICULTURAL COMMODITIES, 1913–77, SELECTED YEARS—CONTINUED

B. OTHER CROPS

(thousands of metric tons)

Year	Cotton fiber and EQ (ginned)				Flax and EQ			Hemp	Jute	Sugar—Granulated			
	Q	XX	MM	net XX/Q	Q	net XX	XX/Q	X	M	Q	X	M	net M/S
1913	[220]	0	197	47%	347	304	~88%	53.6	44.7	1,363	147	0	−11%
1931	[420]	33	48	−4	443	65	15	5.9	23.4	1,486	320	0	−22
1950	1,204	227	56	14	255	7	3	n	13.2	2,523	97	358	9
1960	1,459	421	214	14	425	43	10	10.3	16.9	5,266	243	1,594	21
1965	2,033	496	211	14	480	15	3	2.3	22.9	8,924	604	2,171	15
1970	2,129	561	293	13	456	20	4	3.9	42.0	8,139	1,106	2,790	18
1971	2,361	593	283	13	486	36	7	4.8	22.8	7,800	1,000	1,395	5
1972	2,360	696	211	21	456	30	7	3.3	35.8	7,300	49	1,829	20
1973	2,471	765	170	24	443	37	8	3.7	28.1	8,400	42	2,462	22
1974	2,476	763	176	24	402	35	9	4.5	20.0	7,800	95	1,784	19
1975	2,649	834	190	24	493	23	5	3.6	22.5	7,400	53	2,980	28
1976	2,590	910	169	29	509	18	4	3.5	28.4	6,200	72	3,453	35
1977	p2,611	1,003	154	33	475	16	3	4.6	22.5	8,200	81	4,484	35

Year	Sunflower seed and EQ					Oilseed imports (unreported)	Vegetable oil		
	net Q	X	XX	XX/Q	Lagged XX_{t+1}/Q_t		Q	X	X/Q
1913	(c)	(c)	(c)	(c)	(•)	(•)	538	8	2%
1931	2,400	0	200	0.1%	(•)	(•)	490	27	6
1950	1,800	n	n	(•)	(•)	(•)	819	13	2
1960	3,700	70	160	4.0	(•)	(•)	1,586	92	6
1965	5,000	80	300	6.0	11%	0	2,770	242	9
1970	5,700	140	490	9.0	17	0	2,784	372	13
1971	5,200	80	980	19.0	20	0	2,923	408	14
1972	4,600	70	1,030	22.0	19	300	2,827	423	15
1973	6,800	70	890	13.0	18	710	2,676	371	14
1974	6,200	60	1,210	19.0	15	0	3,411	513	15
1975	4,600	60	980	22.0	15	350	3,344	416	12
1976	4,900	0	700	14.0	11	1,770	2,775	295	11
1977	5,400	[000]	550	10.0	(•)	1,380	2,947	231	8

C. FOREIGN TRADE IN ANIMAL PRODUCTS

(thousands of metric tons)

Year	wool and EQ (washed)				Hides, skins, and leather (millions of pieces)			
	Q	XX	MM	net MM/C	Hides and skins Q	Hides net M	Skins net M	Leather 10^6 dm^2 net M
1913	184	[17]	63	25%	n	Large	Small	Large
1931	94	[8]	33	32	n	½ 1913	Small	Small
1950	173	12	35	12	15.0	.1	2.6	n
1960	343	18	64	12	18.3	2.7	18.2	60
1965	343	26	54	7	25.3	2.7	16.5	22
1970	402	18	84	14	41.4	2.5	25.6	425
1971	412	14	88	15	n	2.4	21.3	498
1972	403	12	85	15	n	1.9	20.8	547
1973	416	8	98	18	n	.3	26.3	767
1974	443	6	102	18	n	1.1	22.0	756
1975	448	7	112	19	n	1.0	20.3	862
1976	418	2	111	21	n	.2	13.8	618
1977	440	3	113	20	n	.2	.2	977

Year	Butter		Meat		Eggs (million)	Fish	
	Net X (net M)	X/Q (M/S)	Q	M	M	Q	X
1913	78	60%	1,300	10	(3,660) [d]	1,050	30
1931	31	[37]	n	0	(293) [d]	[1,330]	80
1950	29	9	1,600	50	36	1,760	20
1960	33	5	4,400	70	113	3,540	80
1965	37	4	5,300	250	706	5,770	210
1970	71	7	7,100	160	662	7,900	270
1971	22	2	8,200	220	946	7,790	300
1972	10	1	8,700	130	1,029	8,210	270
1973	(212)	(15)	8,400	130	791	9,000	290
1974	7	1	8,400	520	736	9,620	400
1975	8	1	9,900	520	767	1,0400	530
1976	7	1	8,400	360	654	1,0500	510
1977	(58)	(4)	9,100	620	691	9,600	440

TABLE 6.—U.S.S.R.: TRADE SPECIALIZATION FOR SELECTED MACHINERY PRODUCTS, 1950–77, SELECTED YEARS

Q=domestic output in physical units
val=millions of rubles, current prices
X=exports in appropriate units
M=imports in appropriate units
S=output plus imports
*=excludes items in "complete plants"
n="not listed"
0="probably small"
—=no trade

x=exports relatively small or zero
m=imports relatively small or zero
ETN=Soviet commodity number
p=plan
(•)=not estimated, inadequate data
a Domestic output in domestic rubles, exports and inports in foreign trade rubles
b Parts included
1 Change in domestic prices

A. COMPARISONS IN VALUE IN CURRENT PRICES

[Output in domestic prices, imports and exports in foreign trade rubles]

ETN	Total machinery (billions of rubles)			100 metal cutting equipment *			101–103 metal forming equipment *		
Year	Installed equipment	Export value	Import value	Q-val	X-val	M-val	Q-val	X-val	M-val
1950	(•)	191	282	(•)	19	14	(•)	0.8	2.0
1960	11.0	1,027	1,507	419	13	57	129	4.7	34.4
1965	17.5	1,471	2,423	638	40	83	161	4.7	36.2
1970	25.3	2,459	3,706	979	79	135	246	14.4	73.9
1971	26.6	2,776	3,719	1,053	79	155	273	12.1	63.3
1972	28.8	2,979	4,506	1,140	84	231	297	11.7	88.5
1973	31.1	3,424	5,231	1,263	95	253	329	13.8	86.6
1974	34.1	3,942	5,971	1,387	120	212	371	15.3	89.9
1975	38.1	4,448	8,866	1 1,338	141	253	379	4.9	57.8
1976	42.2	5,404	10,255	1,458	193	396	433	7.9	69.5
1977	p 42.9	6,221	11,289	1,620	n	n	479	n	n

ETN	151 equipment paper and cellulose industry		150 equipment for chemical industry					157 polygraphic and printing	
Year	Q-val	M-val	Q-val	X-val	M-val	Net M-val	Net M/S	Q-val	M-va
1950	(•)	0	(•)	—	7	7	(•)	(•)	2
1960	20	33	200	•5	167	162	45%	23	11
1965	42	37	330	•5	187	182	35	35	16
1970	84	91	339	53	218	165	33	50	39
1971	91	64	453	57	240	183	29	52	44
1972	100	116	487	61	375	314	39	54	41
1973	114	129	543	57	430	373	41	55	43
1974	128	139	607	69	474	405	40	61	44
1975	ı135	150	ı576	79	638	559	49	ı59	55
1976	144	213	623	86	1,132	1,046	63	63	50
1977	p158	250	667	104	1,722	1,618	70	p69	54

ETN	144 equipment for textile and knitting industry			145 sewing industry equipment		146 shoemaking equipment		154 food industry equipment		
Year	Q-val	X-val	M-val	Q-val	M-val	Q-val	M-val	Q-val	X-val	M-val
1950	n	n	n	n	n	n	n	n	n	3
1960	126	n	n	19	n	15	n	163	n	111
1965	199	n	n	29	n	14	n	223	5	80
1970	300	19	75	48	18	25	13	344	52	124
1971	321	26	65	56	15	25	8	354	27	98
1972	354	25	105	62	19	28	14	388	21	120
1973	402	25	122	67	18	29	13	420	22	161
1974	464	44	162	67	17	28	17	465	37	196
1975	ı438	57	272	ı60	25	ı27	48	ı451	66	231
1976	462	75	309	63	31	27	47	482	83	232
1977	n	100	298	n	43	n	48	p529	95	241

TABLE 6.—U.S.S.R.: TRADE SPECIALIZATION FOR SELECTED MACHINERY PRODUCTS, 1950–77, SELECTED YEARS—Continued

B. COMPARISONS IN UNITS

ETN	100 metal cutting (thousand units)			11129 power transformers (10^6 KVA)			12303 rolling mill equipment (thousand tons)		
Year	Q	X/Q	M/Q	Q	X/Q	M/Q	Q	X	M
1950	71	5%	2%	10	9.8%	5.5	66	n	n
1960	156	1	5	49	7.3	2.4	120	9.4	22.9
1965	192	3	3	95	3.0	4.5	111	9.3	50.8
1970	202	6	5	106	1.7	1.3	140	18.6	52.9
1971	207	6	6	108	1.7	1.9	141	16.2	50.3
1972	211	5	8	116	.8	1.5	141	12.4	36.4
1973	214	7	6	121	1.4	2.3	145	13.3	29.1
1974	226	7	5	127	.6	1.7	127	15.5	38.3
1975	231	8	5	137	(•)	(•)	132	13.2	39.2
1976	233	7	5	144	(•)	(•)	146	n	n
1977	236	(•)	(•)	p 154	(•)	(•)	p 168	n	n

Year	12302 steel making furnaces (thousand tons)		15501 pumps (thousand units)			17301 ball bearings (10^9 units)		13304 lifts (thousand units)	
	Q	X	Q	X/Q	M/Q	Q	X/Q	Q	M/S
1950	25.7	n	93	1.6%	0.6%	93	(•)%	0.5	(•)%
1960	36.8	n	391	.8	1.2	370	3.2	3.4	19.4
1965	37.2	n	774	.5	1.3	524	3.0	8.6	11.5
1970	50.7	5.9	1,161	4.1	1.0	673	5.2	18.1	4.3
1971	54.5	8.7	1,199	1.5	1.4	709	5.2	20.8	2.8
1972	45.8	8.3	1,191	2.0	2.1	756	4.8	22.8	1.7
1973	57.3	16.9	1,213	2.9	2.1	799	4.7	24.3	1.8
1974	63.3	26.6	1,328	3.1	1.9	849	5.0	25.3	1.5
1975	63.4	18.9	1,378	4.4	2.0	907	4.6	25.2	2.6
1976	67.2	19.2	1,419	5.0	1.8	953	n	27.4	.9
1977	68.8	21.5	1,496	6.9	2.2	n	n	29.0	.7

Year	13007 Cranes-Truck [m] (thousand units)		13009 Cranes-railroad [x] (units)		15408 Bulldozers (thousand units)		15407 Graders (thousand units)	
	Q	X/Q	Q	M/S	Q	X/Q	Q	X/Q
1950	4.2	0 %	478	0 %	3.8	4.0%	0	(•)%
1960	6.7	4.1	444	4.7	12.9	5.8	3.1	6.4
1965	11.4	4.0	463	10.3	20.1	8.1	4.2	10.7
1970	15.4	5.6	493	15.4	33.5	5.4	4.6	13.5
1971	16.2	5.6	496	17.2	38.0	4.2	5.6	10.9
1972	16.4	5.2	509	17.2	40.2	3.5	6.0	10.4
1973	17.2	4.9	482	16.3	45.6	3.8	5.9	5.9
1974	19.0	5.3	474	14.1	47.1	3.5	6.3	11.5
1975	19.6	5.3	499	13.1	51.1	3.6	6.5	12.7
1976	20.2	(•)	515	(•)	49.1	(•)	6.8	(•)
1977	20.8	(•)	p 510	(•)	52.2	(•)	6.8	(•)

Year	15401 excavators (thousand units)		19007 electric locomotives (units)		19015–21 railroad freight cars (thousand units)		19024 railroad passenger cars (units)		19025 metro [m] (thousand units)
	X/Q	M/Q	Q	M/S	Q	M/S	Q	M/S	X/Q
1950	4.5%	8.8%	102	0%	50.8	6%	12	10%	(•)
1960	5.7	.1	396	22	36.4	8	1,656	47	0
1965	5.8	3.1	641	22	39.6	13	1,991	35	0
1970	7.4	4.5	323	26	58.7	7	1,791	30	10.4
1971	6.6	4.8	341	6	63.7	6	1,871	31	17.8
1972	6.0	5.4	351	10	68.9	6	2,001	32	0
1973	7.0	3.8	354	3	71.8	6	2,001	34	5.9
1974	8.1	2.8	358	19	72.4	9	2,051	34	5.7
1975	6.8	2.1	395	4	69.9	9	2,090	32	13.2
1976	(•)	(•)	410	(•)	71.9	7	2,078	27	6.2
1977	(•)	(•)	425	(•)	73.2	(•)	2,110	(•)	(•)

TABLE 6.—U.S.S.R.: TRADE SPECIALIZATION FOR SELECTED MACHINERY PRODUCTS, 1950–77, SELECTED YEARS—Continued

Year	19501 automobiles (thousand units)		19506 auto parts (million ft R)		19101 Trucks (thousand)		19111 truck parts (million ft R)		19035 Trolleys[a]	19103 Buses[a]
	Q	X/Q	X-val	M-val	Q	X/Q	X-val	M-val	M/S	M/S
1950	65	8%	n	n	294	4%	n	n	(•)%	0 %
1960	139	22	n	n	362	7	n	n	18	0
1965	201	24	n	n	379	4	n	n	20	2
1970	344	25	142	n	525	7	403	297	39	9
1971	529	28	228	n	564	6	300	305	40	11
1972	730	26	287	n	597	6	322	396	41	12
1973	917	26	350	n	630	5	337	402	39	12
1974	1,119	26	431	67	666	5	361	371	35	12
1975	1,201	25	475	72	696	5	448	703	35	12
1976	1,239	28	633	78	716	5	555	833	34	14
1977	1,274	28	719	99	713	(•)	661	765	35	(•)

Year	181 agricultural machinery (excluding tractors) (millions)			18001, 05 tractors and parts[m] (thousand units)			Plows[m]	Harrows[m]	Mowers[a]	Seeders[a]	Milkers[a]
	Q-val	X-val	M-val	Q	X/Q	X'/Q'[b]	X/Q	X/Q	M/S	M/S	M/S
1950	286	6	6	117	7%	(•)%	(•)%	(•)%	3%	0%	(•)%
1960	759	38	7	239	8	11	5	17	9	0	(•)
1965	1,462	68	54	355	6	11	3	3	15	0	(•)
1970	2,115	57	140	459	6	11	2	8	15	15	21
1971	2,347	64	185	472	6	11	2	5	13	18	20
1972	2,599	75	265	478	6	11	2	3	10	17	25
1973	2,993	86	296	500	7	13	5	6	4	19	28
1974	3,470	147	289	531	8	13	7	15	6	17	23
1975	3,658	176	338	550	7	13	7	27	27	16	35
1976	3,894	185	461	562	8	15	7	84	31	15	18
1977	4,059	196	540	567	(•)	(•)	5	61	31	17	15

TABLE 7.—U.S.S.R.: DIRECTION OF MACHINERY TRADE, 1960–77, SELECTED YEARS

[Millions foreign trade rubles]

	Machinery exports				Machinery imports			
	Total	Eastern Europe[1]	Western industrial[2]	Other[3]	Total	Eastern Europe[1]	Western industrial[2]	Other[3]
1960	1,029	365	14	650	1,508	1,095	410	3
1965	1,654	731	23	900	2,423	1,964	417	42
1970	2,482	1,320	70	1,092	3,706	2,706	903	97
1971	2,705	1,543	73	1,089	3,817	2,867	938	12
1972	3,006	1,751	84	1,171	4,609	3,458	1,035	116
1973	3,450	2,046	136	1,268	5,339	3,886	1,429	24
1974	3,974	2,476	158	1,340	6,104	4,127	1,944	33
1975	4,482	2,707	246	1,529	9,046	5,387	3,617	42
1976	5,428	3,249	286	1,893	10,427	6,045	4,334	48
1977	6,248	3,897	242	2,109	11,466	6,996	4,429	41

[1] Eastern Europe includes: Bulgaria, Hungary, German Democratic Republic, Rumania, Czechoslovakia, and Yugoslavia.

[2] Western industrial includes: West Germany, France, Italy, Great Britain, Sweden, Finland, United States, Japan, Belgium, Netherlands, Canada, and Austria.

[3] Equals total minus Eastern Europe and western industrial.

TABLE 8.—U.S.S.R.: MACHINERY TRADE: COMPOSITION, ORIGIN, AND DESTINATION BY TYPE, 1970–77, SELECTED YEARS
(Millions of Foreign trade rubles)

Year	100–103 metal-working equipment		104–105 metal-working (whole plants, lines)		110 energy equipment (boilers, diesels)		111 electro-technology (motors, transformers)		120 and 121 mining equipment	
	X	M	X	M	X	M	X	M	X	M
1970	93	189	38	237	217	67	29	118	57	25
1975	146	311	80	575	321	77	67	285	182	97
1976	200	465	95	438	440	115	83	345	265	109
1977	262	627	82	432	527	154	98	416	287	126
Percent of 1977 to—										
Eastern Europe	85	56	30	8	51	81	81	88	39	14
Other Socialist	3	0	9	0	16	0	10	0	56	0
Western Industrial	8	42	0	63	3	6	4	10	1	43
Other	4	2	[1] 61	[2] 29	30	13	5	2	14	43

Year	123 metallurgical equipment		127 and 128 oil refining and drilling equipment		13 lifting-transport (forklifts, etc.)		140 food industry equipment		144, 145, 146 textile, sewing, shoe equipment		150 chemical industrial equipment	
	X	M	X	M	X	M	X	M	X	M	X	M
1970	223	135	105	44	45	203	52	124	19	118	53	218
1975	338	371	124	233	89	499	66	231	57	344	79	638
1976	302	439	132	233	100	505	83	232	75	387	86	1, 132
1977	329	450	159	197	111	631	95	240	100	389	104	1, 722
Percent of 1977 to—												
Eastern Europe	28	33	40	40	71	75	27	74	62	66	87	21
Other Socialist	2	0	17	0	21	0	38	0	15	0	5	0
Western Industrial	1	38	0	57	0	4	0	26	0	20	0	79
Other	[1] 69	[2] 29	[1] 43	3	8	21	[1] 35	0	[1] 23	14	8	0

Year	151–152 timber, paper, and cellulose equipment		153 construction materials equipment		154 road construction equipment		155 pumps and compressors		159 other equipment	
	X	M	X	M	X	M	X	M	X	M
1970	12	93	20	22	95	74	16	25	(•)	(•)
1975	21	160	63	73	141	232	26	131	147	918
1976	25	221	82	92	185	298	28	156	143	1,076
1977	27	256	118	88	224	149	33	163	194	1,054
Percent of 1977 to—										
Eastern Europe	38	9	39	55	85	63	60	53	(•)	(•)
Other Socialist	13	0	17	0	14	0	20	0	(•)	(•)
Western industrial	0	89	0	24	0	37	3	24	(•)	(•)
Other	49	2	44	21	1	0	17	23	(•)	(•)

Year	170 laboratory equipment		172 medical equipment		180 tractors and parts		181 agricultural equipment	
	X	M	X	M	X	M	X	M
1970	40	105	6	48	156	18	60	140
1975	63	191	9	86	252	18	176	338
1976	75	221	11	103	335	26	185	462
1977	71	256	13	119	415	n	197	540
Percent of 1977 to—								
Eastern Europe	79	67	68	73	78	n	77	98
Other Socialist	11	0	2	0	13	n	19	0
Western industrial	3	32	2	25	2	n	0	1
Other	7	1	28	2	7	n	4	1

TABLE 8.—U.S.S.R.: MACHINERY TRADE: COMPOSITION, ORIGIN, AND DESTINATION BY TYPE, 1970–77, SELECTED YEARS—Continued

Year	190 railroad equipment		191 trucks and parts		192 ships		193 aircraft		195 automobiles, motorcycles, and parts	
	X	M	X	M	X	M	X	M	X	M
1970	56	261	262	235	75	574	153	n	142	0
1975	152	473	448	703	97	1,087	303	n	475	122
1976	185	455	555	833	86	915	363	n	633	137
1977	198	471	661	765	107	918	365	n	719	157
Percent of 1977 to—										
Eastern Europe	90	92	45	67	66	60	53	n	72	64
Other Socialist	4	0	21	0	6	0	17	n	5	(•)
West Indies	4	0	0	5	10	40	0	n	13	(•)
Other	2	8	[1] 34	28	[1] 18	0	[1] 30	n	10	36

[1] Trade largely with developing economies.

[2] Large amount unspecified as to origin or destination.

TABLE 9.—U.S.S.R.: OUTPUT AND FOREIGN TRADE IN SPECIALTY FOODSTUFFS

[In thousands of metric tons unless otherwise noted]

M=imports
X=exports
MM=imports of product and equivalents
Q=output

Qst=state purchases from agriculture
S=output plus net imports
Val=value in million of rubles in current prices
[b] Foreign trade rubles of foodstuff converted to domestic rubles by coefficient 4.17

Year	Coffee M	Cocoa M	Spices M	Tea			Tobacco and EQ			Wine (10^6 decaliters)			Dried fruits	
				Qst	M	net M/S	Qst	net MM	net MM/S	Q	M	M/S	Q	M
1913	12.6	6	6.3	0	75.8	100%	n	−13	(•)%	n	1	(•)%	n	53
1931	1.2	4	0.4	n	20.7	(•)	n	−11	(•)	0	0	(•)	n	5
1950	1.2	12	3.1	85	5.7	4	157	30	16	24	0	0	38.9	6
1960	19.1	58	8.4	164	22.6	12	178	76	30	78	6	7	46.2	77
1965	30.9	89	11.8	197	36.3	11	217	125	36	134	12	8	57.3	85
1970	41.5	109	11.7	273	29.2	7	263	106	29	268	72	21	34.7	128
1971	43.0	148	11.3	280	42.6	10	254	121	32	280	77	22	36.2	130
1972	42.1	141	15.6	291	47.5	11	292	260	45	293	78	21	40.1	97
1973	32.0	127	11.6	305	37.3	8	305	137	31	207	67	25	43.9	80
1974	45.7	158	12.8	330	49.3	10	313	123	28	267	76	22	37.8	95
1975	60.2	169	12.3	352	66.9	12	296	137	32	297	85	22	45.2	118
1976	44.3	149	16.0	375	60.1	11	311	127	29	315	78	20	33.2	101
1977	44.6	82	13.1	434	59.8	8	n	131	(•)	309	64	17	NA	113

Year	Vegetables (without potatoes)		Canned vegetables (10⁶ standard cans)			Fruit and fruit products						
						Fresh fruit				Canned fruit		
						(10⁶ dom R [b])		Tropical		(compote 10⁶ cans)		Nuts
	Qst	M	Q	M	M/Q	Sales	M val	Qst	M	Q	M	M
1913	n	0.06	n	0	(●)	n	[49]	n	5	n	9	[26]
1931	n	.00	n	n	(●)	n	[1]	n	n	n	0	[1]
1950	2.0	.05	163	1	0	294	[5]	2.4	0	n	2	n
1960	5.1	.22	1,055	40	4	976	[181]	27.7	[120]	354	58	12
1965	7.7	.35	1,484	319	21	1,521	[291]	28.6	[192]	584	72	n
1970	10.9	.49	2,611	623	24	2,546	401	86.2	334	897	283	39
1971	11.5	.59	2,723	776	29	2,427	424	33.2	252	902	263	44
1972	11.2	.64	2,894	866	30	2,569	481	46.1	424	718	252	47
1973	14.1	.53	3,285	874	27	2,635	513	45.1	392	886	194	52
1974	14.7	.55	3,372	840	25	2,967	602	114.3	475	858	166	57
1975	13.9	.49	3,016	805	27	3,178	737	143.0	475	872	181	60
1976	16.0	.57	2,960	811	27	2,975	828	112.4	445	871	210	48
1977	16.3	.61	n	927	n	n	815	197.7	473	n	161	58

TABLE 10.—U.S.S.R.: OUTPUT AND FOREIGN TRADE IN MANUFACTURED CONSUMER GOODS

[Billions of rubles unless otherwise specified]

Year	Domestic retail sales			Sewn clothing			Knitted wear			Furniture		Rugs (10⁶m²)	
	Total	Foodstuffs	Non-foodstuffs	Retail sales	Imports [a] dom R	M/sales	Retail sales	Imports [a] dom R	M/sales	Retail sales	Imports [a] dom R	Q	M
1913	n	n	n	n	.01	(●)	n	.00	(●)	n	0.02	n	n
1931	n	n	n	n	.00	(●)	n	.00	(●)	n	.00	n	n
1950	36.0	21.0	15.9	3.0	.00	0%	.98	.00	0%	.22	.00	n	0.0
1960	78.6	42.8	35.8	8.1	.71	9		.28	(●)	1.59	.19	n	1.6
1965	104.7	60.5	44.3	8.7	.83	10	3.00	.34	11	2.15	.47	19.6	4.2
1970	155.2	86.2	69.0	14.4	1.48	10	6.87	.69	10	3.04	.60	30.3	5.2
1971	165.6	91.5	74.1	15.3	1.62	11	7.49	.72	10	3.30	.73	33.1	7.3
1972	176.4	96.5	79.9	15.9	1.68	11	7.85	.80	10	3.52	.76	35.9	8.7
1973	186.7	101.2	84.5	16.2	1.71	11	8.18	.85	10	3.77	.78	39.0	8.6
1974	196.6	106.5	90.0	17.1	1.91	11	8.55	1.01	12	4.05	.81	44.7	10.9
1975	210.4	112.7	97.7	18.3	2.33	13	9.08	1.11	12	4.37	1.03	47.5	11.8
1976	220.1	117.1	103.0	19.3	2.40	12	9.43	1.14	12	4.45	1.02	52.2	14.1
1977	230.0	120.6	108.4	20.1	2.64	13	10.13	1.21	12	4.79	1.05	[p]61.7	16.2

[a] Foreign trade rubles converted to domestic rubles by coefficient 3.4

(●) denotes imports

TABLE 10.—U.S.S.R.: OUTPUT AND FOREIGN TRADE IN MANUFACTURED CONSUMER GOODS—Continued

[Billions of rubles unless otherwise specified]

Year	Cotton cloth (10^6 meters length)				Woolen cloth (10^6 meters length)		Silk-type cloth (10^6 meters length)		Leather shoes (10^6 pairs)			Cosmetics 10^9 dom M	Medicine 10^9 dom M
	Q	X	M	net X/Q	M	M/Q	Q	M	Q	M	M/C		
1913	2,670	172	37	5.0%	6.0	6%	43	1	68	0.1	0%	7	9
1931	2,240	159	1	7.0	.4	0	n	0	100	0	0	0	4
1950	3,900	80	81	0	5.5	4	130	2	203	6.6	3	n	5
1960	6,390	195	143	1.0	26.5	8	810	61	419	39.0	7	8	80
1965	7,080	272	95	3.0	9.0	3	937	31	486	28.0	6	61	273
1970	7,480	307	155	2.0	12.0	2	1,241	82	679	60.0	8	190	565
1971	7,716	324	152	2.0	15.1	3	1,273	101	682	62.0	8	230	710
1972	7,680	306	168	4.0	16.6	3	1,348	130	647	60.0	8	275	815
1973	7,839	253	148	1.0	14.5	3	1,401	98	666	59.0	8	250	810
1974	7,857	172	146	.3	16.2	3	1,447	106	684	64.0	9	255	780
1975	7,810	248	181	1.0	19.1	3	1,517	156	698	68.0	9	410	985
1976	7,899	244	184	1.0	14.5	3	1,588	140	724	68.0	9	445	1,125
1977	7,935	234	190	1.0	13.6	2	1,637	143	734	79.0	10	540	936

Year	Sewing machines (thousands)				Bicycles (thousands)		Watches and Clocks (millions)		Cameras (thousands)	
	Q	X	M	net X/Q	Q	X	Q	X	Q	X
1913	[272]	0	20.1	(7)%	[5]	(20)	n	(0.4)	0	0
1931	501	0	0	0	[81]	(4)	n	0	23	0
1950	502	2.5	1.1	0	649	19	n	0	261	17
1960	3,096	18.5	314.8	(10)	2,783	196	26.0	4.0	1,764	76
1965	800	52.2	63.5	(2)	3,873	155	30.6	5.0	1,053	305
1970	1,400	117.3	63.1	4	4,443	510	40.2	11.0	2,045	621
1971	1,408	134.0	120.5	1	4,547	522	42.1	11.0	2,216	669
1972	1,439	134.2	127.0	1	4,631	499	44.1	12.0	2,384	698
1973	1,400	139.5	119.0	1	4,779	630	47.5	13.0	2,573	861
1974	1,366	114.7	45.0	5	4,831	788	50.6	16.0	2,600	945
1975	1,360	81.7	51.6	2	5,007	887	55.1	16.0	3,031	1,078
1976	1,358	100.9	66.4	3	5,072	945	57.9	18.0	3,245	1,016
1977	1,360	110.6	83.8	2	5,228	942	60.7	18.0	3,582	980

Year	Televisions (thousands)		Radios (thousands)		Pianos (thousands)		Motorcycles (thousands)	
	Q	X	Q	X	Retail sales	M	Retail sales	M
1913	0	0	n	0	n	n	n	2
1931	0	0	n	n	n	n	n	0
1950	12	0	1,072	8	n	n	n	3
1960	1,726	104	4,165	16	91	n	501	17
1965	3,595	86	5,160	364	155	n	690	70
1970	6,682	123	7,815	1,200	180	17.2	816	76
1971	5,817	140	8,794	1,200	175	19.2	901	87
1972	5,980	143	8,842	1,400	168	20.1	901	87
1973	6,271	222	8,615	1,300	179	19.9	936	88
1974	6,569	370	8,753	1,300	169	13.9	1,005	84
1975	6,960	508	8,376	1,500	165	13.9	1,033	85
1976	7,063	570	8,456	1,480	193	14.4	1,054	91
1977	7,069	508	8,652	1,300	n	14.6	n	84

Appendix

Sources of Data and Notes to Tables

General Note on Sources

Trade data are from Ministerstvo vneshnei torgovli SSSR, *Vneshniaia Torgovlia SSR za . . . g Statisticheskii Obzor*, (Moscow: Mezhdunarodyne otnosheniia, and statistika, various years); *Vneshniai torgovlia SSSR za 1918–1944 g.g.* (Moscow: Vneshtorgizdat, 1960); and *Vneshniai Torgovlia SSSR: statisticheskii sbornik, 1918–1966*, (Moscow Izdatel'stvo "Mezhdunarodnye otnosheniia", 1967). Output data are from Tsentral'noe statisticheskoe upravlenie SSSR, *Narodnoe khoziaistvo SSSR v 1970 g Statisticheskii ezhegodnik*, (Moscow: Izd. "Statistika", 1971) and also . . . *1975 g.*, . . . *1917–77 g.; SSSR v tsifrakh v 1977 godu, kratkii statisticheskii sbornik*, (Moscow: "Statistika", 1978); Warren Nutter, *The Growth of Industrial Production in the Soviet Union*, (Princeton, Princeton University Press, 1962); Douglas Diamond and Constance S. Krueger, "Recent Development in Output and Productivity in Soviet Agriculture", in *Soviet Economic Prospects for the Seventies*, (Washington, D.C.: U.S. Government Printing Office, 1973), pp. 337–339; and David Carey, "Soviet Agriculture: Recent Performance and Future Plans" in *Soviet Economy in New Perspective* (Washington, D.C.: U.S. Government Printing Office, 1976), pp. 575–599. All foreign trade data are converted to post-1961 rubles. Data for 1913 refer to Russia excluding Finland (for foreign trade) and to current Soviet boundaries (for output). Data for 1931 refer to pre-1939 borders. Volume and price indices of Soviet trade for 1913–1938 are from Michael R. Dohan, *Two Studies in Soviet Terms of Trade* (Bloomington: International Development Center of Indiana University, 1973). The specific commodity items and groups are identified by their "ETN" numbers of the USSR's Unified Commodity Classification of Foreign Trade (*Edinaia Tovarnaia Nomenklatura Vneshnei Torgovli*, 3rd ed. (Moscow: Vneshtorgizdat, 1971)). This classification is described in Paul Marer, *Soviet and East European Foreign Trade, 1946–1969: Statistical Compendium and Guide.* (Bloomington: Indiana University Press, 1972), pp. 309-322.

Notes to Table 1

Volume indices for 1938-1977 are from the above cited Soviet sources and are linked indices with fixed price weights: estimates for 1913, 1927, and 1931 are volume indices with 1937 price weights linked with Soviet data for 1938. The implicit price indices are calculated from the volume indices and value of trade and are "variable weighted". Estimates of Soviet GNP in 1970 factor costs for 1950–1975 are derived from GNP indices and estimates of ruble GNP in 1970 (factor cost) in Rush Greenslade, "The Real Gross National Product of the USSR, 1950–1975" in *Soviet Economy in New Perspective*, pp. 271, 284. Data for 1976 and 1977 are based on estimates provided by Douglas Whitehouse. Estimates of exports and imports in 1970 domestic prices are based on the volume indices and estimates of 1972 exports and imports recalculated in 1970 domestic prices used in SRI-WEFA model published by Donald Green, et al. "An Evaluation of the 10th Five-Year-Plan Using the SRI-WEFA Econometric Model of the Soviet Union" in *Soviet Economy in New Perspective*, p. 321. These are at best rough approximations especially since the composition of trade changes over time. See Michael Dohan. "Trade Specialization" for earlier estimates in 1959 prices. Trade participation ratios are exports (and imports) in 1970 domestic rubles (cols. 9 and 10) divided by USSR GNP in 1970 domestic prices.

Notes to Tables 2 and 3

General. Soviet export and import data are incomplete. Estimates of trade by commodity group presented here are based on a combination of Soviet data on group shares, and summation of two digit and/or three digit and/or five digit items with adjustment to make categories consistent over time. See Paul Marer, *op. cit.*, pp. 360–368. The items included in each commodity are listed by Soviet share estimates (SSE) or Edinaya Tovarnaia Nomenklatura (ETN), 1971. Significant changes in data availability are indicated by brackets.

Machinery. ETN 10–19 or "machiny, oborvdornie i transportnye sredstra." After 1970 minus ETN 113 cables and wire. *Fuel and Energy.* ETN 200, 201, 21,

22, 23001, 23101, or SSE "toplivo i electroenergiia." *Metals and Minerals.* Exports: SSE "rudy i kontsentraty, metally, i izdeliia . . ." plus SSE "nerudyne iskopaemye, gliny, zemli" in 1955–1967, ETN 250 x 2 for 1968–1974, and ETN 25 in 1975–1977 plus new ETN 113 after 1970. Probably does not include precious metals. Plus apatite concentrate, old ETN 34005 (new 25013) before 1971. Imports: SSE "rudy . . .". plus ETN 250 for 1950–1974, ETN 25 for 1975–1977. *Chemicals.* SSE "khimicheskie produkty, udobreniia, kauchuk" (excludes apatite concentrate and ore) minus old ETN 34005 before 1971. *Forest Products.* Timber, paper, pulp ETN 50. *Fibers.* ETN 51. Includes cotton, flax, silk, artificial fibers, wool, and intermediate products. *Other Agricultural Raw Materials.* Includes: furs, hides, skins, leather, seeds, vegetable oil for industrial purposes, bristles, etc. Sum of ETN 52, 530, 531, 55, 560, 562, 57, 590x, 591xx, 592xx. 1964 and 1965 are estimates. This series has various minor items added and dropped out over time. The years 1960–1966 are more inclusive. Does not include raw tobacco (ETN 54) which is included in "Other Foodstuffs". *Grain and Oilseed.* Exports: ETN 700 (grain) plus ETN 720 or ETN 72005 (sunflower seed) which were not listed in 1976 or 1977 (probably negligible). Imports: ETN 700 plus 720 minus peanuts, flaxseed, copra, coconuts, palm nuts, assumes unspecified items are oilseed (soya bean and sunflower seed). *Sugar.* Raw sugar (ETN 84002 before 1971, then ETN 72306) plus refined sugar ETN 84001. *Other Foodstuffs.* Includes tea, coffee, spices, exotic oilseed, tobacco, malt, meat, butter, milk, eggs, fish, fruit, vegetables, nuts, vegetable oil, wine, cigarettes, etc. All items in ETN 7 except those included in "grain and oilseed" and ETN 72306, raw sugar, plus items in ETN 8 except sugar (ETN 84001, 84002). Includes raw tobacco (old ETN 54) for pre-1971 years.

Cloth, Clothing, Haberdashery, and Shoes, Sum of 90, 900–904, 91, 92, and 93. *Small Consumer Appliances.* ETN 970, sewing machines, refrigerators, radios, televisions, watches, cameras, etc. *Other Manufactured Consumer Goods.* SSE "promyshlennye tovary narodnogo potreblenia" minus 1) cloth, clothing, haberdashery, and shoes, and 2) small consumer appliances. Includes tableware, furniture, cosmetics, soaps, medicines, musical instruments, books, sports goods, etc.

Notes to Table 4

General. Quality of "domestic item" and "trade item" assumed to be approximately identical. Output data for chromite ore, vanadium, magnesium, asbestos, and non-ferrous metals are for smelter output and are derived from Bureau of Mines data as cited in U.S. Department of Commerce, *Minerals Year-Book,* volumes I and III, various years, and U.S. Bureau of Mines data cited in *Commodity Yearbook, 1978.* These estimates tend to be low compared with C.I.A. estimates.

Coal and Equivalents (standard 7,000 kilocalorie units). XX in coal equivalents refers to direct exports plus coal embodied in exports of a) coke (201) converted to equivalents by "1.4", b) pig iron by "1.0", c) all other steel products by "2.0" (based on Gardner Clark, *The Economics of Soviet Steel* (Cambridge: Harvard University Press, 1965, pp. 114–115), and d) electricity assuming 1 billion kwh requires one-third million tons of coal. *Oil and Equivalents.* XX is crude oil (21) plus refined products (22) adjusted for 8 percent refining loss. *Iron Ore and Equivalents.* Net XX includes net exports of iron ore (24001) plus pig iron, scrap alloys, and semi-processed ferrous metals converted to ore equivalents by coefficient of 1.8 (based on Clark, *Economics of Soviet Steel, op. cit.,* pp. 114–115). Soviet machinery trade is not taken into account. *Manganese Ore and Equivalents.* Gross XX is manganese (tovarnii) ore ETN 24002 plus 3 times ferromanganese ETN 26101 (based on Clark, *Economics of Soviet Steel, op. cit.,* p. 105). *Chromite Ore.* Gross XX includes chromite ore ETN 24005 plus 2 times ferrochrome ETN 26103 based on relative chromium content of ferrochrome (78%) and chromite ore. *Vanadium.* Ferrovanadium ETN 26104 times .35 times plus vanadium slag ETN 26106 times .035. *Semiprocessed Ferrous Metals.* Q equal total rolled metals, X and M are ferrous rolled products and rolled steel ETN 264, 265, 267. *Pig Iron and Ferrous Metals.* Export (XX) of all iron metals ETN 26 compared with new pig iron metal (Q) from ore. *Nonferrous Metals.* Q estimates refer to new smelter output and are rough approximations. *Copper.* XX and MM include copper ingots ETN 27001 plus rolled copper ETN 27201, plus 88% of bronze 27002 and 27202, plus 70% of brass ETN 27203. *Zinc.* XX and MM include zinc ETN 27004 and 30% of brass. *Aluminum.* XX and MM include ingots ETN 27008, rolled aluminum ETN 27295. *Aluminum-Shabad* from Theodore Shabad, "Raw Material Problems

of the Soviet Aluminum Industry", *Soviet Economy in New Perspective*, pp. 661–676. *Bauxite and Aluminum Ores.* Output includes bauxite, nepheline, alunite and is based on Shabad, *op. cit.* One ton of bauxite 24001 is assumed to equal .4 tons of alumina ETN 24216. *Phosphate rock.* Q equals estimated output of phosphate rock converted to 18.7% P_2O_5 content. Estimated as sum of 1) phosphate fertilizers converted to phosphate rock equivalents allowing for a 16% loss of P_2O_5 content and 2) export of apatite concentrate expressed in terms of 18.7%. Apatite concentrate assumed to contain 39.4% P_2O_5. X equals apatite concentrate converted to 18.7% P_2O_5 plus minor ore exports. XX equals apatite concentrates in 18.7% P_2O_5 plus superphosphate and phosphate flour. *Phosphate Fertilizer.* Exports of superphosphate ETN 34005. Output of phosphate fertilizer and phosphate meal in standard units (18.7% P_2O_5). *Pesticides.* Identical to the Soviet "standard unit". *Synthetic Fiber.* XX and MM include fiber and yarn ETN 51302, 51402 and silk type cloth ETN 902. *Artificial Fiber.* XX and MM include fiber and yarn ETN 51301. *Commercial Timber.* Solid cubic meters, Q refers to "commercial timber hauled" (delovaia drevecina). X is round timber ETN 500. Net XX is round wood equivalents: 1) round timber ETN 500, 2) sawn timber and plywood ETN 501 and 502 multiplied by 1.55, 3) pulp ETN 505 multiplied by 5, and 4) paper and paperboard ETN 505–6 multiplied by 4. Conversion coefficients are approximate. *Pulp.* Q, X, M include "tselliuloza and drevesnaia massa". Net XX includes the pulp content embodied in paper ETN 506 and paperboard ETN 507 multiplied by 0.8.

Notes to Table 5

Grain. Output: Soviet data from *Nar. Khoz. SSSR.* Estimated barn crop from Douglas Diamond and Constance Krueger, *op. cit.*, pp. 316–339, data for 1973–1977 by adding 27 million tons allowance for seed to estimates of net output excluding seed. "Net output excluding seed" represents domestic output available for food, fodder, exports and reserves, for 1960–1975 from David W. Carey, *op. cit.* p. 587, extrapolated forward by reference to Soviet data from similar output, backward by barn crop times 8. "Extended grain exports" include grain ETN 70 and 1.18 times flour exports ETN 84001 (assumed an 85% extraction rate for flour). 1977 data from 1979 C.I.A. report. Agricultural year trade data for year beginning July 1: "USSR Agricultural Situation, Review of 1977 and Outlook for 1978", U.S. Department of Agriculture, Economics, Statistics, and Cooperative Services. *Cotton Fiber.* Ginned Cotton. XX and MM include cotton fiber ETN 51001, cotton thread ETN 5140104, and cotton cloth ETN 900. *Flax.* (scutched basis) XX includes fiber, combings, thread, and cloth ETN 51004, 005, 1301, and 903. Million meters of fabric equals 127 metric tons. *Hemp.* ETN 5107. *Wool.* Washed equivalent. XX and MM include wool fiber ETN 511, wool yarn ETN 5140105, and tops ETN 51401. *Butter.* Q refers to "factory production" which was much less than Q in 1913 and 1931. *Hides and Skins.* Cattle hides and calf skins. *Sunflower Seed.* XX is seed ETN 72005 plus sunflower seed oil ETN 84109 in seed equivalents (2.38). *Sugar.* Output is granulated sugar refined from domestic sugar beets. Raw sugar is converted to granulated sugar by .93. Consumption equals output plus net imports of sugar. *Oilseed Unreported Imports.* ETN 720 minus peanuts, copra, coconuts, flaxseed and palm. *Meat.* ETN 800. *Fish.* ETN 81 in millions of cans converted to tons by coefficient .004.

Notes to Table 6

General. Ratios are rough approximations. Domestic ruble value of imported equipment is assumed similar in value in foreign trade rubles. See footnote 30. No adjustment for changes in world prices over the period, some of which are offset by the change in official exchange rate of the rubles against depreciating currencies. Value of output in domestic rubles at official enterprise wholesale prices which were lowered slightly in 1967 and 1975. New version of existing models, however, are often introduced at higher prices not reflected in these indices. Machinery item identified by ETN number. *Installed Equipment.* In "constant 1969 prices". Series "Struktura kapital'nikh vlozhenii oborudovanie, instrument i inventor". Includes investment in inventory. Data for 1976 and 1977 adjusted to earlier series. *Metal Cutting Equipment.* Does not include substantial imports of such machinery included in ETN 104 lines of metal working equipment, ETN 105 equipment for enterprises in metal working industry. In 1977 imports in ETN 104 and 105 were 87.6 million ftR and 344.7 million ftR, exports in ETN 105 were 83 million ftR. *Steelmaking Furances and Rolling Mill*

Equipment. Excludes large exports of these items included in "equipment of factories for production of iron, steel, and rolled products" ETN 12390. *Tractors.* XX is complete tractors ETN 18001–93 plus "complete tractor equivalents" of tractor parts ETN 18091, 98 based on quaitity/value ratio for complete tractors assuming one tractor of parts for each unit value of tractors.

Notes to Table 7

Eastern Europe. Bulgaria, Hungary, German Democratic Republic, Poland, Romania, Czechoslovakia, Yugoslavia. *Western Industrial Economies.* Austria, Great Britain, Denmark, Italy, Canada, Netherlands, Norway, United States, West Germany, Finland, French, Switzerland, Sweden, Japan. *Other.* Total minus Eastern Europe and Western Industrial Economies. *Note.* The large unspecified component of trade (see Tables 2 and 3), and the large unspecified component of machinery trade in these years should alert the reader to be wary of such estimates.

Notes to Table 8

Categories are based on 3 digit ETN classification. *1977 Shares.* Based on sum of import and export of 3 digit category or items belonging to category as reported in *Vnesh. Torg. SSSR za 1977.* Same country groupings as in Table 7. ETN 159 "Equipment for other fields of industry" is an important catch-all category for which there is relatively little detailed data.

Notes to Table 9

Q-st denotes state purchases of agricultural products from state and collective farms. Sales denotes domestic retail sales in the state and cooperative network including public catering at current domestic prices. Collective farm market sales and purchases not included. Domestic data from *Nar. Khoz. SSSR.* The value of imported foodstuffs was adjusted to approximate levels of domestic retail prices by the coefficient 4.17. See footnote 5. Recent inflation in world prices may make this adjustment less accurate by the mid-1970's. Pricing in the CMEA traded products are more stable. *Tobacco and Equivalents.* Includes high-grade tobacco and makhorka. Net MM includes raw tobacco, and cigarettes converted to tobacco equivalents by 1 metric ton of tobacco per 1 million cigarettes. *Wine.* Bottle equals .07 decaliter. Includes bulk and bottled wine. *Canned Vegetables.* Not including canned tomatoes. *Fruit.* Presumably sales of fresh fruit. Imports of all fresh fruits, ETN 832. Excludes fruit-based products. Tropical fruit: domestic citrus fruit output, imports of pineapple, banana, and citrus fruits. *Canned Fruits.* ETN 83412, compote, excludes preserves.

Notes to Table 10

Domestic Rubles Sales. In state and cooperative network including public catering in current domestic prices. Value of imported consumer manufacturers were adjusted to approximate level of domestic retail prices by coefficient 3.44, see footnote 51.

THE RATE OF RETURN ON FOREIGN CAPITAL INFLOW TO THE SOVIET ECONOMY

(By Padma Desai*)

CONTENTS

I. INTRODUCTION

The recent growth in Soviet borrowing from the West, resulting in the rise of net Soviet debt to $16 billion by 1977, has raised the analytical question of considerable economic and political significance: how much are such credits worth to the Soviet Union? [1]

Several alternative approaches to answering this question are possible. Broadly speaking, they may be grouped into categories: (1) partial equilibrium; and (2) general equilibrium.

In the partial equilibrium analyses, we may include (i) the econometric investigation of whether foreign capital goods have greater productivity in Soviet industry and branches than domestic capital

*Research associate, Russian Research Center, Harvard University and Visiting Professor of Economics, Boston University.

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[1] The political relevance is immediately evident from the continuing debate in the United States about the leverage that the denial of such credits would have on possible Soviet liberalization of domestic dissent and on withdrawal of its direct and indirect military presence in Africa.

goods, the relevance of this to the problem at hand being established by the argument that foreign credits may be jointly supplied with the capital goods embodying advanced technology; and (ii) the noneconometric examinations of the role that foreign credits and technology can or do play in specific sectors (e.g., automobiles and oil).[2]

On the other hand, a partial equilibrium approach is not a satisfactory way to approach the question at hand. For the productivity of foreign credits can be defined meaningfully only in the context of the use of resources generally, requiring a general equilibrium approach.

In turn, a general equilibrium approach may be based on the incorporation of foreign credits into one of the "large" models, either of the computable planning type or of the econometric variety as represented by the SOVMOD exercise of Green and Higgins (1977), the productivity of foreign credits being estimated by the required variation in the levels of foreign borrowing therein. However, these "large" models tend to be rather cumbersome and the total effects of parametric variations are therefore extremely difficult to disentangle. "Small" models, by contrast, often have the advantage of both elegance and ease of interpretation, while not burying the essence of the economic system within a complex structure.

In this paper, where we have elaborated a general equilibrium model primarily of the Harrod-Domar variety, we have therefore avoided resort to large models and settled for a small, simple decision" model.[3] We have estimated the functional relationships postualted and calculated alternative rates of return on foreign capital inflow (of which foreign credits are a component) within it. The model is set out, its structure is justified, and the analytical methods to be used to calculate the rates of return on foreign capital inflow in it are spelled out in section II. In section III, we present the estimates of the model and the rates of return on capital inflow that emerges from them. Section IV offers some concluding observations, in light of our estimates.

II. The Model and Its Rationale

(*A*) *Underlying Rationale of the Model*

The model developed here is of the Harrod-Domar variety. Its key characteristic, as is well known, is that it is a "flow" model where savings define investment and hence the growth of the economy given the marginal capital-output ratio, in contrast to a typical "structural" model of the Fel'dman-Mahalanobis variety where the current investment allocation pattern defines the feasible savings in the future and hence the growth of the economy.[4]

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[2] The econometric analyses include those of Green and Jarsulic (1975) and Green and Levine (1976); incidentally, the Green-Levine analysis leads to extremely high estimates of the relatively superior productivity of foreign capital and the methodology for estimating such superiority needs further analytical and econometric examination. Among the noneconometric discussions focusing on the impact of technology transfer in particular industries or branches of industry are Hanson (1975, 1976, 1977) and Sutton (1973), to list only a few of the numerous such efforts.

[3] For a recent survey of models built for Soviet-type economies, see Shapiro (1977). In addition to the original SOVMOD volume by Green and Higgins (1977), the reader should refer to the penetrating review article of Portes (1978).

[4] The Harrod-Domar model is a "putty" model, whereas the Fel'dman-Mahalanobis model is a "putty-clay" model, in the categories of modern, optimal growth theory. The Fel'dman model is elegantly discussed in Domar (1957) and the Mahalanobis model in Chakravarty (1956).

The Harrod-Domar representation of the Soviet economy is not unusual. But the use of such a model for the problem at hand does imply that the constraint on the growth of the Soviet economy is provided by savings and that the returns to foreign capital inflow are determined by its direct addition to domestic investment, the latter being always equal to the sum of domestic savings and foreign capital inflow.

This view therefore ignores the possible role of foreign capital inflow in breaking a "foreign exchange" or "transformation" bottleneck to Soviet growth.[5] If foreign exchange is considered to be the constraint on Soviet growth, then clearly the estimates of rates of returns on foreign capital inflow in this paper should be considered to be "lower bound" estimates.[6]

On the other hand, it can be argued with some plausibility, that, for the Soviet Union at the present juncture, foreign capital inflow is a constraint not to growth of income but to a shift towards a greater availability of consumer goods, in total and in composition. For example, a steady inflow of feedgrain imports in the range of 10 million metric tons per annum in the period of the eighties, financed partly by credits and by gold sales, will certainly guarantee a sustained rise in the consumption of meat and dairy products by the Soviet population.[7] This argument of foreign capital inflow being a constraint on the growth and diversification of consumption levels is best illustrated by reference to the classical and idealized demonstration of the foreign exchange bottleneck for developing countries in figure 1.

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[5] The model, as stated below and as estimated in Section III, also ignores the other possible links between foreign capital inflow and the growth of the Soviet economy. (i) The Soviet savings function is estimated without specifying any adverse effect on domestic savings from the influx of the foreign savings represented by the foreign capital inflow. There is a considerable volume of statistical and analytical literature on this question for the less developed countries; see, for example, Weisskopf (1972). (ii) Any improvement in the Soviet production function that may result from the foreign capital inflow via resulting imports of more productive capital goods embodying technical change in the West or via some sort of diffusion of better techniques, in the broadest sense inclusive of management practices, which may follow from the "demonstration effect" of credit-financed activities of Western corporations in the Soviet Union, is also ignored.

In this context, note that Stanislaw Gomulka has argued recently that the impact of imported technology on aggregate productivity in the Soviet economy in the postwar period could not have been significant. For details, see Gomulka (1976, p. 552). At the same time, in some specific industry or branch of industry, the presumed impact on output of superior embodied technology in imported equipment can be substantial. Thus, "... in most of the more advanced branches of the chemical industry the role of imported machinery remains predominant. In 1973, 74 percent of Soviet complex fertilizer production, 50 percent of ammonia, 62 percent of urea and 84 percent of high-pressure polythelene output came from imported equipment [Luk'yanov (1974)]." Hanson (1976, p. 801).

At the same time, the speed and extent of diffusion of the technology embodied in imported equipment from the West seems to be slow and sporadic. Thus Hanson (1976, p. 798) has argued: "This is one of the fields of Soviet endeavor in which statements of intent abound but clear-cut examples of implementation are not easy to trace. Campbell refers to plans, whose execution does not seem to have been reported, to produce ten off-shore oil-drilling rigs for the Caspian, designed on the lines of an imported Dutch rig [Campbell, (1976), p. 19]. The present author has quoted references to what appears to be an imported complex granular fertilizer plant which came on stream in Vinnitsa in 1968; statements that this was a pilot plant to be followed shortly by two scaled-up (and apparently domestically-built) plants of the same type were made at the time. though the subsequent completion of these plants does not appear to have been reported [Hanson (1976), p. 81]." It also seems that whereas the Fiat-collaborated Tolyatti plant has succeeded in raising the quality and performance requirements of components and material for the Tolyatti complex, the problem remains of spreading the relatively advanced technology of the Tolyatti plant to other Soviet factories. For details, see Hanson (1976, p. 808). For a comprehensive documentation and in-depth analysis of the extent of diffusion in the Soviet economy, see Amman, Cooper and Davis (1977). For a discussion of the reasons for such diffusion to be low, see Hanson (1976).

[6] That the returns on/of foreign capital inflow, in a Harrod-Domar framework, would be higher with a foreign exchange constraint is obvious, but also demonstrated elegantly in Chenery and Bruno (1962).

[7] For details and methodological basis of this estimate, see Desai (1978). The argument in the text assumes of course that there is no wage-goods contraint on Soviet growth.

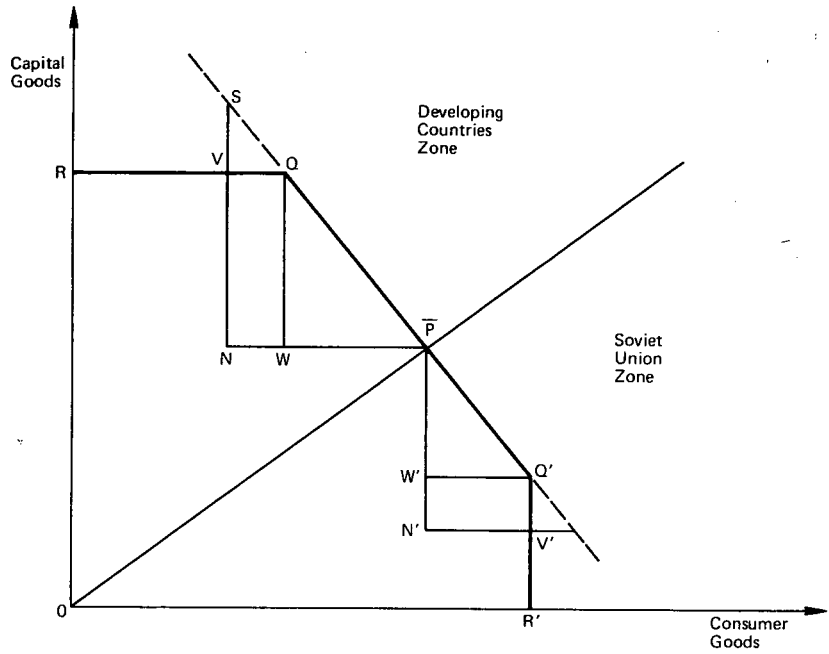

Figure 1.

Assume there that the economy, at the relevant point of time, has a production possibility vector, $\bar{P}$: i.e., resources cannot be transferred from one sector to another.[8] Let the two sectors be producing capital and consumer goods respectively, a la the standard two-sector model. For the developing countries traditionally, the argument of the developmental planners during the 1950's and 1960's was that a foreign exchange bottleneck existed for raising investment (i.e., availability of capital goods) and growth of income. For, starting from $\bar{P}$, the foreign offer curve facing them was $\bar{P}QR$ and if the developing countries could save more than $\bar{P}W$, say $\bar{P}N$, the incremental ex ante savings work NW would not yield any incremental imports of capital goods and hence there would be no increase in ex post investment. NW worth of consumer goods, saved by the developing countries, would only accrue to foreigners via terms of trade loss from $\bar{P}Q$ to $\bar{P}V$.[9]

The Soviet Union's present situation, on the other hand, may be idealized in this illustration by turning the dilemma on its head. With its objective of shifting availabilities in favor of consumer goods, the foreign exchange constraint for the Soviet Union would seem to imply a willingness, but not the ability (beyond $\bar{P}W'$ of capital goods), to

[8] That is, the "clay" assumption applies to all factors of production.

[9] The super-imposition of the foreign offer curve POR on the production point P is a technique due to Baldwin (1952). The stretch OR represents of course unitary foreign elasticity of demand for the developing countries' exports of consumer goods. Also see Findlay (1971).

transform capital goods [10] into consumer goods through foreign exchange earnings a la foreign offer curve $\overline{PQ'R'}$. The foreign exchange constraint of the Soviet Union, therefore, is indeed, as with the developing countries, on shifting the availabilities between investment and consumption through trade. However, in the case of the developing countries, this translated into a constraint on growth of income; in the case of the Soviet Union, it amounts rather to a constraint on the composition of the growing income. The validity of this contention needs to be analyzed at length; for the present, however, our calculations can be taken as defining at least a lower-bound estimate of returns on foreign capital inflow to the Soviet Union, during the period 1975–85.

(*B*) *The Model*

The model consists of the following equations, written in their estimating form. The actual data used for computing each equation, their sources, and limitations are discussed in the next section.

$$Y_t = Ae^{\lambda t}[\alpha K_t^{*-\rho} + (1-\alpha)L_t^{-\rho}]^{-1/\rho} \cdot e^{u_t} \tag{1}$$

where $A>0$, $0 \leq a \leq 1$ and $\rho > -1$. This is the aggregate *CES* production function for the Soviet economy, with Hicks-neutral technical change (at rate λ). Y_t to GNP, L_t is total employment in man-hours, K_t^* is the average capital stock (during year t), t is time in years and u_t is the error term.

$$S_t = I_t - F_t \tag{2}$$

This is the basic savings-investment identity where S_t is domestic saving, I_t is gross fixed investment and F_t is foreign saving, measured as the excess of Soviet imports over exports.

$$\begin{aligned} S_t &= B + sY_t + \epsilon_t \\ &= S_o + s(Y_t - Y_o) + \epsilon_t \end{aligned} \tag{3}$$

where $0 \leq s \leq 1$. This is the Keynesian-type savings function [11] for the Soviet economy and reflects, of course, the planners' decision on the rate of saving.

$$K_{t+1} = K_t + I_t - D_t \tag{4}$$

$$D_t = \delta K_t^* + \pi_t \tag{5}$$

where $0 \leq \delta \leq 1$

$$K_t^* = (K_t + K_{t+1})/2 \tag{6}$$

Equations (4) to (6) relate to the relationship between investment and capital accumulation. K_t is the capital stock at the beginning of

[10] The idealized treatment of the Soviet economy in figure 1 may appear unrealistic to the reader who knows that the Soviet Union exports mainly raw materials such as ores, timber, oil and gas, and chemicals such as potash and ammonia. This worry can be laid to rest by thinking of exports at the margin, as in fact we need to do here; and then it is readily seen that figure 1 is close enough to reality. Thus, recall that Soviet machinery exports are widely referred to in the Sovietological literature as "soft exports" whereas exports of raw materials beyond current levels appear infeasible owing to supply, rather than demand, difficulties. Recall also that a wage-goods constraint on Soviet growth is assumed not to exist.

[11] For alternative specifications and estimates of household savings functions for centrally planned economies, see Portes and Winter (1978).

the year t and K_{t+1}, that at the end of it. K_t^* is then defined by equation (6) as the simple average of the two, entering equation (1) as the average, effective capital stock. D_t refers to depreciation/retirement of capital, expressed as a proportion of the average capital stock in equation (5). Equation (4) will determine D_t given the observed values for $(K_{t+1}-K_t)$ and I_t.[12]

$$L_t=L_o\cdot e^{\lambda_L t} \tag{7}$$

Finally, the growth of employment is exogenously determined at rate λ_L.

The system stated above has seven equations. Given F_t and K_t exogenously at time t, it will determine the seven unknowns: Y_t, S_t, D_t, K_t, I_t, K_{t+1} and L_t. Besides, the system is recursive, determining the evolution of the economy, from initial conditions defined by F_o and K_o, as a function purely of the time-path of F_t.

To see this clearly, as also to simplify the numerical solutions later, it is convenient to define a new variable: $k_t=K^*_t/L_t$, the average, effective capital-labor ratio. Then from equations (1) to (3), we can write:

$$B+sAe^{\lambda t}[\alpha k_t^{-\rho}+(1-\alpha)]^{-1/\rho}\cdot L_t-I_t-F_t \tag{8}$$

whereas from equations (4) and (5), we obtain:

$$K_t^*=L_t\cdot k_t=(2/[2+\delta])\cdot K_t+(2/[2+\delta])\cdot I_t \tag{9}$$

Replacing I_t from equation (9) in equation (8), we then obtain:

$$B+sAL_t\cdot e^{\lambda t}[\alpha k_t^{-\rho}+(1-\alpha)]^{-1/\rho}=(2+\delta)L_t\cdot k_t-2K_t-F_t \tag{10}$$

Equation (10) clearly determines k_t [and hence, from equations (1) and (3), also Y_t and S_t] as a function only of K_t the capital stock at the beginning of the period t, L_t the labor supply (as given by equation (7)), and the exogenously-specified F_t, the foreign capital inflow. Once S_t and F_t are known, I_t is also determined from equation (2) and so we have also the capital stock at the end of the period. And therefore the system can be solved recursively into the future. In fact, from equation (6), we can write:

$$K_{t+1}=2\cdot K_t^*-K_t=2L_tk_t-K_t \tag{11}$$

and equations (10) and (11) serve as the reduced-form version of our system, with which we can peform the necessary calculations.

The calculation of returns on foreign capital inflow to the Soviet Union, in this framework, can then be attempted in the following

[12] Note that in equation (4), the addition to capital stock $(K_{t+1}-K_t)$ should actually be represented by the difference between activated capacity (and not investment) and retirements. There is also the additional problem of the lag between investment expenditures and activated capacities. Note that Soviet official sources do publish information on activated capacity (Vvod v deistvie osnovnykhfondov). However, a complex subsystem of investment and capital accumulation with the use of official estimates of activated capacity in equation (4) and also lags between investment and activated capacity did not give statistically meaningful estimates of the lag parameters nor an economically meaningful estimated of δ. We therefore decided to work with the simple relationship, stated in equations (4) to (6), between investment and capital accumulation.

manner. First, for alternative plausible time-paths of Soviet absorption of foreign capital inflow during 1978–85, we can estimate the incremental income[13] resulting from such inflows. Second, for these alternative, plausible profiles of foreign capital inflows, we can then estimate the "internal rate of return" represented by these incremental incomes in each of the years. We thus reduce the benefit vectors to single numbers that may be put against the cost of foreign resources to the Soviet Union.[14]

III. Estimating the Model and the Returns on Foreign Capital Inflow

(*A*) *Estimating the Model*

Our estimates of the equations of the model are as follows:

(1) THE PRODUCTION FUNCTION[15]

In estimating equation (1):

$$Y_t = Ae^{\lambda t}[\alpha K_t^{*-\rho} + (1-\alpha)L_t^{-\rho}]^{-1/\rho} \cdot e^{u_t},$$

we measured the variables as follows:

Y_t = Greenslade estimate of GNP in billion rubles (appendix table 1),

L_t = total employment in billion man-hours (appendix table 1),

K_t^* = average capital stock in billion rubles (appendix table 1),

t = time in years, $t = 0$ in 1950.

Note that the Greenslade estimate of Soviet GNP used by us includes weapons production. The Greenslade methodology consists in first estimating the GNP total for each year by sector of origin, that is, quantity indexes by sector of origin are weighted by factor cost value-added weights of 1970. This total estimate is then distributed to various end-use categories such as consumption, gross fixed investment, etc. The employment estimate in man-hours is by Feshbach and Rapawy and the capital stock data are from official Soviet sources. Note that the Soviet capital stock estimates refer to both productive and unproductive capital in Soviet classification and include livestock. They are gross of wear and tear and are stated to be in constant 1955 established (as opposed to factor cost) prices.

The equation was estimated, using the data for the period 1950–75, a log formulation and the TSP nonlinear estimation procedure. The results are presented in table I below.

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[13] Note that incremental income streams are those resulting from alternative flows of foreign capital inflow over and above those accruing from zero capital inflow.

[14] Since we are truncating the benefit stream (that is, incremental income stream) in 1985, the calculation of the internal rate of return will have to adjust the benefit stream by adding the value of the terminal equipment, attributable to the foreign inflow, left over at the end of 1985.

[15] The entire research effort of collecting the required data and estimating the production function was financed by the National Science Foundation Grant No. 77–07254.

TABLE I.—*Estimated parameters of the production function for the Soviet economy*

Parameter	Estimated value	Standard error of the estimate	t-values
A	0.7759	0.0095	81.2653
λ	.0173	.0046	3.7555
ρ	1.1828	.3137	3.7704
$1-\alpha$	.5396	.0513	10.5251
α	.4605	.0513	8.9826

NOTE.—The standard error of the regression (in logs) is 0.0155; the Durbin-Watson statistic and the (correlation-coefficient)^2 are 1.7830 and 0.9987 respectively.

The elasticity of substitution is therefore estimated as equal to 0.4583. The hypothesis that it is equal to 1 (that is, that $\rho=0$) is strongly rejected by a t-test (although of course that test can be justified only asymptotically here). So is the hypothesis of no technical change (that is, $\lambda=0$).

Evidently, the fit is remarkably good and yields a plausible, modest technical change of 1.7 percent for the economy and a low elasticity of substitution.[16] The graph of the "de-trended" values of $L_t=e^{\lambda t}L_t/Y_t$ and $K_t = e^{\lambda t}K_t/Y_t$, as recorded in table 2 in the appendix, then leads in figure 2 to the representative isoquant implied by the estimated production function. Note that the isoquant reveals substantial diminishing returns with increasing capital intensity in the Soviet economy—a phenomenon which will be evident from our estimates of the marginal product of capital in the simulation runs later on.

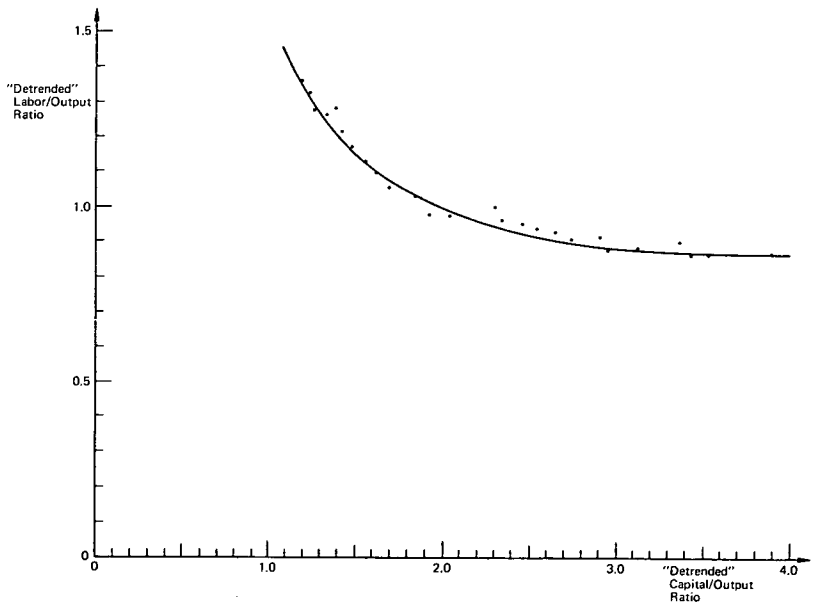

Figure 2. Production Isoquant for Soviet Economy, 1950-75.

[16] The low estimate of δ is consistent with estimates of δ in econometric studies of Soviet industry alone. See Weitzman (1970) and Desai (1976).

(2) ESTIMATE OF SAVINGS

We estimated savings from equation (2) : $S_t = I_t - F_t$ by using data on I, X and M where:

I_t = Greenslade estimate of gross fixed investment in billion rubles (appendix table 3),

X_t = total merchandise exports in 1970 prices in billion rubles (appendix table 3),

M_t = total merchandise imports in 1970 prices in billion rubles (appendix table 3),

$F_t = M_t - X_t$.

Note that the Greenslade estimate of gross fixed investment with 1970 equal to 100 includes new fixed investment and capital repairs. New fixed investment, in turn, consists of machinery and equipment (based on the "official machinery and equipment component of investment in constant prices),[17] construction, other outlays, and net addition to livestock. The merchandise export and import data, both from official trade sources, are on f.o.b. basis and are reported in foreign exchange rubles [18] with the conversion rate, up to and including 1971, being 1 ruble being equivalent to $1.1. The constant 1970 values of both exports and imports are derived by applying official quantity indexes with 1970 equal to 100 in each category to absolute levels of 1970 exports and imports. And finally, since the merchandise export data in official sources do not include sales of gold,[19] the estimated foreign capital inflow $(m_t - X_t)$ overstates its true magnitude.

(3) THE SAVINGS FUNCTION

With these calculated savings (presented in appendix table 3), we estimated equation (3) : $S_t = B + sY_t + \epsilon_t$ for the period 1955–75. An initial estimation showed a high degree of serial correlation in the residuals, so the equation was reestimated assuming $\epsilon_t = \rho' . \epsilon\ (t-1) + \eta_t$. The final results are tabulated in table II below:

TABLE II.—*Estimated parameters of the savings function for the Soviet economy*

Parameter	Estimated value	Standard error of the estimate	t-values
B	−21.5876	(2.5667)	(8.4106)
s	.3340	(.0088)	(38.1675)
ρ'	.3099	(.2126)	(1.4576)

NOTE.—The standard error of the regression is 2.0981; the Durbin-Watson statistic and the (correlation coefficient)^2 are 1.7995 and 0.9939 respectively.

The marginal propensity to save for the Soviet economy thus turns out to be 33 percent.

[17] Greenslade (1976, p. 298).

[18] Note that in Soviet practice, the export and import data are incorporated into national income statistics in terms of domestic rubles. For illuminating discussions of the range of problems arising from this, see Becker (1972, pp. 78–83). Treml, Gallik, Kostinsky, and Kruger (1972, ch. 7) and Holzman (1974). Our estimate of foreign resource inflow has to be in terms of foreign exchange rubles; on the other hand, for deriving an estimate of the component of imported equipment in total investment, we would need to convert imports of equipment (in foreign exchange rubles) into domestic rubles.

[19] Since the Soviet Union produces gold on a continuous basis (unlike India, where it is held as an unproductive asset) and occasionally sells it in foreign markets for financing imports from abroad, Soviet gold sales should technically be included in merchandise exports.

(4) INVESTMENT AND CAPITAL ACCUMULATION

Next, equation (4) : $K_{t+1}=K_t+I_t-D_t$, where

K_t=capital stock at the beginning of the year in billion rubles (appendix table 1),

D_t=retirements of capital stock during the year, in billion rubles,

was estimated with data of $(K_{t+1}-K_t)$ in appendix table 1 and on I_t in appendix table 2.

The data on K_t and K_{t+1} (appendix table 1) also enables us to estimate equation (6) : $K^*_t=(K_t+K_{t+1})^2$.

Finally, the estimated series of D_t from equation (4), when regressed on K^*_t, gave an estimate of equation (5) : $D_t=\delta K^*_t+\pi_t$. The estimated value of δ was 0.0482, with a standard error of 0.0025 and a t-value of 19.5623. [The standard error of the regression was 6.7147, the Durbin-Watson statistic was 2.2057 and the (correlation coefficient)^2 was 0.7182.] It seems that, on an average, about 5 percent of the Soviet capital stock is retired, giving an average life of the capital stock of 20 years.

The estimated system was used to produce a simulated run for the period 1950–75, with the exogenously specified values of (i) the 1950 capital stock, (ii) labor, L_t, in billion man-hours during 1950–75 (stated in appendix table 1) and the foreign capital inflow F_t during 1950–75 (stated in appendix table 2). The simulation tracked the actual values of Soviet output rather well,[20] increasing our confidence in the exercises to which we turn next.

(*B*) *Estimates of Productivity of Foreign Resource Inflow*

Given this estimated system, we simulated "runs" for the period 1976–85, using three alternative flows of foreign resources (F) at zero, 1 billion and 3 billion, in 1970 rubles, for each year during the 10-year period. The incremental values of Soviet output for each year, between the zero and 1 billion and between the zero and 3 billion inflow runs, then represent the corresponding "benefits" from the streams of 1 and 3 billion rubles worth of foreign inflow, respectively.[21] Before we utilize these benefit streams to obtain the "internal rate of return" numbers for the two levels/streams of foreign inflow, however, the following observations on the simulated runs are in order.

The principal dimensions of the three simulation runs are presented in tables III–V. Common to all the runs are the initial conditions—that is, the 1976, beginning-of-the-year capital stock—and the assumed growth of the labor force at rate 1.2 percent per annum, the only difference being in the assumed level of F.

Among the striking features of our predicted scenarios of tables III–V are:

(1) A steady deceleration in both the rates of growth of output and investment with output growth declining from 3.8 percent in 1977 to

[20] Whereas our estimated output values (presented in appendix table 4) exceed the actual outputs in later years, the excess is in the range of 2 to 9 percent.

[21] Calculating the returns on foreign capital inflow by reference to F_t at a historical-trend value, as distinct from F_t at zero, makes little difference to the estimates presented because of its low average value around 0.3 billion 1970 rubles annually. Besides, the trend is difficult to estimate with statistical significance because of wide annual fluctuations. The runs at F_t worth 1 and 3 1970 rubles seem realistic in view of the currently anticipated utilization of foreign resources by the Soviet Union.

about 3.4 percent in 1985 and investment decelerating to around 4 percent in 1985;[22]

(2) A steady decline in the marginal productivity of capital from about 6.6 percent in 1976 to 3.5 percent in 1985. Our depiction of the Soviet economy in terms of a CES production function with a low elasticity of substitution between capital and labor makes it a labor-shortage economy with low returns on capital; and

(3) A miniscule impact of varying foreign capital inflows on output and also investment since the foreign capital inflow has been and will remain an insignificant fraction of the size of the Soviet economy in terms of its output and investment.

TABLE III.—*Predicted outputs in the Soviet economy during 1976–85 with an annual foreign capital inflow of zero*

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	Output (Y_t) (billion rubles)	Growth rate of Y_t (percent)	Gross investment (I_t) (billion rubles)	Growth rate of I_t (percent)	Foreign capital inflow (F_t)	Marginal productivity of capital
1976	473.617	----------	130.720	----------	0	0.0658
1977	491.696	3.81	134.113	2.60	0	.0606
1978	509.978	3.72	139.398	3.94	0	.0560
1979	528.583	3.65	145.358	4.28	0	.0520
1980	547.558	3.59	151.616	4.31	0	.0484
1981	566.939	3.54	158.064	4.25	0	.0452
1982	586.751	3.49	164.673	4.18	0	.0423
1983	607.021	3.45	171.440	4.11	0	.0397
1984	627.772	3.42	178.369	4.04	0	.0373
1985	649.029	3.38	185.468	3.98	0	.0351

Notes;

1. The estimates of Y_t, ΔY_t, I, and the specified values of F_t are in terms of 1970 rubles.
2. Additional outputs, ΔY_t in tables IV and V are derived by subtracting the outputs Y_t in table III for each year from the corresponding output entries in tables IV and V.

TABLE IV.—*Predicted outputs in the Soviet economy during 1976–85 with an annual foreign capital inflow of 1,000,000,000 rubles*

Year	Output Y_t (billion rubles)	Growth rate of Y_t (percent)	Gross investment (I_t) (billion rubles)	Growth rate of I_t (percent)	Foreign capital inflow (F_t) (billion rubles)	Additional output from F_t (billion rubles)	Marginal productivity of capital
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1976	473.650	----------	131.732	----------	1.0	0.033	0.0658
1977	491.784	3.83	135.142	2.56	1.0	.088	.0604
1978	510.113	3.73	140.444	3.92	1.0	.135	.0558
1979	528.755	3.65	146.415	4.25	1.0	.172	.0518
1980	547.762	3.59	152.684	4.28	1.0	.204	.0481
1981	567.166	3.54	159.140	4.23	1.0	.277	.0449
1982	586.999	3.50	165.755	4.16	1.0	.248	.0420
1983	607.284	3.46	172.528	4.09	1.0	.263	.0394
1984	628.047	3.42	179.461	4.02	1.0	.275	.0370
1985	649.313	3.39	186.563	3.96	1.0	.284	.0348

Notes;

1. The estimates of Y_t, ΔY_t, I_t and the specified values of F_t are in terms of 1970 rubles.
2. Additional outpurs, ΔY_t in tables IV and V are derived by subtracting the outputs Y_t in table III for each year from the corresponding output entries in tables IV and V.

[22] Note that the official estimates of output and investment in the past four to five years also show a deceleration with the actual growth rates in each category being slightly higher. Indeed, such a deceleration of the Soviet economy in recent years, which is likely to continue in the near future, has been emphasized as its dominant characteristic.

TABLE V.—*Predicted outputs in the Soviet economy during 1976–85 with an annual foreign capital inflow of 3,000,000,000 rubles*

Year	Output Y_t (billion rubles)	Growth rate of Y_t (percent)	Gross investment (I_t) (billion rubles)	Growth rate of I_t (percent)	Foreign capital inflow (F_t) (billion rubles)	Additional output from F_t (billion rubles)	Marginal productivity of capital
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1976	473,715	----------	133.753	----------	3.0	0.098	0.0657
1977	491.961	3.85	137.201	2.58	3.0	.265	.0601
1978	510.381	3.74	142.533	3.89	3.0	.403	.0554
1979	529.098	3.67	148.530	4.21	3.0	.515	.0513
1980	548.164	3.60	154.818	4.23	3.0	.606	.0476
1981	567.618	3.55	161.291	4.18	3.0	.679	.0443
1982	587.488	3.50	167.919	4.11	3.0	.737	.0414
1983	607.803	3.46	174.701	4.04	3.0	.782	.0388
1984	628.590	3.42	181.643	3.97	3.0	.818	.0364
1985	649.874	3.39	188.750	3.91	3.0	.845	.0343

Notes:
1. The estimates of Y_t, ΔY_t, I_t and the specified values of F_t are in terms of 1970 rubles.
2. Additional outputs, ΔY_t in tables IV and V are derived by subtracting the outputs Y_t in table III for each year from the corresponding output entries in tables IV and V.

We may now turn to the calculations of the "internal rate of return," as an estimate of the returns on foreign capital inflow to the Soviet economy. For this purpose, we utilize the incremental income streams associated with the inflow streams of 1 and 3 billion 1970 rubles respectively. Note that in view of the finite time horizon of 10 years that is imposed on the benefit streams, we calculate and add to the benefit streams, the incremental capital stock as at the end of the period. In this way, we account for the income benefits beyond the 10-year period which are otherwise lost by the truncation of the time horizon to 10 years.

This procedure of calculating the "internal rate of return" of the stream of inflows of foreign capital inflows leads to the following estimates: 1.88 percent for the 1 billion stream and 0.8 percent for the 3 billion stream. Since the production function is characterized by substantial diminishing returns, these figures decline steadily over time with the length of the time horizon. Thus, for example, if we had calculated the "internal rate of return" with 1981, rather than 1985, as the terminal year, our procedure would have yielded the estimates of 4.41 percent corresponding to the 1 billion resource inflows and 1.68 percent corresponding to the 3 billion resource inflow.[23]

IV. CONCLUDING OBSERVATIONS

Our estimates of the returns on foreign capital inflows to the Soviet economy are therefore remarkably low compared to the market terms for credits that typically obtain in the private capital markets of the West. They suggest the following thoughts.

First, they may explain why the Soviet Union is keen to get softer terms and conditions.[24] While soft terms are better than hard terms,

[23] The detailed calculations are available from the author on request.

[24] For example, the specific type of industrial cooperation agreement which meets Soviet requirements is defined as follows: "Contracts involving large sums that extend over lengthy periods and which are signed with a firm or group of firms in the capitalist countries, usually on long term credit, for machines, equipment, development or con-

(Continued)

by definition, the Soviet keenness to get them may follow from the fact that hard, commercial terms may tend to result in counterproductive borrowing, given the low returns domestically.

Second, it may also explain the Soviet emphasis on getting associated technology rather than pure capital inflow.[25] Unless the importation of technology is at terms that capture for the sellers of technology the full returns to the Soviet Union from its utilization—which is quite improbable—the incremental benefits to Soviet income from such technological imports, financed with the capital inflows, would raise the net return from such "joint" capital-cum-technology inflows above the rates of return that we have calculated.

Third, and related to the preceding remarks, our results may also suggest that the Soviet Union is likely to be very particular about the areas in which foreign capital-cum-technology is available and accepted.[26] If the returns in terms of the growth of income from foreign resource inflow in general are not substantial, the net benefit would have to be substantial in terms of other objectives such as diversification of the economy toward specific consumer goods, or raw material extraction and processing for the commercial terms of such capital-cum-technology imports to be acceptable to the Soviet Union.

Statistical Appendix

Table 1.—*Production function data for the Soviet economy, 1950–75*

(1) Year	(2) Output Y_t (billions of 1970 rubles)	(3) Labor L_t (billion man-hours)	(4) Capital stock K_t (on Jan. 1) (billion rubles, 1955 prices)	(5) Average capital stock K_t^* (billion rubles, 1955 prices)
1950	114.944	155.781	130.7	137.7
1951	119.757	155.626	144.7	146.7
1952	127.242	156.476	148.8	155.9
1953	133.706	159.894	163.1	170.1
1954	141.191	168.156	177.1	184.1
1955	153.779	171.052	191.2	200.4
1956	165.346	174.294	209.7	220.6
1957	175.553	175.313	231.6	242.6
1958	187.461	178.815	253.6	264.1
1959	196.647	177.017	274.6	285.5
1960	203.791	176.533	296.5	316.8
1961	217.400	175.515	337.1	345.5
1962	225.225	178.259	354.0	375.5
1963	225.225	179.661	397.0	415.5
1964	245.638	184.765	434.0	452.5

See footnotes at end of table.

(Continued)

struction of a project—natural resource or industrial enterprises. Credits are reimbursed by the delivery of products turned out by the project." A. Belov, "Agreements on Large Scale Compensatory Projects with Firms in the Capitalist Countries," U.S.-U.S.S.R. Trade and Economic Council Journal, No. 3, 1976, pp. 48–51, cited in Smith (1976, pp. 779–780). The emphasis is clearly on long-term credits which can be repaid with outputs of the credit-financed project.

[25] In this context, note that the Soviet preference is for turnkey project agreements with the West where ". . . the Western partner is normally committed to provide a complete facility, including training, technical assistance in achieving targeted production goals and, in some instances, technology updates as well." Ibid., p. 770. In 1975, turnkey project agreements constituted 57 percent of the total. Ibid., p. 772.

[26] The Soviet emphasis on large scale turnkey-type projects is again geared to the achievement of specific objectives: "Among these, accelerated oil and gas production from Siberian deposits; major technological improvements in domestic production of special steels, computers, cars and trucks; and the achievement of a significant breakthrough in livestock production all will require substantial and continuing inputs of Western technology, equipment, management skills, and marketing capability. The turnkey approach, as developed in the Soviet context, is probably the most efficient of the industrial cooperation instruments for effectively importing these resources." Ibid., pp. 773–774.

TABLE 1.—*Production function data for the Soviet economy, 1950–75*—Continued

(1) Year	(2) Output Y_t (billions of 1970 rubles)	(3) Labor L_t (billion man-hours)	(4) Capital stock K_t (on Jan. 1) (billion rubles, 1955 prices)	(5) Average capital stock K_t^* (billion rubles, 1955 prices)
1965	260.608	191.038	471.0	494.5
1966	276.938	196.352	518.0	536.5
1967	289.867	200.031	555.0	574.5
1968	306.197	203.974	594.0	616.0
1969	315.383	207.017	638.0	661.0
1970	340.219	211.108	684.0	710.5
1971	353.488	216.088	737.0	768.0
1972	359.611	219.693	799.0	829.5
1973	386.829	222.718	860.0	893.5
1974	401.118	227.609	729.0	962.5
1975	410.644	230.338	998.0	1,038.0
1976			1,078.0	

Sources:

1. The estimates of output are from Greenslade (1976, p. 275).
2. The labor data are from Feshbach and Rapawy (1976, p. 138).
3. The capital stock estimates are from *Narkhoz* (1956–1975).

*Notes:*s

1. The Greenslade methodology of estimating Soviet GNP of column (2) consists in first estimating the GNP total for each year by sector of origin. The quantity indexes of each sector are weighted by factor cost value-added weights of 1970.
2. The methodology and limitations of the labor data are discussed at length in Feshbach and Rapawy (1976, pp. 130–138).
3. The capital stock data of col. (4) refers to the entire capital stock (i.e., productive plus nonproductive in Soviet classification) and includes livestock. The data is gross of wear and tear and is presumably at1955 established (as opposed to factor cost) prices.
4. Until the revision of the capital stock estimates in 1960, the data is scattered and is also exclusive of livestock. Therefore, the data between 1950–60 is built from information in various sources, among them Cohn (1970, p. 188).
5. The capital stock estimates were again revised in 1971 and stated for the subsequent years in 1968 prices. Therefore, the estimates for 1970–75 are derived in terms of 1955 prices by applying a conversion factor of 0.857 to the 1970–75 values in 1968 prices. The conversion factor is derived on the basis of the Jan. 1, 1971, estimate of 737 billion rubles in 1955 prices (*Narkhoz 1970*, p. 61) and of 860 billion rubles in 1968 prices (*Narkhoz 1975*, p. 58).
6. The estimates of K_t in col. (4) are as of Jan. 1 of the stated year. The estimates of K^*_t of col. (5) are simple averages of 2 consecutive years.

TABLE 2.—*Investment, savings, and foreign capital inflow data for the Soviet economy 1951–75*

[In billion 1970 rubles]

(1) Year	(2) Gross fixed investment I_t	(3) Imports M_t	(4) Exports X_t	(5) Foreign capital inflow F_t	(6) Savings S_t
1951	20.306	NA	NA	0	20.306
1952	19.755	NA	NA	0	19.755
1953	22.787	NA	NA	0	22.787
1954	24.717	NA	NA	0	24.717
1955	29.862	3.085	2.736	.348	29.513
1956	33.813	3.548	2.951	.597	33.216
1957	38.315	3.779	3.456	.323	37.990
1958	42.174	4.550	3.600	.950	41.224
1959	46.585	5.475	4.752	.723	45.862
1960	48.606	5.860	4.769	1.181	47.425
1961	54.395	5.938	5.184	.754	53.641
1962	55.957	6.555	6.048	.507	55.450
1963	50.260	7.017	6.263	.754	49.506
1964	62.572	7.326	6.480	.846	61.726
1965	67.810	7.711	7.200	−.511	67.299
1966	68.728	7.557	8.208	−.651	69.379
1967	71.117	8.251	8.928	−.677	71.794
1968	75.803	9.177	9.792	−.615	76.418
1969	81.041	9.794	10.871	−1.077	82.118
1970	91.883	10.565	11.520	−.955	92.838
1971	95.283	11.182	11.879	−.697	95.980
1972	98.590	13.110	12.240	.870	97.720
1973	107.044	14.961	13.968	.993	106.051
1974	114.027	15.531	15.782	−.251	114.278
1975	120.367	18.383	16.243	2.140	118.227

Sources:

1. The estimates of gross fixed investment of col. (2) are from Greenslade (1976, p. 275).
2. The estimates of imports and exports of col. (3) and (4) are from *Vneshnyaya Torgovlya SSSR* . . . (1966–1975).

Notes:

1. Estimates of gross fixed investment of col. (2) include disbursements on new fixed investment, capital repairs and net additions to livestock (Greenslade [1976, p. 275]). New Fixed investment in turn includes equipment purchases, construction (including assembly and installation) and other outlays such as surveys, plans and designs, technical documentation, etc. [Cohn, 1970 (p. 30)]. The machinery and equipment estimate is based on the "official machinery and equipment component of investment in constant prices." Greenslade (1976, p. 298).
2. The import and export estimates of cols. (3) and (4) are at 1970 prices, i.e., official quantity indexes with 1970=100 are applied to absolute levels of 1970 imports and exports.
3. Up to and including 1971, the ruble-dollar conversion rate for converting dollars values of exports and imports (at current prices) was 1 ruble=1.1 dollars. *Vneshnyaya Torgovlya* (1967, p. 13). For the later years, the conversion rate was decided upon by the State bank and fluctuated from year to year.
4. The foreign capital inflows F_t of col. (5) are derived by subtracting X_t from M_t whereas the savings estimates of col. (6) are the difference between I_t and F_t of each year.

TABLE 3.—*Values of "detrended" capital-output and labor-putput ratios for the Soviet economy, 1950–75*

(1) Year	(2) "Detrended" labor/output ratio	(3) "Detrended" capital/output ratio
1950	1.355	1.198
1951	1.322	1.246
1952	1.275	1.268
1953	1.259	1.340
1954	1.276	1.397
1955	1.213	1.421
1956	1.169	1.480
1957	1.127	1.560
1958	1.095	1.618
1959	1.052	1.696
1960	1.030	1.848
1961	.977	1.922
1962	.974	2.052
1963	.999	2.310
1964	.958	2.347
1965	.950	2.459
1966	.935	2.555
1967	.926	2.659
1968	.909	2.746
1969	.912	2.911
1970	.877	2.951
1971	.879	3.124
1972	.894	3.374
1973	.857	3.438
1974	.859	3.634
1975	.864	3.895

Notes:

1. For deriving the "detrended" labor/output ratio, we first "detrend" actual output, Y_t by $e^{\lambda t}$ (where $\lambda=0.0173$ from the estimated production function) and divide actual labor input L_t by $Y_t/e^{\lambda t}$. Similarly the "detrended" capital/output ratio is $K_t e^{\lambda t}/Y_t$.
2. The "detrended" labor/output and capital/output ratios of cols. (2) and (3) are used for plotting the production isoquant of figure (2).

TABLE 4.—*Actual and simulated output levels for the Soviet economy, 1951–75*

(1) Year	(2) Actual output (billions of 1970 rubles)	(3) Simulated output (billions of 1970 rubles)	(4) Excess of (3) over (2) (percent)
1951	119.757	118.714	−0.87
1952	127.242	122.866	−3.44
1953	133.706	128.026	−4.25
1954	141.191	135.794	−3.82
1955	153.779	142.851	−7.11
1956	165.346	151.301	−8.49
1957	175.553	159.924	−8.90
1958	187.461	170.835	−8.87
1959	196.647	180.102	−8.41
1960	203.791	190.472	−6.54
1961	217.400	200.786	−7.64
1962	225.225	213.932	−5.01
1963	225.225	226.653	.63
1964	245.638	243.012	−1.07
1965	260.608	261.361	.29
1966	276.938	279.635	.97
1967	289.867	296.838	2.40
1968	306.197	314.756	2.80
1969	315.383	331.956	5.25
1970	340.219	350.663	3.07
1971	353.488	370.963	4.94
1972	359.611	389.937	8.43
1973	386.829	408.361	5.57
1974	401.118	429 729	7.13
1975	410.644	448.123	9.13

Notes:

1. The actual outputs of col. (2) are from table 1, col. (2).
2. The simulated outputs are derived from the model stated in sec. III(A) assuming (i) capital stock K_t at the beginning of 1950, (ii) foreign capital inflow F, during 1951–75 stated in col. (5) of table 3 and (iii) labor in billion man-hours, L_t, stated in col. (3) of table 1.

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SOVIET EXPORTS TO THE INDUSTRIALIZED WEST: PERFORMANCE AND PROSPECTS

(By Hedija H. Kravalis, John P. Young, Ronald G. Oechsler, and Deborah A. Lamb*)

CONTENTS

TABLES

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APPENDIXES

I. BACKGROUND AND OBJECTIVES

Despite recent stagnation in Soviet imports from the West, Soviet needs for Western grain and technology remain significant, not only to bolster key areas of the economy but to provide the impetus for further growth in such important sectors as energy. Needs, however, are not the sole determinant of trade. Over the long term, a country's imports must be paid for by earnings from commodity exports, gold sales, arms sales, and earnings on invisible accounts.

During the first half of the seventies, the Soviet Union rapidly expanded its imports from Western countries, helping finance large portions of its purchases with heavy borrowing. At mid-decade, the amount of debt owed to the West appears to have become unacceptable to the Soviets themselves. In an effort to stem the growth in debt and to bring its trade with the West more closely into balance, the Soviet Union curtailed its growth in imports from the West. This policy was clearly effective in achieving its goal. Between 1972 and 1975, hard currency imports expanded at an average annual rate of 50 percent. This contrasts with a 4 percent average annual growth rate between 1975 and 1978. With exports posting moderate increases, hard currency trade deficits in each of the last 2 years have been $3 billion, or half the amount in 1975. Total net debt outstanding at yearend 1978 was about $11 billion, and so long as an import restraint policy is pursued, prospects for maintaining this level appear favorable in the near term.

Given the importance of grain and technology imports to the Soviet economy, had there been acceptable alternatives, import curtailment as a strategy for debt control would probably not have been mandated. A stronger hard currency export position would have made it unnecessary to curtail imports from the West, would have allowed expanded purchases in the future, and would facilitate amortization of the existing debt.

There are opportunities for the Soviet Union to expand hard currency income from shipping, tourism, gold sales, arms sales, and insurance. In the recent past, these together have accounted for about 25 percent of total hard currency earned annually, a share likely to continue and even expand somewhat in the future. Inevitably, however, Soviet hard currency earning capability will have to be based primarily on expanded merchandise exports through larger sales of raw materials, semiprocessed products, and finished manufactures. Looking only at merchandise trade, total hard currency imports between 1972 and 1978 were $63 billion, whereas hard currency exports for the period amounted to $44 billion.

Given the proposition that future levels of Soviet trade with the West will be constrained by Soviet export capabilities, we have undertaken an examination of the volume and composition of Soviet exports

to the Industrialized West [1] over the period 1973 to 1977.[2] By examining the degree to which Soviet export capability is indeed a limitation on trade, we aim to contribute to an assessment of future levels of trade between the Soviet Union and the West. In this study our objective is also to provide basic data which can be used by other researchers performing their own analyses.

II. Summary and Conclusions

To date, the Soviet Union has not been a significant exporter to the Industrialized West. Only 1.4 percent of the Industrial West's global imports were supplied by the U.S.S.R. in 1977. Although the share of Soviet exports destined for the West has increased somewhat in the 1970's, Communist countries still absorb the major portion of commodities exported by the Soviets. In 1977, Soviet exports to the Communist world were about 2½ times greater in value than exports to the Industrialized West.

The value of commodities imported by the Industrialized West from the U.S.S.R. did, however, increase markedly in the 1970's. Between 1972 and 1977, foreign exchange earned by the Soviets from exports to the Industrialized West increased 250 percent. Over the same period, Industrialized Western imports from the world registered a 155 percent gain. The more rapid growth in imports from the U.S.S.R. enabled the Soviets to slightly expand their penetration of Western markets from 1 percent in 1972 to 1.4 percent in 1977.

Much of the growth in dollar earnings from the Industrialized West was based on oil exports. Their value escalated 570 percent between 1972 and 1977, but a significant portion of the earnings gain came from the windfall profits associated with the 1973–74 world oil price increase. In view of the expected decline in the volume of Soviet oil available for export, combined with the assumption that price rises of the 1973–74 magnitude will not be repeated, future hard currency earnings growth is likely to be more dependent upon volume and price increases among the remaining commodities that comprise Soviet exports to the Industrial West.

An examination of the commodity profile of Soviet exports to the Industrialized West reveals that in recent years three-fourths of these exports have consisted of raw materials and fuels. Oil, wood, coal, gas, diamonds, cotton, and nonferrous metals have been leading hard currency earners. A moderate share of foreign exchange earnings has also been contributed by semiprocessed goods such as chemicals and iron and steel.

The Soviet Union's export performance has been weakest in the area of finished manufactures, which have earned a mere 4 percent of

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[1] The "Industrialized West" includes the following 15 countries: Austria, Belgium, Canada, Denmark, Federal Republic of Germany (FRG), France, Italy, Japan, Luxembourg, Netherlands, Norway, Sweden, Switzerland, the United Kingdom, the United States. Since Belgium and Luxembourg report as one, tables containing breakouts by Western country will have only 14 entries.

[2] This paper is the third of an ongoing study of Soviet-East European hard currency export potential. The initial paper on the subject, "An Analysis of Recent and Potential Soviet and East European Exports to 15 Industrialized Western Countries," by Allen J. Lenz and Hedija H. Kravalis, appeared in the 1977 Joint Economic Committee compendium of papers entitled "East European Economies Post-Helsinki." An unpublished update to that work was made available in mid-1978.

Soviet hard currency from the Industrialized West. Although finished manufactures have accounted for a rising source of hard currency in exports to the LDC's, on Western markets, they have been seriously hampered by what have become characteristic problems of style and quality; poor aftersales service and inadequate spare parts have further compounded the problem. Finished manufactured commodities that have achieved some success on Western markets include passenger cars, machine tools, tractors, and some instruments such as watches, clocks, and cameras.

For decades the Soviets have actively promoted exports of technically advanced products and licenses to developed Western countries. The Soviets frequently argue that their extensive R. & D. efforts have given them world leadership, or at least parity, in numerous technological areas with important commercial applications. It has been acknowledged that the Soviet Union has the largest number of scientific and engineering personnel of any country, and that the Soviets earmark a larger share of national product to R. & D. than other countries. In addition, the Soviets have claimed that one of every five registered inventions in the world are of Soviet origin.

After examining the record of Soviet export performance of technically advanced products, we found that these accounted for a very small proportion of finished manufactures; that, while increasing absolutely in dollar value, they are decreasing as a proportion of Soviet finished manufactures exports; and that they are low, relative to the seeming export potential afforded by the magnitude of the Soviet R. & D. effort. Many Western analysts agree, however, that there remains significant untapped potential for exports of Soviet advanced product and technologies to the West. Their future success in the area will be largely determined by their ability to correct the conditions that heretofore have kept these exports at very low levels. In the case of technically advanced products, the most serious problems are the same as those which affect Soviet exports of finished manufactures in general—quality, sales, service. Because advanced products, virtually by definition, require strict quality control and because close contact between supplier and purchaser is almost a sine qua non for product adaptability, problems hampering exports of finished manufactures in general will have proportionately greater effects on exports of technically advanced products. Our assessment is that the problems we have described are traceable to the basic features of the Soviet centrally planned economy and as such are not likely to be corrected easily. The result will probably be that Soviet supplier performance will continue to fall short of Western requirements. In light of this, and acknowledged Soviet R. & D. strengths, perhaps the greatest potential lies in exports of advanced technology through licensing, joint R. & D., industrial cooperation, and similar areas that would allow Western industrialists to tap into Soviet technical know-how. Soviet leaders have endorsed this in principle, but a traditional preference for commodity exports, combined with Soviet difficulty in accepting close contact and cooperation with Western firms, will hinder development of these mutually advantageous forms of exchange.

We conclude then that Soviet export strength, at least through the medium term, will remain in raw materials, energy products, and to an

increasing extent in semiprocessed goods. Among the most important questions concerning future Soviet hard currency earning capability will be the question of Soviet oil. The CIA maintains that Soviet oil production may have peaked last year, but if it did not, it will do so by the early 1980's. Clearly this would seriously erode the 40 percent of Soviet hard currency earned from the Industrialized West on the oil and oil products account. It is doubtful that gas, the currently fast-growing energy export, could make up for potential shortfalls in earnings from oil. Although gas deliveries are already charted through numerous gas-for-pipe deals, they probably will not earn enough hard currency to offset earnings losses from oil. Furthermore, the Soviets appear to be having some serious difficulties in the energy sector in general, and until these are resolved, they are less likely to be easily able to commit energy resources to foreign markets than they were when the energy balance was not as critical.

Hard currency earnings from other raw materials and from semiprocessed commodities will probably increase, and be buoyed if the 1980's bring recovery on the world commodity market. Diamonds, cotton, wood, aluminum, platinum, copper, and nickel are likely to remain important to hard currency proceeds. In the semiprocessed goods category, the Soviets will become significant exporters of petrochemicals, plastics, and fertilizers. During the 1970's, the Soviet chemical industry was boosted by an infusion of Western technology, which was to be paid for by future deliveries of chemicals. Many chemical exports generated by these compensation agreements will be coming on stream in the early 1980's, adding significantly to Soviet hard currency earning capability.

An analysis of compensation agreements and their impact on future Soviet export capability [3] indicates that these agreements, covering primarily coal, gas, wood, and chemicals, contributed about $830 million to the hard currency account in 1977. By 1980, this amount is expected to rise to $2 billion, and at an estimated $4 billion, compensation exports will comprise a major share of hard currency exports in 1985. But the analysis concludes that compensation exports, while adding a substantial layer to the export base, and sizably offsetting anticipated declines in earnings from oil exports, will probably not be large enough to prevent a slowdown in hard currency earning growth in the 1980's.

The implications of a slowdown in hard currency earning growth are several. The Soviets may continue their import restraint policy into the 1980's, in which case, overall growth in Soviet-Western trade will be limited. An important restraint policy, however, may be difficult to endorse as the economic pressures on the Soviet economy mount. Infusions of Western technology will probably be necessary both to maintain momentum in the economy as a whole and to provide impetus to several key sectors, energy being primary.

Siberian development will be essential to expansion of energy resources. If and when the Soviets agree to forge ahead with full-scale development in this area, they will have to turn to the West for necessary equipment and technology. Judging from the size of some of the projects that have been discussed, the Soviets may have to accept

[3] See Barclay, Dennis J., "U.S.S.R.: The Role of Compensation Agreements in Trade with the West," in this volume.

larger debt in the medium term. On the other hand, continued Western willingness to extend credits and willingness to take back product as payment for exported equipment and technology will also be key elements to the future of Soviet-Western trade. For the West, taking back energy and raw material resources will pose relatively fewer problems than accepting semi-processed and finished manufactured goods. To the extent, however, that the Soviets press Western firms to accept semi- and finished manufactured goods, the Soviets will restrict the volume of potential large scale exchanges, not only because of the quality problems in the products offered to the West, but also because these goods often run the risk of evoking Western import restriction measures.

Future expansion in Soviet-Western trade is likely to rest more on Western participation in development of the products which have a proven market in the West. It implies Western flexibility in extending credit and taking products back as payment. It also requires Soviet flexibility in allowing Western firms access to their Soviet counterparts, a larger role in production decisions, and acceptance of quality control mechanisms. Perhaps then the Soviet Union will expand its export base and minimize what we see to be the basic constraint to the future expansion of Soviet trade with the West.

III. Methodology and Limitations

A. Methodology

Our basic assumption is that growth in a country's export capabilities and adjustments in the types of commodities offered for export must normally occur in moderate stages. We hold that this also is true for the Soviet Union. Therefore, an examination of the composition and earnings history of recent exports can be used as a basis for estimating export performance in the medium term.[4]

In our analyses we use import data reported by 15 Industrialized Western [5] (IW) countries to the United Nations. This data is available at several levels of aggregation [6] and is used variously throughout this study depending upon the specific needs in each of the three sections.

Our research focuses first on identifying the Soviet Union's major exports, examining their recent growth pattern, and assessing their hard currency earning potential for the medium term. Where possible, we will examine recent production performance and assess the likelihood that the 5-year plan goals, where available, will be fulfilled. After assessing Soviet supply availabilities we then examine Western demand for the types of commodities that are strong Soviet exports. Factors affecting demand will be economic conditions in Western

[4] In this paper, near term is defined as 1980 and medium term as 1985.

[5] Henceforth often referred to as "IW."

[6] In the "SITC, Revised," there are 1312 basic items classified at the 4 or 5 digit level of detail, depending upon whether the 4 digit category is further subdivided. These items are summarized into 177 groups (3-digit SITC). The groups, in turn, are assembled into 56 divisions (2-digit SITC) and the divisions are finally aggregated into 10 sections (1 digit SITC). For a fuller treatment of this system, see "Standard International Trade Classification, Revised," United Nations Statistical Papers, Series M, No. 34, Statistical Office of the United Nations, New York, 1961.

countries, extent of import restriction measures, product quality, marketing strategy, and in some cases, the political relations between the U.S.S.R. and its Western trading partners.[7] Other factors that can bear directly on the level of export earnings are the overall degree of concentration of exports among commodities,[8] the concentration of products among raw materials, semiprocessed goods, and finished manufactures[9] and the extent to which future exports are charted through compensation arrangements.

Because many Soviet and Western analysts suggest that the Soviet Union possesses a large and untapped source of foreign exchange in products and licenses embodying advanced technology, we examine Soviet performance and prospects in this area. Our analysis is based largely on aggregations of the United Nations data to reflect two definitions of advanced technology. We have supported our research by contrasting Soviet exports of advanced products to the Industrialized Western countries with Soviet imports from the Industrialized West. For our assessment of Soviet strength in license exports, we used licensing and patent registration data, which has been derived from various Soviet and Western technical publications.

The final chapter of this paper describes Western import-protection systems and assesses their current and potential effect on exports from the Soviet Union. The analysis includes an identification of broad categories that are currently sensitive on world markets. Soviet export items falling within these categories are identified and their potential for encountering restriction measures is assessed. The data used in this section of the paper is also derived from our United Nations data bank.

B. Limitations

There are always significant limitations on the use of historical data in predicting future trends. Although the recent past may be a good indicator of the near term there are conditions which could alter trends suggested by past experience. In centrally planned economies a policy decision allocating products for export could be effective in changing the volume available for sale to hard currency markets; world supply and demand conditions could drastically affect prices for commodities and hence earnings levels; for the U.S.S.R., the political integration with Eastern Europe carries with it weighty economic obligations. Changes in any of these conditions, to cite just a few, could significantly affect trends in export performance whose perception is based heavily on trade data.

In addition to general problems concerning the use of historical data, the reader should be aware of the limitations specific to data in this study. Data used in this paper covers Soviet exports to 15 Indus-

[7] Concentration of sales in only a few of the 15 Western countries would tend to make export capabilities sensitive to economic conditions in those importing countries and conceivably could also make sales dependent upon political relations between the Soviet Union and those Western importers.

[8] From our data we are able to judge the extent to which Soviet exports are concentrated among commodities. Concentration of hard currency earning capability in only a few items makes overall hard currency earning capability sensitive to fluctuations in world demand and prices of those few commodities.

[9] Assuming constant supply, a high dependence of export earnings on raw materials would make earnings, as a result of price fluctuations, more susceptible to Western countries' economic conditions. On the other hand, raw materials are less likely than manufactured goods to encounter Western import restriction measures and quality, style, marketing, and servicing difficulties.

trialized Western countries. While these countries represent the major source of Soviet hard currency export earnings, there are additional markets from which the Soviets earn foreign exchange. These include OECD countries not covered in our IW sample, some OPEC countries, and several LDC's. We have concluded, however, that these additional markets are, by and large, limited sources of hard currency. Using the OECD as a proxy for the "developed West" and hence the preponderant source of Soviet hard currency earnings, we estimated the extent to which our data for 15 Industrialized Western countries provide coverage of Soviet hard currency export capability.[10] We did a similar comparison using data estimates of total hard currency exports of the U.S.S.R.[11] (see table 1).

TABLE 1.—COVERAGE OF SOVIET HARD CURRENCY EXPORTS USING DATA OF 15 INDUSTRIALIZED WESTERN IMPORTING COUNTRIES

[Dollar amounts in millions]

	1974	1975	1976	1977
Industrialized West 15	$6,739	$7,131	$8,773	$10,079
OECD [1]	6,929	7,346	9,032	10,322
Hard currency	7,470	7,835	9,721	11,666
Industrialized West as percent of OECD	97	97	97	98
Industrialized West as percent of hard currency	90	91	90	86

[1] Excludes OECD countries not trading in hard currency. These are Finland, Greece, Iceland, and Turkey.

As can be seen in table 1, using data reported by the 15 Industrialized Western countries provides virtually 90 percent coverage of estimated total Soviet hard currency exports. The additional OECD hard currency countries not covered by our data, plus OPEC and LDC countries, overall have not been significant sources of hard currency. Based on this information, we argue that the data used in this paper covers the great majority of Soviet hard currency exports. We further argue that LDC's are generally experiencing debt and trade-deficit problems of their own and, therefore, as a group, are not promising targets for exports that could develop surpluses of the magnitude needed to support a growing Soviet import bill. We conclude then that the hard currency trade deficits leading to the current level of Soviet debt have been generated largely on trade with the 15 Industrialized Western countries, that elimination of hard currency deficits will have to be achieved principally by expanding exports to these same 15 countries, and that therefore, our data are useful in assessing overall near-to-medium-term Soviet export patterns and hard currency earning capabilities.

Another limitation on our data is that all but 2 of the 15 countries in our sample, report their imports to the United Nations on a CIF basis (cost, insurance, freight).[12] Therefore, dollar values of imports from the U.S.S.R. cited in our tables, by and large include insurance and freight charges.

We were further limited by our data because of the unavailability of volume data in our data bank. Hence, our data provides no informa-

[10] OECD countries not included in our data are: Australia, Finland, Greece, Iceland, Ireland, Portugal, Spain, and Turkey.
[11] Total hard currency exports were estimated by Office of Economic Research, CIA.
[12] United States and Canada report their imports FOB (free on board).

tion on the volume trends in exports, which could be significant to an understanding of basic export capabilities. Where possible, we have tried to overcome our limitation by researching other sources for volume information.

We were also limited by the time lag in our data which, disaggregated to the level of detail presented in this paper, covers Soviet exports to 15 Industrialized Western countries only through yearend 1977. Similar 1978 data will not be available until the third quarter of 1979.[13] In making analysis of future Soviet hard currency export capabilities employing the technique used herein, there will inevitably be a lag of at least 6 months between the period covered by the data and its availability.

Finally, in the last two sections of this study (analysis of Soviet exports of technically advanced products and examination of Western import protection systems and their potential effect on Soviet exports), we were limited by the level of detail in the data available from the United Nations. In both cases, the analyses would have benefitted from more detailed breakdowns within the United Nations SITC framework.

Having established our analytical framework and its limitations, we now examine the commodity structure of Soviet exports to the Industrialized West, and assess their future growth potential.

IV. Analysis of Export Commodities [14]

A. Overview

From the data presented in tables 2, 3, and 4, we can make the following general observations about Soviet exports to the Industrialized West:

TABLE 2.—EXPORTS TO THE INDUSTRIALIZED WEST BY THE U.S.S.R., 1974–77

[Amounts in millions of U.S. dollars]

SITC	Description	1974		1975		1976		1977	
		Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent
0	Food and live animals	116	1.7	129	1.8	131	1.5	163	1.6
1	Beverages and tobacco	9	.1	13	.2	16	.2	19	.2
2	Crude materials, inedible	1,923	28.5	1,748	24.5	1,958	22.3	2,157	21.4
3	Mineral fuels	2,544	37.8	3,404	47.7	4,666	53.2	5,317	52.8
4	Animal and vegetable oils and fats	149	2.2	122	1.7	64	.7	34	.3
5	Chemicals	279	4.1	279	3.9	343	3.9	686	6.8
6	Manufactured goods classified by chief material	1,511	22.4	1,123	15.8	1,182	13.5	1,324	13.1
7	Machinery and transport equipment	133	2.0	229	3.2	294	3.4	252	2.5
8	Miscellaneous manufactured articles	47	.7	51	.7	62	.7	67	.7
9	Commodities not elsewhere classified	29	.4	32	.5	58	7	60	.6
	Total	6,739	100.0	7,131	100.0	8,773	100.0	10,079	100.0
0–4	Primary products	4,740	70.3	5,417	76.0	6,834	77.9	7,690	76.3
5–6	Intermediate goods	1,790	26.6	1,403	19.7	1,525	17.4	2,010	19.9
7–8	Manufactured goods	180	2.7	280	3.9	357	4.1	319	3.2

[13] This paper will be updated as soon as 1978 data are available. The update should be completed by December 1979, and can be obtained from the Office of East-West Policy and Planning, Bureau of East-West Trade, Industry and Trade Administration, U.S. Department of Commerce, Washington, D.C. 20230.

[14] The material in this chapter was prepared by Hedija Kravalis and Ronald Oechsler.

TABLE 3.—1977 TOP INDUSTRIALIZED WEST IMPORTS FROM THE U.S.S.R.

[Amounts in thousands of U.S. dollars]

SITC	Descriptor	1977 Rank	1977 value	Percent of total	Cumulative percent	1976 rank	1976 value	Percent of total	Cumulative percent	1975 value	Percent of total	Cumulative percent
	1977 TOP INDUSTRIALIZED WEST IMPORTS FROM U.S.S.R. (2-digit SITC)											
33	Petroleum and petroleum products	(1)	4,100,778	40.7		(1)	3,868,682	44.1		2,730,901	38.3	
24	Wood, lumber, cork	(2)	1,117,591	11.1		(2)	944,727	10.8		797,636	11.2	
66	Nonmetallic mineral manufacturers, n.e.s.	(3)	634,012	6.3		(3)	532,469	6.1		487,463	6.8	
51	Chemical elements and compounds	(4)	570,668	5.7		(8)	260,459	3.0		162,867	2.3	
26	Textile fibers, not manufactured into yarn, etc	(5)	512,243	5.1	68.8	(5)	427,383	4.9	68.8	357,384	5.0	63.6
68	Nonferrous metals	(6)	430,250	4.3		(6)	419,992	4.8		439,698	6.2	
32	Coal, coke, briquettes	(7)	403,050	4.0		(4)	438,619	5.0		452,723	6.3	
34	Gas, natural and manufactured	(8)	342,955	3.4		(9)	237,765	2.7		142,477	2.0	
28	Metalliferous ores and metal scrap	(9)	222,928	2.2		(7)	262,259	3.0		258,910	3.6	
73	Transport equipment	(10)	143,705	1.5	84.2	(10)	186,504	2.1	86.4	125,062	1.8	83.5
27	Crude fertilizers and minerals	(11)	130,698	1.3		(11)	158,495	1.8		232,270	3.3	
67	Iron and steel	(12)	94,140	.9		(13)	88,589	1.0		87,056	1.2	
21	Hides, skins, and furskins, undressed	(13)	77,175	.8		(12)	88,992	1.0		58,787	.8	
03	Fish and fish preparations	(14)	73,630	.7		(15)	65,780	.7		63,506	.9	
71	Machinery, other than electric	(15)	72,361	.7	88.6	(14)	84,987	1.0	91.9	78,482	1.1	90.8
	Top 15 total		8,931,184				8,065,702			6,475,222		
	Total exports to Industrialized West		10,079,290				8,773,153			7,131,446		
	Top 15 as percent of total exports to Industrialized West		88.6				91.9			90.8		
	1977 TOP 50 INDUSTRIALIZED WEST IMPORTS FROM U.S.S.R. (4-5 digit SITC)											
33101	Crude petroleum	(1)	1,839,572	18.3		(1)	1,434,479	16.4		585,736	8.2	
3323	Distillate fuels	(2)	1,171,900	11.6		(2)	1,120,363	12.8		878,881	12.3	
6672	Diamonds, nonindustrial	(3)	621,865	6.2		(3)	521,978	5.9		481,512	6.8	
24221	Sawlogs and veneer logs, conifer	(4)	509,494	5.1		(7)	404,455	4.6		392,224	5.5	
24321	Lumber, sawn lengthwise, conifer	(5)	497,465	4.9	46.0	(4)	460,224	5.2	44.9	314,255	4.4	37.2
3324	Residual fuel oils	(6)	497,077	4.9		(5)	450,139	5.1		510,675	7.2	
2631	Raw cotton	(7)	485,740	4.8		(8)	408,804	4.6		339,992	4.8	
5151	Radioactive chemical elements	(8)	461,206	4.6		(12)	164,006	1.9		60,717	.9	
3214	Coal (anthracite, bituminous)	(9)	388,400	3.9		(6)	424,358	4.8		438,200	6.1	
3411	Natural gas	(10)	342,955	3.4	67.6	(10)	237,765	2.7	64.1	142,477	2.0	58.1
3321	Gasoline	(11)	327,359	3.2		(9)	356,679	4.1		364,461	5.1	
68121	Platinum	(12)	180,640	1.8		(11)	186,764	2.1		200,940	2.8	

TABLE 3.—1977 TOP INDUSTRIALIZED WEST IMPORTS FROM THE U.S.S.R.—Continued

[Amounts in thousands of U.S. dollars]

SITC	Descriptor	1977 Rank	1977 value	Percent of total	Cumulative percent	1976 rank	1976 value	Percent of total	Cumulative percent	1975 value	Percent of total	Cumulative percent
	1977 TOP 50 INDUSTRIALIZED WEST IMPORTS FROM U.S.S.R. (4–5 digit SITC)—Continued											
33291	Nonlubricating oils, n.e.s	(13)	138, 449	1.4		(13)	117, 137	1.3		49, 941	.7	
6841	Aluminum and aluminum alloys, unwrought	(14)	131, 479	1.3		(16)	84, 176	1.0		63, 990	.9	
7321	Passenger motor cars	(15)	121, 125	1.2	76.5	(14)	108, 416	1.2	73.8	76, 239	1.1	68.7
2421	Pulpwood	(16)	95, 633	.9		(21)	67, 411	.8		75, 019	1.1	
2120	Fur skins, undressed	(17)	74, 469	.7		(17)	84, 066	1.0		55, 971	.8	
2813	Iron ore and concentrates	(18)	67, 026	.7		(19)	75, 919	.9		83, 822	1.2	
3322	Kerosene, illuminating oil, jet fuel	(19)	64, 356	.6		(28)	45, 543	.5		24, 724	.3	
2764	Asbestos, crude, washed, or ground	(20)	64, 322	.6	80.2	(26)	60, 433	.7	77.6	49, 917	.7	72.8
2820	Iron and steel scrap	(21)	62, 431	.6		(24)	58, 799	.7		54, 320	.8	
2713	Natural phosphates	(22)	50, 759	.5		(18)	82, 053	.9		158, 204	2.2	
5613	Potassic fertilizers	(23)	49, 903	.5		(26)	46, 113	.5		77, 398	1.1	
6831	Nickel and nickel alloys, unwrought	(24)	45, 118	.4		(27)	45, 767	.5		52, 287	.7	
28404	Aluminum waste and scrap	(25)	44, 200	.4	82.7	(38)	22, 384	.3	80.5	8, 733	.1	77.7
68212	Refined copper (including remelted)	(26)	44, 057	.4		(20)	68, 292	.8		56, 066	.8	
01189	Meat and edible offals, n.e.s	(27)	38, 113	.4		(34)	23, 441	.3		15, 361	.2	
33102	Petroleum, partly refined	(28)	37, 990	.4		(30)	32, 575	.4		39, 470	.6	
28391	Chromium ores and concentrates	(29)	36, 187	.4		(15)	90, 696	1.0		97, 043	1.4	
63121	Plywood and veneered panels	(30)	34, 839	.3	84.6	(36)	22, 920	.3	83.2	22, 869	.3	80.9
4216	Sunflower seed oil	(31)	31, 127	.3		(25)	53, 616	.6		116, 747	1.6	
03201	Fish, prepared/preserved (including caviar)	(32)	30, 368	.3		(32)	23, 667	.3		17, 544	.2	
25172	Sulphate wood pulp, bleached	(33)	28, 643	.3		(49)	12, 040	.1		1, 330	0	
6575	Carpets, carpeting and rugs	(34)	28, 486	.3		(31)	25, 163	.3		18, 274	.3	
7151	Machine tools for working metals	(35)	27, 391	.3	86.0	(29)	35, 924	.4	84.9	32, 436	.5	83.5
5214	Oils and products of coal tar distillation	(36)	23, 350	.2		(83)	4, 867	.1		5, 419	.1	
6715	Ferro-alloys, n.e.s	(37)	23, 107	.2		(35)	23, 307	.3		30, 452	.4	
67271	Iron/steel coils for rerolling	(38)	22, 568	.2		(46)	14, 527	.2		6, 749	.1	
0311	Fish, fresh, chilled, frozen	(39)	19, 662	.2		(39)	21, 985	.3		17, 496	.2	
03202	Crustacea and mollusks, prepared/preserved	(40)	18, 756	.2	87.1	(44)	16, 722	.2	85.9	23, 970	.3	84.7
6895	Base metals, n.e.s	(41)	18, 420	.2		(33)	23, 501	.3		38, 741	.5	
6712	Pig iron (including cast iron)	(42)	17, 663	.2		(37)	22, 681	.3		31, 183	.4	
6130	Fur skins, tanned or dressed	(43)	17, 148	.2		(42)	18, 325	.2		14, 757	.2	
51212	Hydrocarbons, n.e.s	(44)	16, 709	.2		(41)	18, 980	.2		31, 731	.4	
7353	Ships and boats, other than warships	(45)	16, 656	.2	87.9	(22)	65, 384	.7	87.6	36, 346	.5	86.9
6413	Kraft paper and kraft paperboard	(46)	16, 173	.2		(43)	17, 794	.2		9, 663	.1	
63183	Hoopwood, chipwood, split poles, piles	(47)	15, 244	.2		(48)	13, 015	.1		8, 890	.1	

89601	Paintings, drawings, done by hand	(48)	14,993	.1		(87)	4,539	.1		2,589	0					
5812	Poly-ethylene, -styrene, -vinyl, etc	(49)	14,813	.1		(52)	9,768	.1		3,558	0					
7125	Tractors	(50)	12,521	.1	88.7	(40)	19,893	.2	88.3	16,902	.2	87.4				
	Top 50 total		8,937,927				7,746,853			6,236,221						
	Total exports to Industrialized West		10,079,290				8,773,153			7,131,446						
	Top 50 as percent of total exports to Industrialized West		88.7				88.3			87.4						

[1] Standard International Trade Classification System, Rev. 1.

Source: United Nations.

TABLE 4.—MAJOR 977 SOVIET EXPORTS TO THE INDUSTRIALIZED WEST AND PERCENT SHARES IMPORTED BY EACH WESTERN COUNTRY

SITC	Export group	1977 rank	Dollar value (thousands)	Percent shares taken by Industrialized Western countries													
				Austria	Belgium-Luxembourg	Canada	Denmark	Federal Republic of Germany	France	Italy	Japan	Netherlands	Norway	Sweden	Switzerland	United Kingdom	United States
	TOP 15 COMMODITY GROUPS EXPORTED IN 1977																
33	Petroleum and petroleum products	1	4,100,788	4.7	3.9	0.5	5.2	13.7	11.5	21.6	1.9	5.8	2.1	8.3	7.7	11.7	1.6
24	Wood, lumber, cork	2	1,117,591	.4	3.7		1.0	8.3	7.0	7.7	48.2	4.0		2.2	(1)	17.6	
66	Nonmetallic mineral manufactures	3	634,012	.1	15.3	.1	(1)	4.3	(1)	.1	2.6	5.9	(1)	(1)	2.2	65.3	4.0
51	Chemical elements and compounds	4	570,668	.3	.3	(1)	.4	39.0	39.4	5.3	3.1	2.9	.8	5.9	.7	1.3	.6
26	Textile fibers, not yarn	5	512,243	2.9	2.8	(1)		13.9	21.9	7.9	37.8	2.2	(1)	.1	.7	9.8	(1)
68	Nonferrous metals	6	430,250	1.9	1.5	(1)		16.2	9.1	4.1	43.8	4.3	.1	1.0	1.3	2.6	14.0
32	Coal, coke, briquettes	7	403,050	13.0	2.8			1.5	15.6	13.2	41.1	3.2	(1)	6.8	.1	2.6	(1)
34	Gas, natural and manufactured	8	342,955	43.7	.3				3.9	52.0		.1					
28	Metalliferrous ores and scrap	9	222,928	16.1				10.3	3.2	23.7	21.6	1.8	1.3	2.7		3.5	15.8
73	Transport equipment	10	148,705	11.1	13.8	.6	4.9	16.6	13.2	2.0	4.2	8.4	3.6	4.1	.8	16.7	.1
27	Crude fertilizers and minerals	11	130,698	3.7	6.4		1.3	33.1	8.8	6.8	18.4	2.1	5.1	10.0	1.9	.1	2.5
67	Iron and steel	12	94,140	9.9	7.0		3.3	21.3	1.0	21.0	.4	1.3	(1)	8.1	.1	26.4	.1
21	Hides, skins, furskins, undressed	13	77,175	.8	.2	1.7	.3	26.0	4.8	5.2	8.0	1.5	.2	2.0		38.5	10.8
03	Fish and fish preparations	14	73,630	.4	5.4	(1)	2.8	9.1	25.7	5.4	22.6	6.6	4.0	1.5	2.6	13.0	.8
71	Machinery, other than electric	15	72,361	3.7	2.8	15.1	1.3	8.0	16.6	17.7	8.8	1.5	2.5	6.3	1.3	10.9	3.5

See footnotes at end of table.

TABLE 4.—MAJOR 1977 SOVIET EXPORTS TO THE INDUSTRIALIZED WEST AND PERCENT SHARES IMPORTED BY EACH WESTERN COUNTRY—Continued

SITC	Export group	1977 rank	Dollar value (thousands)	Percent shares taken by industrialized Western countries: Austria	Belgium-Luxembourg	Canada	Denmark	Federal Republic of Germany	France	Italy	Japan	Netherlands	Norway	Sweden	Switzerland	United Kingdom	United States
	TOP 25 ITEMS EXPORTED IN 1977																
33101	Crude petroleum	1	1,839,572	10.1	5.0	1.2	7.0	-------	15.0	40.0	0.3	0.6	2.9	1.9	0.5	14.9	0.4
3323	Distillate fuels	2	1,117,900	.1	2.5	-------	51.1	31.3	12.0	2.9	(1)	6.4	-------	9.7	23.3	6.5	6.3
6672	Diamonds, nonindustrial	3	621,865	-------	15.6	-------	-------	3.9	-------	-------	2.6	6.0	-------	-------	2.1	66.2	3.5
24221	Sawlogs and veneerlogs, conifer	4	509,494	.6	(1)	-------	-------	.2	-------	.4	96.3	-------	-------	2.4	-------	-------	-------
24321	Lumber, sawn lengtjwise, conifer	5	497,465	(1)	7.1	-------	2.3	18.1	12.3	10.5	2.1	8.5	-------	.1	(1)	38.9	-------
3324	Residual fuel oils	6	497,077	-------	4.5	-------	3.5	7.7	6.8	14.2	13.7	.5	1.4	35.5	1.9	1.8	8.5
2631	Raw cotton	7	485,740	2.8	2.4	-------	-------	14.1	22.8	7.6	39.3	2.0	-------	.1	.7	8.3	-------
5151	Radioactive chemical elements	8	461,206	-------	(1)	(1)	-------	42.3	46.9	4.4	-------	-------	-------	6.3	(1)	-------	-------
3214	Coal	9	388,400	11.5	2.9	-------	-------	1.3	15.8	13.0	42.6	3.3	-------	7.0	-------	2.5	-------
3411	Natural gas	10	342,955	43.7	.3	-------	-------	-------	3.9	52.0	0.1	-------	-------	-------	-------	-------	-------
3321	Gasoline	11	327,359	1.0	4.2	-------	.9	.5	6.1	13.1	-------	44.1	.3	1.4	6.6	21.9	-------
68121	Platinum	12	180,640	-------	-------	-------	-------	15.7	2.3	.3	51.9	.3	-------	(1)	2.3	1.9	25.3
33291	Nonlubricating oils, N E S	13	138,449	-------	-------	-------	-------	100.0	-------	-------	-------	-------	-------	-------	-------	-------	-------
6841	Aluminum and aluminum alloys	14	131,479	.9	2.7	-------	-------	3.8	18.2	4.1	64.7	1.3	-------	(1)	-------	4.3	-------
7321	Passenger motor cars	15	121,125	4.2	16.8	(1)	5.4	19.7	13.9	1.9	-------	10.1	4.1	4.2	.8	18.8	(1)
2421	Pulpwood	16	95,633	(1)	5.1	-------	-------	(1)	18.1	27.6	34.9	2.4	-------	11.9	-------	-------	-------
2120	Fur skins, undressed	17	74,469	.8	.2	1.7	.3	26.7	4.9	3.6	8.3	.7	.2	2.0	-------	39.8	10.8
2813	Iron ore and concentrates	18	67,026	18.4	-------	-------	-------	3.6	-------	30.5	25.5	5.7	3.0	-------	-------	11.6	1.7
3322	Kerosene, illum Oil, jet fuel	19	64,356	-------	-------	-------	2.7	19.4	-------	2.0	-------	6.9	35.9	15.8	-------	17.4	-------
2764	Asbestos, crude, washed or ground	20	64,322	5.6	7.3	-------	-------	19.1	17.3	7.5	35.0	1.4	.2	(1)	3.6	-------	2.9
2820	Iron and steel scrap	21	62,431	.4	-------	-------	-------	16.0	(1)	50.1	32.0	-------	-------	1.5	-------	-------	-------
2713	Natural phosphates	22	57,759	.7	5.1	-------	1.2	54.6	-------	-------	-------	2.9	12.0	23.5	-------	-------	-------
5613	Potassic fertilizers	23	49,903	-------	27.1	-------	-------	(1)	4.3	10.2	34.1	7.3	3.6	4.5	-------	6.9	2.0
6831	Nickel and nickel alloys	24	45,118	.3	1.4	-------	-------	26.4	16.9	4.0	-------	-------	-------	-------	-------	-------	-------
28404	Aluminum waste and scrap	25	44,200	-------	42.5	-------	-------	-------	-------	.5	-------	.4	-------	-------	-------	-------	56.7
	Total exports to Industrialized Western countries		10,079,290	5.1	4.0	.4	2.5	18.4	11.5	14.3	14.1	4.3	1.2	4.9	3.6	13.5	2.3
	Total imports from Industrialized Western countries		11,412,224	2.4	2.4	3.0	.6	24.4	13.1	10.8	16.9	1.8	.7	2.3	2.1	5.3	14.2

(1) Small amount rounding to zero.

At $10 billion, the 1977 value of Soviet exports to the Industrialized West was 15 percent greater than in 1976. Discounting the sluggish export performance in 1975, the 1977 growth in earnings was the slowest registered in several years.

For the first time in recent years, Soviet earnings from exports of oil and oil products rose more slowly in 1977 than did total exports to the Industrialized West. Oil and oil products gained 6 percent over 1976 values while total exports to the Industrialized West expanded 15 percent.

Soviet exports to the Industrialized West continued to be concentrated in primary products and intermediate goods. In 1977, 96 percent of earnings from exports to the Industrialized West came from commodities classified as primary or intermediate products.

1977 hard currency earnings from exports of finished manufactures declined from 1976 levels both in dollar value and in share of total earnings from the Industrialized West. The 3 percent share of earnings contributed by finished manufactures was lower in 1977 than any year since 1974. The single finished manufactures item showing dollar gains in 1977 was passenger cars.

Looking at the structure of Soviet exports at the commodity level reveals a very high concentration of export earnings among a relatively few products. The top 50 commodities displayed in table 3 accounted for nearly 90 percent of total Soviet export earnings from the Industrialized West in 1977.

Among the traditionally strong hard currency earning products, all but coal showed increased earnings in 1977.

Exports of chemicals and natural gas were among the most rapidly rising sources of hard currency in 1977.

In 1977 the largest market for Soviet exports continued to be the Federal Republic of Germany. Other major Western importers of Soviet products were Italy, Japan, the United Kingdom, and France.

The following section provides an analysis of performance and prospects for earnings from exports in the following commodity groups: energy (primarily oil, gas, coal), wood, diamonds, cotton, nonferrous metals, and metalliferous ores and scrap. In addition, an examination of chemicals is included because they represent a rapidly growing source of foreign exchange. Finally, we present an appraisal of Soviet performance in finished manufactured exports.

B. Energy Products

Since 1974, Soviet energy exports have together earned more hard currency than any other group of products (table 2, SITC 3). Most of the earnings have come from exports of oil and oil products, but coal exports have also generated a notable amount of foreign exchange. To date, exports of natural gas have not been significant if viewed in the overall energy export product mix, contributing less than 4 percent annually to total hard currency earnings on the energy account. This balance, however, is likely to change as exports of natural gas climb and those of coal and oil decrease. Following is an analysis of the three energy products—oil, coal, gas—and their future prospects as hard currency generators.

Petroleum and petroleum products (SITC 33) together have been by far the strongest hard currency earning commodities in recent years. In 1973, earnings from oil and oil products contributed 24 percent to total hard currency earned from the Industrialized West; by 1976 this share had risen to 44 percent. In 1977, because of a slowdown in earnings growth, the oil and oil products contribution lost some ground, but still accounted for a significant 41 percent of foreign exchange earned from the Industrialized West. Furthermore, nearly 20 percent of the 1977 rise in total hard currency earned from the IW countries was accounted for by the increase in the oil and oil products group.

Production in 1977 was about 5 percent greater than in 1976, but somewhat short of the 1977 target. The volume of exports allocated to the West increased only slightly, but price rises enabled earnings to rise by 6 percent for the petroleum and petroleum products group as a whole. The conservation measures, cutbacks in domestic allocation and probable drawing down of stockpiles that made possible the very large growth in oil exports in 1976, could not sustain a similar expansion in 1977.

Although 1978 data are not available at the time of this writing, reports indicate that oil production grew by another 5 percent, but that exports to the West remained virtually stagnant. Therefore, repeating the 1977 scenario, any increase in hard currency earnings for 1978 would have to result from price rises rather than from larger volume deliveries.

Prospects for future hard currency earnings from oil and oil products do not appear good. As the CIA predicted,[15] growth in oil production has indeed slowed. Furthermore, production can be expected to peak no later than the early 1980's. The implications from the CIA assessment are that exports can be expected to decline, perhaps as early as this year. Therefore, for the immediate future, it appears that any gains in hard currency earnings on the oil export account will have to be generated by price increases, which, based on current experience will prove highly favorable to the Soviets in both 1979 and 1980. The CIA further suggests that once Soviet production peaks, it will rapidly decline in which case, the Soviet Union's oil export position will erode quickly.

If Soviet oil production does not follow the pattern suggested by the CIA, and, as some expect,[16] continues to expand, then Soviet hard currency earning capability will benefit from volume and price increases well into the 1980's.

Production and export performance in the next few years will probably shed evidence on the future of Soviet oil and because of the overall importance of these products in the Soviet hard currency export profile, will also determine in large measure, Soviet hard currency earning capability through the 1980's.

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[15] "Prospects for Soviet Oil Production," Central Intelligence Agency, Publication No. ER77–10270, April 1977 and "Prospects for Soviet Oil Production, A Supplemental Analysis," Central Intelligence Agency, Publication No. ER 77–10425, July 1977.

[16] Jermol, Mitja M. and Magnusson, L. A. "Soviet Preparations for Major Boost of Oil Exports," Petro Studies Co., Malno, Sweden, August 1978. It should be noted, however, that by and large, Western analysts of Soviet oil production agree that production will decline. Differences of opinion which do exist center primarily on the timing of the production falloff.

Continuing the rapid rate of growth seen in recent years, 1977 gas exports (SITC 34) to Western countries increased about 35 to 40 percent in volume over 1976 levels. Price increases enabled earnings to rise by 44 percent, gaining the Soviet Union nearly $343 million in foreign exchange from the Industrialized Western countries. The main Western importers were Italy and Austria.

Although gas export growth is the bright spot in Soviet energy exports to hard currency destinations, it still accounted for less than 4 percent of total foreign exchange earned from the IW countries. Furthermore, gas earnings were only 6 percent of total energy-based hard currency earnings in 1977. This represents some increase over previous years when the percentage ran at about 3 to 4 percent.

Over the last 20 years the share of natural gas in the Soviet energy balance has been continually increasing.[17] During the seventies, the share of production allocated for export has also been on the rise, with Eastern Europe receiving the larger share of exports. By 1976, however, the Eastern countries' share had declined to just over one-half of the total exported as the Western countries' share rose.

Gas exports will continue to increase through the current plan period, as deliveries from the numerous gas-for-pipe deals negotiated with Western countries earlier in the decade come onstream. By 1980 the Soviets are expected to at least double the 12.4 billion cubic meters exported to Western countries in 1976. Combined with price increases, 1980 earnings from gas exports could top $1 billion. These earnings will come primarily from countries that have concluded compensation arrangements involving gas. Among them are Italy, Austria, France, and West Germany.

If the Soviets encounter difficulties in fulfilling their charted deliveries, they will probably be the result of transportation bottlenecks and inadequate infrastructure. As of last year, the principal source of increments to Soviet gas production has been the Tyumen region, which includes the large Urengoy field. Reserves in that area are known to be huge, but there are persistent reports of inadequate rail and river transport, inadequate housing and insufficient technology, particularly in automation and control systems. Added to these difficulties are problems with inter-ministry coordination, labor shortages and ever-rising costs associated with moving northward for increased production. Despite these difficulties, the gas industry has met and at times exceeded its planned targets, and there is optimism that the 1980 production goal of 435 billion cubic meters will be achieved.

Looking beyond 1980, continued price rises and assured markets based on compensation arrangements will net the Soviet Union even larger earnings than the $1 billion-plus for 1980.[18] However, these are not likely to offset the anticipated decline in earnings from oil exports. Oil and oil products currently account for over three-fourths of earnings on the energy account, whereas gas accounts for only 6 percent. If and when oil exports decline, growth in gas exports would have to be very rapid to sustain hard currency earnings from energy.

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[17] For an in-depth treatment of the Soviet gas industry, see "U.S.S.R.: Development of the Gas Industry," Central Intelligence Agency, Publication No. ER 78-10393, July 1978.

[18] Recent events in Iran apparently will have some impact on Soviet gas exports to the West. Some of the future gas to be exported by the Soviets was to have originated in Iran. In the wake of the revolution, current deliveries to the U.S.S.R. have been decreased and future shipments remain uncertain.

One possible answer to the hard currency question would be the finalization of some huge LNG projects currently in the negotiating phase. Two such projects are the Yakutsk and the North Star. Both involve the United States and/or West European, Japanese partners. The West would develop the areas and be repaid with deliveries of LNG. The projects have been on and off the drawing boards for some time and it is unlikely that they will be finalized in the very near future. Even if they were to be contracted soon, exports could not begin until the latter part of the 1980's. However, if these deals are negotiated, exports generated by them would be large enough to significantly alter the Soviet energy export profile by 1990.

In recent years, coal exports (SITC 32) have accounted for an average 5 percent of total hard currency proceeds from exports to the Industrialized West. From a 1975 peak earnings level of $450 million, earnings from coal deliveries have been declining, first to $439 million in 1976 and then down again to $403 million in 1977. Their percentage share of total hard currency earnings also declined from 6 percent in 1975 to just under 4 percent in 1977.

The Soviet Union's major markets for coal have been Japan, France, and Italy. In 1977, lower imports by all three contributed to the drop-off in total coal earnings from the Industrialized West. Japan, which alone has been importing on the average of 40 percent of Soviet coal exports to the Industrialized West, has attempted to cut back on its coal orders. This is part of the Japanese strategy to lower imports from all its major suppliers, as the steel industry continues to lag and demand for metallurgical coal remains slack.

Lower Western demand for Soviet coal may only be part of the reason for the dropoff in 1977 earnings. Production in that year increased only marginally over the 1976 level, implying possible constraints on the Soviet supply side. The supply situation should improve somewhat this year with the opening of additional mines in Ekibastuz. But while this is expected to add somewhat to Soviet production capacity, it will have no effect on the volume of coal offered for export on hard currency markets, since the quality of the coal is by and large poor, making it suitable only for domestic use. On balance, the Soviet coal industry's production growth pattern can be characterized as slow, and in recent years, frequently falling short of plan. At least part of the difficulties have stemmed from the need to source increments to production capacity in Siberia, where development costs are higher and transportation more difficult.

In the near term, hard currency earnings on coal cannot be expected to expand significantly, partly because of slow production growth and partly on account of lagging Western demand. This may improve in the early 1980's as deliveries to Japan come onstream from the joint Soviet-Japanese coal development project in South Yakutsk. The project, financed with Japanese loans of $540 million, calls for development of the South Yakutsk coal basin, with repayment in deliveries of more than 100 million tons of coal over the 20-year period, 1979–98. The bulk of the shipments, however, are not scheduled to begin until at least 1983, at which time hard currency earnings from coal will expand.

Looking further into the future, the very large deposits of the Kansk-Achinsk basin, which will probably go into full production

around 1990, will add a significant increment to Soviet coal production capacity. It is difficult to determine what, if any, effect Kansk-Achinsk output will have on Soviet coal export capacity, since domestic demand by that time may be so high as to absorb all the added production.

Sketching a profile of near- to medium-term Soviet hard currency exports, energy products, which have thus far accounted for nearly one-half of Soviet hard currency earnings, are likely to figure somewhat less importantly in the export commodity structure. This conclusion rests on the assessment that petroleum and coal are not expected to generate increases in hard currency earning capability; in fact, earnings on the petroleum account may even decline. The key to future earnings from energy exports are rapidly expanding gas deliveries. Hard currency earnings from gas exports, however, are not likely to be large enough to offset the anticipated decline in earnings from oil, while earnings from coal, if they do expand, will do so only marginally.

C. Wood and Wood Products

The second largest product group (at the two digit SITC level of disaggregation) exported by the Soviet Union in recent years has been wood and wood products (SITC 24). All but a small portion of these exports consist of softwoods, by far the most plentiful species found in the U.S.S.R. The major export items in this product group are sawlogs and veener logs (SITC 24221) and lumber sawn lengthwise (SITC 24321). The remaining wood product exported by the U.S.S.R. for hard currency is pulpwood (SITC 2421).

Hard currency earnings from exports of wood products in 1977 topped $1.1 billion, an 18-percent increase over 1976. These exports accounted for a significant 11 percent of total hard currency earnings from the Industrialized West.

Most of the increase in 1977 earnings on the wood and wood products account came from a 25-percent rise in the value of sawlog shipments to Japan, the principal Western market for this Soviet export commodity. These exports are charted by a 5-year compensation arrangement signed in 1974, which called for Soviet imports of $500 million in logging equipment and plants financed by deliveries of logs to Japan. Owing largely to higher 1977 prices, the value of Soviet log exports to Japan increased by $100 million over those of 1976.

In contrast, exports of lumber grew by only 8 percent in 1977. Once again, this reflects increases in Western prices, since the volume of lumber exported to the West actually declined by 16 percent in 1977.[19] As in prior years, the United Kingdom was the largest Western buyer of Soviet lumber, absorbing nearly 40 percent of total Soviet lumber exported to the Industrialized West in 1977.

Prospects for growth in hard currency earnings from wood and wood products over the near term are only moderately favorable. The U.S.S.R. forestry industry is currently undergoing a major restructuring program, whose goal is to shift production from the already overlogged forests of European Russia to the timber-rich forest lands of Siberia and the Far East. Progress in this enormous undertaking, however, has tended to be slow, in part due to the need to build up an

[19] Vneshnaya Torgovlya, 1977.

entire production infrastructure in remote, previously undeveloped areas. Progress has also been hindered by the low priority of the timber industry in the allocation of investment resources and by cutbacks in hard currency purchases of forestry machinery and equipment anticipated at the outset of the current 5-year plan. In addition, difficulties in mastering complex sawmill and timber handling equipment at the Ust-Ilimsk and Bratsk[20] complexes have led to frequent disruptions in production.

Owing to these factors, the volume of wood and wood products exported to the Industralized West is likely to be constrained on the supply side. Earnings will be sustained through the current plan period partly by exports generated under the 1974 compensation agreement with Japan and partly by constant West European demand. Any increases in earnings are likely to be generated largely by price rises.

The outlook for wood exports might improve if the U.S.S.R. is able to conclude additional compensation arrangements with industrialized countries, particularly Japan. At present, however, the Japanese have not indicated an interest in obtaining large additional wood imports from the Soviet Union. This reflects an apparent downward revision of lumber requirements, possibly necessitated by sluggish domestic economic conditions.

D. Diamonds

Nonmetallic mineral manufactures (SITC 66), of which 98 percent are nonindustrial diamonds (SITC 6672), was the third ranking hard currency earner in 1977, maintaining its relative importance among major hard currency earning commodities (in recent years, only oil/oil products and wood have earned more hard currency from deliveries to IW markets). Based largely on price rises, earnings from diamond exports posted a 19 percent increase in 1977, and at $622 million, accounted for more than 6 percent of total hard currency earned from the Industrialized Western countries in that year. Major importing countries were the United Kingdom and Belgium, which together have absorbed over 80 percent of Soviet diamond offerings in recent years.

Soviet diamond sales consist mainly of rough stones. De Beers handles Soviet rough stone exports through its London-based Central Selling Organization (CSO). The CSO guarantees fixed prices to producers even if the market price is soft. By controlling the volume available to the diamond cutting market, de Beers is able to maintain world prices. With its huge cash reserves, the CSO can stockpile diamonds when demand is weak, and release them, often at higher prices, when demand recovers. Such was the case in 1977, when strong demand enabled a price increase of 15 percent at the beginning of the year and another 17 percent increase in December. Therefore, so long as the Soviets sell through de Beers, they will benefit from de Beers' monopoly position.

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[20] These are two of the largest timber processing complexes in the Soviet Union. The Bratsk complex, constructed on the Angara River in Eastern Siberia during the 1960's, is capable of processing 7 million cubic meters of Siberian timber per year into cellulose, cardboard, plywood, lumber, turpentine, and resin. The centerpiece of the Ust-Ilimsk complex, currently under construction by a consortium of CMEA countries in the wilderness to the north of Bratsk, is a 500,000-ton-per-year sulphate pulp mill. Production from the mill, which is scheduled to enter operation in 1979–80, is to be shipped to Eastern Europe. France and Sweden will also receive output from the mill as repayment for machinery and equipment provided for the project.

In addition to large exports of rough stones, the Soviets have been expanding their exports of finished gems. Cutting expertise, gained mainly from the Belgians, has enabled the Soviets to produce fine quality gems that are competitive on Western markets. There are indications however, that Soviet gem cutters still lack important cutting techniques, with the result that the Soviets need far larger amounts of rough stone than used by Western cutters to produce the same gems. Overall, cut diamond exports are still relatively small, and given the technical shortcomings and insufficient marketing strategy, will probably take some time to expand into established Western markets.

Final 1978 data are not yet available in disaggregated form. Given strong prices and the benefit of the 17 percent price increase just at the end of 1977, Soviet hard currency earnings on the diamond account probably increased, although the amount of increase cannot be determined without volume information. Looking to the future, with de Beers as an available outlet for Soviet rough exports, which are substantial in global terms (about 25 percent of world rough gem output originates in the U.S.S.R.), Soviet supply availabilities will probably be the main constraint on expanded diamond hard currency earnings. Although the Soviet diamond mining industry has grown in recent years, it is generally faced with difficulties associated with production in remote areas of eastern and northern Siberia. On balance, near to medium term hard currency earnings from diamond exports will increase moderately, and will be aided greatly by a stable upward trend in prices.

E. Chemicals

In 1977, chemical exports (SITC 5) accounted for nearly 7 percent of total hard currency earnings from the Industrialized West, and were the fourth largest among the two-digit SITC categories. Earnings from chemical exports have expanded rapidly since 1975, with much of the growth coming from increases in the dollar value of radioactive elements exports made possible primarily by Soviet uranium enrichment services. Principal Western markets for the enriched products have been France and the Federal Republic of Germany. There are indications that future earnings in this area will expand, particularly in view of the fact that many Western countries are reluctant to provide full scale enrichment services to non-domestic users.

Future hard currency earnings from chemicals, however, will to a larger degree be generated by exports, particularly of organic chemicals, arising out of compensation arrangements. Over the last several years, the Soviet chemical industry is estimated to have imported about $3.2 billion in equipment, to be financed by product buyback.[21] Among the Soviet export commodities involved in these agreements are ammonia and a variety of petrochemicals. These began to enter the Western market in 1978, and will continue to come on stream through the 1980's. The amount of hard currency gained from these exports will be largely determined by demand and price on Western markets. In the near term, earnings will probably be dampened by weak prices. Given the overcapacity in the Western chemical industry,

[21] See "Soviet Chemical Equipment Purchases from the West: Impact on Production and Foreign Trade." Central Intelligence Agency Publication No. ER 78–10554, October 1978.

the increasing capacity of OPEC countries and LDC's, and uncertainties about Western economic conditions, prices may well remain soft into the 1980's, providing a continued check on the amount of hard currency earned from chemical exports.

Another potential problem facing Soviet chemical exports is that of Western import restrictions. These could come into play, particularly where some of the larger chemical deals are concerned. For example, the ammonia-phosphate deal between Occidental Petroleum and the U.S.S.R.[22] has already raised market disruption questions in the U.S. Uncertainties of this type may prove to be significant obstacles to potential earnings growth from Soviet chemical exports.

F. Cotton

The fifth largest group of Soviet exports, at the two-digit SITC level of aggregation, has been textile fibers (SITC 26). Fiber exports, consisting almost entirely of raw cotton (SITC 2631) earned $512 million in 1977 and contributed over 5 percent to total hard currency earned from exports to the IW. Growth in 1977 earnings on cotton was 20 percent, repeating the gain of the year prior. Among Industrialized Western countries, Japan, France, and West Germany have been major Soviet cotton importers.

Cotton production in the Soviet Union has expanded steadily in recent years. The 1977 crop was a major success as production reached a record 8.76 million tons, which was 5 percent above target and one-half million tons larger than the 1976 output. While sown area expanded, as it has for several years, most of the additional production was reportedly due to improved yields. The 1978 cotton crop was 8.5 million tons, down some from the 1977 output, but fulfilling the year's planned target.

Earnings from cotton exports are likely to expand in the near to medium term. The Soviets should maintain, even expand, the volume offered for export to hard currency countries. In the immediate future, however, weak demand and a downward pressure on prices may act as a check on earnings growth.

Looking beyond 1980, the Soviets are likely to maintain their position as a major world cotton exporter, and barring any major upsets in the world cotton market, hard currency earnings on the cotton account will contribute a significant share to total Soviet earnings of convertible currency.

G. Nonferrous Metals

Earnings from nonferrous metals (SITC 68), the sixth largest two-digit export category for the U.S.S.R. in 1977, provided over 4 percent of total hard currency earned from the Industrialized West. This category includes such traditional export commodities as platinum

[22] This is a $20 billion deal covering the period 1978–97. In addition to supplying technology and equipment for a Soviet fertilizer complex, Occidental Petroleum is expected to ship 480,000 tons/year of super phosphoric acid to the Soviets. U.S. exports over the period are valued at $10 billion. Payment is to be made in product buyback valued at $10 billion, consisting primarily of ammonia, but also including urea and potash. 1978 ammonia imports were 350,000 tons. The agreement calls for 950,000 tons to be imported in 1979, rising in subsequent years to a peak of 2.1 million tons annually. 1979 urea imports are expected to be about 600,000 tons, increasing somewhat in future years. The agreement calls for products to be traded at market prices.

and platinum group metals, aluminum, nickel, copper, and miscellaneous base metals.

In recent years exports of nonferrous metals have performed poorly due to a combination of slack Western demand, sluggish prices, and supply difficulties in the U.S.S.R. As indicated by our data, this trend continued in 1977.

Exports earnings from platinum group metals, for instance, traditionally the largest item in the nonferrous metals category, decreased by 3 percent in 1977 to a total of $180 million. Earnings on nickel exports posted a similar decline, while the value of base metal exports dropped 22 percent from a year earlier. The largest decrease, however, occurred in exports of copper which, at $44 million, were valued at 35 percent below the year prior, thereby halting the modest recovery noted in 1976.

The only bright spot in the export picture was aluminum, which gained 60 percent in value over 1977, almost entirely on the strength of higher shipments to Japan. Due to the increase in aluminum exports, export earnings from nonferrous metals rose to $430 million in 1977, 2 percent higher than in 1976. This arrested their steady slide since 1974. Nonetheless, earnings from this category were still only slightly more than half their peak 1974 total of $837 million.

Based on recent indications, Soviet export prospects in nonferrous metals may improve somewhat over the medium term (through 1985). This is based on expectations of strong export performance in platinum group metals and aluminum, as well as the likelihood of a recovery in copper sales. In some instances, however, export growth may be constrained by supply availability, and in others, by sluggish Western market conditions.

Because of a recent surge in Western prices, platinum group metals are likely to be among the strongest performers in the years ahead. During 1978, a combination of strong industrial and investor demand, weakness of the U.S. dollar, and inflation raised the price for platinum to a new high level. According to preliminary reports, the U.S.S.R. took advantage of these conditions by boosting exports of platinum group metals—particularly platinum—to Japan, which raised earnings on this account more than 50 percent in 1977. Underlying this earnings growth was a sizable increase in the volume of shipments. This calls into question recent speculation on production difficulties in the U.S.S.R. In any case, reserves are plentiful and there is apparently a high priority attached to the continued development of the Norilsk complex, the source for nearly 75 percent of Soviet platinum and platinum group metals. In addition, as the world's largest producer of palladium and the second largest producer of platinum—and an important supplier of these metals to the West—the U.S.S.R. should be in a position to affect price movements to some degree. This suggests the likelihood of further growth in earnings from platinum group metals over the medium term future.

Western demand for aluminum is also expected to remain strong for the foreseeable future. Once again, the best market prospects for the U.S.S.R. may lie in Japan and, to a lesser extent, the United States. Japan's aluminum industry has been particularly hard hit by rising energy prices and the recent appreciation of the yen vis-a-vis

the dollar. Both conditions have contributed to a surge in imports from abroad. Japanese aluminum imports are likely to grow even further through the early mid-1980s, especially in view of the shutdown of one quarter of the country's smelting capacity (that was old and inefficient) as part of a government-sponsored program to improve the competitive position of the industry. It appears likely, therefore, that Western demand for aluminum will remain strong.

Soviet aluminum export growth, however, is likely to be constrained by supply availabilities, which have grown much more slowly than anticipated by the current 5-year plan. This apparently reflects the lengthiness of negotiations with Western firms over the construction of a large aluminum smelter at Sayanogorsk in Western Siberia. The smelter which is to be paid for largely by shipments of aluminum produced at the plant, was to have gone into prduction in 1976. Negotiations, however, have not been finalized, and even if they are concluded soon, the plant will probably not be completed before the early 1980's. In the interim, therefore, growth in exports to the West is likely to be marginal, with any increase in earnings largely a result of higher Western prices.

Soviet exports of copper to the West may also pick up in the future, in view of the copper market's recent signs of recovery from the depressed conditions of the past 4 years. In 1978, Western demand for copper was brisk, while supplies tightened considerably, in part reflecting prior output cuts by several major producers. This led to sizable reduction in the large surplus stocks held by producers and consumers worldwide. Consequently, prices also began to rise from previously depressed levels.

Given continued strong Western demand, and a further growth in Soviet copper production (which appears on target towards meeting its planned 20–30 percent increase for the 1976–80 period), Soviet earnings from copper may recover from the current slump, as they did briefly in 1976. In the early to mid-1980's, export prospects should improve further, given expectations of a significant shortfall in world copper supplies by that time. Simultaneously, large copper supplies could become available if development of the vast Udokan reserves gets underway in the 1980's.

Prospects for increased hard currency earnings from exports of nickel and miscellaneous base metals are less promising, given continued weakness in Western demand and the presence of large surplus stocks, which are likely to keep prices low. On the Soviet supply side, nickel is probably ample but is subject to problems associated with mining east of the Urals. The most important nickel-producing area is in Norilsk, where a large smelting plant purchased from Finland is expected to go into service in 1980. Western supplies, however, will probably remain adequate until the mid-1980's, thus preventing a large growth in Soviet exports prior to 1985.

To summarize, the overall outlook for medium-term increases in hard currency earnings from exports of nonferrous metals appears moderately promising. It must be noted, however, that earnings growth would need to be substantial even to recover to the 1974 level, which was about twice the amount earned in 1977. At the present time, an increase of this magnitude does not seem out of reach, especially in

view of the improvement noted in 1978 in Western demand and prices for the major Soviet nonferrous metals exports. On the other hand, given a softening of Western demand and prices, such as might accompany a halt in the current economic recovery in the West, the prospects for a significant improvement in Soviet earnings from nonferrous metals would be limited.

H. Metalliferous Ores and Scrap

The ninth ranking product group in 1977 was metalliferous ores and metal scrap (SITC 28). The most important commodities in this category were iron ore (SITC 2813), iron and steel scrap (SITC 2820), aluminum scrap (SITC 28404), and chrome ore (SITC 28391). In 1977, exports of these commodities totaled $222 million, 15 percent lower than in 1976. This was due to a decrease in earnings from iron ore and chromite which was too large to be offset by the modest dollar gains from iron and steel scrap exports and a nearly doubling of earnings from aluminum waste and scrap deliveries.

In 1977, the largest item in the category of metalliferous ores and scrap was iron ore, whose hard currency earnings on the Industrialized West account fell 12 percent from 1976. With the exception of Austria, all major Industrialized West importers of iron ore from the U.S.S.R. (Italy, Japan, and the United Kingdom) purchased amounts lower in value than the year earlier. This reflects the efforts of steel producers in these countries to cut back purchases of iron ore in view of lagging steel demand and the excessively large inventories currently held. Barring a dramatic recovery in Western steel production, exports of iron ore are likely to remain sluggish at least through the early 1980's.

Stagnation in Western steel industry has also created weak markets for Soviet scrap iron and steel exports. In 1977, however, due to a nearly 50-percent increase in the value of imports by Japan, total Soviet hard currency earnings from iron and steel scrap exports posted a modest, 6-percent increase over 1976. Despite this gain, the total export earnings from iron and steel scrap remained 35 percent below the peak level of 1974.

Exports of aluminum scrap, valued at $44 million in 1977, were nearly twice as large as in 1976. This represents substantially larger sales to the United States and Austria, the only significant importers of scrap aluminum from the U.S.S.R. in 1977. Purchases by the United Kingdom, which had accounted for 15 percent of total imports by the West in 1976, were negligible in 1977.

Soviet scrap aluminum is reported to consist largely of high quality remelt ingot. Thus, it should continue to enjoy excellent market prospects in the future, especially in view of the growing aluminum shortage in Western countries. It is doubtful, however, that Soviet aluminum scrap exports will continue to increase at their present rate for very long. The U.S.S.R. is already beginning to place increased emphasis on secondary recovery of aluminum, and production from recycled scrap is expected to increase substantially by the early 1980's. Thus, while scrap exports may continue to grow in the immediate fu-

ture, a leveling off and possibly even a decline seems likely by the early to mid-1980's.

Chromium ore (chromite), traditionally a notable Soviet hard currency export commodity, posted a 60-percent drop in exports in 1977, as earnings fell from $91 million in 1976 to $36 million. This reflects sharply lower deliveries to all Western importers. The fundamental cause for this poor export performance was a technological change in the Western stainless steelmaking industry—the introduction of the argon oxygen decarburation (AOD) process. By permitting the use of cheaper low quality chromite, the AOD process has led to a sharp reduction in demand for expensive, high quality chromite, the principal Soviet export commodity. Given the small proportion of low grade ores in Soviet chromite reserves, exports to the West are likely to remain depressed for the foreseeable future.

Prospects for growth in exports of metalliferous ores and scrap over the medium term, therefore, do not appear promising. Based on recent export performance and Western demand conditions, aluminum waste and scrap is the only item that could post moderate earning gains, but this too appears questionable, given Soviet moves to establish recycling capacity. If there are increased earnings from scrap aluminum, they are not likely to be large enough to offset the anticipated decreases in export earnings from iron ore, iron scrap, and chromite. Hence we see little growth potential for earnings from commodities in the metalliferous ores and metal scrap category.

I. Finished Manufactures

After rising slowly in the early to mid-seventies, the dollar value of finished manufactures exports (SITC 7 and 8) declined in 1977 to $319 million. These earnings represented only 3 percent of total hard currency earned from the Industrialized West in that year. It is significant that Soviet manufactured goods exports to the Industrialized West were lower in value than those of any other East European country except Bulgaria. Further, the percentage share contributed by finished manufactures exports to total hard currency earnings was the lowest among all the East-bloc countries.[23] Clearly, Soviet export strength, at least for the near-to-medium term, does not rest in finished manufactured products.

Table 5 shows finished manufactured exports at the two-digit SITC level of aggregation. These account for virtually all finished manufactures exported by the Soviets.

[23] Although finished manufactures exports to the Industrialized West earn relatively insignificant amounts of hard currency, such exports to LDC's have expanded rapidly in recent years, accounting for a substantial amount of export trade to nonindustrial countries. Despite this expansion, however, earnings of hard currency from finished manufactures, regardless of their origin, still comprise a relatively small percentage of total Soviet hard currency earnings.

TABLE 5.—MAJOR SOVIET EXPORTS OF FINISHED MANUFACTURES TO THE INDUSTRIALIZED WEST, 1974–77

[In millions of U.S. dollars]

SITC	Commodity group	1974	1975	1976	1977	1977 as percent of finished manufactures total
73	Transport equipment	57	125	187	149	47
71	Nonelectric machinery	55	78	85	72	23
89	Miscellaneous manufactured articles	23	25	38	39	12
72	Electrical machinery	22	26	23	31	10
86	Scientific and measuring instruments	21	23	21	23	7
	Total	178	277	354	314	99
	A. Total finished manufactures exports to industrialized West	180	280	357	319	
	B. Total exports to Industrialized West	6,739	7,131	8,773	10,079	
	C. A/B (percent)	2.7	3.9	4.1	3.2	

Within the broader categories of transport equipment (SITC 73), nonelectric machinery (SITC 71), and miscellaneous manufactures (SITC 89), items such as passenger cars (SITC 7321), machine tools (SITC 7151), ships and boats (SITC 7353), and tractors (SITC 7125) have been leading exports. Although in recent years art works and collectors' items have also appeared among top export items, their appearance has been intermittent. By and large, the finished manufactures export profile has shown little variation in the 1970's, with only three commodities—passenger cars, machine tools and tractors—exhibiting a longer term export potential. The following analysis examines export performance of each of these three products.

The Soviets are making a concentrated drive to capture a larger share of the Western automobile market. Global exports more than quadrupled from 84,000 units in 1970, to 362,000 in 1977. About 20–25 percent of Soviet car exports are now exported for hard currency; in 1977 among major Industrialized Western countries importing Soviet cars were Great Britain (15,000), France (13,000), West Germany (11,000) and Belgium (10,000). Canada received its first shipment in 1978, with plans to expand the number of units imported to 11,000 this year. Plans to penetrate the U.S. market have been on the drawing board for some time. To support the import effort, an assembly, service, and spare parts depot is to be built on the U.S. east coast, once the cars start coming into the country. Initially these are to arrive at the rate of 10,000 cars per year.

In recent years, about two-thirds of cars exported by the Soviets have been the Lada, whose manufacture is based on the Fiat 124 design. The Soviets bought Fiat technology equipment for production of 600,000 cars per year, and installed the plant at Togliatti on the Volga. The production coming on stream from this site contributed significantly to the growth in Soviet passenger car export capacity of the 1970's. There are reports that the Lada is a well-built car and priced at three-fourths the quote on similar Western models. Despite this, however, its design is already becoming somewhat outdated, making it less competitive. Growth in hard currency earnings from Lada

exports is likely to register only moderate gains in the near to medium term.

In addition to the Lada, the Soviets have recently announced the introduction of the Niva, a new competitor on Europe's expanding four-wheel drive market. Niva cars should begin to appear on West European markets in 1979. From production of 5,000 Niva units in 1977, the Soviets plan rapid expansion to 50,000 units in 1980. Like the early 1970's success in penetrating Western tractor markets, the Niva is expected to fill a gap in the West between low priced and expensive four-wheel drive vehicles. However, since the Niva will begin to be exported to the West toward the end of the current plan, and since initial marketing will be limited, Niva exports will not significantly affect hard currency earnings in the near term. At least through 1980, growth of hard currency earnings from passenger car exports is likely to rest on expanded Lada markets.

Looking beyond 1980, hard currency earnings from passenger cars should improve. By that time, the Lada should have made a mark, albeit small, on Western markets, and the Niva is likely to have gained some popularity. Added to these models may be a Soviet designed "super-mini", scheduled to go into production in 1981. Beyond this, there are indications that the Soviets plan to take their automobile production plans further yet. Several sources report that a number of Western car manufacturers have been approached about restructuring the Soviet "Moskovitch" to a medium-sized, front-wheel drive family vehicle. The Soviets apparently have proposed that about one-third of the 200,000 units of annual production be imported by the Western firm as payment for equipment and technology used in the car's manufacture. Perhaps for this reason, Western response has been lukewarm.

When comparing Soviet car export volumes to those of traditional automobile exporting countries, Soviet exports are very small, and the Soviet share of the Western import market is not significant. To the Soviets, however, passenger car exports are important perhaps as much for their psychological value as for their foreign exchange worth. Insofar as finished manufactures, this is an area where the Soviets have achieved some success on Western markets—and given the small base from which they are starting—even a moderately broader penetration of Westeren markets will raise hard currency earnings enough to noticeably increase the rank of passenger cars among top hard currency earning commodities.

After increasing steadily during the 1970's, hard currency earnings from machine tool exports to the Industrialized West declined 25 percent in 1977. While a drop in the value of imports by France and Sweden accounted for the major portion of the decline, lower import values were reported by most Industrialized Western countries. Despite this slack export performance in 1977, machine tool deliveries accounted for over 8 percent of hard currency earnings from finished manufactures exports, but were only 0.3 percent of total foreign exchange earnings from the Industrialized West.

According to Soviet sources, substantial changes are taking place in the structure of metal working equipment production in the U.S.S.R. Output is reportedly growing at a fast pace and is being accompanied by gradual introduction of digital program-controlled metal cutting

machines. This development is heralded as one of the more promising trends in the industry and reportedly is to enhance Soviet export capability. The major importers, however, have been other communist countries. Italy, Japan and the United Kingdom were the largest Western importers in 1977, and although Sweden and France sharply cut back their machine tool imports that year, their import growth in prior years sustained a good part of Soviet hard currency earnings growth from machine tools in the first half of the seventies.

It appears unlikely that Soviet machine tool exports will expand significantly in Western markets for the same reason that finished manufactures in general have been hampered in their sales performance—quality, style, servicing, spare parts problems, poor adaptability and poor marketing strategy. Nevertheless, we can expect that exports of machine tools will repeat their moderate growth pattern of the earlier seventies and to some extent, they may be strengthened if the Soviets are able to perfect a standard line that can be marketed in the West at competitive prices.

In recent years, tractor exports (SITC 7125) caught attention as the Soviets began to penetrate several Western markets. Sales began in Western Europe and eventually expanded to the United States and Canada. In 1977, important Western importers were France, Canada, the United Kingdom, and the United States. Total exports were $13 million and accounted for about 4 percent of Soviet hard currency earned from exports of finished manufactures.

Some of the factors contributing to the initial Soviet success in the tractor export venture can be seen from a look at their experience in the United States. Their product was off to a good start because the small tractor they offered filled a gap in the American market. Added to this was the fact that marketing and servicing were handled by an American company, thus allowing the Soviets to gain from a Western firm's marketing expertise. The venture, though initially successful, later encountered problems as Soviet producers were unable to adapt their product to suit a broader consumer market. Prospects for future expansion of tractor exports appear limited. Although the Soviets produce a rugged vehicle, it lacks many features that would make it attractive to the consumer. Hence, even the competitive price may not be enough to overcome reportedly persistent style shortcomings. Exports to LDC's will probably fare better, but here too, one can expect problems if production quality is not maintained and after sales service is unavailable.

In an effort to further increase and diversify manufactures exports westward, the Soviets have also been promoting sales of televisions, cameras, and watches. Although the quality of some of these select items may be comparable to that of Western goods, penetrating established markets, particularly without the advantage of lower prices, will be difficult.

Some see a great Soviet potential in exporting licenses and technically advanced products. A close look at past performance and the conditions that have thus far prevented the Soviet Union from being a notable force in this area, suggest a limited growth potential in years to come.[24]

[24] For a full treatment of this subject, see section V in this paper entitled "Soviet Exports of Advanced Technology Products and Licenses."

In sum, the near to medium term outlook for hard currency earnings based on exports of finished manufactured commodities, is characterized by little growth potential. What have now become well known problems of quality, style, servicing, et cetera, will continue to make Soviet products difficult to market in the West. To overcome some of these barriers, the Soviets have at times used price discounting; this, too, has its dangers because it runs the risk of evoking Western action based on import protectionism.[25] Therefore, though future hard currency earnings from finished manufacturers exports will continue to grow, they will do so only moderately. Furthermore, it does not seem likely that, given the small base from which to expand, they will contribute significantly more to total hard currency earnings than the 3–4 percent they have thus far.

J. Summary and Outlook

Total Soviet hard currency earnings from exports to the Industrialized West grew 15 percent in 1977. Discounting the sluggish growth in 1975, the 1977 growth was the slowest in several years. Perhaps the most striking feature of the 1977 export performance was the fact that earnings from oil and oil products exports increased more slowly than earnings from total exports to the Industrialized West. Aside from coal, all the traditionally strong export categories posted increased earnings in 1977, with chemicals and natural gas showing the strongest growth.

The following scenario estimates hard currency earnings (in constant dollars) through 1980. Assuming that non-oil exports expand at an annual rate of 10 percent [26] over 1977 and that oil exports remain at 1977 levels, we estimate 1980 hard currency earnings from exports to the Industrialized West at about $12 billion.

SOVIET EXPORTS TO THE INDUSTRIALIZED WEST, NONOIL EXPORT GROWTH—10 PERCENT; OIL EXPORTS CONSTANT AT 1977 LEVELS

[In constant 1977 dollars]

	1977	1978	1979	1980
Nonoil	5.9	6.5	7.1	7.9
Oil	4.1	4.1	4.1	4.1
Total	10.0	10.6	11.2	12.0

What happens, of course, depends in large part on exports of oil. The above scenario assumes no growth in volume deliveries beyond 1977. If oil export growth is maintained, total hard currency earnings from the Industrialized West will be higher than suggested in the scenario.

If we add another $1 billion [27] to 1980 hard currency earnings to

[25] For survey of export commodities that could potentially encouter Western import restriction measures, see the section VI in this paper.

[26] The average annual rate of growth, in current dollars, of exports to the industrialized West, 1972–76, was 32.5 percent.

[27] In a separate study it was estimated that compensation agreements will account for $2 billion of hard currency earned in 1980. See in this volume, Barclay, Dennis J. "U.S.S.R.: The Role of Compensation Agreements in Trade with the West." We break out this figure by assuming that $1 billion of the $2 billion would be accounted for within the 10 percent growth rate, which would have been lower were it not for gradual increases in export capacity arising from compensation deals. The other $1 billion, which we define as a "net increment" to 1980 earnings, is added because so many compensation exports are due to come on stream at just about that time.

account for exports generated by compensation arrangements above and beyond those that would already be included in the 10 percent annual growth, then we can estimate that total 1980 hard currency earnings from the Industrialized West would be $13 billion in constant dollars. This represents about a 40–45 percent growth in earnings over 1976 levels, and even taking into account price rises, this growth would be considerably lower than the 148 percent nominal growth achieved in the 4 years prior to 1976, that is, 1972–76.

V. Soviet Exports of Advanced Technology Products and Licenses [28]

A. Introduction

For several decades the Soviet Union has actively promoted the export of licenses and technically advanced products to developed Western countries. The competitiveness of these exports depends partly on their technical sophistication, and the Soviets frequently argue that their extensive R. & D. efforts have given them world leadership (or essential parity) in numerous areas of technology with important commercial applications. The Soviet Union is acknowledged to have the largest number of scientific and engineering personnel of any country; [29] it is believed for some time to have devoted a larger share of its national product to research and development than any other country; [30] and, as a measure of output, the Soviets recently have claimed that one of every five registered inventions in the world is of Soviet origin.[31]

Competitiveness, however, also is a function of the Soviet approach to exports, such as marketing, pricing, servicing, and related nontechnical factors, and of Western receptivity to the Soviet effort, including the erection of special barriers targeted at the Eastern supplier.

Based on Soviet technical accomplishments, Premier Kosygin and others have argued that the Soviet Union can and should have a "significant" role in the world market for advanced technology.[32]

Recent Soviet policy and planning directives have called for increases in exports of advanced products and technologies, and have stated that the Soviet Union will seek to alter its predominant role as supplier of raw materials to Western markets. Certain Western assessments have argued that there is generally a "large stock of unused applied research" that could usefully be exploited by Western industry.[33] Most Western analyses of the technological level of Soviet sectors have found the Soviets to be lagging behind Western state-of-

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[28] This section was researched and authored by John P. Young.

[29] David Bronson "Scientific and Engineering Manpower in the U.S.S.R. and Employed in R. & D." in Joint Economic Committee, Congress of the United States, Soviet Economic Prospects for the Seventies (Washington: U.S. Government Printing Office, 1973).

[30] See, for example, Zaleski, Kozlawski, Wienert, Davies, Berry, and Amann, Science Policy in the U.S.S.R., OECD, Paris, 1969.

[31] "Rychagi i stimuly" Trud, Aug. 25, 1977.

[32] Yu. N .Smirnov and V. D. Ivanov, "Prodazha Iistseniy: dostizheniya i problemy" Voprosy izobretatelstva No. 12, 1976, pp. 2–7; Herbert S. Levine and James E. Cole, "Prospects for Expanded U.S.-U.S.S.R. Licensing Activity" SRI Technical Note SSC–TN–5553–1, October 1978.

[33] James C. DeHaven, "Technology Exchange: Import Possibilities from the U.S.S.R." RAND Report R–1414–ARPA, April 1974; Charles Wolf, Jr., "U.S. Technology Exchange with the Soviet Union: A Summary Report" RAND Report R–1520/1–ARPA; John W. Kiser, "Report on the Potential for Technology Transfer from the Soviet Union to the United States," report prepared for the Department of State, October 1977.

the-art, although they acknowledge that Soviet strengths in certain areas could provide a basis for expanded Soviet exports of advanced products and technologies. Most frequently mentioned are metallurgical equipment, power engineering, and segments of heavy machine building, machine tools, and the extractive industries.[34]

Organizationally, the Soviets market and sell advanced technology through foreign trade organizations (FTO's) organized by product area, or in the case of pure license sales through the FTO Litsensintorg, formed in 1962.[35] Industrial ministries and production establishments work with the relevant FTO in arranging for and fulfilling the conditions of sale. License sales are nearly universally dependent on prior acquisition of a patent in the purchasing country; filing for foreign patents is the responsibility of the State Committee for Inventions and Discoveries, with applications channeled through the U.S.S.R. Chamber of Commerce and Industry. Among its other functions, the State Committee for Science and Technology oversees the planning and implementation of technology exports, and specifically issues permits for the sale of licenses abroad.

Certain Soviet policies to encourage manufactured goods exports apply to exports of advanced technology with particular force.[36] Products certified for export meeting or exceeding world technical standards are permitted an increment in their wholesale price, presumably resulting in easier overfulfillment of sales and profits targets with resulting favorable impact on bonuses. Specific mandatory targets for exports are sometimes included in enterprise and association plans. As perhaps the most attractive feature, enterprises or associations and their parent ministries are permitted to retain a portion of the hard currency earned from export sales, and are permitted considerable latitude in spending that hard currency, usually to import Western technology. Finally, there are prestige and associated rewards; as noted by one Soviet, the sale of licenses and advanced products "increases the scientific-technical authority of our country.[37] And with national prestige comes personal prestige, greater opportunities for travel abroad and increased interaction with the Western scientific community.

This section presents measures of Soviet exports of advanced technology to the 15 industrialized Western countries. Specifically, the next part assesses the magnitude and composition of Soviet exports of technically advanced products to Industrialized Western countries, and this is followed by an assessment of Soviet exports of disembodied technology through licenses. When possible, exports to Industrialized Western countries are contrasted with imports from Industrialized Wesern countries. Factors affecting Soviet performance are analyzed, particularly concerning their impact on future export prospects.

Only exports to Industrialized Western countries are considered in this analysis in part because of the desirability of assessing the past and potential contribution of Soviet advanced technology exports in

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[34] See DeHaven, Kiser, ibid.
[35] Licensing Executives Society (U.S.A.), Inc., "U.S./U.S.S.R. Technology and Patents: Sales and License Prospects," 1974.
[36] Paul Ericson, "Soviet Efforts to Increase Exports of Manufactured Products to the West" in Joint Economic Committee, Congress of the United States, Soviet Economy in a New Perspective (Washington: U.S. Government Printing Office, 1976).
[37] "Rychagi i stimuly" Trud, Aug. 25, 1977, op. cit.

redressing severe balance of trade deficits with the West. It should be evident, however, that the Soviets have important customers for their advanced technology elsewhere in the non-Communist world and earn significant hard currency from these sources. However, an important share of such exports are tied to or influenced by political alliances, aid programs, and other factors not directly associated with the sophistication and effectiveness of the Soviet technology. Therefore, a second advantage of focusing on Industrialized Western markets is to provide a better test of the competitiveness of Soviet technology against leading world alternatives.

It should be clear, however, that while export competitiveness may be suggestive of indigenous Soviet technical capabilities, export performance is influenced by too many more technical factors and measurement difficulties to permit a direct linkage.[38] This section does not attempt to assess Soviet technological strengths and weaknesses.

B. Exports of Advanced Products

Soviet authorities have endorsed various forms of East-West technological cooperation, including the exchange of licenses, but clearly favor when feasible the export of technically sophisticated products incorporating Soviet technological advances. Soviet preference for exports over licensing appears to reflect standard concerns over the export of disembodied technology, namely that technical leadership may be eroded and that opportunities to maximize hard currency earnings through exports of finished products may be forgone.[39] Studies of Western firms have revealed a similar preference for internal utilization in the early stages of a technology's life cycle.[40] However, in the Soviet Union the preference is grounded in statutes covering the sale of licenses abroad, which direct that:

> . . . the expedience of the sale of licenses abroad for Soviet inventions and other scientific and technical achievements should be considered in dependence on the possibility and expedience of export of the finished product, which in principle is preferable if there is a possibility of sale on the market.[41]

Measuring Soviet exports of technically advanced products runs into obvious difficulties of determining what is "advanced". Among other factors, what is advanced will be a function of the requirements which the technology is intended to meet, and hence will differ across countries and between industrial conditions. In all cases, as a Western authority has noted, the background and subjectivity of the analyst will influence the classification, and any classification will become obsolete with technical advance.[42]

These difficulties are compounded by standards of international trade data collection and classification. United Nations data employed in this analysis are not sufficiently detailed to distinguish precisely

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[38] R. Amann. J. Cooper, R. W. Davies, "The Technological Level of Soviet Industry" (New Haven : Yale University Press, 1978), ch. 1.

[39] See, for example, an East German view : Jurgen Reichenbaecher "License Trade—Is It Advantageous for U.S. ?" Erfurt Das Volk Sept. 16, 1978.

[40] See the summary discussion in F. Scherer, Industrial Market Structure and Economic Performance (Chicago : Rand McNally, 1970) ch. 15.

[41] (Secondary source) "Directives No. 1 on the Procedure for the Preparation of Materials for the Sale of Licenses Abroad" Soviet Statutes and Decisions, Summer 1977, vol. XIII, No. 4, p. 46.

[42] R. Amann, et al. The Technological Level . . . , op. cit. ch. 1.

between levels of technology. For example, at the level of greatest disaggregation in the "office machine" category, SITC 7142 includes both electronic computers of varying degrees of sophistication and more mundane calculating and accounting machines. Thus, there is difficulty in deciding exactly which categories of products should be considered as embodying or having a potential for embodying advanced technology. There is no generally accepted list of such products, and any listing would change over time with technological advance. Second, any trade data categorization selected doubtless will include shipments of products not considered "advanced" by some objective criteria, and similarly exclude shipments of products which should be included. However, while trade data may not accurately represent absolute levels of trade in advanced technology products, the data are useful in assessing trade trends over time and relative performance of exporting nations.

The most commonly used classification of "advanced technology products" includes all products placed in Standard International Trade Code Classifications 7 (Machinery and Transport Equipment) and 86 (Professional, Scientific, and Controlling Instruments). These categories incorporate all industrial plant and equipment, products which "embody" advances in industrial processes with resulting improvement in productivity or end product quality. Because these broad classifications also include more mundane industrial and consumer goods, Department of Commerce analysts have derived a refined list of "high technology product" categories likely to contain products embodying critical technologies with especially great impact on advancing industrial productivity. This refined list of "high technology product" categories, at the four and five digit SITC level in disaggregation, is presented in table 6. Product categories in classifications 7 and 86 that were excluded from this list are presented in appendixes A and B. Products identified as "high technology products" in table 6 clearly reflect the impact of the microelectronics revolution. Certain categories (e.g. computers) are based directly on semiconductor technologies while others, such as machine tools, were included because of recent advances in adapting electronic controls packages. For comparison purposes the subsequent analysis will present two measures—the narrow definition of "high technology products" and the broad definition of "machinery, transportation equipment, and instrumentation".

TABLE 6.—*High technology items*[1]

SITC	*Description*
71142	Jet and gas turbines for aircraft.
7117	Nuclear reactors.
7142	Calculating machines (including electronic computers).
7143	Statistical machines (punch card or tape).
71492	Parts of office machinery (including computer parts).
7151	Machine tools for metal.
71852	Glass-working machinery.
7192	Pumps and centrifuges.
71952	Machine tools for wood, plastic, etc.
71954	Parts and accessories for machine tools.
71992	Cocks, valves, etc.
7249	Telecommunications equipment (exc. TV & radio receivers).
72911	Primary batteries and cells.

See footnote at end of table.

TABLE 6.—*High technology items* [1]—Continued

SITC	*Description*
7293	Tubes, transistors, photocells, etc.
72952	Electrical measuring and control instruments.
7297	Electron and proton accelerators.
7299	Electrical machinery, n.e.s. (incl. electromagnets, traffic control equipment, signaling apparatus, etc.).
7341	Aircraft, heavier than air.
73492	Aircraft parts.
7351	Warships.
73592	Special purpose vessels (incl. submersible vessels).
8611	Optical elements.
8613	Optical instruments.
86161	Image projectors (might incl. holograph projectors).
8619	Measuring and control instruments, n.e.s.

[1] This definition of high technology items delegates a number of STIC 7 and 86 items included in some previous analyses. The items deleted by this formulation are listed in Appendix A. Items not included in this report's definition of high technology, but deemed by some analysts to occasionally include high technology items are noted in *Appendix B.*

Table 7 presents data on Soviet exports to I.W. countries of advanced technology products over the 1972–77 period. While exports under both definitions increased significantly, they accounted for a small share of Soviet manufactured goods exports. By way of contrast, 35 percent of 1977 U.S. manufactured goods exports to the world consisted of "high technology products." Furthermore, the Soviet Union supplies a virtually insignificant share of total I.W. imports of "high technology products" (.11 percent in 1977) and of machinery, transportation equipment, and instrumentation (.16 percent in 1977).

Table 8 presents data on the Soviet balance of trade with I.W. countries in advanced products. Over the entire period, the Soviets exported to I.W. countries high technology products valued at 3.46 cents for every dollar of shipments imported; the Soviets exported machinery, transportation equipment, and instrumentation valued at 6.78 cents for every dollar of shipments imported. Table 9 presents the five leading 1977 Soviet exports of high technology products, which together account for 86.25 percent of total high technology product exports. Table 10 presents leading exports under the broader definition of technology intensive products. The dominance of vehicles, watches, and similar end products in Soviet exports of machinery, transportation equipment, and instrumentation supports the view that this broad classification fails to sufficiently refine the analysis to those product categories central to advancing industrial productivity.

The dominance of metalworking machine tools is consistent with Western perceptions of relative Soviet strength in certain areas of metallurgy and metallurgical engineering. Because as previously stated the classification of "high technology" products is arbitrary, we present in table 11 trade data for those categories of capital goods in which the Soviet Union is judged to possess relatively advanced technical capabilities. It must be stressed that these categories are extremely broad and doubtless conceal certain narrow product areas wherein Soviet equipment is quite competitive. Nevertheless, it is highly significant that trade in these six broad product categories—accounting for 15.7 percent of 1977 Soviet manufactured goods exports—has consistently been heavily weighted in favor of the Western exporter. Only in turbines does the Soviet Union enjoy a positive balance in trade

with I.W. countries. In only one other category—heavy metallurgical equipment—does the level of Soviet exports exceed 10 percent of the level of Soviet imports.

TABLE 7.—SOVIET EXPORTS OF ADVANCED TECHNOLOGY PRODUCTS TO INDUSTRIALIZED WESTERN COUNTRIES, 1972–77

[Amounts in millions of U.S. dollars]

Year	High technology products [1]			Machinery, transportation equipment, and instrumentation [3]		
	Total exports	Percent of manufactured goods exports	Percent of total [2] IW imports	Total exports	Percent of manufactured goods exports	Percent of total [4] IW imports
1972	$31.640	29.85	0.16	$93.358	88.08	0.12
1973	33.248	19.11	.12	154.433	88.76	.15
1974	44.210	24.56	.13	154.665	85.92	.13
1975	48.942	16.05	.14	252.309	90.11	.19
1976	54.008	15.13	.14	315.314	88.32	.21
1977	52.045	16.32	.11	275.128	86.25	.16

[1] 25 4 and 5 digit SITC commodities (see table 6).
[2] Industrialized Western imports of high technology products from all sources.
[3] SITC 7 and 86.
[4] Industrialized Western imports of machinery, transportation, equipment, and instrumentation from all sources.

TABLE 8.—SOVIET BALANCE OF TRADE WITH INDUSTRIALIZED WESTERN COUNTRIES IN ADVANCED TECHNOLOGY PRODUCTS, 1972–77

[Amounts in millions of dollars]

Year	High technology products			Machinery, transportation equipment, and instrumentation		
	Soviet exports to industrialized West	Soviet imports from industrialized West	Soviet exports to Soviet imports (percent)	Soviet exports to industrialized West	Soviet imports from industrialized West	Ratio of Soviet exports to Soviet imports (percent)
1972	$31.640	$582.440	5.43	$93.358	$1,170.986	7.97
1973	33.248	806.989	4.12	154.433	1,623.799	9.51
1974	44.210	1,036.208	4.27	154.665	2,169.881	7.13
1975	48.942	1,583.522	3.09	252.309	4,297.852	5.87
1976	54.008	1,627.106	3.32	315.314	4,377.397	7.20
1977	52.045	2,003.195	2.60	275.128	4,716.034	5.83
Total	264.093	7,639.460	3.46	1,245.207	18,335.957	6.78

TABLE 9.—LEADING 1977 SOVIET EXPORTS OF HIGH TECHNOLOGY PRODUCTS TO INDUSTRIALIZED WESTERN COUNTRIES

SITC	Item	Value (millions)	Percent of total high technology products exports	Percent of total manufactured goods exports
7151	Machine tools for working metal	$27.391	53.63	8.59
7293	Tubes, transistors, photocells, etc	9.657	18.56	3.03
7299	Electrical machinery, n.e.s	3.140	6.03	.98
8613	Optical instruments	2.621	5.04	.82
72952	Electrical measuring and control instruments	2.078	3.99	.65
	Total	44.887	86.25	14.07

TABLE 10.—LEADING 1977 SOVIET EXPORTS OF MACHINERY, TRANSPORTATION EQUIPMENT, AND INSTRUMENTATION (SITC 7 AND 86) TO INDUSTRIALIZED WESTERN COUNTRIES

SITC	Item	Value (millions)	Percent of total machinery, transportation equipment, and instrumentation exports	Percent of manufactured goods exports
7321	Passenger motor vehicles (excluding buses)	$121.125	44.02	37.97
7151	Machine tools for working metal	27.391	9.96	8.59
7353	Ships and boats	16.656	6.05	5.22
7125	Tractors	12.521	4.55	3.93
8641	Watches, movements, cases	9.692	3.52	3.04
	Total	187.385	68.11	58.74

TABLE 11.—SOVIET EXPORTS TO AND IMPORTS FROM INDUSTRIALIZED WESTERN COUNTRIES IN SELECTED PRODUCT CATEGORIES

[In millions of dollars]

SITC*	1972			1973			1974			1975			1976			1977		
	1 Soviet exports	2 Soviet imports	3 1/2	1 Soviet exports	2 Soviet imports	3 1/2	1 Soviet exports	2 Soviet imports	3 1/2	1 Soviet exports	2 Soviet imports	3 1/2	1 Soviet exports	2 Soviet imports	3 1/2	1 Soviet exports	2 Soviet imports	3 1/2
711	0.957	124.145	0.008	2.360	27.442	0.086	2.103	39.445	0.053	3.735	119.549	0.031	7.346	115.760	0.063	9.029	317.954	0.028
Of which:																		
7111	.001	6.428	0	0	2.761	0	0	.569	0	.065	6.894	.009	.005	24.601	0	0	21.762	0
7112	0	.956	0	0	.363	0	.002	.622	.003	0	2.038	0	0	12.045	0	.001	26.930	0
7113	.016	5.310	.003	0	3.553	0	.030	5.067	.006	.017	.915	.019	0	.947	0	.013	42.683	0
71181	.204	.288	.708	.583	.399	1.461	.211	1.438	.147	1.447	.881	1.642	4.751	.452	10.511	5.084	2.477	2.052
7151	17.380	244.942	.071	20.132	364.005	.055	24.382	448.796	.054	32.436	550.251	.059	35.924	576.851	.062	27.391	649.338	.042
7152	1.506	10.193	.148	2.644	12.593	.210	4.414	57.364	.077	5.024	83.049	.012	3.963	81.106	.049	5.622	87.843	.064
722	2.259	23.053	.098	3.353	24.169	.138	4.357	42.141	.103	6.210	68.057	.091	5.238	96.279	.054	6.828	149.572	.046
Of which:																		
7221	2.014	7.421	.271	2.615	10.259	.255	3.272	20.198	.162	5.329	30.544	.174	4.424	35.817	.124	5.724	40.480	.141
7222	.247	15.632	.016	.740	14.100	.052	1.086	21.942	.049	.881	37.513	.023	.815	60.461	.013	1.104	109.092	.010
72992	.445	26.595	.017	.308	38.424	.008	.762	60.787	.016	.658	103.210	.006	.392	75.389	.005	1.059	103.291	.010
723	.032	8.777	.004	.023	13.093	.002	.076	36.871	.002	.135	58.722	.002	.185	40.504	.005	.172	74.887	.002

*SITC categories listed in this table are defined as follows:
711.... Power generating machinery, other than electric.
7111.... Steam generating boilers.
7112.... Boiler house plant.
7113.... Steam engines.
71181.... Water turbines and other water engines.
7151.... Machine tools for working metals.
7152.... Metalworking machinery, other than machine tools.
722.... Electric power machinery and switchgear.
7221.... Electric power machinery.
7222.... Electrical apparatus for electrical circuits.
72992.... Electric furnaces, electric welding and cutting apparatus.
723.... Equipment for distributing electricity.

It is also probable that the levels of Soviet exports presented above tend to overstate, in comparison with imports, Soviet shipments of products which by Western standards represent best practice technology. In certain sectors, such as machine tools, the Soviets have used judicious pricing practices to meet Western requirements for standard, relatively unsophisticated equipment. For example, Soviet data on trade in machine tools reveals that average unit value of 1977 exports to main capitalist countries equaled 7.4 thousand rubles, in contrast to an average unit value for imports of 35.2 thousand rubles.[43] This pattern appears to be repeated in other sectors. It is also significant that other successful Soviet exports, most notably motor vehicles. are partly dependent upon earlier imports of Western plant and equipment and Western product design assistance.[44]

Apart from considerations of lagging technology, reasons advanced to explain modest Soviet success in exports of these selected products parallel reasons for generally poor Soviet export performance. However, cultural barriers, distance, bureaucratic inertia, and inadequate servicing and supplies of spare parts for sophisticated products can be an especially serious problem for a prospective importer of industrial plant and equipment.[45] Also reported is Soviet unfamiliarity with world technical standards and industrial practices.[46] But perhaps most serious is the frequent unwillingness of Soviet suppliers to modify equipment to meet the unique requirements of prospective customers.[47] In all these ways, the foreign purchaser faces conditions similar to those traditionally endured by Soviet domestic purchasers of plant and equipment.[48]

C. Foreign Patenting and Exports of Licenses

Despite a clear preference for the export of products, the Soviet leadership has encouraged active trade in licenses since the late 1960's. Licensing of process technologies is favored particularly where export of a higher quality or less costly product is not a viable alternative.[49] Soviet motives for licensing clearly parallel those of Western countries. Earnings (especially of hard currency) are an important consideration, particularly when sales of materials, components, and equipment accompany the license sale. Soviet experts also recognize that license receipts can help further research.[50]

Soviet licensing to Western firms was generally infeasible until 1965, when the Soviet Union joined the Paris Convention for the Protection of Industrial Property. The Soviets appear to view the securing of a foreign patent as a virtual prerequisite to foreign licensing.[51]

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[43] Amann, et al., The Technological Level . . ." ibid., ch. 7.
[44] Ibid.; see also J. Young "The Impact of Ministry Management Practice on the Assimilation of Imported Process Technology (with example from the motor vehicle sector)", Office of East-West Policy and Planning, Bureau of East-West Trade. Project No. D–42.
[45] Kiser, op. cit.
[46] Stanislaus, Wasowski, East-West Trade and the Technology Gap (Washington, D.C. Praeger, 1970).
[47] See, for example, "Russia Sells Its Knowhow—Wrapped in Red Tape" Business Week., May 8, 1971, p. 59; interview with G. A. Zarubkin, president V/O Energomashexport, Journal of the U.S.-U.S.S.R. Trade and Economic Council, August/September 1977, p. 19.
[48] See Joseph Berliner, The Innovation Decision in Soviet Industry (Cambridge, Mass., MIT Press, 1976).
[49] An important recent example is a Soviet technique for underground coal gasification.
[50] One Soviet author endorses foreign (and domestic) licensing by stating that 1970 U.S. licensing receipts (from all sources) were the equivalent of approximately 40 percent of total United States R. & D. expenditures in that year. Smirnov and Ivanov, op. cit.
[51] Licensing Executives Society, op. cit.; and Kiser, op. cit.

Although Soviet statutes authorize the licensing of unpatented inventions and other achievements, this activity is discouraged and appears to be rarely if ever undertaken. Comprehensive data on Soviet patenting in the West, therefore, can serve as a rough guide in assessing the potential for Soviet licensing and its growth over time. This data is presented in table 12. From modest beginnings in 1965, the number of patented inventions in most major Western industrial countries has been running at an annual rate of 350–500 throughout the 1970's.

No comparable aggregate data is available on Soviet foreign licensing activities. In the only comprehensive survey undertaken to date, John Kiser estimates that Litsensintorg sold approximately 300 licenses worldwide between 1962 and 1976.[52] According to his data, the number of these license purchases accounted for by Industrialized Western countries would be approximately 200, including 26–30 accounted for by U.S. firms. Even following for limited additional license sales by other product-based FTOs, Soviet foreign licensing activity by world standards clearly has been minimal.

TABLE 12.—NUMBER OF PATENTS GRANTED TO THE SOVIET UNION BY INDUSTRIALIZED WESTERN COUNTRIES

Industrialized Western country	1965	1972	1973	1974	1975	1976
Austria	9	72	75	87	68	57
Belgium	32	76	72	36	42	0
Canada	18	109	99	136	101	120
Denmark	1	14	19	16	15	10
France	230	448	332	346	198	705
Federal Republic of Germany	11	170	275	261	351	391
Italy		419				
Japan	6	172	172	171	209	193
Luxembourg	0	3	1	2	3	2
Netherlands	0	3	4	13	23	35
Norway	4	14	16	21	15	13
Sweden	11	215	163	143	171	153
Switzerland	12	76	89	111	101	76
United Kingdom	275	553	506	400	458	430
United States	28	355	382	492	404	426

Earnings of hard currency through license sales also have been extremely limited. Litsensintorg estimates that the Soviets pay an average of approximately 10 times more for a U.S. license than U.S. firms pay for a Soviet license. Kiser estimates that Litsensintorg has earned approximately $13–$14 million on the 26 identified licenses sold to U.S. firms since 1964.[53] If this return was typical for all Litsensintorg license sales in industrialized Western countries, the Soviets may have earned in this market approximately $100 to $107 million since 1964.

By contrast, U.S. receipts (fees and royalties) in 1977 alone from license sales to Western Europe equaled $2,263 million including $415 million from unaffiliated firms.[54] As a hard currency generator, license sales make a modest contribution even by standards of Soviet manufactured goods exports. However, on strict profitability grounds, license sales generally will provide higher returns than an equivalent value of product exports, since direct expenses (not including already sunken R. & D. expenses) associated with a license sale will be minimal.

[52] Kiser, op. cit., p. 1.
[53] Kiser, op. cit., p. 65.
[54] Survey of Current Business, March 1978.

Technically, the pattern of Soviet license sales reflects acknowledged Soviet strengths. The 109 Soviet licenses identified by Kiser that were sold to Industrialized Western countries are distributed by industrial sector as follows: [55]

Sector	Number of technologies	Number of licenses
Metallurgy	27	53
Chemicals	14	14
Medicine	10	10
Electronics, instrumentation, measuring devices	11	12
Machinery and equipment	12	13
Energy, mining and drilling	7	7
Total	81	109

Clearly apparent from this distribution is the dominance of metallurgy. It is the only sector where the Soviets have commonly marketed the same technology to firms in a number of advanced Western countries. This concentration parallels the commodity composition of the trade data presented in table 11, where (apart from turbines) the Soviets have experienced the least unfavorable balance of trade in the area of heavy metallurgical equipment (SITC 7152).

Soviet foreign licensing is impeded by the same kinds of factors that impede exports of advanced products. Successful implementation of licensed technology usually requires technical servicing and consulting, re-engineering, and in some cases supply of special materials and components, all areas of generally deficient Soviet performance. In addition, the Soviets appear to experience difficulty in pricing licenses, usually favoring large advance fees over royalty arrangements and underestimating the costs incurred by Western firms in bringing technology to full scale production.[56] Certain license marketing efforts have been hampered by poor central coordination, inasmuch as Litsensintorg has marketed licenses at the same time that other FTO's have independently marketed the comparable finished product, at times to the same customer base.[57]

In general, the preference for product export constitutes probably the single greatest impediment to expanded license sales. The Soviet bureaucracy operates with particular caution and deliberation in the licensing area to insure that valuable know-how is fully exploited. Inventions patented abroad for licensing purposes must be included in draft plans at all levels, with plans and supporting materials transmitted to the Ministry of Foreign Trade and the State Committees for Science and Technology (GKNT), for Planning (Gosplan), and for Inventions and Discoveries. Following plan approval, the originating enterprise or institute must complete and submit to the above agencies a series of standard forms and estimates supporting the licensing effort.[58] In particular, the enterprise must assess the technical and economic effect of its invention, and in so doing must analyze "best

[55] Kiser, op. cit., p. 3.
[56] Kiser, op. cit., p. 50.
[57] Kiser, op. cit., p. 46.
[58] A licensing passport in three copies; brief explanations for the preparation of the licensing passport; a draft of an advertising prospectus with illustrations in three copies; copies of decisions on the issuance of inventor's certificates and description of the inventions for all applications included in the subject of the license; a technical and economic accounting of effectiveness in two copies; a state testing report; and the patent claim. "Directives No. 1 . . ." op. cit. p. 49.

analogous foreign and domestic devices or technological processes being applied at the present time, with an indication of the manufacturing firms." When plans and documentation are readied, the State Committee for Inventions and Discoveries administers plan implementation; the Ministry of Foreign Trade actually negotiates the license; the enterprise's superior ministry is responsible for fulfilling the terms of the contract; and the GKNT may direct and fund after-sales servicing.[59]

Such a procedure is cumbersome even by Soviet standards, requires extensive and probably time consuming coordination among senior agencies, and places a considerable burden upon the enterprise. If the Soviet enterprise is not discouraged by this formidable process, the potential foreign customer may be, given the difficulty of developing the kind of close and responsive working relationships between inventor and applier usually required for effective licensing of technologies.

D. Summary and Conclusions

The data presented in this section illustrate the magnitude and general composition of Soviet exports of advanced products and technologies. As indicated, the standards employed to define advanced products are arbitrary, and the data are frequently too highly aggregated or, in the case of licenses are not sufficiently comprehensive to fully and accurately represent Soviet export performance. However, the data are sufficient to demonstrate that Soviet exports of advanced products and technologies to Industrialized Western countries (1) make up a very small proportion of total exports; (2) while increasing absolutely, are decreasing as a proportion of Soviet manufactured goods exports; (3) are heavily outweighed by Soviet imports of similar commodities, and (4) in a broader context, are low in relation to the seeming export potential afforded the Soviets by the magnitude of Soviet R. & D. efforts and demonstrated technical and industrial achievements.

Assessing Soviet capability on the basis of past performance is fraught with obvious difficulties. First, past export performance provides an imperfect guide to the inherent competitiveness of Soviet exports. On the one hand, stringent Soviet domestic requirements, Soviet industrial isolation, and well-known bureaucratic problems doubtless impair Soviet interest in and the effectiveness of export programs. On the other hand, a combination of Western factors ranging from unfamiliarity with Soviet practices to (in the United States) significant tariff barriers, probably impedes Soviet ability to penetrate the Western market. Even more dangerous is attempting to evaluate the technical or industrial sophistication of past potential Soviet offerings on the basis of past export performance. Prices, contractual terms, servicing arrangements, and a host of other nontechnical factors all influence Soviet export performance.

In general, many Western and virtually all Soviet experts believe there remains significant untapped potential for Soviet export of advanced products and technologies to Western countries.[60] The Soviet

[59] "Directives No. 1 . . ." op. cit., and Licensing Executives, op. cit.

[60] See De Haven and Kiser, op. cit., for an authoritative Soviet view, see N. Inozemtsev, Dpt. Chm. of Gosplan in Journal of the U.S.-U.S.S.R. Trade and Economic Council, October/November 1976, p. 22.

Union is accorded technical leadership or parity in at least a few important sectors, while appropriate pricing, servicing, and related trading policies in these and other marginally lagging sectors could significantly broaden the competitive base of Soviet industry. While there are too many unknowns and variables subject to policy manipulation to warrant a forecast of Soviet exports in these commodity areas, we can estimate the relative ease with which existing impediments, variously enumerated by Western businessmen and analysts, can be overcome.

First, statements by the Soviet leadership combined with Soviet industrial policies demonstrate a strong commitment to export of advanced products and technology.[61] Domestic requirements could impair exports in certain instances,[62] but exports which earn hard currency are accorded high priority.[63] Soviet export controls do not appear to be a serious impediment, particularly in technical areas (with predominantly civilian application) in which the Soviets are acknowledged to be strong.[64]

Western import barriers and (in the United States case) tariff walls can be effective impediments, but greatest Western concern seems now to be concentrated in industrial materials, and at any rate would not affect license sales.[65]

More serious are the many problems which affect Soviet exports of manufactured goods generally. These include unreliable quality control, insufficient supply of spare parts, and servicing inadequacies.[66] If anything, these factors will have a proportionately greater impact on exports of advanced products and especially capital equipment. Close contact and cooperation between supplier and purchaser is essential where innovation or other significant change in the purchasing firm's production base is required. Leading Soviet trading organizations have established programs to provide such after sales servicing to the Western customer,[67] but Soviet performance to date does not appear to meet accepted Western standards. This failure to adequately service foreign customer requirements involving new technology parallels experience in the domestic economy. It has been demonstrated that Soviet difficulties in engendering sufficient concern in the researcher or developer over the successful implementation of his work are traceable to basic features of the Soviet centrally planned economy.[68] In the likely event that these features will not be radically altered, both Soviet and Western customers for advanced technology probably will find that Soviet supplier performance in meeting their requirements will fall short of Western standards. This would serve as a continuing, significant impediment to expanded Soviet exports.

In light of this and acknowledged Soviet R. & D. strengths, the greatest potential for increased Soviet advanced technology exports

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[61] See Ericson, op. cit.
[62] Amann, et al. The Technological Level.
[63] See for example, J. Brougher, "U.S.S.R. Foreign Trade: A Greater Role for the West" Joint Economic Committee, Congress of the United States, Soviet Economy in a New Perspective, (Washington: U.S. Government Printing Office, 1976.
[64] Kiser, op. cit. p. 47.
[65] See Section VI of this paper.
[66] See Ericson, op. cit.: Brougher, op. cit.
[67] See, for example, V. I. Vorontsov, "ETO Machinoexport Sells to 70 Countries." Journal of the U.S.-U.S.S.R. Trade and Economic Council, November/December 1978, p. 28; and V. N. Myshkov, "Traktorexport Technology Opens Worldwide Markets," Journal of the U.S.-U.S.S.R. Trade and Economic Council, March/April 1978, p. 36.
[68] See, for example, Berliner, op. cit.

may well lie in the areas of licensing, joint R. & D., industrial cooperation, and similar areas that would permit Western industrialists to tap the Soviet applied research base.[69] Soviet leaders have endorsed this in principle, but preference for product exports combined with the difficulty of engendering the necessary close and ongoing cooperation at the Soviet enterprise and Western firm level will hinder development of this mutually advantageous form of exchange.

VI. Analysis of Soviet Exports and Their Potential for Encountering Western Import Restrictions [70]

The success Soviet exports will have in penetrating Western markets will depend, in part, on the resistance these exports meet from Western countries' import restriction measures. This examination briefly reviews the import protection tools of the United States and the European Community (EC) which have been or could be employed against exports from the Soviet Union. Our intent is to tentatively identify product groups which might meet import restricting measures in the near term.[71]

The United States and the European Community employ both ex ante and ex post protective systems against the exports of centrally planned economies (CPE). The most important forms of ex ante systems, which provide protection prior to importation, include denial of MFN (the Soviets currently do not have U.S. MFN privileges, and the presence of a quota system established by the European Community for the exports of state-trading countries. In Europe generally, centrally planned economies, exports can face arbitrary denial of "automatic" import licenses.

Ex post systems such as anti-dumping laws, countervailing duty regulations, market disruption provisions and safeguards actions afford protection once the imported goods have entered the Western market.[72]

In general, both ex post and ex ante trade restrictive measures tend to be taken against manufactured products, rather than raw materials or agricultural commodities. Most industrialized Western countries with deficient resource bases seek to import raw materials at the lowest possible prices, and protect affected domestic industries through subsidization, rather than import restraint. Agricultural sectors are afforded a large degree of protection, again primarily through subsidization. Since the 1974–75 recession, new trade restrictions have been imposed on a number of products, most of which are concentrated in a few manufactured product groups—textiles, clothing, shoes, steel, trans-

[69] DeHaven, op. cit., stressed this approach 5 years ago.

[70] This section was written and researched by Deborah A. Lamb.

[71] Over 80 percent of the goods exported by the Soviet Union to the industrialized West in 1977 were exported to European Community members. Though Japan is a major importer of Soviet goods (over 14 percent of Soviet exports to the industrialized West in 1977), Japanese imports from the Soviet Union are mostly raw materials, principally wood and wood products and textile fibers. While Japan does maintain formal and informal restrictions on sensitive items, these restrictions are global and do not discriminate specifically against exports from communist countries.

[72] For a detailed description of the import restriction practices of several Western countries see Karen Taylor. "Import Protection and East-West Trade: A Survey of Industrialized Country Practices." East European Economies Post Helsinki. Submitted to the Joint Economic Committee August 1977. pp. 1132–1174.

port equipment (mainly ships) and diverse light engineering products.[73]

Exports of raw materials are predominant in the export structure of the Soviet Union. Though it is difficult to quantify the amount of ex ante protection provided by denial of MFN, taking the United States as a case in point, econometric techniques suggest that the level of U.S. imports from the Soviet Union would not have been substantially greater (about 9 percent) in 1975 and 1976 (preliminary calculation) if MFN had been available.[74] This is lower than the difference calculated for the other centrally planned economies and is explained in part by the concentration of natural resources exports, which are not generally subject to large tariff differentials, in U.S. imports from the U.S.S.R.

Ex post protective measures taken by the industrialized West against Soviet products have been relatively restrained. The restrictions imposed by the ex ante measures have already eliminated some potential candidates for import restrictions and, clearly, more import restrictions are taken against major trading partners which have open access to the domestic market. For example, since 1955 only two antidumping cases initiated in the United States against Soviet products have resulted in affirmative findings—pig iron (initiated in 1966, determination in 1968) and titanium sponge (initiated in 1967, determination in 1968).

A recent study conducted by the Bureau of East-West Trade examined Communist country exports to the Industrialized West in sectors defined to be sensitive at the two-digit SITC level.[75] Two categories of sensitive goods were defined. Highly sensitive sectors included textile fabrics (SITC 65), clothing (SITC 84), iron and steel (SITC 67) and footwear (SITC 85). Moderately or potentially sensitive sectors included textile fibers (SITC 26), chemicals (SITC 51 and 59), manufactured fertilizers (SITC 56), plastic materials (SITC 58), metal manufactures (SITC 69), electrical equipment (SITC 72) and transport equipment (SITC 73). Soviet exports of goods falling within the highly sensitive category represented, in 1977, only 2 percent of total Soviet exports to the industrialized West, while exports of potentially sensitive goods accounted for 13 percent of total exports to the industrialized West. The shares of Soviet exports falling within sensitive sectors was far below the average share posted by other centrally planned economies and well below the percentage of total world exports to the industrialized West in sensitive sectors.

Of the top 50 items exported by the Soviet Union to the IW in 1977 (see table 3), only 4 fell into the highly sensitive category, as defined in the Bureau of East-West Trade study. Among the four, three were iron and steel products—ferroalloys, coils for rerolling and pig iron, and the fourth—carpets and rugs. The dollar values involved

[73] An interesting study on protectionism has been prepared by the GATT Secretariat. See Richard Blackhurst, Nicolas Marian and Jan Tumlir, "Trade Liberalization, Protectionism and Interdependence." GATT Studies in International Trade Number 5. Geneva, November 1977.

[74] See Helen Raffel, Marc Rubin, Robert Teal, "The MFN Impact on U.S. Imports From Eastern Europe," East European Economies Post Helsinki. Submitted to the Joint Economic Committee, August 1977. Pp. 1396–1427.

[75] See Karen Taylor and Deborah Lamb, "Communist Country Exports in Import Sensitive Sectors." Issues in East-West Commercial Relations. Submitted to the Joint Economic Committee, January 1979, pp. 125–167.

were small. Soviet exports of ferroalloys in 1977 represented only 1.6 percent of total world exports of ferroalloys to the industrialized West in 1977; coils for rerolling accounted for 1.9 percent of total world exports to the industrialized West; pig iron, for 4.6 percent and carpets and rugs, 3.6 percent. And, according to the definitions presented in the study, only 6 of the top 50 Soviet exports to the industrialized West in 1977 could have been considered moderately or potentially sensitive. These were raw cotton, radioactive chemicals, hydrocarbons, potassic fertilizers, passenger cars, and ships. Nevertheless, though the Soviet export structure is weighted in favor of commodities which are not likely subjects of import restraint, among the centrally planned economies, the Soviet Union is a major supplier, in value terms, of such sensitive commodities as textile fibers, chemical elements and compounds, and manufactured fertilizers.

It is likely, then, that most ex post restrictive measures taken against Soviet exports would be directed against goods which compete with products of highly or potentially sensitive domestic sectors, and of which the Soviet Union is a major supplier. This has been generally the case to date, with respect to actions taken by the United States and by the EC.

Aside from the two U.S. antidumping cases mentioned earlier, few ex post actions against Soviet exports have been initiated in this country. However, legislative restrictions, such as prohibition on "entry or withdrawal from warehouse, for consumption of ermine, fox, kolinsky, marten, mink, muskrat, and weasel furskins, raw or not dressed, or dressed which are products of the U.S.S.R. or of Communist China" introduce political elements in import protection.[76]

Another case involving Soviet exports of light manufactured products to the United States is currently pending. In December 1978, the United States issued new regulations revising the method of quota allocation for duty-free watch imports from the insular possessions. The Soviet Union has been a major exporter of watch components to the Virgin Islands, where they are assembled for reexport to the United States, and it is possible that the new regulations could serve to decrease Soviet exports of watch components. The regulations are currently in litigation.

And in July 1979, a group of U.S. ammonia producers filed a petition with the International Trade Commission under section 406 of the Trade Act of 1974 alleging that increased imports of ammonia from the U.S.S.R. are disrupting domestic markets.

Restrictive actions have been few, relative to the number of actions taken against the United States' major trading partners, such as the European Community and Japan, and the developing country suppliers of such sensitive commodities as clothing, footwear, and other light manufactures. This is attributable to the low volume of trade, to the Soviet export structure and to the ex ante protection already provided by denial of MFN.

Soviet trade with the countries of the European Community is larger and more expansive than United States-Soviet trade, and con-

[76] This provision was introduced as part of the Trade Agreements Extension Act of 1951 (by Senator Joseph McCarthy). It is to be found in schedule 1, pt. 5, subpt. B, headnote 4 of the Tariff Schedule of the United States Annotated.

sequently, the number of restrictive actions taken against Soviet exports has been greater. Both ex ante and ex post restrictions tend to affect products, however, that fall in the same general sensitive categories mentioned above. Ex ante restrictions in the form of unilateral import quotas against commodities of state-trading countries are applied by individual Community members to Soviet exports in the following categories (a partial list) : [77]

Benelux: Aluminum, zinc.

Denmark: Cotton and manmade fiber clothing, textile products, glass, and furniture.

Federal Republic of Germany: Chemicals, wood and wood products, textile fibers, textile fabrics, clothing, footwear, ferrochromium, steel wire, zinc, musical instruments of metal, toys.

France: Vodka, certain foodstuffs, anthracite, carbon, crude petroleum, gasoline, porcelain, essential oils, certain paper products, radio and television reception equipment, electronic components, certain measuring instruments.

Ireland: Woven fabrics.

Italy: Excavation equipment, tractors, automobiles, motorcycles, crude oil, gasoline, ferro-manganese, zinc, kraft paper, brandy, porcelain and other glassware, certain chemical products.

United Kingdom: Matches, woven fabrics of cotton, certain items of apparel, porcelain, radio and television receivers, electronic valves and semiconductors.

The European Community also administers communitywide rules for imports from state-trading countries (regulation (EEC) No. 109/70, December, 1969) which provide the framework for seeking consultations or taking actions against non-GATT countries. There are provisions, however, which allow individual members to temporarily "exempt from Community action," (that is, to exempt from Community decision to treat products in a common manner) certain products originating in specific countries. This action restricts the free circulation of goods within the Community, after the goods have been imported by a given Community member, and has been used with increased frequency in recent months. Normally, such items would be allowed to travel freely within the Community, but the decision by one country to exempt a product from Community action restricts the circulation of the goods. For example, certain goods imported by France could not be reexported to, say the Federal Republic of Germany, if the Federal Republic of Germany has exempted the item from Community action. The impact on trade is unknown, but could serve to decrease European Community imports of exempted items from the exporting country, at least in the short run. At present, the Federal Republic of Germany and Benelux countries have exempted from Community action regenerated textile fibers from the U.S.S.R.[78] and the Benelux countries have also exempted from Community action drawn or blown glass from the U.S.S.R.[79] In addition, for 1979, importation into Italy of Soviet electric filament lamps is subject to import authorization and quantitative restriction.[80]

[77] Official Journal of the European Communities No. 1370/77. December 1977. These quotas apply for 1978; the quotas for 1979, are, as of this writing, still in draft form.
[78] Official Journal of the European Communities. No. 251/19. September 1978.
[79] Official Journal of the European Communities. No. L 251/19. February 1979.
[80] Official Journal of the European Communities. No. L/10/5. January 1979.

The European Community also administers antidumping and countervailing duty regulations on a communitywide basis. Three antidumping/antisubsidy cases are pending against Soviet products at this time: Haematite pig iron, fiber building board, sodium carbonate, and standardized electric multiphase motors.[81]

An antidumping investigation initiated in May 1978 on imports of kraft liner paper and board from the Soviet Union was terminated in July 1978.[82] As for countervailing duty actions, none are pending against the U.S.S.R. at this time. In addition, most European Community members apply quotas, through the European Coal and Steel Community, either global or discriminatory, on imports of third-country coal. (The largest European Community markets for Soviet coal exports have been Italy and France.) A unilateral action not sanctioned by the Community occurred in February 1978 when the United Kingdom applied a full embargo of indefinite duration on steel imports from the Soviet Union.

It would appear from this cursory examination that, though Soviet exports are concentrated in raw materials and natural resources, there are a few commodities which have met and may continue to encounter restrictive actions. These commodities generally fall into categories of goods which are readily and universally defined as sensitive. However, even in those few cases, the dollar values involved are probably small enough to render difficult a determination of significant cause of injury to a domestic industry. It is possible, though, that Soviet exports of chemicals, iron and steel products, textile fibers, certain light manufactured goods, and possibly passenger cars (as Soviet export capabilities increase), may encounter Western ex post import restriction actions, particularly if the level of ex ante protection is reduced somewhat through the granting of MFN or continued liberalization of the European Communities' quantitative restrictions.

Appendix A

Machinery, transport equipment and instrumentation items from SITC 7 and 86 that were not classified as high technology in this report.

SITC	*Description*
7112	Boiler house plant.
7113	Steam engines.
71141	Internal combustion engines for aircraft.
7115	Other internal combustion engines.
7116	Gas turbines, ex. for aircraft.
71189	Other engines, n.e.s.
712	Agricultural machinery and implements.
7141	Typewriters and check-writing machines.
71491	Duplicating, addressing, etc., machines.
7152	Metal-working machinery ex. machine tools.
717	Textile and leather machinery.
7181	Pulp, paper and paper article machinery.
71821	Bookbinding machinery.
71829	Printing machinery, n.e.s.
7183	Food-processing machinery.

[81] See the Official Journals No. C 35/3, February 1979; C286/16, November 1978; C 277/4, November 1978, and C 103, April 1979, respectively.

[82] Official Journal of the European Communities No. C174/2, July 1978.

SITC	Description
7184	Construction and mining machinery, n.e.s.
71851	Mineral crushing, sorting, etc. machinery.
7191	Nonelectric heating and cooling equipment.
7193	Mechanical handling equipment.
7194	Domestic appliances, nonelectric.
71953	Motorized hand-tools, nonelectric.
7196	Other nonelectric machines (incl. packaging and weighing machinery, vending machines, etc.)
7197	Bearings.
7198	Nonelectric machinery, n.e.s.
71991	Foundry and other molds.
71993	Transmission shafts, etc.
71999	Nonelectric machinery parts, n.e.s.
722	Electric power machinery and switchgear.
723	Machinery for distributing electricity.
7241	TV receivers.
7242	Radio receivers.
725	Domestic electric machinery.
72912	Storage batteries.
7292	Electric lights.
7294	Automotive electrical equipment.
72951	Electric supply meters.
7296	Electro-mechanical hand tools.
731	Railway vehicles.
732	Road motor vehicles.
733	Road vehicles, non-motor.
73491	Airships and balloons.
7353	Ships and boats ex. warships.
7358	Ships, etc., for breaking up.
73593	Floating structures ex. vessels.
8612	Eyeglasses and frames.
8615	Movie and sound equipment.
86159	Photographic equipment, n.e.s.
8617	Medical instruments, n.e.s.
8618	Nonelectric meters and counters.
8623	Photographic chemicals in measured portions.
863	Developed movie film.

In addition, the items described in appendix B were omitted from our high technology list, although with a lesser degree of certainty.

Appendix B

Items which some of the Department of Commerce Office of Export Administration specialists suggested might contain important high technology products, but which we chose to omit from our select list.

SITC	Description	Remarks
7111	Steam-generating boilers	Might include nuclear plant types, but these are highly developed in U.S.S.R.
71181	Water turbines	Hydroelectric turbine technology is very advanced in the U.S.S.R.
71822	Type making and setting machinery	Advanced models have built-in computers.
71994	Metal-plastic joints (gaskets)	1 model (viton) is made of high technology plastic material.
726	Electromedical and X-ray apparatus	Perhaps some is classifiable as high technology.
8614	Photographic cameras	High-speed cameras might be considered high technology.
8624	Photographic plates, film, etc	Some are of advanced type.
8641	Watches	Some are high technology consumer products.
8642	Clocks	Perhaps some are high technology.

U.S.S.R.: THE ROLE OF COMPENSATION AGREEMENTS IN TRADE WITH THE WEST

(By Dennis J. Barclay*)

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I. INTRODUCTION

The U.S.S.R. has increasingly looked to compensation agreements with Western firms to repay the costs of buying Western equipment and technology. The exports guaranteed under the more than 45 agreements concluded over the past decade in fact will have a value much larger than the $8 billion worth of agreement-related imports from the West.

Earnings from agreements signed thus far will boost Soviet hard currency exports in the 1980s especially. The rise in earnings from compensation deals—from about $1.5 billion in 1978 to nearly $4

*Research analyst with the Office of Economic Research, Central Intelligence Agency.

billion in 1985—will soften the impact of the expected decline in oil production in the early 1980s and the resulting fall in oil exports to the West.

Although Soviet interest in compensation agreements with the West has intensified, the rate at which new deals have been concluded has fallen off considerably in the last four years. Internal Soviet problems and Western disenchantment stand in the way of negotiating new agreements. On the Soviet side, the policy of committing Soviet raw materials as the price for Western help in developing Soviet resources has been questioned. The Soviet bureaucracy, moreover, is ill equipped to handle compensation agreements, while Soviet doctrine clearly conflicts with Western demands for equity participation and/or management control. Even if agreements can be reached in principle, the primitive level of Siberian infrastructure and the difficulties involved in taking on several large development projects simultaneously will slow the proliferation of compensation arrangements.

On the Western side, companies are reluctant to accept many Soviet products. Unlike in 1974, when fuel and raw material shortages made long-term supplies of Soviet products attractive to Western firms, they now regard compensation agreements as a disagreeable condition for winning Soviet contracts. The depressed West European chemical industry is already worried about the chemical fertilizers and petrochemicals that the U.S.S.R. soon will begin to export under compensation agreements. Deals involving energy-based exports, on the other hand, continue to interest Western companies.

Despite the reduced appeal of compensation agreements, the U.S.S.R. is currently negotiating several large deals with Western firms. If concluded, they would increase Soviet raw material production and exports appreciably by 1985. The negotiations now under way center on chemicals, wood and wood products, oil, natural gas, and aluminum. Over the longer term, compensation agreements tied to Siberian natural gas deposits in Yakutsk and Urgengoy, a major steel complex, copper deposits, and exploitation of offshore oil reserves could materialize.

But Soviet ability to conclude these agreements will turn on:

- Soviet willingness to modify its demands so as to entice Western commercial interest.
- The willingness of the West to extend much larger credits to the U.S.S.R.
- The pace of Soviet internal development, especially in Siberia and the Far East.
- Western requirements for Soviet raw materials coupled with a willingness to rely on the U.S.S.R. as a supplier.

The expected downturn in oil production and other economic problems may make the U.S.S.R. more accommodating as it tries to boost domestic energy production and develop alternative hard currency exports. The enthusiasm of Western firms will depend on the pace of economic growth and overall East-West relations.

II. Background

The major impetus behind the rapid expansion of Soviet trade with the West in the 1970's has been the desire to acquire capital,

technology and equipment to develop Siberia and to expand production in certain high-priority industrial sectors. The U.S.S.R. is counting on Siberia with its untapped deposits of oil, natural gas, coal, timber, copper, and other metals to support economic growth in the 1980's and beyond. Western help also has been sought in expanding production in several important industries—chemical fertilizers, petrochemicals, motor vehicles, and both ferrous and nonferrous metals—in which Soviet technology lags the West or in which expanded capacity is needed quickly.

Largely because of the extensive use of long-term Western credits to accelerate the acquisition of capital goods from abroad, Soviet debt to the West has grown from less than $1 billion at the end of 1970 to roughly $11 billion at the end of 1978. To provide a large share of the foreign exchange required to meet debt repayment obligations, the U.S.S.R. has sought compensation agreements with Western firms. There agreements cover Soviet exports as well as imports; a Western firm contracts to supply equipment for a Soviet project and Soviets obtain guarantees from Western firms to purchase Soviet products—often from the output of the project.[1]

Although Moscow concluded its first compensation agreements in the 1960's,[2] it was not until the early 1970's that the Soviets began a major push. In 1971–72 several massive projects proposed to Western firms called for product payback.[3] Meanwhile, compensation agreements have received strong endorsement from the Soviet leadership. Brezhnev's February 1976 report to the 25th Party Congress stressed the importance of compensation agreements in the 1976–80 plan. In early 1976, a spate of articles in the Soviet press pointed to compensation agreements as a new form of economic collaboration with the West. Several technical articles have set forth the theoretical criteria for assessing the efficiency of compensation agreements.[4] Since 1976, Soviet policy statements about trade with the West have usually given prominence to the virtues of compensation agreements.

Compensation agreements indeed offer several advantages to the U.S.S.R. They are an economical way to obtain equipment from the West. Soviet purchases are financed by long-term government-backed credits with very low real interest rates.[5] Since, for a given project, compensation exports will—at a minimum—roughly match debt service requirements, the real cost of the equipment to the U.S.S.R. is essentially the alternative output sacrificed by assigning domestic resources to building the project and—later—producing the portion of the output used as payback.

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[1] For a discussion of the definition and mechanics of compensation agreements, see appendix A. These agreements are also called "product payback" or "product buy-back."

[2] Among the first were a gas-for-pipe deal with Austria (1968) and a timber agreement with Japan (1968). Compensation agreements bear little relationship to the concessions granted to Western firms in the 1920s. In the latter case foreign firms—in return for royalty payments to the Soviet Government—were allowed exclusive rights to develop and exploit commercial opportunities within the U.S.S.R., investing capital goods, technology, and in some cases labor.

[3] The product payback form of transaction is not limited to Soviet-Western deals. A similar pattern has developed for Soviet projects in which East European countries are investing. Soviet aid projects with less developed countries reverse the flows: Soviet aid is often repaid by later deliveries from the project.

[4] V. G. Vasil'yev and V. A. Sorokin, "On the Question of Economic Effectiveness of Compensation Agreements," Dengi i Kredit, August 1976, and V. Savin, "The Effectiveness of Cooperation on a Compensatory Basis," Foreign Trade, May 1977.

[5] Loans for the projects carry an average interest rate of about 7 percent, roughly equal to the inflation in world prices of the products to be delivered by the Soviets as repayment.

Compensation agreements also reduce risk. The heavy reliance of the Soviet economy on planning makes reduction of risk important to Soviet managers, who have found foreign trade with the West particularly difficult to plan. The latest Western recession, for example, hit Soviet exports hard. Reduced demand in 1975 virtually halted the rapid growth in Soviet hard currency exports, driving home to Moscow the dependence of Soviet exports on Western economic conditions. Under compensation agreements Soviet industrial ministries and foreign trade organizations are guaranteed long-term export markets, providing protection from developments in the West that would otherwise reduce Soviet export earnings and hard currency reserves.

The Soviet drive to conclude compensation agreements is in part an effort to placate those in the West who are concerned with the rapid growth of the U.S.S.R.'s debt. Soviet officials can point to long-term export contracts under these agreements as proof of the U.S.S.R.'s ability to service its debt.

Compensation agreements, by providing for a guaranteed market, will also help Moscow establish export industries. Soviet enterprises will gain experience in producing for export while Soviet products establish niches in Western markets. In all likelihood, the U.S.S.R. hopes to renew export contracts after compensation agreements expire.

III. Review of Existing Agreements

The U.S.S.R. has concluded more than 45 compensation agreements with the West in the past decade.[6] (The agreements are listed in appendix B; project locations are shown in figure 1.) Under these agreements, almost $8 billion in Western equipment and technology will be installed in the Soviet Union. In some cases—natural gas and coal—equipment, technology, and pipe were imported to develop export industries; export earnings guaranteed under compensation agreements far exceed the capitalized cost of project-associated imports. In other instances (chemical plant imports, for example), the primary Soviet goal has been to develop productive facilities to meet domestic needs, siphoning off only that portion of output required to repay project-associated debt.

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[6] Soviet officials claim more than 60 compensation agreements with Western firms. This number probably includes some which have not been signed, some very small deals, some contracts which do not fit the definition used in this paper, and some exaggeration. For example, the Soviets identify the Moscow World Trade Center, financed by U.S. Eximbank credits, as a compensation agreement because the complex will be rented to Western firms.

Figure 1

A. Natural Gas

The most important agreements in terms of boosting Soviet exports have been the gas-for-pipe deals, which provide for Western exports of large-diameter pipe to be installed in pipelines to carry Soviet gas to Western Europe. The gas-for-pipe deals will generate Soviet exports worth many times the $2.8 billion spent on Western pipe and pipeline equipment. Under some of the agreements, exports will continue into the 21st century (see table 1). The first gas deal was signed with Austria in 1968, and similar contracts have since been signed with Italy, West Germany, and France. Soviet hard currency gas exports under these and supplementary contracts reached about 17 billion cubic meters in 1978 and are scheduled to reach 34 billion by 1985 as additional pipelines are completed. Hard currency earnings from gas sales will account for 60 to 75 percent of Soviet earnings from compensation agreements signed so far (see table 2).

The earnings from natural gas sales will depend on hard-to-predict fuel prices. The contracts call for prices to be adjusted in line with changes in prices of other fuels, assuring the Soviets of higher earnings as Western energy prices rise. Soviet trade data show that prices received in 1976 were about half the $60 per thousand cubic meters charged by other gas exporters. Prices apparently rose substantially in 1977 and 1978.[7]

The Soviets will probably benefit from large gas price increases for the next several years. There will be strong upward pressure on gas

[7] The U.S.S.R.'s omission of quantity data on gas exports in 1977 and 1978 precludes an accurate estimate of prices.

TABLE 1.—U.S.S.R.: SCHEDULED NATURAL GAS EXPORTS

[In billion cubic meters]

	Austria	France	Italy	West Germany	Total
1976 [1]	2.8	1.0	3.7	4.0	11.5
1977	2.3	1.5	6.5	5.0	15.3
1978	2.4	2.0	7.0	7.0	18.4
1979	2.4	2.0	7.0	8.5	19.9
1980	2.4	4.7	7.0	9.0	23.1
1981 [2]	2.7	5.0	7.0	10.5	25.2
1982	3.0	5.5	7.0	11.5	27.0
1983	3.3	6.0	7.0	12.5	28.8
1984	3.8	7.0	7.0	13.5	31.3
1985	4.2	7.7	7.0	15.0	33.9
1990	4.2	7.7	7.0	15.0	33.9
1995	2.8	7.7	7.0	8.0	25.5
2000	2.8	3.7	7.0	8.0	21.5

[1] Actual exports reported in U.S.S.R. trade statistics.
[2] Amounts for 1981 and thereafter include Soviet deliveries to Austria, France, and West Germany under a switch agreement concluded with Iran in 1975. The new regime in Iran recently cancelled the agreement, casting doubt on whether the U.S.S.R. will proceed with the exports to Western Europe.

TABLE 2.—U.S.S.R.: SCHEDULED COMPENSATION EXPORTS

[In millions of U.S. dollars]

	1977	1978	1980	1985
Total	828	1,453	1,994	3,933
Natural gas	566	1,063	1,192	2,948
Chemicals	15	127	281	326
Wood products	239	263	403	10
Coal	0	0	55	576
Metals	8	0	63	73

prices because of rising energy prices in general, and even faster increases in gas prices to narrow the gap between oil and gas prices. Thus, annual price increases of 10 percent through 1980 and 15 percent thereafter seem likely. These prices would earn Moscow $1.2 billion in 1980 and nearly $3 billion in 1985 under current gas delivery schedules.

B. Chemicals

The Soviet chemical industry has been the main customer for Western equipment over the past several years, and $3.2 billion of the orders have been delivered under compensation agreements.[8] Unlike the gas-for-pipe deals, chemical compensation agreements usually call for exports approximately equal to the value of imports or to the value of credit repayments plus interest.

In the only major compensation agreement with the United States, Occidental Petroleum and Chemico Construction are helping to build four ammonia plants at Tolyatti, an ammonia pipeline to Odessa, and port facilities to ship ammonia from Odessa to the United States.[9] Part of the $400 million project is financed by U.S. Eximbank credits.

[8] See CIA publication, ER 78–10554, "Soviet Chemical Equipment Purchases From the West: Impact on Production and Foreign Trade," ER 78–10554.
[9] Under a separate agreement (not counted as a compensation agreement), Occidental will exchange superphosphoric acid for deliveries of Soviet ammonia, potash, and urea. This counterpurchase agreement is to run from 1978–97 and could be worth $1 billion annually in two-way trade.

Occidental began accepting ammonia early in 1978; the port facilities were dedicated in August 1978.

Most Soviet chemical compensation agreements, however, are with West European and Japanese firms. Italy, Japan, and France will also receive Soviet ammonia as the export component of compensation agreements for several ammonia and other chemical plants. There are also a number of West European—particularly West German—compensation agreements for petrochemicals.

C. Other Major Agreements

There have been a few large deals in other industries, particularly three timber agreements with the Japanese. Under the first—signed in 1968—Tokyo exported $166 million in bulldozers, other timber-processing equipment, and consumer goods in exchange for 8 million cubic meters of Soviet timber, wood chips, and pulp that were delivered during 1969–73. This was followed by a 1971 agreement for another $50 million in Japanese equipment and Soviet shipments of wood chips and pulpwood. According to the third agreement, signed in 1974, Japan will export $500 million in equipment and $50 million in consumer goods in 1975–79 and will take delivery of 17.5 million cubic meters of logs and 900,000 cubic meters of wood products from the U.S.S.R.

Japan in 1974 also agreed to help the Soviets develop the South Yakutsk coal fields with $450 million worth of equipment in exchange for coking coal. Scheduled coal deliveries include 1 million metric-tons per year from the Kusnetsk deposits in 1979–98 and 3.2 million metric tons per year from Yakutsk beginning in 1983 (when the completion of the Baikal-Amur Magistral (BAM) railway is scheduled), reaching 5.5 million tons in 1985, and continuing at that level through 1998.

In the only major compensation agreement for a metallurgy project, Pechiney-Ugine-Kuhlmann of France agreed to supply an alumina plant and will receive 100,000 tons of aluminum bars annually when the plant begins operation, probably about 1980.

IV. Role of Compensation Agreements in Total Soviet Exports

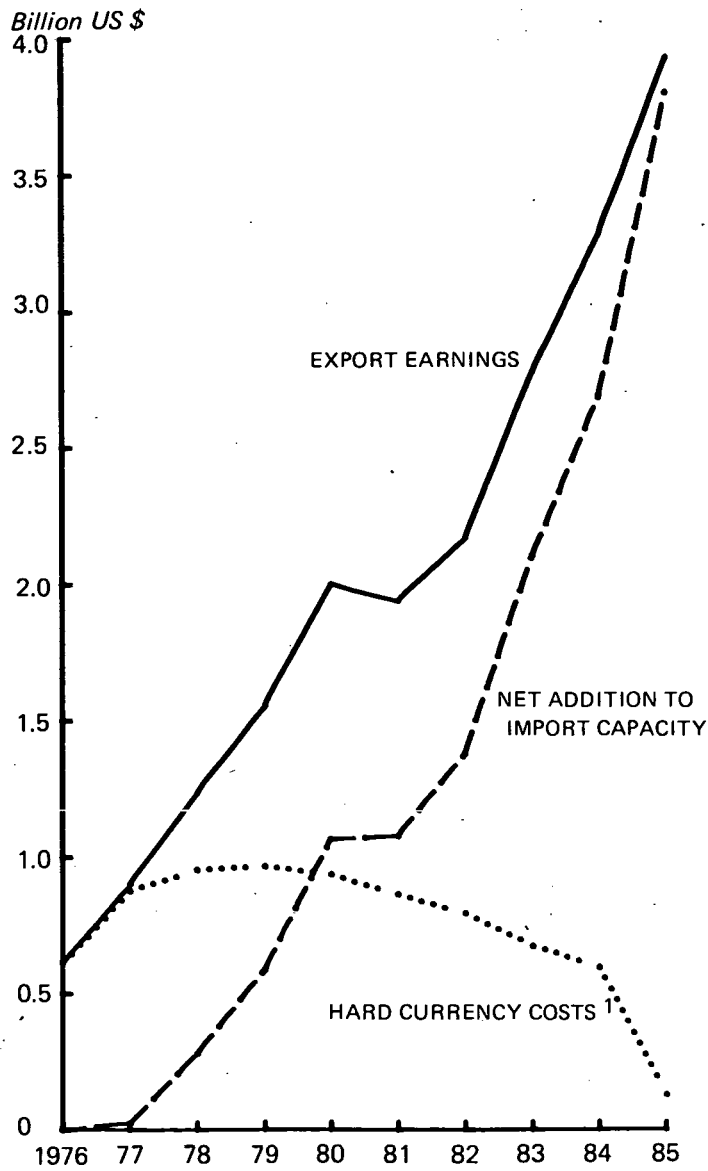
Several of the projects financed under compensation agreements are now underway on roughly coincident timetables. They were proposed in the early 1970's, signed in the mid-1970's, and are now in the import-construction stage. Production and exports from most of these projects will begin in 1 or 2 years. Because compensation exports in most cases will not displace traditional Soviet exports, they will add a substantial layer to the export base. As these compensation agreements come onstream, they will therefore provide a major boost to Soviet hard currency exports. Compensation exports from signed deals will rise from about $1.45 billion in 1978 to $2 billion in 1980 and nearly $4 billion in 1985 and will constitute a major share of hard currency exports by 1985.[10]

An analysis of compensation agreements in isolation shows that revenues from the deals will far exceed costs, yielding Moscow substantial increases in import capacity in the 1980's (see fig. 2). Largely because of the profitable gas and coal deals, the Soviets will net nearly $4

[10] All figures in current dollars.

billion annually by 1985, when most of the debt associated with Soviet imports will have been repaid.

USSR: Estimated Hard Currency Flows From Signed Compensation Agreements



1. Downpayments and debt service on imports under existing compensation deals.

Figure 2

Moscow will depend heavily on compensation exports in the 1980's. Soviet hard currency exports increased rapidly in the early 1970's; however, recent export growth has been slower—the annual increase in 1975–78 was about one-half the 36-percent average annual growth from 1970 to 1974. The Soviets increased hard currency oil sales to about 1.1 million barrels per day in 1977–78—nearly 10 percent of production. The amount of oil available for export to the West should fall absolutely in the early 1980's because of an expected decline in production. Although prospects for other raw material exports are brighter, they are unlikely to offset the loss of oil revenues.

V. Some Constraints on Soviet Use of Compensation Agreements

The impact of the looming oil crisis on foreign trade thus heightens the importance of compensation agreements. In the early 1980's, the increase in compensation exports will be a sizable offset to the decline in oil exports. Nonetheless, the growth of hard currency export earnings will probably be lower than in the past. Despite greater Soviet interest, few major compensation agreements have been signed since 1974. In that year, $2.4 billion in such agreements were concluded, including the Occidental fertilizer agreement, two major resource development projects with Japan, and three natural gas deals with West Germany and Austria. In the following 3 years the annual average of deals concluded was roughly $1 billion. The decline is a function of both internal Soviet problems and disenchantment in the West.

A. Domestic Constraints

Compensation deals that require a continuing Western presence, Western ownership, or Western control over production are alien to Soviet doctrine. The U.S.S.R. is reluctant to allow any form of Western ownership within the U.S.S.R. and, to date, has been unsuccessful in attempts to satisfy Western equity demands by offering to structure jointly owned holding companies in the West. While the equity problem might be circumvented, there are other issues involved in Western participation. Moscow has yet to accede to onsite managerial and quality controls demanded by Western firms. It has also refused Western presence of any form in sensitive areas, making it difficult to take advantage of Western know-how associated with oil and gas exploration or to satisfy insistence on confirming Soviet oil and gas reserve figures. These questions are still being discussed, however (see below).

There is still high-level resistance within the U.S.S.R. to increased dependence on the West. Traditionalists like Suslov show much less enthusiasm than Brezhnev for a large-scale expansion of technological links with the West. Even Premier Kosygin, the leading advocate of expanded economic ties in the late 1960's, appears discomforted by the extent of economic interdependence promulgated by Brezhnev.[11]

[11] "Soviet Technological Progress and Western Technology Transfer to the U.S.S.R.: An Analysis of Soviet Attitudes"; prepared for the Office of External Research, Bureau of Intelligence and Research, U.S. Department of State; July 1978; pp. 21–23.

Soviet policy in general clearly has followed the views of the advocates of acquiring Western help, but the opponents have won some individual victories.

Aside from differences over the desirability of compensation deals, the Soviet economy can take on only so many major projects at the same time. Compensation projects require several rubles in Soviet resources per ruble of imports. Construction bottlenecks apparently have contributed to a slowdown in new agreements. The plan for construction of compensation projects in 1978 was 1.3 billion rubles, 164 percent greater than actual construction on projects in 1976. Construction efforts have not kept pace. A Soviet construction official blames poor planning, leading to a lack of coordination among construction enterprises, end-user ministries, and foreign suppliers for the poor performance.[12] After construction is finished, production often starts slowly because supplies have not been organized proprerly. In some cases supply problems will persist because of shortages of high-quality Soviet human and material resources required by advanced Western technology and equipment.

All of these problems stem in part from the undeveloped nature of the Soviet economy, particularly in Siberia. The Soviets obviously believe that an accelerated construction of the BAM and its feeder lines will permit more concrete discussions on large resource development projects; yet the line is not scheduled to be completed until 1983. Even where a transportation net exists, requirements for infrastructure investment will be formidable, sometimes raising the project-associated costs above the potential economic value of a project. In particular the lack of adequate housing and consumer amenities makes it difficult to attract and retain the manpower required to build and operate major production facilities.

Finally, the Soviet foreign trade bureaucracy does not handle compensation agreements easily. The major problem is coordination: All foreign trade organizations (FTO's) responsible for Soviet imports and exports related to the project must be brought into the agreement. One factor that has limited the range of projects proposed by the Soviets is the desire to keep compensation agreements within a single industry so that the ministry which uses imported equipment also produces the export goods stipulated in the agreement. In 1974, the Ministry of Foreign Trade created a department headed by Deputy Minister Vladimir Sushkov to promote and coordinate compensation agreements. Some increase in flexibility has resulted, but agreements cutting across industry lines still present formidable difficulties. It is too early to predict whether the recent reorganization of the Soviet foreign trade system will have any impact on the handling of compensation agreements.

B. Coolness in the West

For their part, Western firms show little enthusiasm for most of the compensation deals proposed by Moscow. Western firms compare the potential projects in the U.S.S.R. with similar deals available

[12] I. A. Bystrov, "Special Attention for Compensation Construction Projects," "Promylennoye Stroitel'stvo," No. 4, 1978, Moscow.

elsewhere where conditions regarding equity participation and managerial control are far more favorable and where the negotiating process is far less cumbersome. In addition, the Soviets have often tabled harsh financial demands including: (1) long-term credits to finance equipment required to develop related infrastructure as well as the production facilities; (2) medium-term credits to cover consumer goods purchases needed to defray local costs; and (3) deferred payments on the credits during the full period of plant construction.

The large number of agreements signed in 1974 reflected in part the eagerness of Western firms to insure long-term access to raw materials at a time of shortages. More recently the West has experienced slower economic growth, and excess capacity has appeared in some of the industries that produce products the Soviets would like to export. As a result, many firms are unwilling to enter into compensation agreements; those that do view them as competitive necessities. Soviet negotiators make it clear that if other factors are roughly equal, the Western firm willing to sign a compensation agreement will win the Soviet order.

The Western companies perceive a number of pitfalls in agreeing to accept deliveries of Soviet products over a long period. Western importers insist on favorable contracts under which prices are discounted and also adjusted annually or semiannually in concert with changes in a previously agreed-upon Western market price. Although guaranteed access to raw materials and semimanufactures is thus attractive during periods of commodity shortages, it can become a disadvantage when demand is slack and the Western firm finds it hard to market the products or to use them in its own plants.

Some Western firms are also reluctant to conclude compensation agreements because they do not want to sponsor additional competition in their markets. This is already a serious problem for the depressed West European chemical industry, which has been hurt by chemical exports from the East even though the largest increases in chemical exports from the U.S.S.R. are still 2 to 3 years away. Soviet exports of ammonia to the West, for example, are scheduled to exceed 3 million tons in the 1980's—an amount roughly equal to total free world trade in ammonia in recent years. The European chemical industry has requested help from the European Community; at a minimum, a system to monitor compensation agreements will probably be established.

On the other hand, Western concern over excessive dependence on Moscow for energy supplies has lessened in recent years because of Western Europe's desire to find alternatives to OPEC oil and Moscow's eagerness to establish a reputation as a reliable supplier. About 4 percent of Western Europe's total natural gas supply now comes from the Soviet Union; by 1985 the share will rise to about 11 percent. Of the largest Soviet customers, only Austria will depend substantially on Soviet gas (see table 3). The U.S.S.R. will probably continue to be Austria's only foreign source of gas, which by 1985 will constitute 14 percent of Austria's total energy needs. For other Soviet gas customers—Italy, France, and West Germany—the U.S.S.R. will provide an estimated one-fifth of gas supplies in 1985 but only 3 to 4 percent of their total energy. The degree of danger in this dependence

depends on: (1) The likelihood of a Soviet cutoff of supplies; and (2) the availability of alternatives. The size of Soviet gas exports in the 1980's means that an embargo on gas to Western Europe would not have much impact on total energy supplies in the affected countries, although a Soviet cutoff would cause a substantial reduction in gas supplies which would be difficult to replace in the short run.

TABLE 3.—SELECTED WEST EUROPEAN COUNTRIES: DEPENDENCE ON SOVIET NATURAL GAS IMPORTS

[Percent share]

	Natural gas imports	Natural gas supply	Total energy supply
Austria:			
1975	100	47	6
1980	100	48	9
1985	100	76	14
Italy:			
1975	22	9	2
1980	41	23	4
1985	27	18	3
France:			
1975	0	0	0
1980	21	28	2
1985	16	22	3
West Germany:			
1975	11	7	1
1980	18	13	2
1985	29	21	4

Source: OECD projections, scheduled Soviet gas exports.

VI. The Climate for New Deals

The U.S.S.R.'s mounting economic problems clearly incline the leadership toward compensation agreements. The need to develop Siberia and push up productivity increases requirements for Western capital, technology, and equipment. The same economic problems, however, cut into the U.S.S.R.'s export base and the hard currency needed for purchases from the West. The number and scope of projects now under negotiation attest to the Soviet commitment to compensation agreements as the preferred solution to the problem of financing imports from the West in the 1980's. But the pace at which new deals will be made will depend on how effectively the U.S.S.R. and its potential partners in the West overcome the problems discussed above.

If the Soviets are to undertake and complete the projects now under discussion, they will first have to show a stronger and more general commitment within the Soviet Government to attract Western participation. Moscow will have to overcome bureaucratic inertia, cut negotiation times (possibly by abandoning the past hard line on price, guarantees, credits, and other contract terms), and soften restrictions on the Western presence in the domestic economy. The latter condition is particularly important in energy projects. Without onsite inspection by Western experts, exploration times to prove up reserves will be longer than necessary, and Western firms will refuse to participate. Although the Soviets seem to be moving in this direction, they are not moving decisively or quickly.

The Soviets also will need a great deal of Western financing. The credits for the projects now considered likely could run between $10 billion and $15 billion; credits for projects that have been suggested

would perhaps amount to another $20 billion. The Soviet hard currency debt at the end of 1978 was about $11 billion. The $30 billion to $35 billion in credits necessary for these projects spread over a 10-year period compares to the level of export credits the Soviets have been receiving for all of their equipment purchases. Although the West would thus have to provide the Soviets with greater amounts of credit than in the recent past, private bankers and government lending agencies appear to be more receptive to Soviet credit requests that are backed by export agreements.[13]

The current state of certain Soviet bilateral relations complicates Soviet attempts to move ahead on compensation agreements in a special way. For example, the Soviets would like the United States to take the lead in many compensation agreements. Despite the greater distances involved, Moscow views the United States as a huge potential market for Soviet compensation exports. Moreover, the United States possesses unique technology and production capacity in a few areas—particularly oil exploration and drilling—that the Soviets badly need. The Soviets want U.S. Government approval implied by the granting of Eximbank credits, and other sources of capital are insufficient to finance the multibillion-dollar projects the Soviets want. Without Eximbank credits—the U.S. Eximbank window has in effect been closed to the Soviets by legislation since 1974—the prospects are poor for conclusion of major compensation agreements in the near term. Moreover, uncertainties regarding the control of oil and gas equipment exports to the U.S.S.R. cloud the prospects for energy projects that the Soviets have discussed with U.S. firms.

Soviet-Japanese relations also pose obstacles to Moscow's development plans. Japan is a natural partner for the U.S.S.R. in the development of Soviet resources because of its proximity to Siberia and because of its own weak raw material resource base. The Japanese, however, have hesitated at times to cooperate in a big way in the development of Siberia because of China's opposition and Tokyo's desire to avoid dependence on the U.S.S.R. for raw materials. The $20 billion, 8-year trade agreement signed by Japan and China in February 1978 calls for China to export oil and coking coal—two of the major commodities the Soviets would like to ship from Siberia.

The recent Chinese decision to expand economic ties with the West may hinder Soviet attempts to conclude compensation deals with West European and U.S. companies as well. Both the Chinese and the Soviets are contemplating development projects of unprecedented scale, raising the possibility that Western capital goods producers and credit markets may not be able to accommodate both countries' needs. Competition will likely be highest in areas—in the oil and metals industries, for example—where the two countries share a desire for Western assistance and are willing to offer similar products in compensation. On the surface the U.S.S.R. could find itself at a competitive disadvantage given the new Chinese willingness to allow Western onsite participation and to otherwise offer a more attractive package

[13] Lenders tend to overlook the fact that the U.S.S.R.'s debts are obligations of the state as a whole, not of the individual project or enterprise which receives the goods on credit. Exports from the individual project receiving the financing, while covering the repayment of project associated debt, make only a partial contribution to overall Soviet export potential—the key element of creditworthiness.

to Western producers. Even where the two are not in direct competition, to the extent that government-supported credits are subject to total ceilings, the granting of massive credits to China could limit the availability of credit to the U.S.S.R. Credit competition, in all likelihood, would not carry over to the private banking sector as long as Western bank liquidity remains high.

VII. Outlook

A. Deals Likely in the Near Term

Negotiations between Western firms and the U.S.S.R. are far advanced on several important projects. These deals could be signed within the next year or two. Given the leadtimes on these projects, some could be operational (and generating exports) by the early 1980's and almost all could be on stream by 1985. The large compensation agreements most likely to be underway before the start of the next 5-year plan in 1981 include the following (see fig. 3).

Figure 3

Yenesei River timber.—The existing forestry development agreement with Japan, due to expire in 1980, will probably be followed by an agreement for a pulp and paper project on the Yenesei River. The Soviets have discussed this project with Japanese and U.S. firms for several years.

New gas-for-pipe deals.—A recent energy forecast indicates that Western Europe will need substantial additional supplies of natural gas by 1985. The expected decline in Dutch gas exports in the mid-1980's (which now supply one-fifth of the West European gas market) will provide the Soviets with good opportunities for gas sales. The U.S.S.R. could conceivably supply another 5 billion to 10 billion cubic meters per year more than the 34 billion already scheduled. But Mos-

cow has not concluded any major gas deals for several years, presumably because of uncertainties regarding future domestic requirements. Nonetheless, Moscow has found gas-for-pipe deals to be extremely profitable and the need to boost nonoil exports in the 1980's should rekindle Soviet interest in compensation agreements for natural gas once the long-run energy picture is clearer. Valves and compressors, rather than pipe, will constitute the major bottleneck in pipeline construction, and the Soviets will have to turn to the West for these.

Sakhalin oil.—In 1974 the U.S.S.R. and Japan agreed to joint development of oil deposits offshore from Sakhalin Island in the Okhotsk Sea north of Japan. The agreement also called for development of natural gas in the area, but the project has concentrated on oil so far. Gulf Oil has a small share in the company established to carry out the project. Japan provided a $100 million credit for exploration; if reserves justify full development several billion dollars in credit will be needed. Japan would receive one-half of the oil production—at an 8.4-percent discount from world prices—possibly beginning about the mid-1980's and continuing for 10 years after the credits are repaid. According to a provision unique among compensation agreements, the Soviets need not repay the credits if recoverable reserves are not found. The area was surveyed in the spring of 1976, and test drilling began in August 1977. Two months later the Japanese and Soviets announced a promising oil strike off the northeast coast of Sakhalin, claiming that four test wells flowed at a combined rate of 700 barrels per day of high-quality crude. The exploration effort in the summer of 1978 yielded one commercially promising gas discovery.

Tomsk chemical complex.—The biggest chemical deal now under negotiation is a refinery-petrochemical complex at Tomsk in Siberia.[14] A contract seemed imminent in 1978, but negotiations have continued to drag on. A major problem has been that the Japanese and German firms bidding on the project do not want the chemical products the Soviets are offering to export.

Sayansk aluminum smelter.—The Soviets want to build a 400,000-ton-per-year aluminum smelter at Sayansk in Siberia. Pechiney-Ugine-Kuhlmann of France and a consortium of Kloeckner of West Germany and Alcoa of the United States are leading contenders for the $500 to $600 million contract. The deal would involve annual exports of about 100,000 tons of aluminum bars to Western Europe and the United States.

On balance, new agreements might add more than $2 billion per year to the estimated $4 billion of compensation exports already contracted for in 1985. The calculation assumes: Sales of an additional 5 billion cubic meters of gas to Western Europe ($600 to $700 million); a third timber agreement with Japan ($300 to $400 million); oil exports of about 100,000 barrels per day to Japan from the Sakhalin project ($1 billion); several smaller deals—the chemical plants at Tomsk, the Sayansk aluminum smelter, and a few other plants.

[14] An earlier proposal called for construction of a pipeline from the Tyumen oilfields to a Soviet port to ship 800,000 barrels per day to Japan. The deal seemed close to fruition in 1972, but the Soviets reduced the amount of oil offered from 800,000 to 500,000 barrels per day and the Japanese backed out.

B. Possible Development Projects

The Soviets are pushing several other projects that are either less likely to come to anything or less imminent than those discussed above. These additional projects, which could boost export earnings by several billion dollars per year, are concentrated in the energy area. But other possibilities include development of metal ore deposits and timber resources. With many of these projects located in Siberia, their implementation is likely to be tied to the completion of the BAM railroad, which is still several years away.

LNG: Yakutsk.—In the early 1970's the Soviets proposed that the United States join Japan in the Yakutsk liquefied natural gas project. The project would require a 3,700–4,000 kilometer pipeline from Vilyuisk to a yet-to-be-determined port liquefaction facilities, and three LNG carriers for Japan and eight for the United States. Japan and the United States each would receive 10 billion cubic meters of gas annually. According to recent estimates the project will cost $7 to $8 billion.

Yakutsk gas reserves must be confirmed before development can begin. Proved reserves are now about 800 billion cubic meters, and the 1 trillion cubic meters required for full development will probably be proved in the near future. The three parties will then decide whether to undertake the development phase. Delivery of Soviet gas probably could not begin until the 1980's.

LNG: North Star.—The North Star deal calls for development of the Urengoy gasfield in western Siberia, which (unlike the Yakutsk deposits) already has adequate proved reserves. The original proposal called for a 2,400-kilometer pipeline to Murmansk, a gas liquefaction plant at Murmansk, and purchase of 20 LNG tankers to carry 20 billion cubic meters of gas annually to the U.S. east coast for 25 years. North Star first was conceived as a United States-Soviet compact. When U.S. Government approval and Eximbank financing were not forthcoming, the U.S. consortium in 1976 turned to Western Europe as a source of financing and as a customer for 25 percent of the gas, which would be shipped by pipeline. Although both sides are still interested in seeing the project through, they have failed to agree on several basic aspects of the deal and further progress will be contingent on the willingness of the U.S. Government to allow large-scale imports of Soviet LNG.

Krusk steel.—A consortium of West German firms signed an agreement with the U.S.S.R. in 1974 to supply an iron ore pelletizing plant, a direct-reduction plant, two rolling mills, and an electric steel plant at Kursk. The deal originally called for the Soviets to pay cash for the $1 billion project, and supply West Germany with unspecified amounts of sponge iron pellets and semifinished steel in the 1980's. The project has barely limped along: Design changes and inflation have pushed the cost to between $3 billion and $4 billion so that the project will probably be scaled down drastically; the first major equipment contracts were not signed until late 1977 and the Germans now show little interest in exports from the project. Even if final agreement is reached soon, the first stage of the project could not be completed before 1983.

Udokan copper.—The Soviets have discussed development of the copper resources at Ukodan with Western firms since the mid-1960's.

In 1975–76 the Soviets requested proposals for a pilot copper processing plant from United States. British, and Japanese firms. Nothing has come of the talks, however, and the project—estimated to cost $2.5 billion—does not seem practical until the BAM rail line is completed. The Soviets may include the Ukodan project in the 1981–85 plan.

Offshore oil.—The Soviets are also interested in developing offshore oil deposits in the Caspian, Barents, and Kara Seas. Activity so far has mainly involved straight equipment purchases rather than compensation agreements that would provide for oil exports to the West. A recent proposal by Armco International and Phillips Petroleum calls for exploration and development of Arctic and offshore oil reserves and exports of oil to the West as repayment. The Soviets have also held discussions with British and French firms concerning the joint development of oil resources, but apparently no concrete proposals were made. Moscow wants to keep Western personnel away from some of these areas for security reasons, and technology to develop offshore Arctic deposits is not yet available even in the West.

C. Extension to Manufactured Goods?

Moscow has touted compensation agreements as a new form of collaboration with the West. So far, the projects are being carried out on a turnkey basis, in which the participation of the Western firm is essentially completed once the equipment is installed and production is underway. The plant and facilities are owned, managed, and staffed by the U.S.S.R. The Western firm has a claim on part of the output, but no equity in the project or control over product quality.

The Soviets have expressed interest in compensation deals involving manufactured goods, but have failed to conclude such agreements. At the 25th Party Congress in 1976, Brezhnev said that "it is perhaps time to extend the sphere (of compensation agreements) so as to include the manufacturing industry and look for new approaches to cooperation in production." Although increasing manufactured goods exports for hard currency is a longstanding Soviet goal, manufactured goods still represent only 6 percent of Soviet exports to the West. This disappointing performance has been the result of several factors: Insufficient incentives for Soviet enterprises to produce for export; shabby quality; poor marketing systems; and inability to adapt quickly to changing Western tastes. These problems also apply to exports covered under possible compensation agreements, and to them must be added the skepticism of Western firms regarding their ability to market the products on a long-term basis.

Western coolness has not deterred some Soviet officials. Deputy Minister of Foreign Trade Sushkov and the leadership of the Institute of the United States of America and Canada are apparently heading a drive to win approval for increased Western—especially United States—participation.[15] Despite such high-level commitment to change, the fact that no deals have been concluded indicates that a final decision has yet to be made. The issue has been well researched and, in all likelihood, Soviet decisionmakers are fully aware of the costs and benefits associated with direct Western participation in Soviet produc-

[15] Ye. S. Shershnev, "Soviet-American Economic Cooperation: Problems and Prospects," "USA: Economics, Politics, Ideology," May 1976, and V. Sushkov, "Compensatory Long-Term Trade Industrial Cooperation Between the U.S.S.R. and the Industrial Capitalist Countries," Foreign Trade, May 1977, and "Material Basis of Détente," Trud. Dec. 3, 1978.

tion. The economic problems listed above persist and long-standing doctrinal opposition to the type of arrangements Western firms insist upon remains. If the U.S.S.R. does accept Western demands, it will probably be for a major project that will have direct and significant benefits.

A well-publicized deal that was never consummated was a $30 to $40 million spark plug factory with the Bendix Corp. The proposal called for 25 percent of the production to be sold in the West and included provision for a Bendix employee located at the plant with the right to reject for shipment plugs not up to Bendix's standards. The deal—which appeared close to fruition in early 1977—fell through for several reasons, but largely because in the end the proposal was too radical for the Soviets. Other deals proposed to U.S. firms for joint ventures to produce and export diesel engines, truck axles, and computer equipment have foundered largely because of Moscow's failure to agree to Western firms' demands for an ongoing role at a Soviet enterprise.

If approval is given, the test case could be a joint venture to design and produce a new Soviet automobile. Sushkov led a Soviet delegation to U.S. automakers in early 1978 that proposed that the Western partner provide the design and production technology (with continuous updating) for a modern, small, front-wheel-drive car to be produced at the Moskvitch autoplant. About one-third of the planned output of 200,000 autos would be sold in Western Europe through the Western firm's marketing system.

Appendix A

Compensation Agreements: What They Are and How They Work

"A legal analysis of compensation agreements shows that it is very difficult to give them a precise and versatile definition because of their great variety of stipulations."—A. Belov, Deputy Chief of the Treaty and Law Department, U.S.S.R. Ministry of Foreign Trade, in March 1976.

As Belov's remark indicates, there is some confusion in the U.S.S.R. about how to define compensation agreements. The confusion in the West is even greater, with the usage of a number of terms to describe and differentiate among various types of agreements: countertrade, a general term often used synonymously with compensation agreements, usually refers to transactions which call for both exports and imports; in counterpurchase deals, the exchanges are made more or less simultaneously and on a cash basis; barter is a primitive form of counterpurchase in which the exchanges are balanced and no currency payments are involved; product payback arrangements are compensation agreements which specify that exports come from the project which receives the imports. These terms are often used incorrectly or interchangeably.

In this study, all of the above are described as either counterpurchase or compensation agreements. Although counterpurchase arrangements are most prevalent in Eastern Europe, the U.S.S.R. has some major counterpurchase agreements, of which the best known is the barter portion of the Occidental agreements. Two other prominent ones are the Pepsi Cola deal, involving shipments of Pepsi concentrate to the U.S.S.R. in exchange for equal quantities of Russian vodka for the United States, and a 1974 agreement with Finsider of Italy under which Finsider exports 500,000 tons of large-diameter pipe to the U.S.S.R. each year during 1975–80 and receives Soviet coal, iron ore, and steel scrap.

In contrast, compensation agreements provide for Soviet exports well after the imports to the U.S.S.R. have been delivered. The exports usually (but not necessarily) originate in the project for which the Soviets are buying Western equipment and technology. The Soviets view the purpose of the exports at least partly as repayment of the credits extended to finance Western equipment imports.

A compensation agreement generally includes three separate contracts. An equipment contract is negotiated by the Soviet importing foreign trade organization and the Western firm supplying the equipment and whatever other licenses, training, and services the Soviets choose to purchase. A credit contract, a common but not essential component of a compensation agreement, defines the transactions between the Soviet Foreign Trade Bank and the Western creditor, either a commercial bank or credit agency of a Western government. The third contract, the export contract, is the distinguishing feature of a compensation agreement. Under the export contract a Western firm—often different from the one providing the equipment for the project—agrees to accept long-term deliveries of Soviet products. The export contract in most cases is not formally linked to the credit contract, the repayment of the credit is not conditional on fulfillment of the export contract, and Soviet exports do not directly pay for the imports. Moreover, the length and value of the export contract usually do not coincide with the credit repayment schedule.

Compensation agreements generally progress through three distinct stages: (1) Proposals and negotiations leading to contracts, (2) imports and installation of equipment during project construction, and (3) exports of goods and repayment of credits. The first stage usually takes several years. The complexity of negotiations, the scale of the projects, and the number of parties involved on each side, together with frequent changes in Soviet specifications, all complicate and prolong the negotiations.

The second stage—from contract signing until production begins—usually takes three to five years. The Soviets prepare the site, erect the plant shell, and install imported Western equipment—often with the help of Western technicians. The Soviets draw down Western credits as the equipment is delivered.

Once production begins, a substantial share (20 to 30 percent according to Soviet statements) is exported to the West while the rest is available for use in the Soviet economy. The exports generate the hard currency the Soviets need to repay the Western credits and more since the value of the export stream is often much greater than the interest and principal payments. The export contract can run for as long as 20 years but usually corresponds roughly with the length of the credit.

Appendix B

U.S.S.R. COMPENSATION AGREEMENTS WITH THE WEST

[Dollar amounts in millions of U.S. dollars]

	Agreement date	Imports	Imports	Location	Operational date	Exports
Natural gas projects		$2,830		See natural gas pipelines in figure 1.		
Austria	1968	140	Pipe		1968	Natural gas.
Italy	1969	190	Pipe and other equipment.		1974	Do.
West Germany	1970	350	Pipe		1973	Do.
Do	1972	500	do		1973	Do.
France	1972	250	do		1976	Do.
West Germany	1974	600	Pipe and pipeline equipment.		1978	Do.
France	1974	[1] NA	Pipe		1980	Do.
West Germany, Austria, France.	1975	800	Pipe and other equipment.		1981	Do.
Austria	1974	NA	NA[2]		1978	Do.
Do	1975	NA	NA[2]		1978, 1981	Do.
Do	1975	NA	NA[2]		1978, 1981	Do.
Chemical		3,229				
West Germany (Salzgitter).	1972	39	Polyethylene plant.	Kazan	1975	Polyethylene.
France (Litwin)	1973	95	Styrene-polystyrene plant.	Omsk	1978	Do.
West Germany (Salzgitter).	1973	62	Polyethylene plant.	Severodonetsk	1976	Do.
France (Creusot-Loire).	1974	220	Ammonia plants (4).	2 at Gorlovka, 2 at Odessa.	1978	Ammonia.
United Kingdom-United States (Constructors John Brown-Union Carbide).	1974	50	Polyethylene plant.	Budennovsk	1978	Polyethylene.
West Germany (Hoechst).	1974	40	Vinyl chloride plant.	Zima	1978	Vinyl chloride.

See footnotes at end of table.

Appendix B

U.S.S.R. COMPENSATION AGREEMENTS WITH THE WEST—Continued

[Dollar amounts in millions of U.S. dollars]

	Agreement date	Imports	Imports	Location	Operational date	Exports
Chemical—Continued						
United States (Occidental, Chemico).	1974	400	Ammonia complex.	Tolyatti, pipeline to Odessa and port facilities at Odessa and Ventspils.	1978	Ammonia.
Japan (Asahi)	1974	10	Acrylonitrile plant.	Polotsk	1978	Acrylonitrile.
Italy (Montedison-Tecnimont).	1974	60	do	Saratov	1978	Do.
Italy (ENI-Snam Progetti).	1974–1975	150	Urea plants (3)	Tolyatti	1977	Ammonia.
Italy (Pressindustria).	1975	9	Detergent plant	NA	1977	Monethylene glycol and other chemicals.
Italy (Montedison-Tecnimont).	1975	100	Polypropylene plant.	Tomsk	1978	Ammonia.
Do	1975	58	Urea plant (2)	Gorlovka, Novomoskovsk.	1978	Do.
Do	1975	80	Chlorofluoromethane plant (2).	Volgograd, Yavan	1978	Unknown.
Italy (Snia-Viscosa).	1975	171	Caprolactum plant.	Chirchik	1978	Caprolactum.
West Germany (Kloeckner).	1975	68	Polyvinyl chloride plant.	Zima	1978	PVC.
West Germany (Linde).	1975	106	Ethylene, benzene, propylene plant.	Budennovsk	1978	Unknown.
West Germany (Kloeckner).	1976	40	Phthalic acid plant.	Donetsk	1980	Phthalic acid.
France (Technip)	1976	410	Aromatics complex.	Ufa, Omsk	1981	Paraxylol, orthoxylol, petroleum.
Italy (Montedison).	1976	100	Urea plant (2)	Berezniki and Kemerovo.	1979	Ammonia.
West Germany (Salzgitter).	1976	78	Ethylene oxide plant.	Gorkiy	1978	Monethylene glycol.
Japan (Mitsui)	1975	280	Ammonia plants (4).	Cherepovets, Cherkassy, Dneprodzerzhinsk, and Dorogobuzh.	1978	Ammonia.
West Germany (Kloeckner).	1977	42	Phthalic acid plant.		1979	Chemicals.
United Kingdom (Davy Powergas).	1977	275	Methanol plant	Gubakha and Tomsk.	1981	Methanol.
West Germany (Krupp, Koppers).	1977	62	Dimethyl terephthalate plant.	Mogilev	1980	DMT, other chemicals, cotton.
United Kingdom (Constructors John Brown).	1977	86	Polyethylene plant.	Kazan	1980	Chemicals.
France (Krebs)	1977	18	Phosphoric acid	Ukraine	1980	Do.
West Germany (Krupp Koppers).	1978	120	Dimethyl terephthalate plant.	Mogilev	1980	Paraxylol, orthoxylol, DMT, methanol, acetic acid.
Other		1,730				
Japan	1968	166	Logging equipment.	Lower Amur River	1969	Wood and wood products.
Do	1971	50	Port equipment	Vrangel	1972	Wood chips and lumber.
Do	1974	450	Mining, other equipment.	South Yakutsk	1979	Coal.
Do	1974	550	Logging equipment.	Siberia	1975	Wood and wood products.
Japan (Sodeco)	1974	153	Oil equipment	Sea of Okhotsk	1980	Oil.
France (PUK)	1976	300	Alumina plant	Nikolayev	1980	Aluminum.
France (Parsons-Whitmore).	1973	61	Pulp plant	Ust-Ilimsk	1978	Cellulose.

[1] Not available.

[2] The three agreements signed with Austria in 1974–75 were only for supplementary deliveries of gas and required no additional Austrian deliveries.

SOVIET-OWNED BANKS IN THE WEST

(By John T. Danylyk and Sheldon T. Rabin*)

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I. SUMMARY

The U.S.S.R.'s network of Western-based banks, including branches, has more than tripled in size since the early 1960's and now extends from Europe, through the Middle East, into Asia. Wholly owned by Moscow, the seven banks and three branches are located in major financial centers, where they play an active role in local money markets and facilitate the financing of East-West trade. They also extend their lending activities to the less developed countries and have become very active participants in syndicated Eurocurrency lending in the 1970's. Though the banks' policies are generally dictated by Moscow, their day-to-day operations follow the laws and systems of the country in which they are chartered. The banks are also motivated by institutional growth and, like other "Western" banks, have acquired subsidiary interests—including equipment leasing and trade promotion. At times, they act as agents for the U.S.S.R. and other socialist countries in the sale of gold in the West. Despite some recent setbacks,

* Research analysts with the Office of Economic Research, Central Intelligence Agency.

particularly those of the traditionally conservative Moscow Narodny Bank headquartered in London, the Soviet banks continue to enjoy enviable reputations. Over the years, these banks have cultivated extensive correspondent relationships with Western banks all over the world that have to be counted among their more valuable assets, thus giving sustenance to the old Russian proverb—often quoted by Soviet bankers—that "it is better to have a hundred friends than 100 rubles."

II. Development of the Soviet Banks in the West: An Historical Overview

The rapid expansion of East-West trade beginning in the 1960's has been accompanied by the expansion of the Soviet overseas banking network (fig. 1).[1] Until 1963, the U.S.S.R. had only three banks in the West—Moscow Narodny Bank (MNB) in London (1919), Banque Commerciale pour l'Europe du Nord (Eurobank) in Paris (1921), and Bank Russo-Iran in Tehran (1923)—but now Moscow has seven banks and three branches in the major financial centers of Europe, the Middle East, and Asia.[2] The U.S.S.R. began expanding its banking network in the West when MNB opened its first branch in Beirut in 1963; it opened a second in Singapore in 1971. The U.S.S.R. also established Wozchod Handelsbank in Zurich in 1966, Ost-West Handelsbank in Frankfurt in 1971, Donaubank in Vienna and East-West United Bank in Luxembourg in 1974, and a branch of the Bank Russo-Iran in Isfahan in 1975. By the end of 1976, total assets of the Soviet-owned banks grew to more than $7.5 billion, about 34 times the 1958 level (see table No. 1) and now are said to be worth more than $8 billion.[3] Since the late 1960's, the banks in Paris and London have ranked among the 300 largest in the Western World.[4]

Historically, the banks' primary contribution has been the financial flexibility that their resources give to Soviet foreign trade operations. Although it is not possible to estimate the banks' annual extensions of loans, all indications are that the banks have never financed a large share of Soviet foreign trade—nor were they ever expected to do so. Instead, they have enhanced the U.S.S.R.'s financial options through their short-term lending facilities, and since the 1950's by their access to the Eurocurrency markets. In addition, the Soviet-owned banks act as agents for gold sales in the West by the U.S.S.R. and, occasionally by other Communist countries. Furthermore, transactions with the Soviet banks have insured a high degree of secrecy for Communist customers, who often have wished to conceal from Western eyes the size and urgency of their financial needs.

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[1] Trade of the U.S.S.R. and the six East European countries—Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, and Romania—with the developed West has increased about 15 times since 1958.

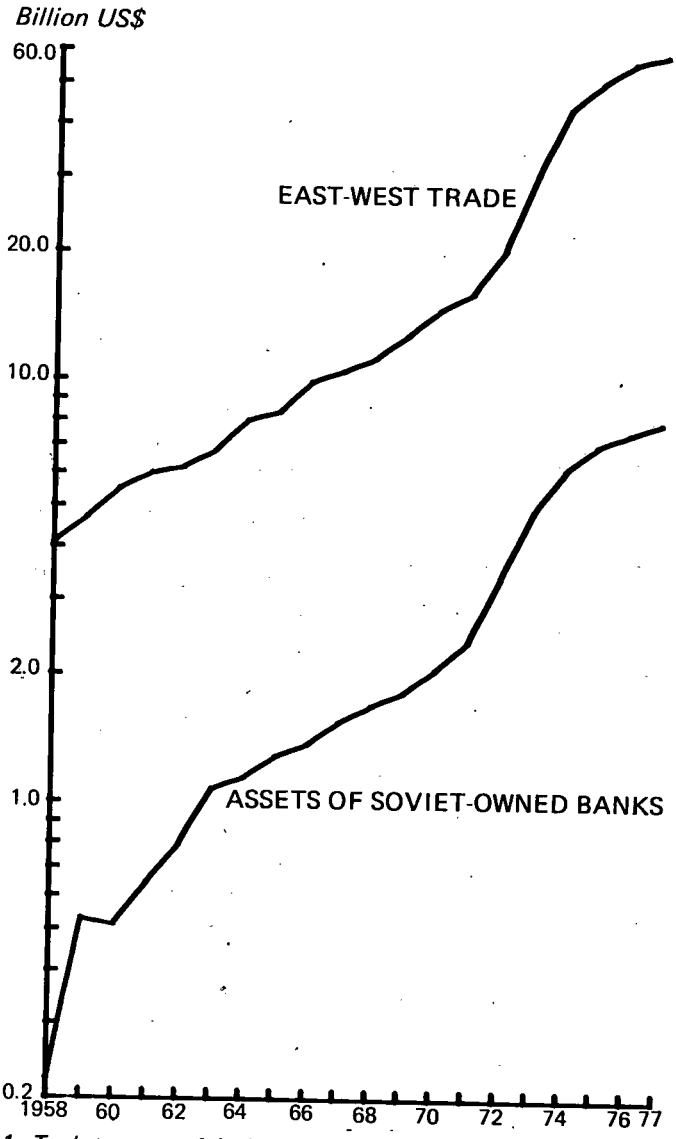
[2] For detailed information on the Soviet-owned banks, see Appendixes A–G.

[3] Vladimir Alkhimov, "Banks Participation in the Soviet Union's Foreign Economic Ties," Foreign Trade (U.S.S.R.), No. 6, 1978, p. 15. According to the chairman of U.S.S.R. Gosbank, "their aggregate resources have trebled in the past 6 years, to reach 6,000 million rubles."

[4] In 1976, for example, Moscow Narodny Bank ranked 216th and Eurobank 186th in the "American Banker" listing of the largest banks in the world by size of deposits.

Figure 1

East-West Trade[1] and Assets of Soviet-Owned Banks in the West



1. Trade turnover of the USSR, Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, and Romania with developed Western countries.

TABLE 1.—ASSETS OF THE SOVIET-OWNED BANKS IN THE WEST [1]

[In millions of U.S. dollars]

	Moscow Narodny	Eurobank	Russo-Iran [2]	Wozchod	Ost-West	Donau	East-West United [3]	Total
1958	24	198	NA					222
1959	151	380	NA					531
1960	156	360	NA					516
1961	219	426	NA					645
1962	291	503	NA					794
1963	520	550	7					1,077
1964	573	570	NA					1,143
1965	653	632	NA					1,285
1966	702	662	NA	13				1,377
1967	719	774	14	42				1,549
1968	775	843	16	61				1,695
1969	797	954	NA	72				1,823
1970	873	1,111	NA	81				2,065
1971	1,000	1,281	28	95	[4] 6			2,410
1972	1,371	1,747	29	111	171			3,429
1973	1,942	2,362	49	[4] 36	408			4,897
1974	2,621	2,798	62	194	559	[4] 6	[4] 7	6,247
1975	2,456	3,035	115	223	591	173	470	7,063
1976	2,585	2,846	227	266	754	215	656	7,549

[1] End-of-year assets. Converted from national currencies to U.S. dollars at the appropriate exchange rate.
[2] Mid-March of each year (end of Iranian calendar year).
[3] End of September each year (the bank's apparent fiscal year).
[4] Subscribed capital.

A. From the Revolution to World War II

The banks' specific contributions to financing foreign trade have varied considerably over time. During the New Economic Policy of the 1920's, they assisted the state and cooperative trading organizations in reestablishing contacts with West European and colonial markets. The Moscow Narodny Bank (MNB) in London was especially helpful in this effort, since as a Soviet cooperative organization, it was able to develop close ties with cooperative institutions throughout the West.[5] During the Depression, however, both MNB and the Banque Commerciale pour l'Europe du Nord (Eurobank) in Paris experienced chronic difficulties in attracting deposits from Western sources.[6] Consequently, their lending capabilities steadily contracted and their scope of operations narrowed until, as Soviet officials have noted, they were little more than local paying agents for Gosbank.[7]

B. Post-World War II Development

After World War II, the diversion of Soviet trade from Western to Eastern Europe and the strict currency controls in the West practically eliminated any useful role for the foreign-based banks. These factors, plus the tensions of the cold war, further depressed the banks' prospects for attracting deposits from Western sources.[8]

[5] The extensive writings of Noah Barou, a director of MNB during the 1920's and 1930's, are the best source of information on MNB's relationship with the international cooperative movement. See, for example, "Russian Cooperation Abroad: Foreign Trade, 1912–28," London: P. S. King and Son, 1930.
[6] In several years, the banks' paid-in capital was greater than the sum of their deposit and current accounts!
[7] "Interview with A. I. Doubonossov," The Banker, March 1967, p. 192.
[8] The local environment was especially hostile in France. For example, French legislators engaged in fist fights on the floor of the National Assembly in November 1948 during a debate over allegations that Eurobank was serving as a covert conduit for subsidies from Moscow to the French Communist Party. See, Mario Einaudi, Jean-Marie Domenach, and Aldo Garosci, "Communism in Western Europe," Ithaca, N. Y.: Cornell University Press, 1951, pp. 96–97.

Eurobank in Paris fared quite differently under these early postwar conditions than did MNB in London. During the period 1951–58, for example, MNB's lending operations were almost nonexistent, and the bank even suffered a net decline in assets from $32 million to $24 million. In contrast, Eurobank's assets increased sharply from $24 million to $198 million. This performance was a consequence of the Soviet and East European decision, made during the Korean war, to lend their dollar holdings to European banks out of fear that these funds would be blocked or subject to attachment by U.S. officials. These funds were placed through Eurobank on the emerging interbank market for foreign currencies.[9] According to many observers, Eurobank's activities were critical to the creation of the Eurodollar market.[10] In any event, by the latter 1950's, Eurobank had firmly established itself as a money market agent for Socialist state banks—handling a share of their temporarily free convertible currencies.

The transformation of both MNB and Eurobank into modern, diversified, commercial banks with broad international interests can be dated from 1958–59, when the expansion of East-West trade increased the Soviets' requirements for convertible currencies. The first East-West trade agreements of the postwar period were concluded in these years, as were the first Western extensions of credits for Soviet purchases of machinery and equipment. As specialists in East-West banking, with intimate ties to the U.S.S.R. and Eastern Europe, the Soviet-owned banks quickly became important European contact points for Western organizations interested in doing business with the Soviet bloc.

The banks' unique position in Western markets, combined with their carefully cultivated reputations as orthodox, commercial banks, enabled them to diversify their sources of funds.[11] For example, by the late 1960's just under one-half of MNB's liabilities—or about $300 to $350 million—consisted of deposits due to Western correspondents. The share of Eurobank's deposits due to Western sources was probably smaller, however, reflecting the Paris bank's specialization as a financial way station for Socialist hard currency balances.

With their enlarged resource base, all the banks (and especially MNB) expanded their traditional U.S.S.R.-Developed West lending business. They also participated increasingly in the financing of U.S.S.R.-LDC trade as well as East-West trade in general. The banking network itself was expanded appreciably, with new banks opened during 1963–75 in Beirut, Zurich, Singapore, Frankfurt, Vienna, Luxembourg, and Isfahan (Iran). These additions, along with the establishment of ties with hundreds of correspondents around the world, helped the Soviet banks to broaden the geographic reach of Soviet foreign trade. In addition, all the banks—to varying degrees—

[9] The most informative discussion of the Soviet-owned banks' role in the early days of the Eurodollar market is contained in K. J. H. Robbie, "Socialist Banks and the Origins of the Eurocurrency Markets," "Quarterly Review" (Moscow Narodny Bank), Winter 1975–76, pp. 21–36.

[10] Jean Marchal, "Monnaie et Credit," Paris: Editions Cujas, 1976, pp. 460–461. According to Eurobank's Director and general manager Gilles Peillon, Eurobank "was indeed among the first, if not the first, to have a U.S. dollars account with another bank in Europe" (personal correspondence).

[11] As a leading U.S. banker in Zurich has noted, the Soviet bankers "are very careful in their transactions—if you expect payment on a certain date, there is no doubt about it being made," New York Times, Oct. 2, 1972, p. 55.

became active in Eurocurrency syndicated loans on behalf of both Socialist and Western borrowers. To some extent, the activity was a partial remedy to the banks' traditional difficulty in generating resources for medium- and long-term lending.

"The Great Leap Forward" of the 1960's was followed by what might be called "The Great Loan Writeoff" of the 1970's. As Soviet hard currency needs soared in the mid-1970's, the banks abroad were subject to unprecedented pressures from Moscow to find new ways of generating hard currency resources. Many of the banks, especially Moscow Narodny and its Singapore branch, deemphasized their traditional sources of growth—East-West trade and Eurocurrency operations—and turned increasingly to the high-risk financing of real estate, construction, shipping, mining, and other areas. When the recession of 1974–75 set in, however, many of these (inadequately secured) loans turned sour, with a resulting loan writeoff of possibly as much as $300 million.

Since 1977, the Soviet banks have instituted a number of reforms which they hope will repair the damages done to their financial reputations by the "go-go" banking practices of 1973–76. Major management and personnel changes have been introduced, and growth policy once again has centered on the relatively risk-free financing of East-West trade. Nevertheless, repercussions from their earlier ventures—in the form of complex law suits and investigations by Western banking commissions—still are being felt today.[12]

III. Initiatives for New Banking Facilities

From time to time, Soviet banking officials have indicated a desire to establish banks, bank branches, or representative offices in key Western and LDC markets.[13] Prior to the 1970's, the U.S.S.R.'s banking network expanded cautiously, as Soviet officials preferred to consolidate their existing facilities and to service their growing needs in foreign markets by strengthening relations with local correspondents.[14] In the past decade, however, Soviet banks have appeared in Frankfurt, Singapore, Vienna, Luxembourg, and Isfahan (Iran). In a novel development in 1975, MNB opened a representative office in Moscow—the fifth "British" bank to do so—to better serve its Western clients, and Ost-West Handelsbank followed suit 1 year later.[15] In addition, it has been rumored frequently that the Soviets are interested in establishing jointly owned Arab-Soviet and Latin American-Soviet banks.[16]

Soviet officials long have expressed a keen interest in establishing a bank in the North American market. In its annual report for 1970, for

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[12] See app. A.

[13] A representative banking office functions as a liaison between the parent bank and the business and financial community where the representative office is located. Thus, it serves to make and maintain contacts, promote trade, and otherwise "represent" the parent bank. In contrast to a fully operating bank or branch, it cannot accept deposits, make loans, or engage in foreign exchange transactions.

[14] N. V. Nikitkin, "Financing East-West Trade and Investment: United Kingdom-based Financial Institutions," The American Review of East-West Trade, June 1968, p. 30.

[15] The motivations of MNB and Ost-West Handelsbank are probably to secure their own competitive position with the roughly 30 Western banks that have opened representative offices in Moscow since 1972.

[16] Eurobank has been conspicuously absent from all reported initiatives on new banking facilities. Throughout its long history, Eurobank always has preferred to work through foreign correspondents rather than establish its own branches abroad.

example, MNB announced that it had plans to open a representative office in Canada "in the near future." [17] No details were provided, nor was such an office ever opened. The following year, MNB responded to a proposal from New York State banking officials and declared that it was actively considering opening a branch in New York City.[18] Although this initiative, too, came to naught, there are a number of reasons why the idea of locating in New York probably remains very attractive to the Soviets. The current level of the United States-Soviet trade, for example, probably could now justify a Soviet bank there. Moreover, the Soviets could use the important New York money market as a supplement or alternative to the Eurocurrency market. Access to the New York market would be particularly useful to the U.S.S.R. in organizing funds for third country projects as it has done for Turkey.[19]

IV. Organization and Policy of the Soviet-Owned Banks

The U.S.S.R. State Bank (Gosbank) and the U.S.S.R. Foreign Trade Bank (Vneshtorgbank) are the major shareholders of the Soviet-owned banks in the West and dictate their policies. Wholly Soviet-owned, the organization of the Western based banks probably closely follows that outlined in the charter of Vneshtorgbank. Thus, general policy guidelines, such as the direction of bank activities, credit plans (presumably including credit ceilings for Socialist countries as well as "client" countries in the Third World), and special regulations and instructions that may even include interest rates on some loans are established by a supervisory council based in Moscow.[20] In other respects, the Soviet-owned banks apparently are free to make their own decisions on loans. Each bank has a board and board chairman that are fully responsible for carrying out day-to-day operations. Annual reports, as well as accounts, reports, and general business of the banks are subject to scrutiny by inspection commissions presumably established for each bank.

Soviet citizens generally occupy the key posts in the banks, a practice that usually insures strict adherence to guidelines set by Moscow.[21] Otherwise, the banks are staffed by local nationals who are hired for their banking expertise rather than ideology.[22] In addition, each bank typically has a number of young Soviet trainees—graduates of the top Soviet financial and banking institutions—who receive first-hand experience in international finance by working on the professional staffs.[23]

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[17] "The Economist," Apr. 24, 1971, p. 103.

[18] The New York Times, Nov. 20, 1972, p. 59; and "U.S.-Soviet Trade Conference: Proceedings." (Washington, D.C.: National Association of Manufacturers, 1973), p. 34.

[19] In October 1975, Vneshtorgbank, Merrill Lynch-Brown Shipley, and seven other Western banks successfully completed the syndication of a 5-year, $150 million syndicated loan for Turkey to finance an oil pipeline in that country. Twenty-nine banks, including Vneshtorgbank and Eurobank, participated in the loan.

[20] Charter for the Bank for Foreign Trade of the Union of Soviet Socialist Republics, "Den'gi i kredit," No. 1, Moscow, January 1963. There have been several open references to MNB's having a supervisory council, but no specific details on its activities or responsibilities.

[21] In recent years, high level banking positions in Moscow have increasingly been filled by "Western-trained" personnel with previous experience at the Soviet banks in the West. For example, in 1974, three out of the five deputy chairmen of Vneshtorgbank had served as directors of MNB, while two of the nine department chiefs also had seen service at MNB.

[22] For example, in 1960, Cyril Dicks, the former manager of the London branch of the Netherlands Bank of South Africa, was named to the newly established position of general manager of MNB.

[23] Eurobank in Paris also provides training facilities for young bankers from Third World countries such as Algeria and Libya.

The maintenance and expansion of its network of Western based banks has increased Moscow's ability to tap outside sources of funds as well as to participate in the foreign exchange and Eurocurrency markets. The banks also enhance the U.S.S.R.'s prestige because of their high visibility and—with the exception of MNB's Singapore fiasco in the mid-1970's—the solid reputation built up by Soviet bankers over the years. The Soviet banks also are profitable: MNB and Eurobank together earned net profits of $10 million in 1976, a return on capital of about 12 percent. Since the early 1960's, these profits have regularly been retained and transferred into reserves or used to increase the banks' capitalization, thereby providing for further expansion. It is suspected, however, that some of the Soviet banks' profits in 1977 and 1978 have been used to cover a portion of MNB Singapore's estimated losses of as much as $300 million (see app. A).

A. Role of the Banks in East-West Trade

The primary function of the Soviet-owned banks in the West is to facilitate Soviet trade with the Western country in which they are located. Moscow Narodny Bank, however, has assumed a much wider scope of activity and—as suggested by its "second name," the Bank for East-West Trade—is heavily and directly involved in the financing of East-West trade in general, not merely that of the Soviet Union. Moscow Narodny's balance sheet, for example, shows that 82 percent of its assets in 1976 were committed to loans. It is believed that about half of its lending was to Socialist countries in the early 1970's. This share may have fallen in recent years, however, in view of the adventurous lending practices of the Singapore Branch (see app. A), which rapidly assumed a large share of total lending by MNB. Despite the setbacks in its Far Eastern Branch, Moscow Narodny Bank can take comfort in, and advertises the fact that, it does not "suffer from * * * adverse worldwide economic conditions to the same extent of many of its competitors because of the nature of its primary business—the financing of East-West trade." [24]

In comparison with MNB, most of the other Soviet banks in the West hold their assets in the form of cash and deposits at correspondent banks and use these deposits to induce their Western correspondents to provide loans to the Socialist countries. Such loans that the Soviet-owned banks do make to their Socialist customers nonetheless are generally of the same type and on the same terms as those normally provided by Western banks specializing in international trade.

In other respects, the services of the Soviet banks in the West are also the same as those provided by Western banks, including making and collecting payments and processing trade documents. They can, however, also provide the Socialist countries with general commercial intelligence, particularly that involving East-West trade. Through their credit departments and contacts with their Western correspondent banks, they can obtain credit information on Western importers

[24] Excerpted from a summary of the MNB chairman's statement of business operations in 1975, advertised in the Financial Times (London), May 28, 1976.

and exporters that normally might not be available to home-based Socialist foreign trade organizations and banks.

Until the late 1960's, the Soviet banks restricted themselves largely to short-term financing, but financing of up to 5 years has become an important part of their business with the East European countries—especially for trade in capital goods.[25] The Soviet banks charge their customers normal commercial rates comparable with those charged by other Western banks, but much higher than the subsidized lines of credit often made available to Socialist countries by some West European governments in an effort to promote their own exports. Thus, the East Europeans generally turn to the Soviet banks to finance imports from countries which have not provided more favorable lines of credit or when such lines of credit have been exhausted. Also, because they can rely on secrecy in their dealings with the Soviet banks, the urgency of their credit requirements is less well known to Western banks, which might otherwise charge higher rates or even refuse to grant new credits to the East Europeans.

B. Involvement in Western Money Markets

The Soviet-owned banks are particularly dependent on local money markets and Western banks for a substantial share of their financial resources.[26] The West European-based banks, all of which are located in leading financial centers, participate actively in both foreign exchange and Eurodollar markets. Eurobank has the longest history of such activity, apparently because of its earlier post-World War II development into a sizable international bank. Together with Moscow Narodny, it was among the first European banks to become involved in Eurodollar transactions, at first primarily as lenders (see section on Historical Development above). Over time, the banks have built up their credit standing, enabling them, when necessary, to become net borrowers in Eurocurrency markets. The excellent reputations that MNB and Eurobank have established in Western currency markets have enabled them to attract Eurocurrency deposits at prime rates and by inference have helped to establish the credit-worthiness of the Western-based banks of other Socialist countries.[27] Soviet banks are often called upon to organize or participate in syndicated loans and the placement of bond issues for borrowers all over the world.

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[25] In addition to providing medium-term credits directly to Soviet or East European foreign trade banks for financing imports, the Soviet banks—especially MNB—are active in forfeiting Soviet and East European bills of exchange. Forfeiting, or the purchasing of third-party export paper, is an important method of financing East-West trade and is especially applicable when the exporting country does not provide subsidized lines of credit (e.g., West Germany or Switzerland), or when the importer has exhausted such lines of credit. In these situations, the exporter sells a bank or group of banks the promissory notes issued by the importer and guaranteed by the foreign trade bank of the importing country. These sales are made at a predetermined discount—which usually reflects the credit-worthiness of the importer and, ultimately, the yield to the bank—and with no recourse to the exporter.

[26] "Each of the Soviet banks abroad carries on operations drawing on local money markets and the banks of other countries for freely convertible currencies. Considerable resources are also drawn from the Vneshtorgbank of the U.S.S.R. and from Socialist countries' banks." Alkhimov, loc. cit., p. 15. From this statement, it can be inferred that the bulk of the Western-based banks' resources comes from Western banks.

[27] The East European countries, except for East Germany, also own or are part owners of banks in the West; their number, including branches and representative offices, more than doubled during the 1970's and now include the Litex Bank in Beirut with representative offices in London and Sofia (Bulgaria); the London branch of the Prague based Zivnostenska Banka (Czechoslovakia); Central Wechsel und Creditbank in Vienna and the Hungarian International Bank of London (Hungary); the Paris and Tel Aviv branches of the Warsaw-based Bank Polska Kasa Opieki, the Centro Internationale Handelsbank in Vienna, the Mitteleuropaische Handelsbank in Frankfurt, and Handlowy Bank for the Middle East in Beirut (Poland); Banque Franco-Romaine in Paris and the Anglo-Romanian Bank in London (Romania).

Moscow Narodny and especially Eurobank are the leaders in the Socialist banking community in Eurodollar lending. For years, these two banks have selectively participated in or comanaged syndicated loans, particularly to help finance East-West trade. Their participation in publicized syndicated lending was particularly heavy during 1974–75 when one or the other of these two banks was involved in more than 100 syndicated loans—nearly 10 percent of the time as co-managers.[28] Since that time, their activity appears to have slowed, especially for MNB, whose financial difficulties in Singapore have forced it to stabilize and consolidate its overall operations.

The wide-ranging activities of the Soviet-owned banks are perhaps best illustrated by a few specific examples. MNB broke new ground in 1971 when it helped organize the successful placement of a $25 million Eurobond issue for Hungary—the first time a Socialist country had ever entered the bond market. Buoyed by its success, MNB helped organize a $50 million Eurobond for Hungary in the following year. The London-based bank also helped put together several international syndications for the Moscow-based banks of the Council for Mutual Economic Assistance (CEMA)—the International Bank for Economic Cooperation (IBEC) and the International Investment Bank (IIB)—and for the Soviet Foreign Trade Bank. MNB and Eurobank continue to play a role, though on a smaller scale than in 1974–75, in international syndicate loans organized for the CEMA banks, for the U.S.S.R., for other Socialist countries, as well as for West European governments and various less developed countries. Recent activities in 1978 include the $500 million 10-year syndicated loan for IIB, comanaged by MNB and with MNB and Eurobank among the banks providing the funds; the participation of Eurobank in a $30 million floating rate 10-year bond issue for Poland; continuing participation of Eurobank in official French borrowing (e.g., the $600 million 10-year loan for Electricite de France in December 1978).[29]

The smaller Soviet-owned banks continue to be active as well. East-West United Bank and Wozchod Handelsbank both participated in 1978 in the $300 million syndication for the National Bank of Hungary, and East-West United also comanaged an 8-year DM 400 million loan for the Kingdom of Denmark.[30]

The reason for participation by Soviet-owned banks in syndicated lending, particularly to non-Socialist countries, goes beyond the profit motive. By participating in loans syndicated by Western banks for Western borrowers, the Soviets can count on them to reciprocate and participate in loans organized for the U.S.S.R. and other Socialist

[28] During the period January 1974–October 1975, Eurobank participated in 92 publicized syndicated loans, while MNB was observed taking part in 28 (see app. H). According to an MNB spokesman at the end of 1974, some 60 percent of MNB's participation in syndications is in loans for less developed countries. Only about one-third of MNB's publicized loans in 1974 were for less developed countries, however, suggesting that a larger volume of its syndicated lending goes unobserved. The MNB spokesman also stated that MNB's average level of participation runs about $3 million to $4 million for loans to less developed countries, but is higher when the loans are for CEMA countries. There is no official information on the level of Eurobank's participation, but in the 81 syndicated loans in which it participated and for which detailed information is available, the average participation was $5 million, with participations for loans to Socialist countries averaging $5 million, for less developed countries $3 million, and for developed countries $8 million.

[29] Press Bulletin (Moscow Narodny Bank), May 24 and Sept. 13, 1978; Wall Street Journal, Jan. 15, 1979.

[30] Press Bulletin (Moscow Narodny Bank), June 7, 1978.

borrowers. According to a sampling of publicized loans,[31] the Socialist banks—including those owned by the East Europeans—participated in a total of 123 syndicated loans which raised a total of $14.8 billion. Of this amount, $2.4 billion went to Socialist borrowers (including an estimated $325 million from Socialist banks) at a "cost" of only $475 million—the Socialist banks' estimated participation in loans to non-Socialist borrowers. The $2.4 billion is in addition to the several hundred million borrowed during the same period by the East Europeans that did not include Socialist participants. Since 1975, the Socialist countries, either on their own behalf or through the medium of the two CEMA banks, have availed themselves of several additional billion dollars in syndicated loans while reducing substantially their own participation in syndicated loans.

C. Subsidiary Interests

Other efforts undertaken by Soviet-owned banks in East-West trade include the establishment of equipment leasing companies [32] in London and France, and trade promotional organizations in France and West Germany. In October 1973, MNB and Morgan Grenfell Bank and Co. in London established a jointly owned firm, East-West Trading, to promote and finance leasing operations in Britain and Eastern Europe. Day-to-day management is handled by City Leasing Ltd. of London, a wholly owned subsidiary of Morgan Grenfell.[33] In December 1973, Eurobank and Credit Lyonnais joined together to form a similar firm, Societe pour la Promotion Europeene du Leasing (Promolease) in Paris. Sibail Internationale, a subsidiary of Credit Lyonnais, supervised this operation.[34] Among the types of equipment leased by the British and French concerns are heavy construction machinery, containers, machine tools, and automobiles.

In January 1971, Eurobank joined with the three state-owned French banks to form Gisofra, an organization designed to further Franco-Soviet trade through increased contacts, research, and dissemination of information on market conditions.[35] Gisofra's first project was to study the potential for increasing the volume and diversity of French imports from the U.S.S.R.[36] Since then, Gisofra has arranged numerous Soviet industrial exhibitions in France and has assisted interested French buyers in their negotiations with Soviet foreign trade organizations.

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[31] The Soviet banks' participation in syndications is illustrated in apps. H and I. App. H is a sample list of most of the publicized syndications involving these banks during 1974–75—their most active years—and provides specific information on the identity of the borrower; the value and term of the loan; the number of banks participating in the loan; the identity of the Soviet and other Socialist banks participating in the loan; and which Socialist banks played a management role. From this sample, the average rates of participation (in 109 of the 123 syndicated loans for which detailed information is available) are $3.8 million for loans to non-Socialist borrowers and $4.3 million for loans to Socialist borrowers. It is assumed that the Socialist banks participated at the average rate. Appendix I provides a more complete summary of participation in publicized Eurocurrency syndications during 1973–77, including a breakdown by type of borrower.

[32] Leasing is a means of meeting a short-term requirement for major capital equipment and, at the same time, avoiding the expenditure of investment capital which may be either in short supply or better employed in other forms of investment.

[33] "East West Markets," Feb. 11, 1974, p. 7; The Times (London), Oct. 17, 1973, p. 26.

[34] "East West Markets," June 3, 1974, p. 6.

[35] "Rabochaya gazeta," Dec. 5, 1974, p. 3; Press Bulletin (Moscow Narodny Bank), Feb. 18, 1971, p. 10.

[36] "Rabochaya gazeta," Dec. 5, 1974, p. 3.

In May 1974, Soviet and West German interests established a jointly owned trading company, Sobren Chemie Handel G.m.b.H, in Muelheim (Ruhr) to promote trade in chemicals between the two countries. Both the Soviet foreign trade organization Soyuzkhimeksport and the West German company Brenntag have a 49-percent equity interest in the company. The Soviet-owned Ost-West Handelsbank in Frankfurt subscribed for the other 2 percent, giving the U.S.S.R. controlling interest. Ost-West Handelsbank profits from this arrangement because presumably it keeps a large share of the lucrative financing and documentary business with the attendant fees and commissions for itself.

D. Gold Sales

In addition to normal banking activities, the Soviet-owned banks in the West act as agents for the U.S.S.R., and, occasionally, for other Communist countries for the sale of gold in the West. Although the banks have facilitated Soviet gold sales for over 50 years,[37] their roles have assumed increased importance in recent years as Soviet hard currency trade deficits have remained high. The banks also represent a useful source of intelligence to Moscow on Western gold market conditions and prospects.[38]

Until 1968, London was the major gold market because of the special role of the Bank of England both in the Gold Pool and as agent for sales of South African gold. Accordingly, MNB handled most Soviet gold sales.[39] Smaller amounts of gold also were sold during this period in Paris, via Eurobank, and in Switzerland. With the establishment of the free gold market in 1968, Zurich replaced London as the major gold market in the world, and nearly all Soviet gold sales are now made on the Zurich market, where Wozchod Handelsbank presumably is the Soviet agent.[40]

Appendix A

Moscow Narodny Bank

The Moscow Narodny Bank was founded in London in November 1915 as an agency (later a branch) of the Moskovskiy Narodny Bank of Moscow, the central credit institution of the burgeoning Russian co-operative movement. Following the October Revolution and the nationalization of banks in Russia, the ties with Moscow were disrupted and the London office incorporated itself as an independent British bank (October 1919). The bank remained under the direction of White Guard sympathists until the early 1920s, when Soviet authorities waged a successful struggle to regain control (1924).[1]

MNB prospered during the New Economic Policy (NEP) of the 1920s, helping to spearhead the USSR's efforts to re-enter its pre-Revolution foreign markets and to seek out sources of financing foreign trade. The bank's assets rose from

[37] MNB's Gold Department dates back to the mid-1920's. See Noah Barou, "The Co-operative Movement and Co-operative Banking of the U.S.S.R.," London: P. S. King and Sons, 1928, p. 28.

[38] The sophistication of the banks' analyses of Western gold market conditions probably is reflected in MNB's Quarterly Review. Not surprisingly, MNB's regular, published assessment of Western gold markets never discusses the U.S.S.R.'s participation.

[39] "Interview with A. I. Doubonossov," The Banker, March 1967, p. 196.

[40] The Economist, Mar. 22, 1975, p. 22; Walter Frey, "The Zurich Gold Market," Euromoney, August 1971, p. vi.

[1] Both the London and New York offices of the Moskovskiy Narodny Bank engaged in clearly anti-Bolshevik activities. For example, the New York branch proposed that the cooperatives (through their overseas banks) help bankroll the American forces fighting against the Bolsheviks in Siberia. E. T. Blanc, "Co-operative Movement in Russia," New York: The Macmillan Co., 1924, pp. 275–276.

$3.2 million in 1923 to $41 million in 1929, and branches were opened in Paris, New York, and Berlin.[2] With the Depression, World War II, and finally the Cold War, business fell off, the branches were closed, Western sources of funds dried up, and assets declined sharply.[3] As late as 1951, MNB's assets were less than $24 million, but since the late 1950s its assets and scope of activities expanded rapidly. Its growth has slowed substantially, however, beginning in 1975 as MNB entered a period of consolidation following the disastrous Singapore debacle (see below). Expressed in pounds sterling, MNB's assets actually fell 11 percent in 1977 though its dollar equivalent showed an insignificant decline. Nonetheless, with assets of $2.6 billion in 1977, MNB consistently has ranked among the 20 largest banks in London.

Some 80–90 percent of MNB's assets typically consist of loans and discounts, and another 5–10 percent are in the form of balances held with banks and correspondents. The increase in MNB's resources over the years has come about largely through the increase in balances held by both Western (Developed and LDC) and Communist correspondents. These balances, which totaled $2.5 billion in 1976 and comprised 96 percent of the bank's resources, have provided an expanding pool of resources for MNB's lending activities.

Since 1965, MNB has not paid dividends; instead it transferred profits to its reserve account to build up its capital. The cumulative value of such transfers—including a net profit of $2.6 million in 1976—exceeded $28 million during 1965–76. (It is suspected that the profits during 1977–78 have been used to provide against the losses incurred by the Singapore branch.) In early 1977, MNB raised its authorized capital from £25 million to £40 million and its paid up capital by £21 million to about £36.5 million ($63 million).

In other activities, MNB has been active in the London foreign exchange market since 1961.[4] It has been a principal in the sale of Eurodollar certificates of deposit (CDs) since 1967, and sterling CDs since 1968.[5] To better manage its rapidly accumulating liquid resources, MNB established an investment department in 1966 that immediately became active in the gilt-edged market. By 1967, this department had begun operating in the Eurobond market and underwriting certain issues of stock on the London Market. (MNB co-managed the 1971 Eurobonds issued by Hungary, the first time any Communist country had attempted to tap the Eurobond market.) [6] MNB further expanded its activities in 1969 by the acquisition of two wholly-owned investment subsidiaries, although economic problems in the United Kingdom have apparently rendered such business less attractive in recent years.

In October 1963, MNB opened a branch in Beirut, Lebanon, becoming the 13th foreign bank and the first Communist-owned bank in this then-booming Middle Eastern financial center. The bank was founded because of the need to facilitate banking operations in an area where Communist trade was growing rapidly. Although the emphasis was on financing East-West trade,[7] the Beirut branch has also been involved in financing non-Communist trade, in domestic banking activities, and in foreign exchange operations.

The Beirut branch generally has been profitable but has suffered setbacks induced by the 1967 and 1973 Arab-Israeli wars and, more recently, by the Lebanese Civil War. For three consecutive years (1967–69) the Beirut branch's assets fell. There was some growth in 1970, but the pre-war level was not surpassed until 1972. Although the branch's assets continued to grow in 1973, set-

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[2] Most of the bank's activities in this period were on behalf of Soviet cooperative organizations, whose foreign trade operations were officially encouraged during the NEP. Of particular note was the head office's (London) financing of cooperative trade with China—an interest which resulted in MNB's establishment of a branch in Shanghai in 1935. Frank Tamagna, "Banking and Finance in China," New York: Institute of Pacific Relations, 1942, pp. 90–91.

[3] For a full discussion of the historical development of MNB and the other Soviet banks abroad see Sheldon T. Rabin, "Soviet-Owned Banks in Europe: Their Development and Contribution to Trade with the West," Ph. D. dissertation, Johns Hopkins University, 1977.

[4] Quarterly Review (Moscow Narodny Bank), Summer 1967, p. 6.

[5] Ibid., p. 30; The Economist, Apr. 27, 1968, p. 97. For a detailed discussion of the bank's involvement in the early days of the Eurodollar market, see K. J. H. Robbie, "Socialist Banks and the Origins of the Eurocurrency Markets," Quarterly Review (Moscow Narodny Bank), Winter 1975/76, pp. 21–36.

[6] See William Low, "Hungarian Eurobonds: A Second Attempt," Euromoney, November 1972.

[7] For example, about three-fourths of all Lebanese exports to Eastern Europe in 1969 were financed by MNB Beirut. The Economist, Apr. 26, 1969, p. 102.

backs in operations following the 1973 war were reported. Nevertheless, in spite of a declining balance sheet induced by apparent withdrawal and/or non-renewal of deposits, the branch's lending activities on the whole continued to grow. The branch did this by drawing down its own deposits at other banks and making the funds available for lending (see Table A–1 below). At the end of 1973, the Beirut branch was reported to be the third largest bank in Lebanon.

The Lebanese Civil War disrupted Beirut branch business, but because it was largely "off-shore," MNB was able to take "timely measures . . . [making] it possible to maintain reasonably efficient continuity in that area." [8] Like other international banks, MNB closed its operations and transferred its assets out of Beirut—in its case, to the Singapore branch. The situation was uncertain in mid-1976. As MNB explained, "We can't really do any business there at the moment. Naturally we don't want to pull out of there and the future of the branch is not decided yet." [9] By the end of 1976, however, international banks began returning to Lebanon, which still offered facilities, communications, staffs, and a business environment superior to other Middle East locations. The returning banks—and presumably the MNB Beirut branch—likely have restricted themselves to offshore banking since then.[10]

TABLE A–1.—MOSCOW NARODNY BANK, BEIRUT BRANCH, SELECTED BALANCE SHEET ITEMS (END OF YEAR)

[In millions of U.S. dollars] [1]

	1966	1967 [2]	1968	1969	1970	1971	1972	1973 [3]
Assets (million U.S. dollars)	126	84	81	78	103	126	145	192
Of which:								
Loans:								
Million U.S. dollars	15	13	14	22	25	30	39	67
Percent	12	15	17	28	24	24	27	35
Cash and banks:								
Million U.S. dollars	100	59	52	42	58	78	93	112
Percent	79	70	64	54	56	62	64	58
Liabilities	126	84	81	78	103	126	145	192
Of which:								
Deposits:								
Million U.S. dollars	120	78	74	71	96	117	131	171
Percent	95	93	91	91	93	93	90	89

[1] Unless otherwise indicated.
[2] 7-day war in June 1967.
[3] October war.

In November 1971, MNB opened a branch in Singapore in order to provide on-the-spot service to the bank's clients in the South Asia region. Specifically, the branch was expected to (a) help Soviet trade with the region by providing credits to Asian importers, (b) collect intelligence on Asian economic and commercial conditions and (c) gain access to the Asian-dollar market, an inter-bank market in convertible currencies created by the Monetary Authority of Singapore.[11] The branch's operations during the first few years apparently were highly successful. By 1973, the branch reportedly had grown into one of the three largest foreign-owned banks in Singapore, earning profits on the order of $1 million that year. By 1974, it grew to represent nearly 50 percent of MNB's total operations.[12]

As the U.S.S.R.'s hard currency trade deficits grew in the mid-1970's, both the Head Office in London and the branch in Singapore came under unprecedented pressure from Moscow to increase rapidly their hard currency earnings. In responding to this demand, however, the banks committed a series of major policy misjudgments which have resulted in loan write-offs totaling as much as $250–300 million—almost all by the Singapore branch. Behind these costly mistakes was

[8] Financial Times, London, May 28, 1976.
[9] Nick Gilbert, "Moscow Narodny—all quiet on the Western Front," Euromoney, June 1976, p. 88.
[10] Dow Jones News Service, Dec. 11, 1976.
[11] An excellent analysis of the Asian-dollar market from its founding in 1968 through 1972 is contained in Quarterly Review (Moscow Narodny Bank), Winter 1972/73, pp. 23–27.
[12] Total assets of the Singapore branch at the end of 1974 were reported to the Singapore Registry of Companies at some US$1,274 million (at the then prevailing exchange rate of S$2.33 : US$1), according to Gilbert, p. 84.

the banks' decision to de-emphasize their traditional and relatively risk-free financing of East-West trade in favor of the far riskier (but potentially more lucrative) environment of construction, real estate, shipbuilding, mining, personal, and other types of local lending. However, as one Western observer has succinctly noted, the banks abandoned their usual cautious, orthodox approach to lending and:

". . . suddenly began engaging in and tolerating reckless operations. They made all the mistakes the capitalists made. They lent money to Herstatt, they bought Penn Central paper and New York City bonds, and they trusted the realty wizards and fringe bankers of London. In addition, they made mistakes all their own. Eager to start new offices and grow fast, they hired banking's black sheep. Greedy for market share, they took capitalist sharks for customers." [13]

Despite the problems with its branches, Moscow Narodny is still well regarded in London. According to a prominent discount house:

"They're pretty good names still and there is a general feeling that they are OK to the discount houses. As one of the latter we would and do buy their paper. As a foreign owned bank, of course, they are not eligible for Bank of England rediscounting so their paper commands some premium but no higher than many other foreign banks.[14]

Nonetheless, it is believed that MNB's prestige has slipped somewhat since 1972 and 1973 when it apparently was able to get prime rates for its paper on discount markets or when it borrowed in the money market. In mid-1976, for example, MNB reportedly was paying one-sixteenth above what Japanese banks were paying for overnight dollars; for three-month funds it was paying one-sixteenth more than top Canadians and one-eighth more than good US names.[15]

Appendix B

Banque Commerciale pour l'Europe du Nord (Eurobank)

Eurobank was founded in Paris in 1921 by Russian anti-Communist emigres, who sold out to Soviet interests in 1925.[1] The expectations of the new Soviet owners that Eurobank would grow rapidly and make a contribution to financing Franco-Soviet trade were not realized in the period before WW II. Assets rose from $6.5 million in 1924 to $17.7 million in 1929 but declined sharply thereafter, reflecting Eurobank's inability both to attract deposits from Western sources and to generate lending opportunities.[2] The bank was closed in June 1940 by order of the Nazi occupation authorities and its assets placed under the control of a Nazi administrator.[3]

In 1948 Eurobank had assets of less than $7 million, or only 10 percent of MNB's total assets at the time. However, as a result of the bank's early involvement—on behalf of Soviet and East European state banks—in the emerging Eurodollar market, its balance sheet worth by 1958 had risen to roughly $200 million—approximately eight times that of MNB.[4] With total assets at the end of 1976 of $2.85 billion, Eurobank is the largest Soviet bank in the West, and consistently has ranked among the ten largest banks in Paris.

Unlike MNB, the largest proportion—76 percent—of Eurobank's assets in 1976 was in the form of cash, mainly with banks and correspondents.[5] Only some 17

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[13] Neil McInnes, "Ivan the Capitalist," Barron's, Dec. 13, 1976, pp. 15 and 23.
[14] Gilbert, p. 88.
[15] Ibid.

[1] Soviet sources often conveniently overlook the fact that Eurobank existed before 1925 (e.g., "Finansogo-kreditnyi slovar," vol. II, 1961, p. 616). In any event, the U.S.S.R. Bank for Foreign Trade was the purchaser of record in 1925 at the bargain price of $650,000—a reflection of the original owners' difficulties in attracting business.

[2] To illustrate Eurobank's inability to expand its resource base, it is noted that the bank's paid-up capital in 1935 was $3.3 million, while its deposits from all sources totalled only $0.97 million!

[3] While Soviet officials have commented that the Nazis left the bank's records "in less than perfect order," they have disclosed no other information on Eurobank's status during the occupation. "Eurobank 1921–71: A Fiftieth Anniversary Book," Paris, Banque Commerciale pour l'Europe du Nord, 1971, p. 5.

[4] Most, if not all, of the U.S.S.R.'s Eurodollar transactions through 1956 were handled by Eurobank. According to an official of MNB, the selection of Eurobank in Paris and not MNB in London as Moscow's agent was dictated primarily by the less constrained state of the continental banking markets. Robbie, p. 35.

[5] Eurobank has more than 200 correspondents.

percent was allocated to loans and discounts—about two-thirds for terms of three years or less—but this was a significant increase over the 11 percent share in 1969 and probably results from the heavy participation of Eurobank in international syndicated loans over the past few years. According to a Eurobank spokesman, roughly 45 percent of the bank's activity is in the Euro-currency business.[6] On the opposite side of the ledger, over 90 percent of Eurobank's resources typically come from deposits maintained by banks and correspondents. Eurobank's net profit in 1976 of $7.8 million represents a return on capital of almost 16 percent. With the exception of 1974, annual profits have been fully retained and placed in the bank's capital reserve. In May 1977, the bank's directors increased the paid-up capital from $51 million to $61 million, thereby providing for further expansion.

The high proportion of cash on the assets side and the correspondingly small proportion used for commercial lending indicate that Eurobank does relatively little direct financing. Instead, it works to induce a number of its Western correspondent banks to provide such trade credit. A considerable proportion of Eurobank's deposits with its Western correspondents has served to secure lines of credit at these banks, primarily for Communist imports from the country in which the Western bank is located. Serving basically as a financial intermediary—rather than directly financing East-West trade—Eurobank is apparently even more actively involved in Eurocurrency markets than is MNB.[7] Eurobank, for example, is known to have participated in at least 192 international consortium loans during 1973–77, compared with 40 for MNB (see Appendix I). The bulk of MNB's loans apparently consist of direct bank-to-bank credit as opposed to bank syndications.

Appendix C

Bank Russo-Iran

The Bank Russo-Iran originally was established under joint Soviet-Iranian ownership in 1923 in Tehran, where it operated as a branch of the Russian Asiatic Company Limited. In 1932 the banking office was reorganized into an Iranian company and registered under its present name. By 1934, with a capital of about $5 million, it was one of the largest banks in Iran, with branches throughout the country. World War II and the ensuing cold war, however, apparently ruined the bank's business. In 1944 the bank's capital stood at about $250,000. In 1954 the U.S.S.R. assumed complete ownership, with Vneshtorgbank holding an 84 percent interest and Gosbank the remainder.

With the return to closer Soviet-Iranian economic relations in the late 1960s, Bank Russo-Iran began a period of increased activity in domestic and international banking. The bank steadily expanded its paid-in capital from $1.3 million in 1968 to $18 million in 1976. Although average-size by Iranian standards, Bank Russo-Iran, with total assets in March 1976 (the end of the Iranian calendar year) of only $277 million, is relatively small compared with other Soviet banks in the West. Lending activities (loans and discounts of bills) continue to be an important part of the bank's business (42 percent of its assets in 1976, compared with 82 percent in 1968), although it now keeps a significantly larger share of its assets in the form of balances with other banks (28 percent in 1976 compared with 11 percent in 1968). Like other banks operating in Iran, Bank Russo-Iran does a heavy volume of business in letters of credit and guarantees—essentially contingent liabilities which are offset by equal claims on its customers. They accounted for 25 percent of its balance sheet total in 1976. In contrast, such business accounted for only 1.5 and 0.3 percent of MNB and Eurobank's respective balance sheet totals in 1976. The increased ability of Bank Russo-Iran to attract deposits, especially from foreign banks, has provided the funds to support its operations. Worth $142 million in 1976, deposits were thirteen times as large as in 1968 and accounted for 63 percent of the bank's resources.

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[6] In addition, 40 percent of the bank's activity is concerned with import and export transactions, and 15 percent with franc transactions with French business, "The Bank on Boulevard Haussman," Euromoney, January 1976, p. 14.

[7] The idea of Eurobank as basically a financial "way-station" for Socialist hard currency balances was first developed by Paul Gekker in "The Soviet Bank for Foreign Trade and Soviet Banks Abroad: A Note," Economics of Planning, No. 2, 1967, pp. 183–197.

Before the 1978 civil unrest in Iran, the bank's prospects for further growth appeared good.[1] In 1975, the bank opened a branch in Isfahan to enhance its domestic operations. A year earlier, Iran had announced the liberalization of its foreign exchange regulations and its intention of becoming an important international foreign exchange and capital market. By 1978, Tehran was developing into a regional money market, and Bank Russo-Iran was able to share in this growth. In recent years, for example, Bank Russo-Iran had become more actively involved in the financing of East-West trade and in other international banking activities. It is, for example, one of the shareholders of the East-West United Bank, the Soviet bank established in 1974 in Luxembourg. In addition, Bank Russo-Iran has participated in several syndicated loans (see Appendixes H and I).

Appendix D

Wozchod Handelsbank

In August 1966, the USSR opened the Wozchod Handelsbank[1a] in Zurich, the first "independent" banking addition in the postwar period. Wozchod was established ostensibly to finance Soviet trade with Switzerland as well as East-West trade. The major reason for the bank, however, seems to have been Moscow's desire to enhance the efficiency and secrecy of its gold sales and to tap new large sources of Eurocurrencies.[2] The opening of Wozchod, in any case, marked the beginning of a movement to increase Soviet banking operations around the world. Between 1967 and 1978, the Soviets doubled the number of banking facilities in their network by founding three new banks and two branches.

As was the case with MNB's expansion into Beirut in 1963, the Soviets moved into the Swiss market only after the "fashionable invasion" of other Western banks.[3] In fairness to Soviet banking planners, it should be noted that U.S. and European bankers themselves were noticeably slow to relocate in Switzerland, despite the country's liberal banking laws. This may have been due to the lagging Swiss appreciation of the potential importance of the Eurodollar business.[4] It was not until the early 1960s that the Swiss recognized the profit potential in Eurodollars and quickly developed a market to rival London and Paris.

The Swiss Banking Commission granted a charter to Wozchod Handelsbank on July 29, 1966.[5] The initial share capital was subscribed by three Soviet banks: Gosbank was the majority shareholder with 55 percent; Vneshtorgbank held 40 percent; and the All-Union Bank for Financing Capital Investments (Stroybank) held the remaining 5 percent. Since its founding, Wozchod's authorized and paid-up capital have increased several times, reaching $26.5 million in 1976. However, with a capital-assets ratio typically about 10 percent—much higher than any of the other Soviet banks abroad—Wozchod seems to be over-capitalized for its volume of business.

Wozchod's assets have risen gradually from $42 million in 1967 to $266 million in 1976—a pace far below the performance of its sister-banks in the West. Like MNB and Eurobank, Wozchod relies heavily on deposits from other banks, which usually account for more than 80 percent of liabilities. Wozchod's operations resemble Eurobank's more than MNB's; functioning principally as an interbank intermediary, Wozchod places roughly two-thirds of its assets in fixed-term deposits with other banks. Hence, less than one-third of its assets are involved in the direct financing of trade. Wozchod was a fairly active participant in publicized Eurocurrency syndications during 1974–76 (see Appendixes H and I).

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[1] This article reflects information received as of Jan. 1, 1979. Almost no data are available on the performance of Bank Russo-Iran for 1977–78. The disruption of the Iranian banking system during the civil disorders of 1978 undoubtedly resulted in a sharp curtailment of Bank Russo-Iran's operations, however.

[1a] Wozchod Handelsbank translates literally as the Sunrise Commercial Bank, a reference to the spaceships launched by the U.S.S.R. during 1964–65. See Time, Nov. 18, 1966, p. 112.

[2] The New York Times, Oct. 2, 1972, p. 55.

[3] The Economist, Feb. 12, 1966, p. 638.

[4] Ray Vicker, "Those Swiss Money Men," New York: Charles Scribners' Sons, 1973, p. 121.

[5] The Times (London), July 29, 1966, p. 17. The original Soviet application for a banking charter called for establishing a "branch" of Gosbank. Swiss banking laws, however, require the governments of foreign banks in Switzerland to grant equal and reciprocal rights to Swiss banks. When the Soviets refused to meet this condition, they had to alter their application to request a charter for an "independent" bank. The Economist, Feb. 12, 1966, p. 641.

Any detailed assessment of Wozchod is made especially difficult by the near-total silence maintained on its activities—presumably because of the bank's sensitive role as Moscow's primary agent for gold sales in the West.[6] On occasion, however, the bank's activities do receive public notice in the Western financial press. For example, in December 1975 Wozchod's sophisticated foreign exchange dealers made headlines when they managed to sell almost $100 million for Swiss francs—in the space of only thirty minutes of trading.[7] This operation reportedly helped the Soviets meet large yearend Swiss franc denominated obligations.

Appendix E

Ost-West Handelsbank

In November 1971, Ost-West Handelsbank was established in Frankfurt, marking the return of a Soviet-owned bank to Germany after an absence of nearly 40 years.[1] Negotiations to open a bank in Frankfurt date back to January 1967, when the Soviets formally requested permission to establish a branch of the Moscow Narodny Bank. Although indications in 1967 were that MNB's application would be approved, negotiations broke down when the German banking authorities held out for an independent bank comparable with Moscow's other western-based banks.[2]

Negotiations for a Soviet bank in Germany began again in October 1970, with both sides seeking to avoid the pitfalls that had aborted the earlier talks. The Soviets agreed from the outset that the bank would be an independent bank and not a branch of an existing bank. The German authorities in turn were equally conciliatory on the questions of location, staffing, and provisions of the bank's charter.[3]

According to Soviet sources, the bank's principal mission was to finance U.S.S.R.-FRG trade as well as East-West trade in general.[4] There were, however, two additional but undeclared motives behind the bank's founding. First, the bank was to facilitate the sale of Soviet diamonds—thereby improving Moscow's hard currency receipts—by advancing credit to Western industrial and artistic users.[5] Secondly, the bank was to provide the Soviets with additional access to the Eurocurrency markets. The importance that Moscow attached to this objective was indicated by the appointment of Andrei Doubonossov as chairman. Doubonossov was the leading Soviet expert on Eurocurrency operations as a result of his tenure as chairman of MNB during 1959–67.

Ost-West Handelsbank has been one of the U.S.S.R.'s most rapidly growing foreign-based banks. Since West Germany is the U.S.S.R.'s leading Western trading partner, the bank has been able to attract considerable business. From assets of $6.3 million in 1971, Ost-West's resources have risen to $408 million in 1973 and to $754 million in 1976—making it three times as large as Wozchod Handlesbank in Zurich (founded in 1966). To support this growth, the bank's paid-in capital has been increased several times, reaching $25.4 million in 1976.[6]

The bank's performance has been paced by its ability to capture a large share of the lucrative short-term financing and documentary business generated by increased Soviet-West German trade. The small risk and high turnover of short-

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[6] Wozchod is rarely mentioned in the specialized Soviet literature on international commerce and finance. For example, in an otherwise thorough and detailed examination of banking and other businesses in Switzerland, Soviet author V. B. Mogutín never mentions the existence of Wozchod. See, "Schveytsariya: Bolshoy Biznes Malyenkoy Strani," Moscow, 1975.

[7] Herbert E. Meyer, "This Communist Internationale has a Capitalist Accent," Fortune, February 1977, p. 146.

[1] The Moscow Narodny Bank had operated a branch in Berlin from 1926 to 1935. The bank assisted the Soviet co-operative and state trading organizations in German and Scandinavian markets. (See "Bank for Russian Trade Review (London)," No. 10, 1929, p. 9). Following the rise of the Nazis to power in 1933, however, the bank was the target of frequent anti-Bolshevik harrassment campaigns which forced the bank to close its doors in 1935.

[2] The Times (London), Jan. 4, 1967, p. 14, and Paul Ferris, "The Money Men of Europe," London: Hutchinson and Co., 1968, p. 162.

[3] "Soviet Gold," The Nation, May 31, 1971, p. 678.

[4] "Vneshnaya Torgovliya," No. 4, 1972, p. 56.

[5] Adam Zwass, "Monetary Co-operation between East and West," in "Soviet and Eastern European Foreign Trade," Fall-Winter 1974–75, p. 216.

[6] Ost-West's shareholders include Gosbank (15 percent), Vneshtorgbank (13 percent), the State Savings Bank (9 percent) and seven Soviet foreign trade organizations (each with a 9-percent interest).

term financing, together with fees and commissions from processing trade documents, have been a valuable source of revenue for Ost-West.

Ost-West has avoided the gross notoriety attracted by its sister-banks in London and Singapore in their drive to generate greater hard currency resources. At least one venture into real estate turned out badly, however. The bank financed the operations of two German diamond importers and provided them with a share of the construction funds for their diamond exchange building in Frankfurt. (Ost-West became the principal tenant). But the diamond exchange went bankrupt in 1976, and the two Germans were charged with fraudulent bankruptcy and tax evasion. Ost-West suffered a sizable bad-loan loss and received considerable adverse publicity in the Western financial press.[7]

Appendix F

Donaubank

In February 1974, Donaubank was formally established in Vienna, capping almost a decade of intermittent planning and negotiations between the U.S.S.R. and Austria. The first attempt to open a Soviet bank in Austria occurred in 1966, when Garant Versicherungs AG,[1] the Soviet insurance firm in Vienna, asked the government for permission to convert to a full-fledged banking institution. The Austrians denied Garant's request on the grounds that it had violated regulations prohibiting the purchase of corporate securities by insurance companies.[2]

Negotiations were re-opened in June 1972, when a high-level Austrian delegation visited Moscow. Led by Finance Minister Hannes Androsch and National Bank President Wolfgang Schmitz, the Austrians reportedly wanted a Soviet bank to locate in Vienna to symbolize and strengthen that city's importance as a center for East-West trade.[3]

Subsequent negotiations resulted in the Austrians granting Donaubank a limited banking charter which allowed it to carry out normal banking operations such as making loans, engaging in foreign exchange and Eurocurrency operations, and making and receiving payments for both domestic and foreign customers. Donaubank's local activities were severely restricted, however. It could not offer savings accounts, issue mortgage bonds and other debentures, or trade in mutual funds.

The bank's initial shakedown period apparently was marked by bad-loan losses and rapid turnover of senior personnel. According to one report, the bank proceeded to lose its entire capital of 100 million schillings (about $5 million) within its first ten months, in transactions unrelated to East-West trade. It lent 80 million schillings to Anger, an Austrian plastics firm, which filed for bankruptcy shortly thereafter. It put 20 million schillings on deposit at Allgemeine Wirtschaftbank, which also went out of business.[4]

Donaubank's Soviet shareholders, Gosbank (60 percent) and Vneshtorgbank (40 percent) were forced to put up additional funds to keep the bank solvent. They also replaced several senior bank officers over the next year, including the Soviet national who was chairman of the board and the Austrian who served as the chief foreign exchange dealer.

In recent years, Donaubank has concentrated on its primary mission of financing trade between Austria and the CEMA countries. To a lesser extent, it has financed third country trade, especially trade of the less developed countries. In addition, Donaubank has participated increasingly in Eurocurrency syndicated loans, and it assumed a sizable share of the 1976 expansion of Garant Versicherung's subscribed capital.

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[7] See, for example, Neil McInnes, "Ivan the Capitalist," Barrons, Dec. 13, 1976, p. 5, and The Economist, July 23, 1977, p. 100.

[1] Garant specializes in East-West trade-related business, including nonpayment risk, manufacturing risk, technical risk, and transportation risk. The latter includes coverage for shipments via the Trans-Siberian Railroad to and from Japan. Garant's nonpayment risk policies are accepted by Western banks active in East-West trade and include coverage against losses resulting from delayed payments—an area of growing concern to lenders to some East European countries. West German firms reportedly account for more than half of Garant's business, followed by Austrian and Swiss firms.

[2] "Communist Bankers," Forbes, Feb. 15, 1967, p. 62.

[3] Clyde H. Farnsworth, "Communist Bankers Prove Themselves Able Capitalists," New York Times, Oct. 2, 1972, p. 55.

[4] Neil McInnes, "Ivan the Capitalist," Barron's, Dec. 13, 1976, p. 5.

Appendix G

East-West United Bank

In June 1974, the newest of the Soviet-owned banks in the West, East-West United Bank (or Banque Unie Est-Ouest), was established in Luxembourg. The bank was set up primarily to finance Soviet trade with Benelux countries and other European Community members. In recent years it has developed close working relationships with several joint Belgian-Soviet enterprises operating in Brussels and Antwerp.[1]

The Soviets believed that their ability to obtain trade credits and consortium funds would be enhanced by an on-site location in Luxembourg's fast growing financial center. Luxembourg is the site of the EC's currency fund, the Cedel Eurobond clearing system, and the Eurex secondary market clearing system and has a well-developed foreign exchange and Eurocurrency market. Luxembourg's currency regulations also permit EWUB to engage in some banking operations that OWHB in Frankfurt could not undertake because of German currency regulations.

East-West United Bank's initial share capital was 250 million Luxembourg francs (almost $7 million). The bank's fully-paid capital was increased to 500 million francs in 1976, indicating that the shareholders—Gosbank, Vneshtorgbank, and all the Soviet-owned banks in the West except Donaubank—were optimistic about EWUB's prospects. Indeed, in its short lifetime, East-West's growth has been phenomenal even compared with the rapid growth of Ost-West Handelsbank in Frankfurt (see Table 1 above). The bank's ability to attract deposits from banking as well as non-banking sources has been a key factor in its meteoric rise [2] and should justify its shareholders' optimism. East-West United also has become one of the more active of the Soviet-owned banks in the syndicating of Eurocurrency loans, especially for Socialist and LDC borrowers (see Appendixes H and I).

Appendix H

PUBLICIZED SOVIET AND EAST EUROPEAN PARTICIPATION IN EURODOLLAR LOANS IN 1974 AND 1975 [1]

Total number	Participating banks: Soviet and/or East European banks	Announced	Value [2]	Term [3]	Recipient
1974:					
93	Moscow Narodny, Eurobank	January	$600	10½-yr	Instituto Mobiliare Italiano
18	Eurobank	do	$60 MC	10-yr	Neste Oy (Finland).
17	Moscow Narodny	do	L£55 (about $22).	8-yr	Banque Exterieure D'Algerif
10	Eurobank	do	$43	12-yr	Grupo Cimento Paraiso (Brazil).
161	Moscow Narodny, National Bank of Hungary.	do	$30 B	16-yr	Mexico.
161	National Bank of Hungary	February	$30 D	15-yr	Quebec Hydro-Electric Commission (Canada).
163	do	do	$50 B	15-yr	British Steel Corp. (United Kingdom).
28	Eurobank	March	$130	10-yr	Republic of Peru.
34	do	do	$80	10-yr	Do.
91	Eurobank, Anglo-Romanian Bank.	do	$1,000	8-yr	Consorzio di Credito per le Opere Pubbliche (Italy).
19	Eurobank	do	$60	Tanker finance	Rederi A/S Julian (Helmar Reksten).
48	do	do	$500 EC	NA	Greater London Council.
76	do	do	$200	5-yr RC	Central Bank of the Philippines.
27	Moscow Narodny	do	$110	Medium-term	Dubai Dry Dock Co. Ltd. (Dubai).
19	Eurobank (co-mgr), Bank PKO (Paris), IBEC, Moscow Narodny.	do	$45 EC	7-yr	Bulgarian Foreign Trade Bank.
15	Eurobank	April	$20	Medium-term	K/S Dyvi Drilling A/S (Norway).
106	do	do	$300 MC	7-yr	Instituto Nacional de Industria (Spain).

See footnotes at end of table.

[1] "Annual Report 1975–76 of East-West United Bank S.A., February 1977." as reported in Press Bulletin (Moscow Narodny Bank), Mar. 23, 1977, pp. 15–16.
[2] Ibid.

PUBLICIZED SOVIET AND EAST EUROPEAN PARTICIPATION IN EURODOLLAR LOANS IN 1974 AND 1975 [1]—Con.

Total number	Participating banks: Soviet and/or East European banks	Announced	Value [2]	Term [3]	Recipient
1974:					
17	Hungarian International Bank	do	$25	Medium-term	Mercantile Credit Co. Ltd.
38	National Bank of Hungary	do	$40 B	12-yr	European Investment Bank
60	do	do	$12 B	15-yr	Mitsubishi Rayon Co., Ltd (Japan).
41	Eurobank	do	$100	10-yr	Republic of Argentina.
26	do	do	$50	2-yr RL	Venezolana del Nitrogeno C.A. (Venezuela).
16	do	do	$20	8-yr	Republic of Senegal.
18	Eurobank, Banque Franco-Roumaine.	do	$30	7-yr	Bank Handlowy w Warszawie (Poland).
13	Central Wechsel	do	$50	8-yr	National Bank of Hungary.
Not available.	Wozchod Handelsbank	May	SF 8($3)	15-yr	SLAS (Denmark).
38	Eurobank, Banque Franco-Roumaine.	do	$300	7-yr	Kingdom of Denmark.
30	Eurobank	do	$200	10-yr	Democratic Republic of Sudan.
12	do	do	$22	Term loan	Societe Nationale d'Electricite (Zaire).
88	Eurobank, Vneshtorgbank, IBEC, Bulgarian Foreign Trade Bank.	do	$1,500	Medium-term	Republic of France.
40	Eurobank	do	$500	10-yr	Electricite de France.
14	Mitteleutropasche (co-mgr.), Bank PKO (Paris), Eurobank, Central Wechsel.	do	$40 EC	Medium-term	Bank Handlowy w Warszawie (Poland).
35	Eurobank, Moscow Narodny, Wozchod Handelsbank, Anglo-Romanian Bank, Banque Franco-Roumane, Bulgarian Foreign Trade Bank, Hungarian International Bank, Zivnostenska Banka, Havana International Bank (co-mgr.), IBEC.	do	DM 150 ($59)	5-yr	Banco Nacional de Cuba.
19	Eurobank	June	$100	10-yr	Gaz de France.
Not available.	Eurobank, National Bank of Hungary.	do	$40 B, ($20 B) ($20 B).	2-maturities, (15-yr) (7-yr).	Banque Francaise du Commerce Exteriur.
28	Eurobank	do	$100	10-yr	Comission Federal de Electricidad (Mexico).
10	do	do	$35	10-yr	Imatran Vioma Osakeyhtio (Finland).
Not available.	do	do	$100 MC	10-yr	Bank of Finland.
34	do	do	$80	10-yr	Republic of Peru.
20	do	do	$55	12-yr	Telecommunicacoes de Minas Gerais (Brazil).
12	do	do	$15	10-yr	L'Office du Chemin de Fer Transgabonais (Gabon).
Not available.	Eurobank, Vneshtorgbank, IBEC.	Circa June	$1,200	NA	Mediobanca (Italy).
Not available.	Eurobank	June	$50	Medium-term	GIS Groupement de L'Industrie Siderurgique.
8	Eurobank, Moscow Narodny	do	$8.9	do	Jugoslovenska Poljoprivredna Banka (Yugoslavia).
22	Eurobank	July	$100	8-yr	Republic of Argentina.
15	do	do	$42	Term loan	Autopistas de Cataluna y Aragon (Spain).
Not available.	do	do	$25	12-yr	Caisse Centrale de Cooperation Economique.
17	do	do	$50 MC	7-yr	Oy Wilh, Schauman AB (Norway).
30	do	do	$60	NA	Indonesian State Oil Co. (Petramina).
9	Anglo-Romanian Bank	do	$30	3-yr RC	First National Holding, Atlanta, Ga. (U.S.).
13	Eurobank	August	$30	7-yr	Creusot-Loire (France).
32	do	do	$150	10-12-yr	National Highway Department of the Federal Republic of Brazil.
16	Eurobank, Moscow Narodny	do	$35	8-yr	Bank Handlowy w Warszawie (Poland).
Not available.	Eurobank	September	$4.5	Medium-term	Centris Electricas de Golas Brazil.
22	do	do	$60	10-yr	Republic of Ivory Coast.
14	Moscow Narodny (Beirut)	do	$20	7-yr	Dem. Republic of Sudan.
6	Eurobank	October	$15	8½-yr	Zeljeznicko Transportno Poduzece Zagreb (Yugoslavia).

See footnotes at end of table.

PUBLICIZED SOVIET AND EAST EUROPEAN PARTICIPATION IN EURODOLLAR LOANS IN 1974 AND 1975 [1]—Con.

Participating banks					
Total number	Soviet and/or East European banks	Announced	Value [2]	Term [3]	Recipient
1974:					
16	do	do	DM 87.5 ($34).	Medium-term	Metalurski Kombinat Zeljezara Sisak (Yugoslavia).
10	do	do	$18	10-yr	Metalurski Kombinat Smederevo (Yugoslavia).
37	Moscow Narodny (co-mgr.), Eurobank, Bank Russo-Iran, East-West United Bank, Ost-West Handelsbank, Donaubank, Hungarian International Bank, Zivnostenska Banka.	do	$518	NA	Krsko Nuclear Power Plan (Yugoslavia).
7	Eurobank	do	$30	Medium-term	Petroleo Brasileiro S.A.
19	do	November	$40 MC	NA	Kooperativa Forbundet (Sweden).
6	do	do	$10	8-yr	Servicos Electricos Del Gran Buenos Aires-"SEGBA" (Argentina).
12	do	do	$40	10-yr	Superfos A/S (Vedback-Denmark).
16	do	December	$45	Medium-term	Banco Nacional de Obras y Servicios Publicos S.A. (Mexico).
Not available.	Moscow Narodny	do	$25	5-yr	Isefjord Power Company (Hellerup, Denmark).
27	Eurobank	do	$100	8-yr	National Highway Dept. of the Fed. Rep. of Brazil.
15	Moscow Narodny (co-mgr.)	do	$100	5-yr	U.S.S.R. Foreign Trade Bank.
35	Eurobank, Ost-West Handelsbank.	NA	$100	9-yr	Central Bank of Egypt.
1975:					
Not available.	Eurobank (co-mgr.)	January	$60	5½-yr	International Bank for Economic Cooperation (CEMA).
16	Eurobank	do	$150	7-yr	Frigg Gas Field Development (Norway).
14	do	do	$150	7-yr	Frigg Gas Field Transportation System (Norway).
5	Ost-West Handelsbank	do	DM 50 ($20)	Medium-term	Petroleo Brasileiro S.A.
34	Eurobank, East-West United Bank, Wozchod Handelsbank.	February	$100	5-yr	National Bank of Hungary.
16	Eurobank	do	DM 80 MC ($35).	5-yr	Autopista Vasco-Aragonesa (Spain).
20	do	do	$37	5-yr	Five Star Navigation Co. Ltd. (Japan).
4	do	do	FF1,500 ($360).	10-yr	Banco Nacional de Cuba.
Not available.	Eurobank (co-mgr.)	March	$15	7-yr	Bulgarian Foreign Trade Bank.
5	Eurobank	do	$30	NA	Intercontinental Quimiea S.A. (Spain).
32	do	do	$140	10-yr	Malaysian International Shipping Corp.
Not available.	Eurobank (co-mgr.), Moscow Narodny (co-mgr.).	do	$12.9	8-9½-yr	FENI Nickel Project (Yugoslavia).
Not available.	Eurobank (co-mgr.), Moscow Narodny (co-mgr.).	do	$11.6	NA	FENI Nickel Project (Yugoslavia).
Not available.	Moscow Narodny (co-mgr.)	do	$50	5-yr	Deutsche Aussenhandelsbank (East Germany).
48	Moscow Narodny (co-mgr.), Eurobank, East-West United Bank, Ost-West Handelsbank, Donaubank.	do	$140	Medium-term	State of Sao Paulo (Brazil).
14	Eurobank	do	$20	7-yr	Groupement pour le financement des ouvrages de batiment travaux publics et activites annexes (France).
34	Moscow Narodny, Hungarian International Bank.	do	$64	Medium-term	Mitsubishi International S.A. (Japan).
40	Eurobank	April	$100	10-yr	Republic of Argentina.
48	do	do	$300	5-yr	Electricite de France.
10	do	May	$35	10-yr	Imatran Voima Osakeyhtio (Finland).

See footnotes at end of table.

PUBLICIZED SOVIET AND EAST EUROPEAN PARTICIPATION IN EURODOLLAR LOANS IN 1974 AND 1975 [1]—Con.

Participating banks					
Total number	Soviet and/or East European banks	Announced	Value [2]	Term [3]	Recipient
1975:					
50	Eurobank (co-mgr.), Moscow Narodny, Anglo-Romanian Bank, Banque Franco-Roumame.	do	$250	5½-yr	U.S.S.R. Foreign Trade Bank
18	East-West United Bank	do	$50	5-7-yr	City of Sao Paulo (Brazil).
36	do	do	$240	5-yr	Bank Handlowy w Warszawie (copper loan) (Poland).
Not available.	Eurobank (co-mgr.)	June	$70	5½-yr	International Investment Bank (CEMA).
32	Hungarian International Bank.	do	$150	5-yr	Instituto de Credito Official (Spain).
8	Eurobank, Bank PKO (Paris).	do	$50	8-yr	Bank Handlowy w Warszawie (Poland).
17	Eurobank, East-West United Bank, Bank PKO (Paris).	do	$50	5-yr	Bank Handlowy w Warszawie.
102	Central Wechsel, Hungarian International Bank, Moscow Narodny.	July	DM 100 B ($43).	6-yr	National Bank of Hungary.
22	Eurobank	do	$50	7-yr	Petroleos del Peru.
15	Moscow Narodny (Beirut), Moscow Narodny (Singapore).	do	$55	Medium-term	Republic of Indonesia.
37	East-West United Bank, Central Wechsel.	August	$100	5-yr	Nacional Financiera S.A. (Mexico).
57	Eurobank	do	$150	Medium-term	Rede Ferroviaria S.A (Brazil).
10	do	do	$40	6-yr	Westburne International Drilling Ltd. (Canada).
42	Eurobank, Moscow Narodny, Ost-West Handelsbank, Bank Russo-Iran, East-West United Bank, Banque Franco-Roumaine, Central Wechsel, Hungarian International Bank, Litex Bank, IBEC.	do	DM 250 ($106).	5-yr	Banco Nacional de Cuba.
11	Eurobank, Moscow Narodny	do	$10	Medium-term	Bank Pars Teheran (Iran).
73	Moscow Narodny (Beirut), Eurobank, Litex Bank, Wozchod Handelsbank.	do	$500	5-yr	Central Bank of Iraq.
13	East-West United Bank	do	$35	7-yr	Veitsiluoto Osakeyhtio (Finland).
29	Moscow Narodny (Beirut)	do	$50	NA	Central Bank of Oman.
33	Eurobank	do	$200	Medium-term	Kingdom of Morocco.
48	Eurobank, East-West United Bank.	do	$200	5-yr	Bank of Greece.
24	Eurobank	September	$100	5-yr	Telefonos de Mexice S.A.
10	do	do	$10 MC	7-yr	Oy Wilh. Schauman A.B. (Norway).
40	Eurobank (assisted), Litex Bank, Moscow Narodny (Beirut).	do	$100	7-yr	Sonaatrach (Algeria).
27	East-West United Bank	do	$50	5-yr	Republic of Brazil.
Not available.	Moscow Narodny, Wezchod Handelsbank.	do	$30	5-yr	Do.
9	Eurobank, Moscow Narodny, Bank Russo-Iran.	do	$50	Term loan	Rudarsko Metalurski Kombinat Zenica (Yugoslavia).
21	Eurobank, Bank PKO (Paris), IBEC.	do	$25 EC	5-yr	African Development Bank.
27	East-West United Bank	October	$50	5-yr	Republic of Brazil.
29	Vneshtorgbank (co-mgr.), Eurobank.	do	$150	5-yr	BOTAS (oil pipeline loan) (Turkey).
10	Moscow Narodny	do	$13.5	5-yr	Government of Bolivia.
15	Wozchod Handelsbank	do	$28	Medium-term	Petroleo Brazileiro S.A.
6	Eurobank	do	$10	5-yr	Empresa Nacional de Autocamiones S.A. (Pegaso) (Spain).
22	do	do	$150	Medium-term	Republic of Peru.
51	East-West United Bank, Wozchod Handelsbank.	do	$150	do	Nacional Financiera (Mexico).

[1] Publicized loans through October 1975.
[2] In million U.S. dollars unless otherwise indicated; L£=Lebanese pounds; SF=Swiss francs; DM=Deutsche marks; MC=multicurrency loan, EC=Eurocurrency loan; B=bond issue; D=debenture.
[3] RC=revolving credit, RL=renewable loan.

Appendix I

PARTICIPATION OF SOVIET-OWNED BANKS IN PUBLICIZED EUROCURRENCY SYNDICATED LOANS, 1973–77 [1]

	1973		1974		1975		1976		1977		Total, 1973–77	
	M	P	M	P	M	P	M	P	M	P	M	P
Total loans:												
Moscow Narodny Bank	1	5	1	12	4	20	1	3			7	40
Banque Commerciale pour l'Europe du Nord (Eurobank)	1	46	3	68	5	41	5	27	1	10	15	192
Wozchod Handelsbank				3		7		6		1		17
Ost-West Handelsbank				4		4						8
Donaubank				1		2		1				4
East-West United Bank				2		15	1	3			1	20
Bank Russo-Iran				1		4						5
Total	2	51	4	91	9	93	7	40	1	11	23	286
Loans to Socialist borrowers:												
Moscow Narodny Bank	1	2	1	6	3	8	1	2			6	18
Banque Commerciale pour l'Europe du Nord (Eurobank)	1	11	2	13	3	11	2	5		3	8	43
Wozchod Handelsbank				2		2				1		5
Ost-West Handelsbank				2		2						4
Donaubank				1		1						2
East-West United Bank				1		8	1	1			1	10
Bank Russo-Iran				1		4						5
Subtotal	2	13	3	26	6	36	4	8		4	15	87
Loans to LDC borrowers:												
Moscow Narodny Bank		3		3	1	11		1			1	18
Banque Commerciale pour l'Europe du Nord (Eurobank)		32	1	26	2	17	3	13		3	6	91
Wozchod Handelsbank						5		4				9
Ost-West Handelsbank				2		2						4
Donaubank						1						1
East-West United Bank				1		5						6
Bank Russo-Iran												
Subtotal		35	1	32	3	41	3	18		3	7	129
Loans to developed West borrowers:												
Moscow Narodny Bank				3		1						4
Banque Commerciale pour l'Europe du Nord (Eurobank)		3		28		10		6	1	4	1	51
Wozchod Handelsbank				1								1
Ost-West Handelsbank												
Donaubank								1				1
East-West United Bank						2		2				4
Bank Russo-Iran												
Subtotal		3		32		13		9	1	4	1	61
Loans to unallocated borrowers: [2]												
Banque Commerciale pour l'Europe du Nord (Eurobank)				1		3		3				7
Wozchod Handelsbank								2				2
Subtotal				1		3		5				9

[1] Derived from "Amex Eurocurrency Syndication Guide," an index and analysis of publicized Euro-currency credits from January 1973, January–December 1977, Euromoney Publications Ltd., London, Index 2. Entries in the "M" column indicate the number of loans managed by the bank, while entries in the "P" column indicate the number of loans for which the bank provided funds. Generally, the bank provided funds for the loan it helped manage. On occasion, as indicated in appendix H, more than 1 of the Soviet-owned banks are involved in the management group and/or among the banks providing funds for a single loan.

[2] Eurobank participated in syndications for North Sea oil financing (2 in 1975 and 1 in 1976); the remaining participations, including Wozchod's, were in syndications for international shipping firms.

THE U.S.S.R.: INTENSIFYING THE DEVELOPMENT OF ITS FOREIGN TRADE STRUCTURE

(By Scott Bozek*)

CONTENTS

TABLES

FIGURES

INTRODUCTION

In 1976, the XXV CPSU Congress considered a number of measures proposed by General Secretary Brezhnev and Premier Kosygin to intensify the development of Soviet foreign trade. Subsequently, in 1978 the U.S.S.R. Council of Ministers began implementing selected measures by issuing orders to revise significant aspects of the Soviet

*The author is a regional economist with the U.S.S.R. Affairs Division of the Bureau of East-West Trade in the Department of Commerce. This article should not be construed as a statement of Commerce policy.
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foreign trade structure. This paper summarizes the recent trends in Soviet foreign trade which have prompted the new measures, and it analyzes what implications revising the foreign trade structure could have for the Soviet domestic economy and world markets.

Since 1970 Soviet foreign trade turnover has increased 187 percent in ruble terms or 77 percent in real terms—see tables 1 and 4—and is equivalent to 15.4 percent of Soviet national income.[1] Soviet imports of machinery, equipment, and foodstuffs, supported by Soviet exports of raw materials, especially energy products, largely are responsible for expansions in total Soviet foreign trade. However, increasing costs for development of natural resources in Siberia, as well as other remote areas, and growing internal demand for these products necessarily will decrease their availability for export. Hence, if Soviet foreign trade is to continue growing, there is a need to increase the processing of natural resources and expand the range of Soviet exports to include manufactured goods. This necessity, together with the possibility of raising the quality and efficiency of some sectors of Soviet industry by subjecting them to the discipline of world markets, has induced the Soviet leadership to revise and develop significant aspects of the foreign trade structure.

Soviet planners seem to have chosen two interrelated strategies for intensifying the development of foreign trade:

Further expanding ties to world markets through such measures as compensation agreements, joint-stock companies in the West, special export industries, and increased numbers and activities of Soviet organizations in foreign trade; and

More closely linking and better compensating Soviet organizations—especially FTO's[2] and industrial enterprises—that have responsibilities for producing and marketing Soviet exports and purchasing and absorbing foreign imports.

Soviet leaders anticipate that the U.S.S.R. will benefit both politically and economically from greater participation in foreign trade[3] and are confident that the "State Monopolies of Foreign Trade and Currency Operations," will shield the U.S.S.R. from disruptive economic disturbances on "capitalist markets." Whether the general strategies and particular measures being implemented succeed in measurably developing and expanding the structure of Soviet foreign trade is problematical. Many significant problems need to be overcome, including changing the attitudes of entrenched bureaucracies, decreasing disincentives to export, raising the quality of Soviet goods, and making industrial enterprises responsive to the world market. It is the resolution of such issues that will decide if the revision of the foreign trade structure will have the same lack of success as did the Liberman proposals[4] of the 1960's, or whether it will result in greater benefits for the U.S.S.R. from foreign trade.

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[1] "SSSR v Tsifrakh v 1977 g.," p. 189.

[2] FTO's are commercial entities of the U.S.S.R. which are legally allowed to conduct foreign trade activities. These state organizations, structured along industrial sector lines, have general responsibility for conducting negotiations with foreign firms and the specific power of signing contracts.

[3] See footnote 6.

[4] See Dobb, M., "Soviet Economic Development Since 1917," International Publishers, New York, 1968, pp. 379–81.

Trends and Highlights in Soviet Foreign Trade

Since 1970, Soviet foreign trade turnover has increased more than 187 percent in ruble terms or 77 percent in real terms and is equivalent to 15.4 percent of Soviet national income.[5] With foreign trade assuming such significant economic proportions, it was appropriate for the Soviet leadership to issue new developmental guidance. At the XXV CPSU Congress, the Soviet leadership acknowledged that, if trade was to progress, further steps had to be taken to adjust the structure of Soviet exports and imports.[6]

As seen in table 3, the structure of Soviet exports and imports exhibits several distinct trends in recent years. The most notable trend in Soviet exports (over the period 1970–77) has been "fuels and electric energy" increasing from 15.6 percent to 35.1 percent of total Soviet exports. During the same period, there have been continuing decreases, albeit of smaller magnitudes, in exports of "foodstuffs," "ores, concentrates and metals," and "machinery and transport equipment." Table 3 clearly shows how dependent Soviet foreign trade has become on its exports of energy, especially oil.

Soviet import statistics in table 4 also show some significant trends. Over the 1970–77 period, the most apparent one is the increase in imports of "foodstuffs," climbing from 15.8 percent to 20.8 percent of total Soviet imports. There have also been rises in imports of "machinery and equipment," reaching a decade high of 38.1 percent in 1977. Smaller changes in the trade structure show Soviets imports of "fuels and electrical energy" rising from 2 to 3.6 percent, while imports of "consumer goods" and "textile fibers and fabrics" were declining 5.4 and 2.2 percent, respectively.

The statistics indicate a growing portion of the Soviet import bill results from purchases of "foodstuffs"—mostly feed grains reflecting a stated policy to upgrade the protein diet of the Soviet population—and "machinery and equipment," more than 40 percent of which comes from the West.[7]

The apparent proportional declines in Soviet exports of "foodstuffs," "ores, concentrates, and metals," and "machinery and transport equipment," and the possibility of decreasing oil exports in the near future will make it difficult for the U.S.S.R. to continue its imports of "foodstuffs," and "machinery and transport equipment," from the West unless some revisions are made in the foreign trade structure.

Soviet Trade by Country Groups

As portrayed in the tables, the U.S.S.R. divides its trade among four country groups—socialist,[8] CMEA,[9] Industrialized Western (I.W.), and developing countries. Historically the largest part of Soviet trade has been with CMEA (59.8 percent);[10] I.W. (28 percent);

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[5] Unless otherwise noted, all figures in this section appear in tables 1–5.

[6] Brezhnev L. Opening Remarks to the XXV CPSU Congress," Feb. 24, 1976 (FBIS–Sov–76–38, Feb. 25, 1976, vol. III, No. 38, supplement 16, pp. 43–44).

[7] "Statistics, Vneshniaia torgovlia" 8 (August) 1978, p. 48.

[8] Socialist countries include Yugoslavia, Vietnam, North Korea, and China.

[9] Countries in CMEA—Council for Mutual Economic Assistance—are Bulgaria, Cuba, Czechoslovakia, Hungary, the German Democratic Republic, Mongolia, Poland, Romania, the U.S.S.R., and, as of 1978, Vietnam. Yugoslavia, while not a full member, has the status of "observer" in CMEA.

[10] All figures are for 1978.

developing countries (12.2 percent); and socialist countries (4.1 percent). This section discusses Soviet trade according to the country groupings and examines aspects of Soviet hard currency trade.[11]

CMEA and Socialist Trade

For both political and economic reasons, the U.S.S.R. continues to conduct the largest part of its trade with CMEA and other socialist countries. Due to these same reasons, the U.S.S.R. also has had its greatest success in exporting industrial and manufactured goods to these countries.

Over the 1970–77 period, trade grew from 14.4 to 36.3 billion rubles (in real terms by 59 percent) and in 1978 represented 59.8 percent of total Soviet trade turnover (see tables 1, 2, 4). CMEA and socialist countries ranked by percentage of total 1977 trade turnover with the U.S.S.R.[12] are as follows:

	Percent	
	1977	1978
1. German Democratic Republic	10.6	10.9
2. Poland	9.6	10.0
3. Czechoslovakia	8.1	8.6
4. Bulgaria	8.1	8.7
5. Hungary	6.4	6.9
6. Cuba	5.4	5.9
7. Yugoslavia	3.2	3.6
8. Romania	3.2	2.8
9. Mongolia	1.1	1.1
10. Vietnam	.7	.7
11. North Korea	.5	.5
12. China	.4	.5

From table 4 it is apparent that in real terms, trade with all socialist countries as a group has increased steadily since 1970. In the CMEA subgroup, however, trade fell in real terms by 8 percent from 1975 to 1976. A probable reason for this one aberration was that in 1975 the U.S.S.R. experienced its largest hard currency trade deficit—about $6.4 billion. It appears that the U.S.S.R. shifted some of its exports from CMEA to the West in order to maintain its hard currency cash flows. In 1977, however, Soviet statistics show that the U.S.S.R. had apparently coped with its possible cash flow problems and had increased its trade with CMEA to an alltime high.

Although the U.S.S.R. exports its largest portion of machinery and transport equipment to CMEA (4.5 billion rubles in 1977 as compared to 1 billion and 257 million for developing and I.W. countries,[13] respectively), the U.S.S.R. has a trade balance deficit with CMEA, in machinery and transport equipment, of about 2 billion rubles. The U.S.S.R. thus relies heavily on its raw material exports to balance trade even with CMEA.

Since European members of CMEA cannot provide large markets for Soviet exports of industrial and manufactured goods and their economies remain greatly dependent on Soviet raw materials, the U.S.S.R. seems to be attempting a new measure for achieving more

[11] The term "hard currency" is a carryover from the days when sound money was freely convertible into hard metal, such as gold. The term is used today, interchangeably with convertible currency, to describe a currency whose value is sound and generally acceptable as an international instrument of exchange.

[12] 1976 rankings were almost identical to 1977. "Vneshniania torgowlia v. 1977 g.", p. 15.

[13] "Statistics," Foreign Trade (in English), 8 (August) 1978, p. 48.

advantageous terms for its raw-material exports. This measure involves interested members of CMEA investing funds, including hard currency funds, into the development of raw material projects in the U.S.S.R., e.g. Orenburg gas deposits and pipeline, the Ust-Ilimsk pulp and paper plant, the Norilsk metallurgical combine, and Kiyembayev asbestos plant. By such hard currency investments the U.S.S.R. hopes to recoup from CMEA some of the hard currency opportunity costs for not selling raw materials to Western countries.

Developing Country Trade

Characterizing Soviet trade with developing countries is rather difficult due to the conflicting information presented by tables 1 and 2. This confusion notwithstanding, trade with developing countries represents a promising area for increased Soviet exports of semiprocessed and manufactured goods.

Over the 1970–78 period, Soviet trade turnover with developing countries increased from 3 to 8.6 billion rubles. At the same time, however, the developing countries' share of Soviet trade turnover decreased from 13.5 percent to 12.2 percent. These figures, of course, show rather contradictory trends. It must be noted, however, that Soviet exports to these countries grew to 5.3 billion rubles in 1977, including Soviet exports of machinery and transport equipment worth about 1 billion rubles. Major Soviet exports to the developing economies in 1977 consisted of machinery and equipment, oil drilling equipment, cameras, watches, oil and oil products, ferrous metals, potassium and nitrogenous fertilizers, sawn timber, and paper. The above goods represented about 70 percent of total Soviet exports to the developing countries.[14]

From this product mix, it appears that the U.S.S.R. is having some degree of success with the developing countries in expanding its export base beyond raw materials. It is possible that in the future the U.S.S.R. could continue to expand its exports to developing countries. In fact, 1978 hard currency trade statistics underline this point. As table 5 shows, the U.S.S.R. more than doubled its 1978 hard currency exports to the developing countries to $2.3 billion. The success of present revisions and development of the Soviet foreign trade structure will be judged, in large part, by the increasing shares of Soviet semiprocessed materials, industrial and manufactured goods which the U.S.S.R. exports to the developing countries.

Industrialized Western Trade

U.S.S.R. trade with the Industrialized West has increased dramatically over the 1970–77 period, rising from 4.7 billion rubles in 1970 to 18.7 billion rubles in 1977. In real terms, this represents an increase of almost 111 percent when developing country trade also is added (see table 4). The major Industrialized West trading partners in 1977, ranked by percentage of total Soviet trade turnover, are as follows:[15]

[14] Ibid., pp. 48–51.
[15] "Vneshniaia torgovlia v 1977 g.", p. 15.

	Percent	
	1977	1978
1. Federal Republic of Germany	4.7	4.7
2. Japan	3.3	3.3
3. Finland	3.1	3.1
4. Italy	2.8	2.8
5. France	2.6	2.6
6. United States of America	2.6	2.6
7. United Kingdom	2.1	2.1
8. Austria	.9	.9
9. Belgium	.9	.9
10. Netherlands	.7	.7

Trade turnover between the U.S.S.R. and I.W. countries has been fairly even, except for trade with the United States. (In 1975 the United States of America ranked fourth, in 1976 second, and in 1977 sixth.) Fluctuations in trade with the United States of America have largely been due to unpredictable Soviet grain harvests.

Two interesting notes in I.W.–U.S.S.R. trade over the 1970–77 period included decreases in Soviet imports from the West in 1974 and 1977. Soviet data, in real terms, for these years indicate that imports from the I.W. fell only slightly in 1974 but rather significantly in 1977 (see table 4). In hard currency terms, Soviet imports from the West in 1977 fell from $13 to $11.6 billion (table 5).[16] The policy of cutting back on imports from the I.W. while at the same time expanding imports to the I.W. resulted from the Soviet desire to control the growth of its hard currency debt, which rose from an estimated $1.9 billion in 1970 to about $16 billion in 1977.[17]

Analysis of the composition of Soviet hard currency trade with the I.W. and developing countries clearly reveals why Soviet planners are attempting to develop their export base. In 1977, for example, about 80 percent of Soviet hard currency earnings came from raw materials, including 48 percent from oil and oil products.[18] U.S.S.R. machinery and equipment exports accounted for only about 6 percent of total hard currency earnings. If Soviet oil production peaks at the end of this decade and the exploitation of other raw materials becomes increasingly expensive, as many specialists predict, the U.S.S.R. will have to expand its range of exports in order to maintain its level of trade. These necessities have induced the Soviet leadership to revise and develop significant aspects of the foreign trade structure.

Foreign Trade Measures of the XXV CPSU Congress

In February 1976, the XXV CPSU Congress considered a number of measures proposed by General Secretary Brezhnev and Premier Kosygin to intensify the development of Soviet foreign trade. Basically, two interrelated strategies were put forward: the expansion of world market ties through new and modified mechanisms; and the improvement of coordination among organizations in the domestic economy, having foreign trade responsibilities. This section of the paper examines how compensation agreements, joint stock companies, special export industries, and increased numbers of participants are

[16] For a current analysis of Soviet debt, see in this volume: Ericson, P. and Miller, R., "Soviet Foreign Economic Behavior: A Balance of Payments Perspective."
[17] Ibid.
[18] Ibid., app. H.

intended to intensify the development of the Soviet foreign trade structure. The next section explains some of the changed relationships among the Ministry of Foreign Trade, FTO's, and industrial ministries and their enterprises.

Traditionally, poor Soviet export performance in goods other than raw materials has resulted from many causes including:

Substandard quality of goods and services;
Lack of after-sales service and parts;
Inadequate methods for entry into world markets;
Separation of foreign trade organizations (FTO's) from factories producing for export; and
Production indices that, in application, penalize factories producing for export.

Until the early seventies such conditions, however, did not greatly concern Soviet economic planners. Historically, foreign trade has been a marginal part of the Soviet economy and the U.S.S.R. has exported only to import needed goods and services—that is, its foreign trade was "import-led." In 1976 at the XXV Congress of the CPSU, however, General Secretary Brezhnev stressed the growing role of foreign trade in the Soviet economy and signaled the need to end "import-led" foreign trade when he said:

> Among the main economic problems, the development of foreign economic ties is gaining increasing significance. This results directly from the rapid growth of our national economy and big changes in the world—successes of the policy of peace and detente. In foreign economic ties we see an effective means of solving both political and economic tasks. [19]

In order to accomplish these political and economic goals the XXV Congress of the CPSU considered measures that would "increase the efficiency" and "improve the structure" of foreign trade, including:

"Extensive development" of compensation agreements [20] and other forms of industrial cooperation with the I.W.;
Organization of special export industries;
Greater Soviet participation in world markets;
Further processing of raw materials;
A larger share for manufactured goods in Soviet exports;
Revision of FTO activities and responsibilities;
Tighter links between FTO's and industrial enterprises;
Increased financial, material, and moral incentives for production of quality export goods; and
A qualitative change in managerial methods.

Compensation Agreements

In proposing compensation agreements as an approved form of trade with the West, the Soviet leadership is attempting to facilitate the financing of hard currency imports, integrate trade with the West into their domestic and foreign trade planning systems and open channels to Western markets, technology, know-how, and management

[19] Brezhnev, L. "Opening remarks to the XXV CPSU Congress," Feb. 24, 1976 (FBIS—Sov—76–38, Feb. 25, 1976, vol. III, No. 38, supp. 16, p. 43).

[20] Generally, a compensation agreement is one in which a seller (a Western exporter) provides a buyer (a Soviet importer) with deliveries (e.g., technology, know-how, finished products, machinery, and equipment) and contractually agrees to purchase goods from the buyer equal to an agreed-upon percentage of the original sales contract value.

techniques. General Secretary Brezhev strongly endorsed compensation agreements (CA's) at the Congress [21] by assigning CA's to the tasks of producing manufactured goods and enforcing greater links among FTO's, industrial ministries, and their enterprises.[22]

Soviet sources report signing more than 60 compensation [23] arrangements, and Western observers expect the U.S.S.R. to earn about $4 billion in 1985 alone from these agreements.[24] To the dismay of the Main Administration for Compensation Agreements of the Ministry of Foreign Trade (see fig. 1) only minor success has been achieved in signing CA's involving manufactured goods. Until the U.S.S.R. becomes less inflexible regarding price calculations, Western managerial presence, and quality control functions, only Western companies seeking additional supplies of raw materials will be inclined to sign CA's with the U.S.S.R.

Joint Stock Companies

Although Soviet joint stock companies have existed in the West since the 1920's, recently the U.S.S.R. has intensified this form of "economic cooperation" to facilitate entrance into various markets and avoid restrictions that might apply to official Soviet organizations. Presently, Soviet FTO's, some All-Union Ministries and other Soviet economic bodies have ties to more than 84 joint stock companies in 26 countries.[25] In the United States, for example, the U.S.S.R. has established five joint-stock companies, including U.S.-U.S.S.R. Marine Resources and Belarus Machinery Inc. U.S.-U.S.S.R. Marine Resources engages in catching and processing fish (mostly hake) and servicing the Soviet fishing fleet off the U.S. west coast. Belarus Machinery sells and services Soviet agricultural tractors. Joint-stock companies, like compensation agreements, have their problems and limitations which sometimes make them inappropriate marketing operations for the U.S.S.R.

Special Export Industries

At the XXV Party Congress Chairman Kosygin raised the possibility of establishing a special sector within the domestic economy that would produce goods, particularly manufactured goods, meeting requirements of world markets: "Since foreign trade has become an important factor of the national economy, the question arises of the organization in a number of cases of special production facilities oriented toward export and the satisfaction of specific requirements of foreign markets." [26]

Although Premier Kosygin paid special attention to discussing the establishment of special export industries, very little information on implementing this measure has appeared in Soviet publications. A

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[21] Brezhnev, op. cit.
[22] Ibid.
[23] Ponomaryov, S., "Compensation-based Cooperation Between the U.S.S.R. and the Capitalist Countries in the Fuel Industry," Foreign Trade (in English) 4, April 1978, p. 25.
[24] See in this volume, Barclay, D., "U.S.S.R.: The Role of Compensation Arrangements in Trade With the West."
[25] See CIA, "Soviet Commercial Operations in the West," September 1977.
[26] Kosygin, A., "Main Directions for the Development of the U.S.S.R. National Economy in 1976–78," Mar. 1, 1976 (FBIS—Sov—76–46, Mar. 8, 1976, vol. III, No. 46, supp. 23, p. 24).

number of articles in the Soviet journal, Foreign Trade, have hinted at Kosygin's proposal being implemented but never forthrightly said this was the case.[27]

The establishment of special export industries within the Soviet domestic economy poses a number of problems, including: how scarce material, managerial and labor resources, will be allocated among the "defense," "foreign trade," and "regular" production industries; and the range and types of incentives to be provided workers and managers for producing high quality goods.

The question of material, financial, and other incentives is crucial. In almost every instance, when Soviet authorities comment on special export industries, a discussion on the skillful use of economic incentives—profits, bonuses, et cetera—usually follows. Premier Kosygin stated at the 25th Party Congress:

> The role of the remuneration system and the record of bonuses in the matter of raising the effectiveness of economic activity should be increased. Progressive forms of material incentives will be used more widely, in particular the earnings for final output or completed projects and requisition systems, and incentives to increase production of high quality output with a smaller number of workers.[28]

At lectures and symposiums in Moscow,[29] Soviets have plainly stated that special export industries are being set up, at least on a pilot basis. These industries are concentrated in the machine building and transport sectors. This information would seem to be buttressed by the fact that the Soviet FTO, Stankoimport (which exports and imports machine tools), was one of the first FTO's to be restructured under the directives of the Council of Ministers (see fig. 3). The Soviets thus seem to be intent on increasing their exports of machinery and equipment to Western markets. Whether such pilot projects will be expanded, of course, depends on world market acceptance of the products of the special export industries.

Soviet Organizations in Foreign Trade

As Soviet foreign trade has expanded, it has become increasingly difficult for the Ministry of Foreign Trade (MFT) to administer, regulate, and execute effectively the growing activities of foreign commerce without greater participation from other organizations and agencies. Since 1946 when the MFT received its ministerial status,[30] a number of other organizations [31] (for example, the State Committee on Foreign Economic Relations, the State Committee on Inventions and Discoveries, the State Committee on Science and Technology, Sovfrakht, Sovexportfilm), with both administrative and operational foreign trade functions, have become more involved in the Soviet foreign trade system. Taking a long-term view of the situation, further

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[27] Kirillov, A. "Soviet Foreign Trade and its Urgent Tasks," Foreign Trade (in English) 8, August 1978, pp. 23–33, and Zavyalov, P., Kretov, I., "Raising the Competitiveness of Export Goods and Marketing," Foreign Trade (in English) 12, December 1977, pp. 32–39. IMEMO, Organizatsiia Vneshneekonomicheskikh Sviazei v SSSR, Akademiia Nauk SSSR. Moscow 1977, p .360.

[28] Kosygin, A. op. cit.

[29] At the joint IMEMO–SRI Symposium on U.S.-U.S.S.R. Compensation Trade in Moscow December 1977, it was stated that these special exports industries did, in fact exist.

[30] Quigley, John. The Soviet Foreign Trade Monopoly, Ohio State University Press, 1974, p. 76.

[31] Ibid., pp. 76–81.

involvement by other organizations would logically follow developments of the past 30 years.

Organizations which administer and execute Soviet foreign trade under the Council of Ministers are as follows: [32]

ADMINISTRATIVE

State Planning Committee (Gosplan).
Ministry of Foreign Trade (MFT).
State Committee on Foreign Economic Relations (SCFER).
State Committee on Science and Technology (SCST).
State Committee on Prices (SCP).
Ministry of Finance (MoF).
State Bank (Gosbank).
Industrial Transport and Other Ministries—(ITOM).
Foreign Trade Bank [33] (Vneshtorgbank).

OPERATIONAL

More than 48 FTO's under the MFT.
Twelve FTO's under the SCFER.
Three FTO's under the Ministry of the Maritime Fleet.
Two FTO's under the State Committee on Cinematography.
Two FTO's under the Meat and Dairy Ministry.
Ingosstrakh—an FTO under the MoF.
Vneshtorgbank.
Intourist—an FTO under the administration for foreign tourism.
Vneshtekhnika—an FTO under the SCST.
Industrial associations and enterprises.
USSR Chamber of Commerce (TPP).
Others.[34]

As Soviet foreign trade becomes a greater and more complex part of the Soviet economy, further responsibilities will probably be delegated to organizations more closely acquainted with the detailed technical problems of their areas of responsibility. It was for this reason that in the 1960's a number of FTO's, for example, Skotoimport, Sovfrakt, were transferred out of the MFT to other ministries subordinate to the Council of Ministers.

Recently greater responsibilities and activities related to foreign trade have been assumed by Gosbank, the Soviet Olympic Organizing Committee (SOOC), and industrial enterprises. In 1976 V. Alkhimov, Deputy Minister of Foreign Trade for finance and foreign exchange (see fig. 1), became Chairman of Gosbank during a period when the U.S.S.R. was experiencing large hard currency trade deficits (see table 5). In the years following his appointment, Gosbank has brought about smaller Soviet hard currency deficits and has increased financial controls over FTO's. His predecessor at Gosbank did not keep a high profile in international economic relations. Alkhimov, however, is a prominent and active participant in activities related to Soviet-I.W. country trade, especially U.S.-U.S.S.R. trade.

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[32] IMEMO, op. cit., p. 96.
[33] Vneshtorgbank is a special case since it has operational functions under MoF and Gosbank but it is legally subordinate to the Council of Ministers.
[34] Loeber, D. "Capital Investment in Soviet Enterprises?" Adelaide Law Review, vol. 6, No. 3, September 1978, pp. 357–360.

The establishment of SOOC in March 1975 was a further step in the development of Soviet foreign trade. Under its charter, SOOC is independent of the MFT and FTO's and has the power to "draw up and sign agreements, treaties, and contracts with foreign firms and organizations on questions related to preparing and staging the 1980 Olympic Games." [35] Since that time SOOC has signed more than 55 contracts with foreign firms. The formation of SOOC and its responsibilities was an important precedent. The U.S.S.R. set up SOOC to carry out a specific task—that is, the 1980 Olympics—and despite resistance from the MFT gave it all appropriate foreign trade powers to accomplish its task. Recent revisions in the structure of the Soviet foreign trade system have seemed to be aimed at this same purpose—that is, to form organizations that are responsible for all aspects of a particular project or product. How this applies to FTO's and industrial enterprises is explored below.

Recent Revisions of the Domestic Foreign Trade Structure

In 1976, the Central Committee of the Communist Party approved a resolution (never published) that outlined revisions for the development of Soviet foreign trade. It was not until 1978, however, that concrete revisions appeared. At this time, the Council of Ministers published two decisions: "Procedures for Signing Foreign Trade Transactions," and "Procedures and Time Limits for Reorganizing All-Union Foreign Trade Organizations in the System of the Ministry of Foreign Trade." [36] These decisions most affected: The Ministry of Foreign Trade (MFT); Trade Sectors Administrations (TSA), and Foreign Trading Organizations (FTO's) underneath the MFT (see figs. 1 and 2); and Industrial Ministries and their production associations and enterprises. From preliminary indications, the basic thrust of the revisions seems aimed at reducing TSA control over FTO's, which are to become more closely linked to the Industrial Ministries.

Organization of the Ministry of Foreign Trade

Responsible to the Council of Ministers, the Ministry of Foreign Trade is directed by a Minister working in concert with a Collegium, currently consisting of 17 people. Organizationally (see figure 1) the MFT consists of: (1) its headquarters offices in Moscow; (2) trade representations abroad; (3) FTO's; and (4) field offices at industrial enterprises.[37] Within the headquarters, under the authority of deputy ministers, are four types of agencies: (*a*) Geographic administrations (for example No. 29, Trade with American Countries); (*b*) functional administrations (for example No. 19 Foreign Exchange); (*c*) trade sector administrations (for example No. 24 Export of Industrial Equipment); and (*d*) support sections (for example the protocol department).

The above-mentioned decisions of the Council of Ministers would seem to affect most directly:

[35] "Report Presented to the 77th sess. of the I.O.C.," Innsbruck, Feb. 3, 1976.
[36] "SP SSSR," 1978, No. 6, art. 35, and "SP SSSR," 1978, No. 13, art. 91.
[37] Quigley, John, op. cit., p. 81.

The MFT's field offices and seven Trade Sector Administrations (see fig. 2);
FTO's that are directly underneath the T5A's;
Industrial associations and enterprises.

The field offices and TSA's historically have fulfilled the functions of insuring proper production and absorption of foreign trade goods. Some contend that if financial and material incentives were made more attractive to industrial enterprises, the need for field offices and TSA's would be reduced and possibly phased out.[38] Effective implementation of compensation arrangements as well as other forms of industrial cooperation, and special export industries could in the future reduce the need for these organizations.

Recentralization of FTO Units

In line with the two decisions of the Council of Ministers, FTO's are being reorganized with special firms (for example, see figs. 3 and 4), that have responsibility for both the export and import of a specified product line. For example, the firm Stankopress (fig. 3) was formed by combining Office No. 5—export of forge and press equipment with Office No. 14—the import of forge and press equipment. It is anticipated that the amalgamation of separate exporting and importing offices of FTO's into one firm will intensify the coordination between FTO's and industrial associations and enterprises. In fact, the reorganization of FTO offices into firms handling homogeneous product lines has been compared, in many instances, to product divisions of large Western corporations. (Typically these product divisions are horizontally integrated and have advertising, marketing, and other nonproduction functions closely linked to the factories.) Fourteen FTO's under the authority of the MFT have already been reorganized along the lines of Stankoimport and Prodintorg, and the remaining FTO's are expected to be reorganized by the end of 1979.[39]

Each reorganized FTO will have a board composed of representatives from industrial ministries, associations, enterprises, and FTO's to act on such matters as: achieving plan goals, increasing exports, widening the range and improving the quality of exports, and establishing new forms of economic ties.[40] Although the General Director of an FTO will continue to be appointed by the Minister of Foreign Trade, a significant industrial ministry presence on the board and possibly also in the management of the FTO will assist in setting more realistically planned targets for delivery of goods for export. Moreover it certainly is coincidental that the measures adopted by the Council of Ministers for intensifying the development of foreign trade appear within the purview of the FTO board. It would seem from the scope of planned FTO activities that the two interrelated strategies of expanding world economic ties and coordinating foreign trade units in the domestic economy are being actively pursued.

Last, and certainly not least, the second decision of the Council of Ministers on foreign trade provides for the creation of financial and material funds within the FTO's. Such incentives are to include:

[38] Ibid., p. 87.
[39] Smirnov. P. "Changes in the Legal Status of Soviet FTO's," "Journal of the Trade and Economic Council" Nov./Dec. 1978, vol. 4, No. 5, p. 23. For new charters of Soviet FTO's, see Foreign Trade (in English) from Oct. 10, 1978, to present.
[40] Smirnov, P., op. cit., p. 24.

material benefits (perhaps special stores as existed in the 1920's for the gold trusts where employees could buy high quality consumer goods not generally available); social, cultural, and housing benefits (perhaps special sports facilities, movies, and apartments); and funds for the development of foreign trade activities and temporary financial assistance. In short, incentives that will encourage firms, FTO's, and individuals to carry out the general strategies and particular measures proposed at the XXV CPSU Congress to intensify the development of Soviet foreign trade.

Conclusions

Most of the measures, proposed by General Secretary Brezhnev and Premier Kosygin at the XXV CPSU Congress, for intensifying the development of Soviet foreign trade seem in the process of being implemented. Whether they will achieve their intended purposes, however, depends upon a number of uncertainties.

The measures aimed at developing compensation agreements, joint-stock companies and other forms of "industrial cooperation"—although not having very visible success—are contributing to the strategy of expanding economic ties with world markets. Moreover these forms of industrial cooperation are helping to increase the further processing of Soviet raw-materials and the range of Soviet manufactured-good exports.

While only very limited information is available on progress in special export industries, there appears to be a concentration of efforts, on a limited scale, in the areas of machine-building and transport equipment. Using new managerial methods and increased financial and material incentives, Soviet planners anticipate tighter links between the industrial organizations and FTO's which, in turn are expected to lead to better quality manufactured goods and a larger share for these products in total Soviet exports.

As the value and complexity of Soviet foreign trade continues to increase, more Soviet committees, ministries, administrations, enterprises, etc., out of necessity, will become more closely involved in various aspects of the Soviet foreign trade structure. This trend has been visible since Stalin's death and the prospects for it continuing seem highly likely.

Recent revisions of the Soviet foreign trade structure seem designed to remove bureaucratic barriers to the further development of foreign trade. It appears that financial and material incentives are being employed to strengthen a weak spot in the trade structure, i.e. the field offices and Trade Sector Administration. The closer coordination of FTO's and industrial enterprises and the horizontal integration of product lines could possibly make these Soviet organizations more responsive to world market demands.

The potential success of these foreign trade reforms is hard to gauge. Difficulties, no doubt, will occur during the implementation of these and related reforms. Only the improved performance of Soviet FTO's on the world market will demonstrate whether the reforms have been successful in improving the efficiency of the foreign trade apparatus in the U.S.S.R.

TABLE 1.—U.S.S.R. FOREIGN TRADE, 1970–78

[In billions of rubles]

	1970	1971	1972	1973	1974	1975	1976	1977	1978
Total:									
Exports	11.5	12.4	12.7	15.8	20.7	24.0	28.0	33.3	35.6
Imports	10.6	11.2	13.3	15.5	18.8	26.7	28.8	30.1	34.6
Turnover	22.1	23.7	26.0	31.3	39.6	50.7	56.8	63.4	70.2
Socialist countries:									
Exports	7.5	8.1	8.3	9.1	11.1	14.6	16.5	19.1	21.2
Imports	6.9	7.4	8.5	9.2	10.3	14.0	15.1	17.2	20.7
Turnover	14.4	15.5	16.8	18.3	21.4	28.6	31.6	36.3	42.0
Western countries: [1]									
Exports	2.2	2.5	2.4	3.7	6.3	6.1	7.8	8.8	8.7
Imports	2.5	2.6	3.4	4.6	6.1	9.7	10.8	9.9	11.0
Turnover	4.7	5.1	5.9	8.3	12.4	15.8	18.7	18.7	19.7
Developing countries:									
Exports	1.8	1.8	2.0	2.9	3.4	3.3	3.7	5.3	5.7
Imports	1.1	1.3	1.4	1.7	2.4	3.0	2.8	3.0	2.8
Turnover	3.0	3.1	3.4	4.7	5.8	6.3	6.5	8.3	8.6

[1] "Western" refers to the non-Communist industrially developed countries of the world.

Note: Figures may not add because of rounding.

Sources: "Vneshniaia torgovlia SSR 1971, 1973, 1975, 1977g". Prilozhenie k zhurnalu, "Vneshniaia torgovlia."

TABLE 2.—PROPORTION OF U.S.S.R. FOREIGN TRADE WITH SOCIALIST, WESTERN, AND DEVELOPING COUNTRIES

[In percent]

	1970	1971	1972	1973	1974	1975	1976	1977	1978
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Socialist	65.2	65.4	64.5	58.5	54.1	56.3	55.6	57.3	59.8
CEMA	(55.6)	(56.2)	(59.6)	(54.0)	(48.9)	(51.8)	(50.8)	(52.5)	(55.7)
Western	21.3	21.5	22.6	26.6	31.3	31.3	32.9	29.6	28.0
Developing	13.5	13.1	12.9	14.9	14.6	12.4	11.5	13.1	12.2

Sources: "Vneshniaia torgovlia SSSR 1971, 1973, 1975, 1977 g." Prilozhenie k zhurnalu, "Vneshniaia torgovlia."

TABLE 3.—SOVIET FOREIGN TRADE BY MAJOR COMMODITY GROUPS, 1970–77

[Percent distribution]

Commodity	1970	1971	1972	1973	1974	1975	1976	1977
Exports, total	100.0	100.0	100.0	100.0	100.0	100.1	100.0	100.0
Machinery and equipment	21.5	21.8	23.6	21.8	19.2	18.7	19.4	18.8
Fuels and electric energy	15.6	18.0	17.7	19.2	25.4	31.4	34.3	35.1
Ores, metals, concentrates, etc	19.6	18.7	19.0	17.1	14.7	14.3	13.2	11.1
Chemicals	3.5	3.4	3.3	3.0	3.6	3.5	3.0	2.8
Wood and wood products	6.5	6.3	6.1	6.4	6.9	5.7	5.3	5.1
Textile fibers and fabrics	3.4	3.3	3.8	3.3	3.3	2.9	2.9	3.2
Foodstuffs	8.4	9.2	5.9	5.6	7.1	4.8	3.0	3.1
Manufactured consumer goods	2.7	2.9	3.1	3.0	2.9	3.1	3.0	2.7
Other	18.8	16.4	17.5	20.6	16.9	15.6	15.9	18.1
Imports, total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Machinery and equipment	35.5	34.0	34.6	34.3	32.4	33.9	36.3	38.1
Fuels and electric energy	2.0	2.7	3.0	3.4	3.5	4.0	3.6	3.6
Ores, metals, concentrates, etc	9.6	9.8	8.9	9.9	13.6	11.5	10.8	9.3
Chemicals	5.7	5.4	4.9	4.3	6.3	4.7	4.3	4.4
Wood and wood products	2.1	2.1	1.3	1.6	1.9	2.2	1.8	1.8
Textile fibers and fabrics	4.8	4.5	3.3	3.7	4.1	2.4	2.3	2.6
Foodstuffs	15.8	15.2	18.0	20.2	17.1	28.0	22.8	20.8
Manufactured consumer goods	18.3	20.1	18.6	15.9	14.6	13.0	12.6	12.9
Other	6.2	6.2	6.9	6.7	6.5	5.3	5.5	6.5

Source: "Vneshniaia torgovlia S.S.S.R. za 1971, 1973, 1975, 1977 g."

TABLE 4.—INDEX OF THE PHYSICAL VOLUME OF U.S.S.R. FOREIGN TRADE BY COUNTRY GROUPS

[In 1970 prices, base year—1970]

	1971	1972	1973	1974	1975	1976	1977
Total:							
Exports	103	106	121	137	141	152	166
Imports	106	124	142	147	174	185	188
Turnover	104	115	132	142	157	168	177
Socialist countries:							
Exports	[1] 104	[1] 103	[1] 112	131	133	138	149
Imports	106	119	127	138	151	156	170
Turnover	90	96	103	135	142	146	159
CMEA:							
Exports	[1] 104	[1] 105	[1] 113	129	143	134	145
Imports	108	118	126	133	156	148	162
Turnover	106	111	120	131	149	141	154
Industrialized West and developing countries:							
Exports	[1] 100	[1] 110	[1] 138	146	155	180	200
Imports	106	130	168	165	216	238	223
Turnover	103	119	152	155	184	208	211

[1] Indices have been calculated, since Soviet data for 1971–73 is available only in terms of a 1965 base year.

Sources: "Vneshniaia torgovlia SSSR 1971–1977 g."

TABLE 5.—SOVIET HARD CURRENCY TRADE, 1975–78

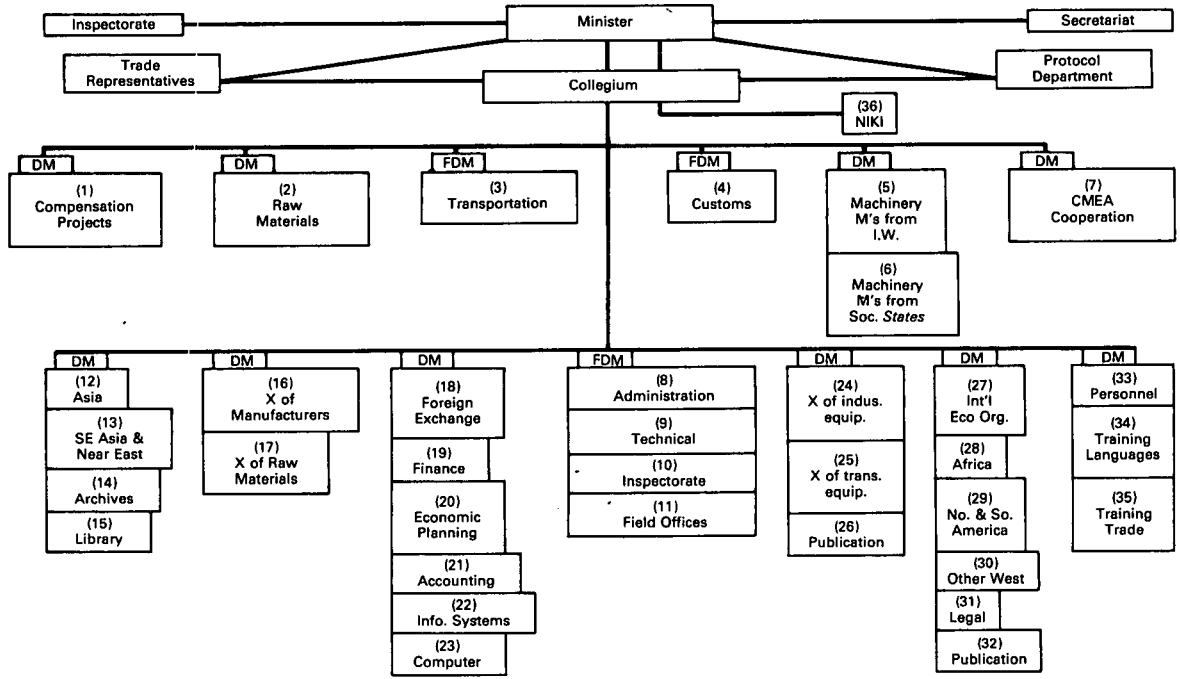
[In millions of U.S. dollars] [1]

	1975	1976	1977	1978
Industrialized West:				
Exports	6.7	8.6	9.8	10.8
Imports	12.1	13.0	11.6	14.0
Balance	−5.4	−4.4	−1.8	−3.2
Developing countries:				
Exports	1.1	1.0	1.1	2.3
Imports	2.1	1.8	1.7	2.4
Balance	−1.0	−.8	−.6	−.1
Total:				
Exports	7.8	9.6	10.9	13.1
Imports	14.2	14.9	13.4	16.4
Balance	−6.4	−5.3	−2.5	−3.3

[1] Totals may not add due tc rounding.

Sources: "Vneshniaia torgovlia, v 1975, 1977, 1978 g." "Annual Report on Exchange Restrictions," International Monetary Fund, Washington, D.C., 1975, 1976, 1977.

Figure 1. — Ministry of Foreign Trade

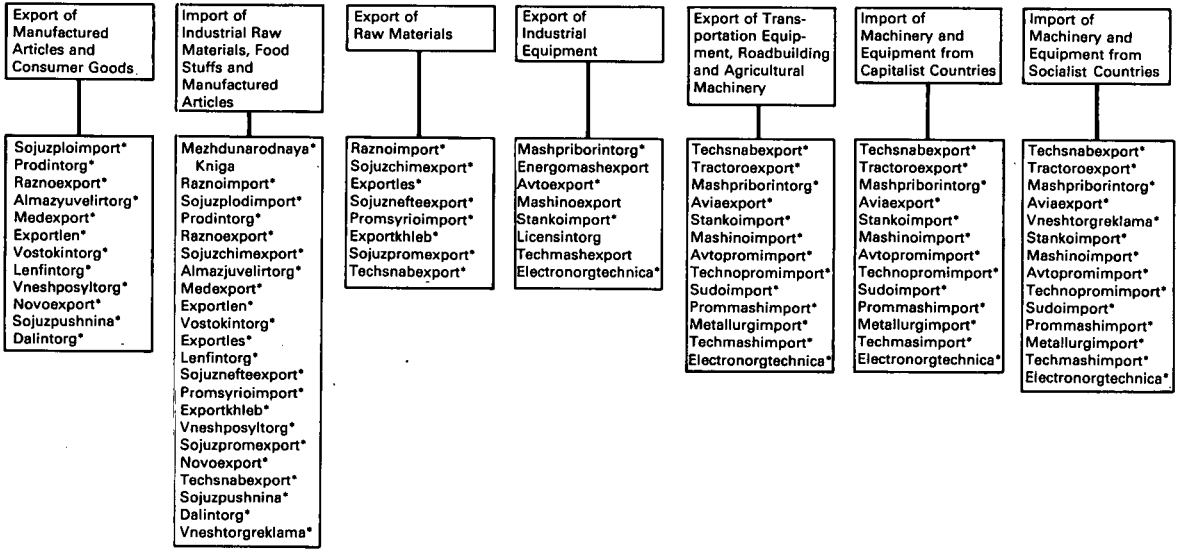


X = Export
M = Import
FDM = First Deputy Minister
DM = Deputy Minister

Source: Gruzinov, V.P. Upravlenie Vneshnei Torgovlei. Moscow 1975 p. 71. (Modifications reflecting current events have been made by the author.)

1. Main Administration for Compensation Projects
2. Main Administration for Import of Raw Materials
3. Transport Administration
4. Main Customs Administration
5. Main Administration for the Export of Industrial Equipment
6. Main Administration for Import of Machinery and Equipment from Socialist Countries
7. Administration for Cooperation with CEMA Member Nations
8. Administration of Affairs
9. Main Engineering and Technical Administration
10. State Inspectorate for Quality of Export Goods
11. Field Offices
12. Administration for Trade with Asian Countries
13. Administration for Trade with SE Asia and Near East
14. Central Archives
15. Central Library
16. Main Administration for Export of Manufactured Articles and Consumer Goods
17. Main Administration for Export of Raw Materials
18. Main Foreign Exchange (Currency Administration)
19. Finance Administration
20. Main Planning and Economic Administration
21. Administration of Accounting Bookkeeping and Control
22. Administration for the Organization of Labor and Information Systems
23. Computer Center
24. Main Administration for the Export of Industrial Equipment
25. Main Administration for the Export of Transportation Equipment, Roadbuilding and Agricultural Machinery
26. Editor of Journal Soviet Export
27. Administration for International Economic Organizations
28. Administration for Trade with African Countries
29. Administration for Trade with American Countries
30. Administration for Trade with Western Countries
31. Treaty and Legal Administration
32. Editor of Journal Foreign Trade
33. Personnel Administration
34. Higher Courses of Foreign Language
35. Academy of Foreign Trade
36. Scientific Research Market Institute (NIKI)

Figure 2. — Authority of Trade Sector Administrations Over FTO's



*Indicates more than one Trade Sector Administration has authority over the FTO.
Source: Gruzinov, op. cit., p. 75

FIGURE 3.—*Reorganization of the FTO Stankoimport*

[Export and import of machine tools and precision tools]

Old organization[1]	*New organization*[2]
1. Office: Import of universal and precision metalcutting machine tools.	1. STANKOROTOR: Export and import of lathes, and the export of woodworking machines.
2. Office: Export of woodworking machine tools.	2. STANKOMODUL: Export and import of gear-working and grinding machines.
3. Office: Export of metalcutting machine tools to socialist countries.	3. STANKOFREZ: Export and import of milling, boring, and drilling machines and planers.
4. Office: Export of tools.	4. STANKOSISTEMA: Export and import of complete sets of equipment for metalworking.
5. Office: Export of forge and press equipment.	5. STANKOAVTOMAT: Export and import of automatic production lines.
6. Office: Export of metalcutting machine tools to capitalist countries.	6. STANKOPRESS: Export and import of forging and pressing equipment.
7. Office: Import of special machine tools from capitalist countries.	7. STANKOINSTRUMENT: Export and import of measuring tools, hand tools, metalcutting and woodcutting tools, fitting and erection tools, hard-alloy articles, abrasive materials and articles, diamonds, and super-hard materials.
8. Office: Export and import of bearings.	8. STANKODETAL: Export and import of spare parts, components and parts for metalworking equipment.
9. Office: Import of special machine tools.	9. STANKOPODSHIPNIK: Export and import of bearings.
10. Office: Export of spare parts, technical service.	
11. Office: Export of metalcutting machine tools to developing countries.	
12. Office: Export of special machine tools.	
13. Office: Import of forge and press equipment.	
14. Office: Import of special and complete forge and press equipment.	
15. Office: Export of diamond and abrasive tools.	
16. Office: Import of spare parts.	
17. Market research department.	
18. Technical department.	
19. Department for commercial advertising.	

[1] "Who's Who in Soviet Foreign Trade," U.S.–U.S.S.R. Trade and Economic Council, May 1977.
[2] Vneshniaia torgovlia," vol. 10, 1978.

FIGURE 4.—*Reorganization of the FTO Prodintorg*

[Export and import of food products of animal origin and also sugar and vegetable oils]

Old organization [1]	*New organization* [2]
1. Office for export and import of sugar.	1. *SAKHAR*: Export and import of sugar and vegetable oils and trade operations related to these products.
2. Office for vegetable oils and animal fats.	2. *MYASOMOL*: Export and import of meat and dairy products and trade operations related to these products.
3. Office for export and import of fish and sea products.	3. *MOREPRODUKT*: Export and import of fish and fish products and trade operations related to the products.
4. Office for export and import of canned fish.	4. *PLEMSKOT*: Export and import of agricultural and zoo animals and trade operations related to them.
5. Office for export and import of meat and meat products.	
6. Office for export and import of dairy products.	
7. Office for agricultural and zoo animals.	
8. Office for export of new products, advertising, and exhibiting.	

[1] "Who's Who in Soviet Foreign Trade," U.S.–U.S.S.R. Trade and Economic Council, May 1977.
[2] Vneshniaia torgovlia," vol. 2, 1979.

RECONCILIATION OF SOVIET AND WESTERN TRADE DATA: THE UNITED STATES AS A CASE STUDY

(By Damian T. Gullo*)

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FIGURE

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*Research analyst with the Office of Economic Research, Central Intelligence Agency.

APPENDIX B

> * * * statistics on foreign trade and gold movements are exceedingly poor, and as a result large parts of the theory of international trade are open to doubt. This presents a real dilemma: economic theory has unquestionably postulated a fine structure in the international field; yet we cannot describe this structure adequately by relying on the data with which we are confronted.
>
> Oskar Morgenstern,
> *On the Accuracy of Economic Observations.*

I. INTRODUCTION

Discrepancies between Soviet and Western trade statistics lead to hard currency balance of trade figures that differ substantially. Western data put the cumulative Soviet deficit with the nine Western countries covered in this paper at $7.7 billion for 1960–77.[1] Soviet statistics on the other hand, show the Soviets in the red by nearly $13.3 billion. The immediate cause of this anomaly is that Western imports generally exceed the U.S.S.R.'s exports by a wide margin, while the value of Soviet imports has usually been quite a bit higher than the value that the nine countries report for exports to the U.S.S.R. A detailed examination of the trade statistics and reporting practices shows that Soviet statistics are a better guide to the U.S.S.R.'s hard currency trade position.

Discrepancies between Soviet and Western statistics are explained by differences in valuation, coverage, and the method used to identify trading partners; these are the very same reasons why trade data among Western countries differ. Taken in the aggregate, Western statistics tend to overstate Soviet hard currency exports because most Western countries value imports c.i.f. (cost, insurance, and freight), which includes transport and insurance costs. This upward bias, however, is partly offset by reexports of Soviet goods that are unaccounted for in Western statistics as a result of the special trade system of reporting generally used in the West and the broader definition of reexports employed by the U.S.S.R. Western export statistics, meanwhile, fail to record the total hard currency cost of Soviet imports. Because of Western reporting practices, a substantial amount of reexports that reach the U.S.S.R. or are bought by the Soviets for delivery elsewhere are absent from Western data. Soviet statistics, on the other hand, somewhat overstate imports by including in the merchandise trade account the purchase of technology—which according to Western convention belongs in the service account.

The reasons for the discrepancies between Soviet and Western data at the aggregate level also are evident on a bilateral basis. For example, a detailed reconciliation of Soviet and U.S. statistics shows that the U.S.S.R.'s failure to identify the United States as the country of final destination for all Soviet goods ultimately reaching the United States was largely responsible for U.S. imports in 1970–75

[1] The countries are the United States, Belgium-Luxembourg, Canada, France, Italy, Japan, the Netherlands, the United Kingdom, and West Germany.

generally exceeding corresponding Soviet exports. For 1976–77—years in which Soviet exports overshadowed U.S. imports—the incorrect identification of the United States as the ultimate consumer of some Soviet exports and the broader definition of reexports used by the U.S.S.R. are the most likely explanations. On the other side of the balance, Soviet imports traditionally have exceeded U.S. exports because all U.S. goods ultimately reaching the U.S.S.R. were not identified in U.S. trade books as exports to the U.S.S.R. Since 1972, moreover, the broader definition of Soviet reexports and the inclusion of technology imports in Soviet trade data have helped to inflate the value of U.S.S.R. imports.

Ongoing reconciliation of Soviet and Western trade data unfortunately has been seriously impaired by the recent omissions in U.S.S.R. reporting. When available, Western commodity data can help to fill in the gaps caused by the increased Soviet use of less detailed commodity categories and the disappearance of others. But as this paper clearly demonstrates, Western reporting still suffers from the more serious shortcomings.

II. Background

A. The Problem

There are significant differences between official Soviet foreign trade statistics and those of the U.S.S.R.'s hard curreny trading partners.[2] Soviet export values traditionally have fallen short of Western import values while Soviet imports have exceeded Western exports. Understandably, questions have arisen concerning the use of Soviet data, especially for obtaining U.S.S.R. hard currency balances. Critics of Soviet data claim the data are misleading and minimize the hard currency earning ability of the U.S.S.R. by understating Soviet trade surpluses and overstating trade deficits. Previous studies have uncovered probable explanations for the discrepancies between Soviet and Western trade data—for example, treatment of exchange rates, reexports, and valuation method— but have not measured their influence. Nor have they reconciled Soviet and Western trade data by country or on a commodity basis.

This paper attempts to identify and measure the relative importance of those factors responsible for the differences between Soviet and Western trade statistics.[3] The paper itself is divided into three major sections. The first section discusses the sources of discrepancies between Soviet and Western reporting and evaluates their influence regarding differences between Soviet and Western trade statistics for major Western trading partners—West Germany, France, Italy, the United States, Japan, the United Kingdom, the Netherlands, Belgium-Luxembourg, and Canada.[4] These countries account for about 85 percent of the U.S.S.R.'s hard currency trade with the developed West and

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[2] Soviet hard currency trading partners are those countries—more than 90—that have multilateral trading arrangements with the U.S.S.R.

[3] Western data are from U.N. or OECD sources. Soviet statistics are from annual U.S.S.R. foreign trade handbooks. Under the terms of the Belgium-Luxembourg Economic Union, the trade statistics of the two countries are reported as those of a single customs territory.

[4] In large measure the first section is a summary of the results of earlier research. For a detailed reconciliation of Soviet statistics with data of the U.S.S.R.'s other major Western trading partners, see "Reconciliation of Soviet and Western Foreign Trade Statistics," Damian T. Gullo, Central Intelligence Agency, ER 77–10132, May 1977.

roughly 70 percent of its total hard currency trade.[5] Included is a discussion on the appropriate way to compute Soviet hard currency trade balances. The second section presents, as a case study, a detailed reconciliation of U.S.–U.S.S.R. trade data for 1970–77. Recent changes in Soviet and Western reporting are discussed in the final section, along with their implications for future reconciliation of trade data.

B. The Analytical Approach

A major share of the analysis is based on two concordances that were developed to link the Standard International Trade Classification, Revised (SITC, Rev.) categories wth the appropriate Common Foreign Trade Nomenclature (CTN) codes used by the U.S.S.R. One of the concordances is on a one-digit CTN level while the other, more detailed, covers the commodities reported in the Soviet Foreign Trade Handbook.[6] The concordances convert SITC, Rev. to CTN codes, to both better focus on Soviet data and to overcome deficiencies in U.S.S.R. reporting. Commodity data usually are not given at the most detailed level in Soviet trade handbooks, consequently, the difficulty of assigning CTN codes to corresponding SITC codes is increased. For example, exports of tools (CTN 174) to West Germany cannot be allocated among the appropriate SITC, Rev. categories 71953, 7296, and 86193, since the U.S.S.R. does not publish a more detailed breakdown of CTN 174. The one-digit CTN concordance was used first to explore the completeness of soviet reporting on a single-digit level (something not possible with a concordance that links CTN to SITC, Rev. codes) and then to identify areas for more detailed examination.

III. General Findings

A. Sources of Discrepancies Between Soviet and Western Reporting

Disparities between Soviet and Western trade data can be explained by differences in valuation, coverage, and the method used to identify trading partners. These are the same reasons that account for discrepancies between trade statistics of any two trading partners. The importance of any one factor in explaining the disparities can vary, however. The following sections summarize the results of an earlier study which examined in detail the causes and impact of the disparities between Soviet and Western trade data.[7] Although the study covered the 1970–74 period, its general conclusions—allowing for minor changes in Western reporting procedures—still hold true today.

1. VALUATION OF EXPORTS AND IMPORTS

Differences in the valuation of traded goods are the most obvious causes of disparities between Soviet exports and Western imports. Western countries—except for the United States and Canada—record imports cost, insurance and freight (c.i.f.) while the U.S.S.R. reports

[5] About 40 percent of the U.S.S.R.'s trade with less developed countries is in hard currency. The International Monetary Fund's Annual Report on Exchange Restrictions is used to determine Soviet hard currency trade partners.

[6] These concordances differ from the ones developed by the United Nations and Paul Marer, "Soviet and East European Foreign Trade, 1964–69." The latter concordances convert CTN codes to SITC codes.

[7] Gullo, Damian T., "Reconciliation of Soviet and Western Foreign Trade Statistics."

exports f.o.b.[8] The United States generally reports imports based on the "transaction value at the foreign port of exportation"; the cost of loading the goods on the carrier is omitted, and the transport cost to the point of exportation may or may not be included.[9] The value of Canadian imports is based on the selling price f.o.b. point of shipment.

Valuation problems encountered in the case of Western imports do not arise on the export side. Western exports—aside from Canadian and U.S. exports—are valued f.o.b. at the frontier of the exporting country, while Soviet imports are valued f.o.b. border of the country of shipment. The U.S. values its exports f.a.s. (free alongside ship), which is equivalent to f.o.b. less the cost of loading the goods on the carrier. Canadian exports are valued either f.o.b. at the point of consignment—where they are loaded aboard a carrier for export—or valued f.o.b. at the port of export, in which case the value would include transport charges to the port.

Considering the effect of these valuation procedures in isolation, reported West German, French, United Kingdom, Italian, Netherlands, and Belgian-Luxembourg imports should be larger than Soviet exports, while United States and Canadian imports should be slightly less than Soviet exports. West German, French, United Kingdom, Japanese, Netherlands, and Belgian-Luxembourg exports meanwhile should equal Soviet imports and United States and Canadian exports should be slightly less than Soviet imports.

2. DIFFERENCES IN COVERAGE

Disparities among trade statistics also stem from differences in the coverage of foreign data caused by differences in (1) the definition of commodity trade, (2) the systems used to record trade flows, and (3) omissions, conscious or otherwise.

Definitions.—Western data, for the most part, include only merchandise trade—goods that add to or subtract from the stock of material resources in a country as a result of their movement into or out of the country. The U.S.S.R., on the other hand, includes the sale and purchase of patents, licenses, repairs, and "services of a productive nature" in its trade statistics. Payment for these kinds of services and "know-how" are treated as invisibles by the West rather than as part of the merchandise account.

Reporting systems.—The comprehensiveness of data on trade flows depends upon the reporting system—general or special—that the countries use. Under the general trade system, all goods entering a country—except for transit trade—are considered imports. The special trade system, in contrast, accepts as imports goods clearing customs or

[8] The f.o.b. value for exports is the value at which goods are sold by the exporter, including export duties, internal taxes, and similar charges plus the cost of transportation and insurance to bring the goods on to the transporting vehicle at the frontier of the exporting country. The cost, insurance and freight value for imports is the value at which the goods are purchased by the importer plus the cost of transportation and insurance to the frontier of the importing country.

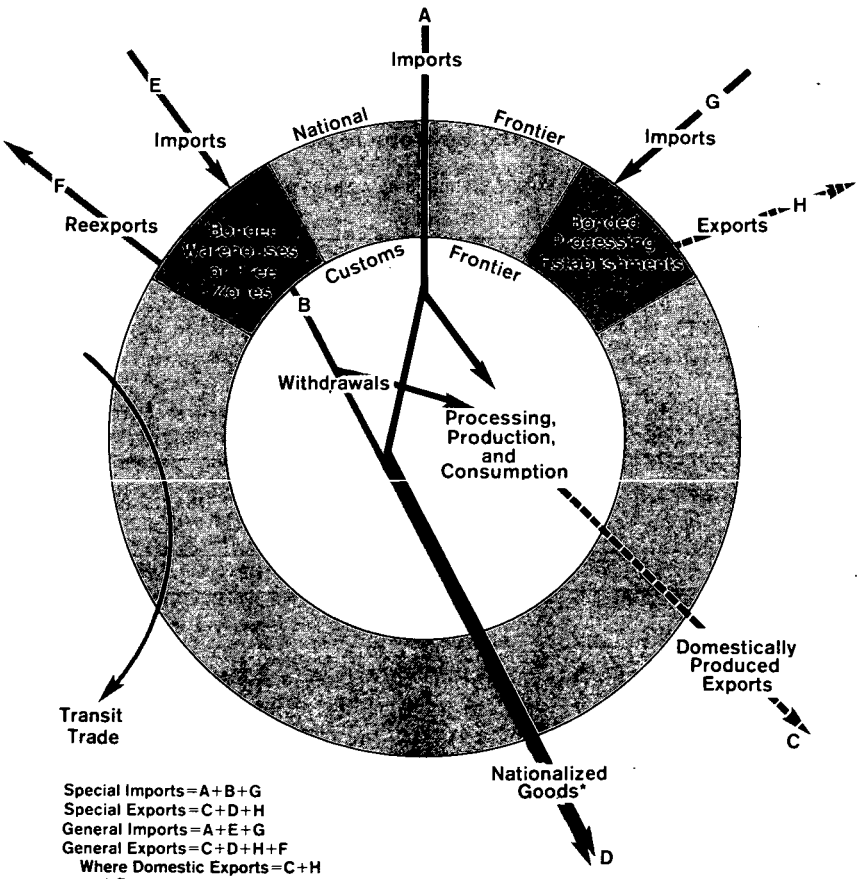
Although valuation discrepancies can also arise when exchange rates are used to convert trade statistics in national currencies to a single currency, they are not addressed in this paper. The U.N.'s conversion of Western trade data to dollars by trade weighted average exchange rates is accepted. (The U.N. computes an average annual dollar exchange rate for a foreign currency by weighting the monthly rates—or the simple average of the rates in effect during a month—by the trade for that month). Soviet trade in rubles is converted to dollars using the official Soviet annual ruble/dollar rate prevailing before 1972 and the average of the monthly ruble/dollar rates announced by the U.S.S.R. since 1972. This computed rate matches the rate reported by the United Nations for the U.S.S.R.

[9] U.S. General Imports, Schedule A Commodity by Country, FT135/September 1978, p. VIII.

entering bonded processing establishments but does not count goods entering bonded warehouses or free zones unless and until they are withdrawn from such warehouses or free zones for domestic use. The general trade system counts all goods leaving the country, across the national frontier, as exports. The special trade system, on the other hand, records trade that is cleared through customs and goods leaving bonded processing plants but excludes reexports from bonded warehouses and free zones (fig. 1).

West Germany, France, Italy, Belgium-Luxembourg, and the Netherlands use the special trade system, while the United States, Canada, Japan, and the United Kingdom use the general system. The U.S.S.R. also records trade under the general system but employs a broader definition of reexports than the West. It includes commodities that physically enter or leave the U.S.S.R. (with the exception of transit goods) and goods of foreign origin acquired by Soviet foreign trade organizations abroad and exported to other countries without passing through the U.S.S.R.

Special and General Trade Reporting Systems Figure 1



Omissions.—The only noticeable omission from aggregate Western statistics is the exclusion in U.N. statistics prior to 1976 of United Kingdom imports of Soviet diamonds, textile fibers, and ferroalloys. OECD and country sources show these deliveries. At the commodity level, West German imports of natural gas from the U.S.S.R. are not broken out in Western data but are included in the broader category mineral fuels, lubricants, and related materials (SITC 3).

On the Soviet side, figures for total exports to and imports from Western trading partners are believed to be free of omissions; at least there is no evidence to the contrary. The commodity breakdowns of exports and imports reported in Soviet handbooks are not exhaustive, however; there are "unspecified" export and import residuals (see tables 1 and 2).[10] In addition, prior to 1977 only the trade involving machinery and equipment (CTN 1) was reported on a one-digit level. (Even then, there is a residual since the subcategory breakdown in CTN 1 is incomplete.) Three two-digit codes, along with their subcategories, traditionally have been missing from the commodity breakdown of exports and imports reported by the U.S.S.R.: precious metals and precious metal goods for industrial purposes (CTN 28), isotopes and amorphous chemicals (CTN 36), and metal storehouses, structures, and tubing (CTN 42). The Soviets over the years also have excluded detailed reporting on several three- and four-digit subcategories—in particular, diamonds—from their trade statistics. In the 1977 Soviet Foreign Trade Handbook, there was a substantial increase in omissions; value and/or volume data for a number of im-

TABLE 1.—SOVIET "UNSPECIFIED" EXPORT RESIDUALS AS A SHARE OF TOTAL EXPORTS, BY COUNTRY

[In percent]

	1970	1971	1972	1973	1974
Exports to:					
United States	58.0	60.7	74.2	88.8	74.6
Belgium-Luxembourg	14.0	15.7	16.2	24.4	17.9
Canada	18.7	46.3	48.7	56.2	25.3
France	5.9	6.2	13.2	10.7	8.7
Italy	2.6	2.9	3.5	2.8	2.7
Japan	17.1	12.4	14.6	15.2	12.8
Netherlands	33.8	10.8	13.6	8.4	8.1
United Kingdom	58.0	54.1	51.8	56.5	46.8
West Germany	8.2	7.8	10.6	11.1	8.1

TABLE 2.—SOVIET "UNSPECIFIED" IMPORT RESIDUALS AS A SHARE OF TOTAL IMPORTS, BY COUNTRY

[In percent]

	1970	1971	1972	1973	1974
Imports from:					
United States	0.6	11.9	8.2	8.7	4.6
Belgium-Luxembourg	10.3	20.3	13.7	16.9	8.9
Canada	.4	.8	.2	.2	3.1
France	4.6	5.0	5.8	5.3	5.2
Italy	4.1	3.9	4.8	5.6	5.4
Japan	5.0	6.8	4.2	5.9	4.9
Netherlands	8.7	3.4	14.8	9.0	3.3
United Kingdon	5.3	4.2	5.6	4.8	7.9
West Germany	3.7	3.6	3.7	6.8	9.8

[10] The "unspecified" residual is the difference between the value of total Soviet exports to or imports from a trading partner and the sum of the values for the commodities broken out in the U.S.S.R. Foreign Trade Handbook.

portant commodity categories such as petroleum and petroleum products were omitted.[11]

The "unspecified" residuals in Soviet statistics on exports to the Western countries (table 1) are accounted for largely by the commodity categories that are omitted from the U.S.S.R. handbooks—diamonds and other precious stones; silver, platinum, and platinum group metals; silver and platinum ores; jewelry of gold, silver, and platinum; nickel; and isotopes and amorphous chemicals. Other commodities comprising the residual vary by country. (Gold, unlike other precious metals, is omitted entirely from Soviet trade data. Before 1978 this was consistent with Western reporting. In 1978, however, the West began reporting trade of nonmonetary gold in the merchandise account. Consequently, gold did not play a role in reconciling Soviet and Western data for 1970–74.) Unspecified residuals in Soviet statistics on imports from Western countries (table 2) generally have been smaller than the export residuals. However, because of the recent omissions in U.S.S.R. reporting, import residuals should account for a larger share of Soviet trade in the future.

Trade in a commodity reported in the breakdown of exports to one country may not be reported in the breakdown for another country, although trade in the given commodity takes place in both cases. To some extent, the reason for the U.S.S.R.'s omission of commodities in its trade reports is innocent enough. This was particularly true before 1977. Goods may be included in a country residual one year and reported explicitly the next. This generally occurs when the statistical authorities deem that trade in the commodity has become large enough to include in the distribution of trade by commodity.

3. METHOD OF IDENTIFYING PARTNERS

Lack of uniformity in identifying the country of origin for imports and the country of destination for exports also results in differences between Soviet and Western trade data. The various procedures are set out in table 3. The United Kingdom, Belgium-Luxembourg, and the Netherlands use the system of first consignment for their imports and the country of last consignment for their exports.[12] Canada also assigns its exports to the country of last consignment but identifies imports with the country from which the goods are last shipped to Canada. France and Japan report their imports by country of production and their exports by country of last consignment.[13] The U.S.S.R.—like the United States, West Germany, and Italy—identifies its imports with the country of production and its exports with the country of consumption.[14]

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[11] Omissions in the 1977 Soviet Foreign Trade Handbook are discussed in more detail later in this paper.

[12] The country of first consignment is the country from which the goods are first shipped to the reporting country without a commercial transaction intervening between that country and the importing country. For exports, the country of last consignment is the last country to which the goods were shipped by the exporting country without any intervening commercial transactions.

[13] The country of production is the country where the merchandise was grown, mined, or manufactured, either wholly or partly.

[14] The country of consumption is the ultimate destination or the country where the goods will be further processed. If the ultimate destination is unknown, the country of last consignment is used.

TABLE 3.—GUIDELINES FOR IDENTIFICATION OF TRADING PARTNERS

	Western exports and Soviet imports		
	Western countries: Identification of export destination	U.S.S.R.: Identification of source of imports	Effect on comparison of Western exports and Soviet imports
Exports by:			
Belgium-Luxembourg, Canada, France, Japan, Netherlands, and United Kingdom.	Country of last consignment.	Country of production.	Western exports should equal Soviet imports if the exports are domestically produced goods that are shipped to the U.S.S.R. without intervening commercial transactions. Soviet import figures should be less than Western values, on the other hand, if the exports are nationalized goods or reexports—the United States, Japan the United Kingdom, and Canada use a general reporting system—and the Soviets can identify the country of origin. If the country of origin is unknown, however, the goods are credited to the Western country from which they are shipped, and Soviet and Western values would match.
United States, Italy, and West Germany.	Country of consumption.	----------	Western exports of domestically produced goods to the U.S.S.R. should be identical to Soviet imports, assuming that the countries of consumption and origin are known to the Western country and to the U.S.S.R.
	Western imports and Soviet exports		
	Western countries: Identification of source of imports	U.S.S.R.: Identification of export destination	Effect on comparison of Western imports imports and Soviet exports
Imports by:			
Belgium-Luxembourg, Netherlands, and United Kingdom.	Country of 1st consignment.	Country of consumption.	Western imports should match Soviet exports if the goods—excluding reexports—are shipped to the Western country from the U.S.S.R. without intervening commercial transactions. When reexports are included in the trade flow, imports for the Netherlands and Belgium-Luxembourg would equal Soviet exports data, assuming that the U.S.S.R. can identify the country of final consumption. If not, some Soviet exports would be credited to these countries, tending to make Soviet exports larger than imports by the Netherlands and Belgium-Luxembourg. United Kingdom imports would be expected to exceed Soviet exports since the United Kingdom includes reexports as imports under its general reporting system.
Canada	Country from which shipped (last stop).	----------	If goods shipped from the U.S.S.R. to Canada for final consumption go directly to Canada without intermediate stops, then Canadian imports should equal Soviet exports. Otherwise, Canadian data would be less than Soviet data. Canadian imports could exceed Soviet exports, on the other hand, if Soviet goods were reexported by Canada and the U.S.S.R. knew the country of consumption.
United States, France, Italy, Japan, and West Germany.	Country of production.	----------	French, Italian, and West German imports should equal Soviet exports. United States and Japanese imports, on the other hand, should exceed Soviet exports—assuming the U.S.S.R. can identify the country of consumption—because the United States and Japan count reexports as imports.

Reconciliation of Soviet and Western trade statistics is especially difficult when countries of first and last consignment or production

and consumption are unknown to statistical agencies. Imports then are usually identified with the country from which they are shipped and exports with the country to which they are addressed. Consequently, countries tend to overstate their trade with partners that are heavily involved in transhipping and reexporting, such as the Netherlands and Belgium-Luxembourg.

B. Explanation and Evaluation of the Differences Between Soviet and Western Trade Statistics

1. SOVIET EXPORTS AND WESTERN IMPORTS

The examination of Western and Soviet trade statistics on a bilateral and commodity basis for 1970–74 reveals a good many special circumstances. Nonetheless, a few primary factors explain most of the discrepancies between Western and Soviet reporting. Western cost, insurance, and freight reporting accounts for most of the difference between Western imports and Soviet exports. This is the case for France, Italy, Japan, the United Kingdom, and West Germany—five of the seven countries that include transport and insurance costs in the value of imports. To some extent, these additional costs are offset in those Western countries—Italy and France—that use the special trade reporting system and therefore do not count as imports the Soviet goods that they buy and then reexport. In any event, the sharp increase in export prices for Soviet raw materials in 1974—particularly prices of crude oil and oil products—reduced the relative importance of transport and insurance costs (see table 4). For France and Italy, the evidence strongly suggests that in recent years the broader definition of reexports used by the U.S.S.R. has, in fact, more than offset the bias expected from Western cost, insurance, and freight reporting; Italian imports from the U.S.S.R. since 1975 have consistently fallen short of Soviet exports to Italy while French imports in 1976 were less than the corresponding Soviet statistics. The cause rests, in part, on Middle East oil that is bought on Soviet account and shipped directly to France and Italy. The U.S.S.R. records the oil—largely Iraqi—as an import from the Middle East and an export to France and Italy. French and Italian statistics, meanwhile, show the oil as an import from the Middle East.

TABLE 4.—WEIGHTED AVERAGE OF WESTERN UNIT IMPORT PRICES AS A PERCENT OF SOVIET UNIT EXPORT PRICES[1]

[Precent]

	1970	1971	1972	1973	1974
Belgium-Luxembourg	123	134	132	99	105
France	147	142	143	126	116
Italy	129	118	123	111	114
Japan	139	140	135	124	117
Netherlands	114	115	115	81	97
United Kingdom	138	138	140	138	123
West Germany	123	129	129	102	99

[1] The ratio of Soviet export unit prices for selected commodities and the the corresponding Western import unit prices in percentage terms are weighted by the appropriate value of Western imports. The selected commodities used in the analysis account for ½ to ⅔ of imports from the U.S.S.R. for Belgium-Luxembourg, France, and Japan; ¾ for Italy; ½ to ¾ for the Netherlands; ¼ to ⅔ for the United Kingdom; and ⅓ to ½ for West Germany.

For the Netherlands and Belgium-Luxembourg, reexports are similarly important, so imports of these two countries from the U.S.S.R. usually are less than the value of corresponding Soviet exports. A substantial share of Soviet goods delivered to these two countries—mainly diamonds and petroleum—are reexported and therefore missing from imports as recorded in their special trade statistics. Since the United States and Canada report imports f.a.s. and f.o.b., respectively, the discrepancies between their imports and Soviet exports originate in the methods used to identify trading partners.[15] U.S. imports exceed Soviet exports because the U.S.S.R. fails to identify the United States as the country of final destination for all Soviet goods that arrive in the United States. These goods, mainly raw materials, are shipped first to Western Europe and then reexported (or transshipped) to the United States. But they often appear in Soviet trade books as exports to Western Europe because the Soviets do not know where the goods are going. The value of Canadian imports, on the other hand, is less than the value of Soviet exports because the method used by Canada to identify the exporting country (the country of last consignment) understates imports from the U.S.S.R.

The factors at work on a bilateral basis also are evident at the aggregate level. Thus the inclusion of transport and insurance costs in Western import statistics drives a wedge between Western imports and Soviet exports. Abstracting from reexports of Soviet goods that are absent from Western aggregate data, Western imports would be 18 to 19 percent larger than U.S.S.R. exports in 1970–72 because of the additional costs.[16] The average difference, however, is only 14 percent; thus, roughly 4 to 5 percent of Soviet exports to the nine Western countries presumably are missing at the aggregate level. The most likely explanations for the incomplete reporting are the treatment of reexports stemming from (a) the various reporting systems (special or general) and methods of identifying trade partners used in the West and (b) the U.S.S.R.'s broader definition of reexports. For example, Soviet exports shipped to a Western country using the special trade system and stored in free zones or bonded warehouses are not recorded as imports by that country (see fig. 1). Nor are these goods, when removed from storage and reshipped, necessarily reported as an import from the U.S.S.R. by the receiving country if that country identifies its imports by country of first consignment (see footnote 12). The receiving country probably would record the goods as an import from the country that stored the Soviet goods. Even when the receiving country identifies imports by country of production, Soviet exports that are reexported may not be recorded as imports from the U.S.S.R. by that country, if they are not readily identifiable as Soviet produced. There are many other similar possibilities that could explain the incomplete Western reporting.

Beginning in 1973, the gap between Soviet exports and Western imports narrowed. The rise in the prices of Soviet raw materials (making transport and insurance costs less important), a slight increase in

[15] A detailed discussion on the reconciliation of U.S. and Soviet trade appears later in the paper.

[16] These estimates are based on weighted averages of unit price ratios (table 4) for the countries that report imports c.i.f. For the trade not included in the sample, an average ratio of 105 percent was assumed, which may be on the low side.

reexport of Soviet goods, and increased deliveries of Middle East oil to Western Europe on Soviet account were primarily responsible. The estimated average difference due to transport and insurance costs in 1973–74 dropped to 9 percent, compared with the actual difference of 3 percent. This change reflected the price increase and a rise in reexports, including those falling under the U.S.S.R.'s broader definition of reexports, to about 6 percent of Soviet exports. Consequently, Western import data before 1973 grossly overstated Soviet exports, with the upward bias in 1973–74 being considerably less and, presumably, even less so today.

2. SOVIET IMPORTS AND WESTERN EXPORTS

Because of differences in trade coverage and, to a lesser degree, difficulties in identifying trade partners, Soviet imports are larger in value than the corresponding exports for all of the nine countries except West Germany. Soviets inclusion of the cost of technology associated with machinery and equipment (CTN 1) in its imports accounts for Soviet imports being larger than French, Italian, United Kingdom, and Japanese exports to the U.S.S.R. Soviet imports from the United States generally were larger than American exports before 1970 because the United States did not know the final destination of all the goods that were exported. More recently, the broader definition of reexports used by the Soviets has added to the bias. U.S. grain bought on Soviet account and shipped directly to a third country appears in Soviet data as imports from the United States but in U.S. trade books as exports to the other country. Similarly, some Canadian grain and wheat flour exports, which the Soviets recorded as imports from Canada, were shipped directly to Cuba. Canada, however, credited Cuba with the imports. In other cases the Canadian practice of identifying the country of last consignment as the buyer, as opposed to country of consumption, contributed to the imbalance.

Reexports (or transshipments)—mainly of chemicals—produced the discrepancy between Dutch and Belgian-Luxembourg exports and Soviet imports. West German exports, in contrast, generally have exceeded Soviet imports. A share of machinery and equipment (CTN 1) delivered to the U.S.S.R. and recorded by the Federal Republic of Germany as exports to the U.S.S.R. was attributed to another country by the Soviets.

Soviet imports in the aggregate are greater than Western exports for the reasons adduced above—the Soviet inclusion of technology imports and the broader definition of reexports employed by the Soviets. Western trade data tend to understate exports to the U.S.S.R.—at least as the Soviets perceive them—because they do not count all reexports to the U.S.S.R. In 1970–74, Soviet imports on the average were 7 percent larger than Western exports. Of this difference, U.S.S.R. technology imports accounted for roughly 2 percentage points.[17] Another 2 to 3

[17] This estimate, which is based on the findings of the country sections, may be on the high side. It was assumed that the difference between Soviet machinery imports (CTN 1) and Western CTN 1 exports is the cost of imported technology. Some of the difference, however, may be accounted for by imports of nonmachinery items, since the Soviets report the entire cost of plants purchased abroad in the machinery and equipment category. The West, on the other hand, assigns the various plant components to the appropriate trade categories.

percentage points can be traced to the Soviet practice of including in their imports goods that are bought on Soviet account and delivered directly to a third country. Reexports (or transshipments) that are not reflected in Western export statistics but which are delivered to the U.S.S.R. probably make up another 2 to 3 percent of the margin.

C. Computing a Hard Currency Trade Balance

It is clear from the preceding analysis that Soviet data are a far-better indicator of total hard currency trade balances; U.S.S.R. statistics more completely reflect Soviet merchandise trade. The difference between the trade balances computed from Soviet and Western data is substantial. After discounting for Soviet technology imports—which according to Western convention would show up as a debit on the service account—Soviet figures put the U.S.S.R. trade deficit with the nine countries for 1970–74 at $2.5 billion. Western data, on the other hand, show a Soviet deficit of only $0.6 billion. It is unnecessary to adjust Soviet data for Western goods that are included in U.S.S.R. trade statistics owing to the Soviet's broader definition of reexports. These goods, such as Western grain purchased by the U.S.S.R. for delivery to Eastern Europe, are bought on Soviet account and therefore represent a hard currency cost to the U.S.S.R. Soviet exports, in turn, need not be adjusted if the reexports are sold for hard currency abroad as in the case of deliveries of Middle East oil to Western Europe on Soviet account. In contrast, substantial adjustments to Western data are needed if they are to be used to compute the hard currency trade balance for the U.S.S.R. The value of reexports, which are missing from Western data either because of the special reporting systems used by many Western countries or the U.S.S.R.'s broader definition of reexports, must be added to Western statistics. On the other hand, transport and insurance costs stemming from the cost, insurance, and freight valuation of imports from the U.S.S.R. must be subtracted; these costs properly belong in the service account. Similarly, nonmonetary gold—which first appeared in Western statistics in 1978—must be subtracted from Western data since Soviet gold sales are usually estimated and listed separately in U.S.S.R. hard currency balance-of-payments accounts for the U.S.S.R.

IV. Reconciliation of Soviet-United States Trade Data, 1970–77

The following case study, which addresses the discrepancies between United States and Soviet trade statistics, demonstrates the path followed in achieving a reconciliation of Soviet and Western data. (A similar reconciliation for the U.S.S.R. and each of its other major Western trading partners is the basis for the general findings that appear in this paper.)

A. Comparison of Soviet Exports and U.S. Imports

Soviet statistics on exports to the United States generally fall short of corresponding U.S. import figures, in line with the usual differences between U.S.S.R. data on exports to the developed West and corresponding Western import statistics. A comparison of Soviet and U.S. data in 1960–77 shows that Soviet figures were less than U.S. statistics in 10 out of the 18 years (see table 5).

TABLE 5.—SOVIET EXPORTS TO THE UNITED STATES

[In millions of U.S. dollars]

Year	Soviet data	United States data	Ratio of Soviet data to United States data (percent)
1960	24.7	23.0	107
1961	24.3	23.0	106
1962	17.4	16.0	109
1963	24.8	21.0	118
1964	20.7	22.0	94
1965	34.4	43.0	80
1966	46.7	50.0	93
1967	39.3	41.1	96
1968	42.9	58.1	74
1969	60.6	51.5	118
1970	64.2	72.3	89
1971	60.4	57.6	105
1972	92.4	95.5	97
1973	186.0	214.0	87
1974	234.0	350.2	67
1975	191.0	254.5	75
1976	264.3	220.9	120
1977	369.4	234.6	157

A close examinaton of Soviet and United States trade data shows that the U.S.S.R.'s failure to identify the United States as the country of final destination for all Soviet goods that ultimately reach the United States—particularly precious metals, diamonds, and more recently petroleum—was largely responsible for U.S. imports generally exceeding corresponding Soviet exports in 1970–75. The reasons for the discrepancies are less certain for 1976 and 1977—years in which Soviet export data exceed U.S. import statistics. The incorrect Soviet identification of the United States as the final destination for some Soviet exports, in particular oil, and the broader definition of reexports used by the U.S.S.R. are the most likely explanations. These findings result from a detailed reconciliation achieved by (a) comparing Soviet and U.S. trade data at the one-digit CTN level to determine the broad categories largely responsible for the imbalance at the aggregate level and (b) determining the individual commodities under these broad categories causing the discrepancies at the one-digit level. Step (b) was accomplished with the help of a detailed concordance that was compiled to compare each commodity category listed in Soviet Foreign Trade Handbooks with its U.S. counterpart.

Source of discrepancy at the one-digit level.—A comparison of Soviet and U.S. data on a one-digit CTN level in 1970–77 shows that Soviet exports of commodities under CTN 2 (fuels, minerals, and metals) account for nearly all of the discrepancy between Soviet exports and U.S. imports (see table 6).[18] The differences between exports explicitly reported under Soviet CTN 2 plus the residual representing "unspecified" Soviet exports (adjusted to exclude non-CTN 2 commodities such as jewelry of gold, silver, or platinum; isotopes; and amorphous chemicals) and the corresponding U.S. CTN 2 imports track closely with the differences between total Soviet exports and U.S. imports (see table 7). Presumably a share of the commodities traditionally in the residual—diamonds, platinum group metals, and nickel—and petroleum products reached the United States but were not identified in Soviet trade books as exports to the United States.[19]

[18] See appendix A for a one-digit CTN breakdown of United States-Soviet trade in dollars.

[19] Soviet exports to the United States of petroleum and petroleum products for 1970–73 were not broken out in Soviet trade books.

TABLE 6.—DIFFERENCE BETWEEN SOVIET EXPORTS AND UNITED STATES IMPORTS ON A 1-DIGIT LEVEL[1]

[In millions of U.S. dollars]

CTN category	1970	1971	1972	1973	1974	1975	1976	1977
1. Industrial machinery and transportation equipment	−0.5	−1.4	−0.7	−1.5	−1.9	−1.7	−2.7	−6.6
2. Fuels, mineral raw materials, and metals	−48.4	−32.3	−71.1	−186.4	−291.5	−137.1	−37.0	−9.4
3. Chemicals, fertilizers, and rubber	.1	−.5	−.3	.2	20.4	38.4	2.6	2.3
4. Building materials and construction parts	−.6	−.5	−.6	−1.7	−.8	(2)	−.1	1.8
5. Raw materials of vegetable and animal origin	−.4	−1.1	−.7	−1.4	−3.9	−2.0	−3.2	−4.9
6. Live animals not for slaughter 7. Raw materials for the production of foodstuffs[3]	4.9	2.5	1.5	(2)	−.5	(2)	−.4	−1.8
8. Foodstuffs	(2)	(2)	.3	.4	−.2	−.1	−.7	−1.8
9. Industrial consumer goods	−.5	−.4	−.2	−1.8	1.7	(2)	−8.8	−1.2
Unspecified export residual	37.3	36.7	68.6	165.1	160.4	38.9	93.7	156.4
Total	−8.1	3.0	−3.2	−27.9	−116.3	−63.6	43.4	137.7
Difference between Soviet total exports and U.S. total imports	−8.1	2.8	−3.1	−28.0	−116.2	−63.2	43.4	134.7

[1] Soviet exports to the United States as reported by the U.S.S.R. and United States imports from the U.S.S.R. as reported by the United States.

[2] Negligible.

[3] CTN 6 and 7 are combined because the SITC scheme does not distinguish between live animals for slaughter and live animals not for slaughter.

TABLE 7.—COMPARISON OF SOVIET EXPORTS AND UNITED STATES IMPORTS IN CTN 2

[In millions of U.S. dollars]

	1970	1971	1972	1973	1974	1975	1976	1977
Soviet CTN 2 exports	48.7	49.0	77.5	169.9	188.0	127.4	230.0	331.0
Exports explicitly reported	13.3	14.3	10.6	6.9	28.2	89.1	136.4	174.9
Exports included in the unspecified residual[1]	35.4	34.7	66.9	163.0	159.8	38.3	93.6	156.1
U.S. CTN 2 imports	61.7	46.6	81.7	193.3	319.6	226.2	173.4	184.3
Imports corresponding to explicitly reported Soviet exports[2]	13.8	11.4	14.2	6.4	115.3	124.7	78.4	75.9
Imports corresponding to Soviet exports included in unspecified residual[3]	47.9	35.2	67.5	186.9	204.3	101.5	95.0	108.4
Difference between Soviet CTN 2 exports and U.S. CTN 2 imports	−13.0	2.4	−4.2	−23.4	−131.6	−98.8	56.6	146.7
Difference between total Soviet exports and United States imports	−8.1	2.8	−3.1	−28.0	[4]−116.2	[4]−63.5	43.4	134.7

[1] The value of Soviet CTN 2 exports contained in the unspecified residual was computed by substracting non-CTN 2 commodities—jewerly of gold, silver, or platinum and isotopes and amorphous chemicals—that are traditionally included in the residual from the value of the unspecified residual; values for these non-CTN 2 exports were obtained from U.S. import data. The remaining share of the unspecified residual includes diamonds and other precious stones, platinum, and planinum group metals, silver and platinum ores, and nickel—CTN 2 commodities that traditionally account for the most of the residual. In addition, the remainder from year to year may include other CTN 2 categories as well as some non-CTN 2 categories.

[2] The value of U.S. CTN 2 imports corresponding to explicitly reported Soviet exports for a given year represents the difference between total U.S. CTN 2 imports and the value of the CTN 2 commodities traditionally included in the Soviet unspecified export residual (footnote 1 above) and other CTN 2 commodities presumed to be included in the residual that year. These additional CTN 2 commodities for 1970–72 were oil and oil products, nonferrous metal scrap, and miscellaneous nonferrous metals; for 1973: oil and oil products, copper, zinc and miscellaneous nonferrous metals; for 1974; clay and other refractory minerals, coke, iron and steel, nonferrous metal scrap, cooper, zinc and miscellaneous nonferrous metals; for 1975, clay and other refractory minerals, coke, nonferrous metal scrap, and miscellaneous nonferrous metals; for 1976, clay and other refractory minerals, iron and steel, nonferrous metal scrap, and miscellaneous nonferrous metals; and for 1977, clay and other refractory materials, iron and steel, and nonferrous metals.

[3] The value of U.S. imports corresponding to Soviet CTN 2 exports included in to residual for a given year are computed by summing the values of the CTN 2 commodities traditionally included in the residual (footnote 1 above) and other CTN 2 commodities not broken out in Soviet trade data but presumed to be in the residual that year.

[4] The difference between Soviet-United States trade is partially offset by Soviet exports of urea—$17,400,000 in 1974 and $33,700,000 in 1975—that are not reported by the United States as imports from the U.S.S.R. The difference between total Soviet exports and United States imports—$116,200,000 and $63,500,000 in 1975—plus the value of Soviet urea exports closely matches the difference between Soviet CTN 2 exports and U.S. CTN 2 imports for 1974–75.

In 1971–72, the minor differences between Soviet exports and U.S. imports are explained by discrepancies in the explicitly reported CTN 2 commodities; the values of Soviet CTN 2 exports in the residual for

these 2 years closely match corresponding U.S. imports (see table 7). A detailed comparison of the trade data shows that Soviet aluminum exports in 1971 exceeded the value reported by the United States as imports by $3 million while in 1972 U.S.S.R. exports of chrome ore were $4 million less than U.S. imports.

In 1973, discrepancies involving the CTN 2 commodities in the residual account for the imbalance at the aggregate level (see table 7). Differences between U.S. imports and Soviet exports of diamonds, platinum group metals, nickel, and petroleum—totaling $23.9 million—presumably were responsible for the lion's share of the difference.[20]

Discrepancies in both CTN 2 exports explicitly reported and those included in the residual explain nearly all of the gaps between Soviet exports and U.S. imports for 1974–75 (table 7). U.S. imports of Soviet oil in 1974 exceeded reported U.S.S.R. exports by $89.1 million and in 1974 by $48.2 million (the 1975 U.S.S.R. Foreign Trade Handbook broke out Soviet oil exports to the United States in 1974 and 1975). As for the differences between the residuals for these 2 years, about $44 million and $63 million worth of diamonds, platinum group metals, or nickel not identified in Soviet trade books as exports to the United States apparently reached the United States in 1974 and 1975.

Most of the Soviet goods reaching the United States but not shown as exports to the United States in U.S.S.R. trade books probably were shipped initially to a third country and then on to the United States. For example, the oil most likely was shipped first to the Netherlands or Belgium, stored in bonded warehouses, and then sold to independent jobbers such as JOC (a Swiss trading company) for delivery to the United States. Consequently, these oil shipments would be recorded by the Soviets as exports to the Nertherlands or Belgium.[21]

The 1974–75 imbalances in favor of the United States stemming from discrepancies in the recording of Soviet exports of diamonds, precious metals, and oil were partially offset by Soviet exports absent from U.S. statistics—in particular, Soviet exports of urea and potassium fertilizer totaling $31 million in 1974 and $37 million in 1975. The fertilizers probably were bought by U.S. trading companies and then resold to Latin American countries—particularly Brazil. If so, these commodities would not show up in U.S. trade books as imports from the U.S.S.R.

Soviet exports and U.S. imports in 1973–75 can be reconciled in the following manner:

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[20] The value of these exports represents the difference between the value of Soviet CTN 2 exports in the "unspecified" export residual and corresponding U.S. imports. It was assumed that the value of Soviet exports of the other commodities presumed to be in the residual—iron and steel, copper, zinc, and miscellaneous nonferrous metals—was the same as the value obtained from U.S. data. Consequently, the difference between residuals is attributed entirely to the difference between Soviet exports of diamonds, platinum group metals, nickel, and petroleum and corresponding U.S. imports.

[21] Reported Soviet petroleum exports to the Netherlands exceeded reported Dutch imports of Soviet oil by $135 million in 1973, $137 million in 1974, and $63 million in 1975. Similarly, Soviet exports of oil in 1973–75 exceeded corresponding Belgian imports by $48 million, $89 million, and $22 million, respectively. (The differences in value also are understated since both Western countries report imports cost, insurance and freight while Soviet exports are recorded f.o.b.) This oil presumably was stored first in bonded areas in the Netherlands and Belgium and then shipped to other countries. Since the Dutch and Belgians record trade under a special system, the Soviet oil was not counted as an import in their trade statistics.

[Millions of U.S. dollars]

	1973	1974	1975
Difference between Soviet exports and United States imports of:			
CTN 2: Fuels, mineral raw materials, metals:			
Petroleum and petroleum products (SITC 33)	−23.9	−89.1	−48.2
Platinum and platinum group metals (SITC 6813) and nickel (SITC 683)		−44.5	−63.2
Asbestos, crude, washed or ground (SITC 2764)		−.1	−2.3
Iron ore (SITC 2813)		(1)	−0.2
Chrome ore (SITC 28391)	.9	4.4	8.1
Aluminum (SITC 684)		(1)	4.1
CTN 3: Chemicals, fertilizers, and rubber:			
Urea (SITC 51274)		17.4	33.7
Potassium fertilizer (SITC 5613)		2.8	3.5
Total	−23.0	−109.1	−64.5
Difference between total Soviet exports and United States imports	−28.0	−116.2	−63.5

[1] Negligible.

In 1976–77, problems of correctly identifying the final destination of Soviet exports and/or the broader definition of reexports used by the U.S.S.R. largely account for Soviet exports exceeding U.S. imports. U.S.S.R. trade books reported more oil delivered to the United States these 2 years than U.S. trade accounts acknowledged—roughly $38 million and $107 million more.[22] Also in 1976, U.S.S.R. exports of nonferrous metals exceeded U.S. imports by about $20 million. Consequently, Soviet CTN 2 exports explicitly reported are greater than corresponding U.S. imports (table 7). One plausible explanation for the difference is that Soviet oil presumably destined for the United States was diverted to a third country; thus the United States was incorrectly identified in U.S.S.R. trade books as the country of final destination. The selling and reselling of oil by brokers in the international markets and the diversion of tankers on the high seas make it extremely difficult to follow the movement of oil, particularly when the amount in question is small. For example, Israel reportedly has bought on a number of occasions Soviet oil destined for European markets by disguising the destination of the tankers.[23]

Another explanation for the discrepancy could be that the U.S.S.R. is servicing its U.S. customers with Middle East oil bought on Soviet account. If so, the oil would be recorded by the United States as an import from the Middle East while Soviet accounts—owing to the U.S.S.R.'s broader definition of reexports—would show the deliveries as imports from the Middle East and exports to the United States.[24] Moscow in recent years has used Middle East oil, mainly from Iraq, to service Soviet clients in Western Europe and India.

The discrepancy between the Soviet "unspecified" exports and the U.S. value of CTN 2 commodities thought to be included in the residual also helps to explain why U.S.S.R. exports exceed U.S. imports in 1977 (table 7). This difference implies that the United States was incorrectly identified as the final destination for at least $48 million

[22] The actual value of the unexplained shipments of Soviet oil for 1976–77 most likely exceeded $38 million and $107 million. Some of this oil presumably offset Soviet oil that reached the United States via a third country and was responsible for U.S. oil imports exceeding corresponding Soviet exports prior to 1976.

[23] "United States Weighs Oil Sales to Israel." J. P. Smith, Washington Post, Jan. 14, 1979.

[24] U.S. oil imports from Iraq in 1976–77 totaled $106 million and $376 million—a substantial increase from the 1975 level of only $10 million.

worth of Soviet goods.[25] Although the exports unaccounted for could fall in any of the one-digit categories, a large share probably belongs to category CTN 2 (fuels, mineral raw materials, and metals), given the usual composition of U.S.S.R. exports to the United States.

B. Comparison of Soviet Imports and U.S. Exports

The relationship between U.S. exports to the U.S.S.R. and Soviet imports from the United States in 1960–77 is more consistent than that between U.S. imports and Soviet exports. The value of U.S.S.R. imports exceeded the value of U.S. exports in 15 out of the 18 years and there is less variation in the ratios of U.S. exports to Soviet imports (see table 8). This pattern resembles the general relationship between Soviet import data and the corresponding export figures reported by the U.S.S.R.'s major hard currency trading partners.

Soviet imports in the past generally ran larger than U.S. exports because all U.S. goods finally reaching the U.S.S.R. were not identified in U.S. trade data as exports to the U.S.S.R. Apparently shipped to Western Europe and then on to the U.S.S.R., these goods appear in U.S. data as exports to a third country and not to the U.S.S.R.[26] More recently, the U.S.S.R.'s broader definition of reexports, which considers as exports goods bought on Soviet account and shipped directly to a third country from the exporting country, and the inclusion of "know-how" costs associated with Soviet purchases of machinery and equipment have largely accounted for the upward bias in Soviet import statistics.

TABLE 8.—SOVIET IMPORTS FROM THE UNITED STATES

[In millions of U.S. dollars]

Year	Soviet statistics	United States statistics	Ratio of Soviet to United States statistics (percent)
1960	59.9	38.0	158
1961	50.7	46.0	110
1962	27.0	20.0	135
1963	27.9	23.0	121
1964	162.6	146.0	111
1965	64.7	45.0	144
1966	63.3	42.0	151
1967	62.6	60.2	104
1968	56.6	57.7	98
1969	116.8	105.5	111
1970	114.6	118.2	97
1971	143.6	161.6	89
1972	558.3	546.7	102
1973	1,381.3	1,187.6	116
1974	745.7	607.9	123
1975	2,032.3	1,834.1	111
1976	2,669.0	2,306.0	116
1977	1,715.6	1,623.6	106

In 1970–71, however, the usual bias in favor of Soviet data was more than offset by the Soviet failure to identify the U.S. as the exporter of all U.S. machinery and equipment (CTN 1) that the

[25] The actual value of goods unaccounted for in U.S. trade data most likely is higher because part of the difference presumably offset Soviet exports that in past years reached the United States but were not shown in Soviet trade books—such as diamonds, precious metals, and nickel.

[26] The ultimate destination most likely was unknown. Consequently, the United States probably used the country of last consignment.

U.S. reported as shipped to the U.S.S.R. (see table 9).[27] Reported Soviet imports of machinery and equipment (CTN 1) were $22 million less than corresponding U.S. CTN 1 exports to the U.S.S.R. in 1970 and $36 million less in 1971. The disparity in 1970 mainly stems from $16 million worth of tractors and construction and mining equipment that are shown in U.S. trade books as exports to the U.S.S.R. but not identified by the Soviets as imports from the U.S. Similarly, U.S. exports of mechanical handling equipment—totaling $18 million—largely account for the difference between U.S. machinery and equipment exports in 1971 and Soviet imports. (Table 10 provides the available evidence on the origin of the differences at the one-digit CTN level.) The CTN 1 imbalances for 1970–71 were large enough to outweigh the differences in other categories—particularly Soviet imports of raw materials of vegetable and animal origin (CTN 5). Also in 1971, the "unspecified" import residual rose to $17 million from only $1 million the previous year. The U.S.S.R. apparently included a share of its imports of raw materials for the manufacture of foodstuffs (CTN 7)—mainly corn and unmilled cereal—in the residual.

TABLE 9.—DIFFERENCES BETWEEN SOVIET IMPORTS AND UNITED STATES EXPORTS ON A 1-DIGIT CTN LEVEL[1]

[In millions of U.S. dollars]

CTN category	1970	1971	1972	1973	1974	1975	1976	1977
1. Industrial machinery, equipment, and transportation facilities	—22.0	—36.2	—7.7	18.7	18.3	64.6	207.7	89.5
2. Fuels, mineral raw materials, and metals	.2	4.3	3.6	12.3	4.5	—8.8	—49.4	—56.5
3. Chemicals, fertilizers, and rubber	7.1	2.2	4.3	5.7	26.2	31.4	21.6	9.9
4. Building materials and construction parts	—1.0	—.8	—.9	—1.9	—6.7	17.6	—33.6	—19.1
5. Raw materials of vegetable and animal origin	12.9	12.1	8.9	3.6	1.5	7.3	—11.5	—18.8
6. Live animals not for slaughter	.1	—14.2	—35.3	49.3	70.6	75.7	221.3	31.9
7. Raw materials for the production of foodstuffs								
8. Foodstuffs	.9	.2	—1.4	—8.5	—4.1	—12.4	2.7	—16.7
9. Industrial consumer goods	—2.5	—2.7	—5.3	—5.4	—6.4	—12.4	—28.4	—33.8
Unspecified import residual	.7	17.0	45.8	119.9	33.9	35.6	33.1	110.3
Total	—3.6	—18.1	12.0	193.7	137.8	198.6	363.5	96.7
Difference between Soviet total imports and U.S. total exports	—3.6	—18.0	11.6	193.7	137.8	198.2	363.0	92.0

[1] Soviet imports from the United States as reported by the U.S.S.R. and United States exports to the U.S.S.R. as reported by the United States.

TABLE 10.—DIFFERENCES BETWEEN SOVIET IMPORTS AND UNITED STATES EXPORTS[1]

[In millions of U.S. dollars]

CTN category	1970	1971	1972	1973	1974	1975	1976	1977
1. Machinery, equipment, and transport facilities	—22.0	—36.2	—7.7	18.7	18.3	64.6	207.7	89.5
SITC 714—Office machines	—1.2	—3.4	—2.6	—3.3	—.1	1.9	3.2	5.5
SITC 715—Metalworking machinery	—6.6	—13.6	—14.5	6.6	—25.3	—1.7	16.7	3.6
SITC 717—Textile and leather machinery	—.2	—.4	0	—1.1	—.6	—.2	1.0	1.5
SITC 7183—Food processing machines	(2)	(2)	(2)	—.1	—.1	8.0	11.7	5.8
SITC 7185—Mineral crushing, sorting and moulding machinery	—.6	—1.6	—.8	—.7	—17.7	—8.8	23.0	21.4
SITC 7191—Heating and cooling equipment	.8	—.1	1.0	—1.4	—25.3	7.1	106.3	86.4
SITC 7192—Pumps and centrifuges								
SITC 7193—Mechanical handling equipment	—5.0	—18.2	—3.8	—65.3	—15.7	—20.3	—49.2	—21.1

See footnotes at end of table.

[27] See appendix B for a one-digit CTN breakdown of U.S.-Soviet trade in dollars.

TABLE 10.—DIFFERENCES BETWEEN SOVIET IMPORTS AND UNITED STATES EXPORTS [1]—Continued

[In millions of U.S. dollars]

CTN category	1970	1971	1972	1973	1974	1975	1976	1977
2. Fuel, minerals, and metals	.2	4.3	3.6	12.3	4.5	—8.8	—49.4	—56.5
SITC 28—Metalliferous ores and metal scrap	—1.4					—1.4	—.2	—10.2
SITC 33—Petroleum and petroleum products	.1	.4	.6	1.8	.4	4.2	1.1	—16.9
SITC 51365—Aluminum oxide and hydroxide	1.1	7.3	3.1	11.8	6.1	6.7	—.1	—4.7
SITC 67—Iron and steel	.4	—2.1	12.4	—7.4	—7.8	—6.0	—28.3	—17.9
SITC 68—Nonferrous metals		(2)	—.1	—.1	(2)	—1.1	—2.1	—4.7
SITC 6989—Articles of base metals, n.e.s	(2)	(2)	(2)		—.4	—10.4	—8.2	—3.4
3. Chemicals, fertilizers, and rubber	7.1	2.2	4.3	5.7	26.2	31.4	21.6	9.9
SITC 23—Crude rubber (including synthetic and reclaimed)	—.2	(2)			—3.5	.9	—2.3	—2.2
SITC 53—Dyeing, tanning and coloring materials	1.5	1.5	—.1	—.5	4.8	8.1	7.4	8.1
SITC 58—Plastic materials, regenerated cellulose, and artificial resins (excluding 5812)	1.9	5.3	2.7	2.1	13.3	15.8	7.6	8.6
SITC 5992—Insecticides, fungicides, disinfectants and similar preparations	4.4	6.4	1.1	6.1	4.4	8.0	8.7	2.8
SITC 62—Rubber manufactures, n.e.s	(2)	—3.5	—1.9	—4.9	—8.1	—4.6	1.5	—2.4
4. Building materials and construction parts	—1.0	—.8	—.9	—1.9	—6.7	17.6	—33.6	—19.1
SITC 5812—Products of polymerization and copolymerization	—.7	—.6	—.3	—1.5	—5.0	20.7	7.3	5.9
SITC 691—Finished structural parts and structures, n.e.s	—.3	—.1		—.4		—1.4	—23.2	—18.3
5. Raw materials of vegetable and animal origin	12.9	12.1	8.9	3.6	1.5	7.3	—11.5	—18.8
SITC 21—Hides, skins, and fur skins, undressed	2.4	3.2	2.5	3.2	1.0	2.2	—1.5	2.2
SITC 2211—Groundnuts, green								—4.5
SITC 25—Pulp and waste paper	6.5	5.1	1.3	2.0	—2.8	2.8	—2.5	.3
SITC 26—Textile fibers	2.0	.7	1.3	1.4	—1.3	1.8	—.2	—.4
SITC 6517—Yarn and thread of regenerated (artificial fibers)	1.1	1.8	3.8	—.1	—3.2	1.4	.2	.7
SITC 655—Special textile fabrics and related products	(2)	—.1	—.7	—1.7	—.2	—.2	—5.1	—9.4
6,7. Live animals not for slaughter, raw materials for production of foodstuffs	.1	—14.2	—35.3	49.3	70.6	75.7	221.3	31.9
SITC 041—Wheat		—.7	—16.8	89.3	11.6	2.3	64.7	—22.2
SITC 043—Barley, unmilled SITC 045—Cereals, unmilled, other than wheat, rice, barley, and maize		—1.8	10.9	3.6	6.6	3.8	—.5	2.7
SITC 044—Corn		—11.7	22.7	23.9	52.6	71.8	180.6	16.3
SITC 2214—Soybeans			—52.1	—67.2		—2.7	—24.4	45.1
8. Foodstuffs	.9	.2	—1.4	—8.5	—4.1	—12.4	2.7	—16.7
SITC 04702—Cereal meals and groats (except of wheat or of meslin)						—9.2	6.1	—3.5
SITC 01—Meat and meat prepartions							—2.4	—6.7
SITC 05—Fruits and vegetables	0	.1	0	—3.0	—4.0	—3.3	—.7	—5.7
9. Industrial consumer goods	—2.5	—2.7	—5.3	—5.4	—6.4	—12.4	—28.4	—33.8
SITC 54—Medicinal and pharmaceutical products	—.1	0	—.1	.6	.2	.4	.4	.4
SITC 653—Textile fabrics, woven	—.1	(2)	(2)	(2)	(2)	—1.3	—3.8	—7.3
SITC 82—Furniture	(2)	(2)	(2)	(2)	(2)	—.1	—.1	—.6
SITC 8616—Photographic and cinematographic apparatus and equipment, n.e.s	.4	.8	.6	.4	.4	0	.9	—.5
SITC 891—Musical instruments, sound recorders, and reproducers, and parts	—.1	—.1	—.3	—.2	—2.2	—.8	—.6	—.9
SITC 892—Printed matter	.5	.8	.6	.6	1.8	1.7	1.5	2.3
SITC 893—Articles of artificial plastic materials, n.e.s	—3.2	—3.8	—6.2	—5.6	—5.3	—12.0	—24.1	—24.9
SITC 896—Works of art, collectors pieces, and antiques	(2)	(2)	(2)	(2)	—.7	(2)	—1.2	—.1

[1] Soviet imports from the United States as reported by the U.S.S.R. and United States exports to the U.S.S.R. as reported by the United States. The differences between Soviet and United States reporting were obtained by comparing the value of trade for each CTN category listed as U.S.S.R. imports from the United States in the Foreign Trade Handbooks with the value of its U.S. counterpart. The detailed concordance contained in Reconciliation of Soviet and Western Foreign Trade Statistics (Gullo) was used to obtain corresponding U.S. exports.

[2] Negligible.

In 1972–77, U.S. grain bought on Soviet account for shipment to third countries (probably Eastern Europe) and substantial Soviet purchases of U.S. technology (not counted in U.S. exports) largely

accounted for most of the excess of U.S.S.R. imports over U.S. exports.[28] With regard to the grain, about $16 million worth of U.S. grain purchased by the U.S.S.R. in 1972 apparently was shipped to third countries.[29] Similar reexports—mainly corn—amounted to $115 million in 1973, $70 million 1974, and a record $240 million in 1976. A comparison of Soviet and U.S. data indicate a substantial drop in such deliveries in 1977.

The inclusion of technology costs in the machinery and equipment category (CTN 1) was not a factor in explaining the discrepancy between Soviet imports and U.S. exports until 1973, when Soviet machinery imports exceeded corresponding U.S. exports by $18 million. The imbalance continued to increase and reached a record $208 million in 1976; Soviet purchases of technology for the manufacture of chemicals played a large role in the 1976 discrepancy. The gap narrowed in 1977, however, when Soviet imports of U.S. machinery and associated technology fell by 40 percent.

Meanwhile, the "unspecified" import residual reached a high of $120 million in 1973, only to fall sharply, and then rebound in 1977 to $110 million. Soviet imports of U.S. soybeans, which were not reported in the U.S.S.R.'s commodity breakdown but presumably were lumped in the residuals, mainly accounted for larger residuals in 1972 and 1973. According to U.S. trade book, $52 million worth of soybeans were shipped in 1972 to the U.S.S.R. and $67 million in 1973. Since 1976, however, the Soviets have included soybeans in the CTN breakdown of U.S.–U.S.S.R. trade. The high value of the 1977 residual seems to originate in large part from a change in Soviet reporting—particularly the omission of imports of petroleum products, ores, steel, and nonferrous metals from the detailed CTN list in the Foreign Trade Handbook. According to U.S. data, U.S. exports of these commodities totaled roughly $60 million.

V. Recent Changes in Soviet and Western Reporting

A. Additional Omissions in Soviet Reporting

The amount of data omitted in Soviet foreign trade statistics jumped sharply in 1976–77. The U.S.S.R. traditionally has omitted detailed reporting on commodities such as diamonds, nickel, and platinum group metals or goods whose values were too small to warrant reporting. However, Moscow in 1976 deliberately increased the number of omissions and in 1977 made even more significant cuts—particularly for trade involving raw materials (CTN 2). For example, detailed breakdowns that in the past were reported for important categories such as rolled ferrous metals (CTN 264) and nonferrous metals and alloys (CTN 270)—in particular, copper, lead, and zinc—were absent from the 1976 Soviet Foreign Trade Handbook. Instead, only value totals at the three-digit levels for these commodities were reported.

[28] The U.S.S.R. reported the grain as an import from the United States and then as a Soviet export, while in U.S. trade statistics the shipment appear as exports to the country of consumption, if known.

[29] The Soviet import figure possibly includes some U.S. grain sold to Western Europe and then resold by the Europeans to the U.S.S.R. The Soviets would credit the United States with the export if they knew the origin of the grain.

Additional cuts were made in 1977; tonnage figures for rolled ferrous metals disappeared from Soviet accounts along with a large group of ferrous metal products including pig iron (CTN 26001), ferroallys (CTN 261), high grade rolled metal (CTN 265), and pipe (CTN 266). Trade data for nonferrous metals, meanwhile, completely vanished.

Statistics on energy trade were particularly hard hit in 1977 by the change in Soviet reporting practices. Imports of petroleum and petroleum products (CTN 21, 22) were omitted in the 1977 Foreign Trade Handbook while tonnage figures for exports disappeared. Furthermore, coal (CTN 200) was replaced by the more general category entitled solid fuels (CTN 20), which in addition to coal includes coke and lignite; only the ruble values for exports were reported. Soviet trade in gas (CTN 23001) suffered a similar fate. Imports were dropped altogether and value and quantity data on exports were replaced with value data for the broader category gas fuels (CTN 230), which also includes liquid gas and propane.

In still another departure from the past, the U.S.S.R. in 1977 reported trade with several of its partners on a highly aggregated one-digit level for commodities other than machinery, equipment, and transportation facilities. Imports of Bolivian tin, for example, were reported under the more general category for fuels, mineral raw materials, and metals (CTN 2), while Malaysian rubber was concealed within chemicals, fertilizers, and rubber (CTN 3).[30] In 1976, Moscow failed to report volume data for rubber and asbestos goods and omitted its subcategories of natural rubber, synthetic rubber, and tires. In 1977, the rubber and asbestos goods category (CTN 35) disappeared altogether.

A particularly noteworthy change was the appearance in 1976 for the first time in Soviet trade data of the category nonmetallic minerals, clays, and earth (CTN 25). Because of its effort to make reporting less detailed, Moscow may have included in this category the value of Soviet diamond (CTN 25911) exports in the summary tables of the Foreign Trade Handbook. Before 1976, only exports of nonmetallic minerals (CTN 250) along with three of its subcategories had been reported. An examination of the summary tables in the 1976 and 1977 handbooks shows that roughly only one-half of Soviet CTN 25 exports to the world in 1975–77 is accounted for in the country breakdown. The value shown apparently reflect exports of nonmetallic minerals (CTN 250). (The value of CTN 250 exports in 1975, which were given in the summary tables of the 1975 Foreign Trade Handbook, closely matches the value obtained by summing the ruble figures for CTN 25 exports listed by country in the 1976 handbook.) The unexplained share, which totals $400 million, $350 million, and $420 million in 1975–77, may in part reflect Soviet exports of uncut diamonds; the value of exports for the remaining subcategories under CTN 25 is not judged to be substantial.[31]

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[30] In the case of Malaysian rubber, the use of a one-digit category does little to disguise the value of these imports since rubber was the only import under CTN 3.

[31] The values of the unexplained share of CTN 25 for 1975–77 closely match United Kingdom data on imports of Soviet diamonds; the United Kingdom imports nearly all Soviet exports of uncut diamonds.

In addition to uncut diamonds (CTN 25911) and nonmetallic minerals (CTN 250), the other subcategories include such minerals as barite, mica, sand, and graphite.

B. Revisions in Western Trade Reporting

There was little change in Western reporting practices until 1978 when most Western countries and international organizations such as the U.N. and OECD began using a revised classification scheme—Standard International Trade Classification, Revision 2 (SITC, rev. 2). Although the new system is designed to reflect recent changes in commodity patterns for Western trade, it unfortunately does little to help reconcile Soviet and Western trade data. The revised scheme—like its predecessor SITC, Revised—classifies goods by kind while the criteria for the Soviet's CTN system is by kind of goods as well as end-use; the latter is particularly troublesome when reconciling Soviet and Western statistics for machinery and equipment trade.

One change in reporting as a result of the new scheme that does affect the comparison of Soviet and Western trade statistics—particularly in computing trade balances—is the inclusion of nonmonetary gold (SITC 9710) in merchandise trade. (The U.S.S.R. does not include in its trade data exports or imports of gold.) If U.S. reporting is an example, however, Western trade data may not completely reflect a country's total imports of Soviet gold. For the United States, only direct purchases of gold from the U.S.S.R. are reported as imports from the U.S.S.R. in U.S. trade books Soviet gold bought by the United States in Zurich or London, meanwhile, is shown as an import from Switzerland or the United Kingdom.[32]

C. Implications for Reconciliation

With few exceptions, the Foreign Trade Handbook is the primary Soviet source for commodity trade data. Thus, recent omissions in U.S.S.R. reporting that have resulted in a more general breakdown of foreign trade or larger "unspecified" trade residuals, seriously impair on a commodity basis the reconciliation of Soviet and Western data.[33] Where available, Western commodity data can help to fill in the gaps.[34] But as this paper demonstrates, Western reporting suffers from substantial deficiencies. Soviet exports that involve re-exports—roughly 4 to 6 percent of Soviet exports to the West—generally are not accounted for in Western trade data. In addition, goods such as oil and grain that are bought on Soviet account for delivery to a third country and represent a hard currency transaction for the U.S.S.R. are not found in Western statistics. (Problems arising from recent omissions in Soviet commodity statistics were

[32] "14th Quarterly Report to the Congress and the East-West Foreign Trade on Trade Between the United States and the Nonmarket Economy Countries During January–March 1978." USITC publication.

[33] For Soviet trade with partner countries, detailed commodity categories dropped from Soviet reporting and not absorbed in more general categories were lumped into the "unspecified" export and import residuals.

[34] Particularly hard hit by Soviet reporting omissions is U.S.S.R. trade with less developed countries. These countries usually do not publish adequate commodity breakdown of their foreign trade.

clearly evident in the reconciliation of U.S.S.R. and U.S. data for 1976 and 1977.)

The disappearance of volume figures for such key commodities as oil, gas, coal, and ferrous and nonferrous metals make it virtually impossible to compute Soviet unit prices in order to determine—as was done in this paper—the bias in Western reporting from the inclusion of transport and insurance costs. The absence of quantity data also precludes—as the Soviets probably intended—a comparison of prices the U.S.S.R. charges its customers and inhibits analysis of Soviet domestic production and consumption.

As for recent changes in Western reporting, the inclusion of nonmonetary gold (SITC 9710) is the only change that affects reconciliation and then only on an aggregate basis. Gold should be excluded when comparing Soviet and Western data since it is absent from U.S.S.R. statistics and there is no assurance that Western data completely account for all Soviet gold sold in the West.

Appendix A

SOVIET EXPORTS TO THE UNITED STATES AT THE 1-DIGIT CTN LEVEL

[In millions of U.S. dollars]

CTN category	1970	1971	1972	1973	1974	1975	1976	1977
1. Industrial machinery and transportation equipment	0.1	0.1	0.7	1.2	1.6	5.6	4.0	3.1
2. Fuels, mineral raw materials, and metals	13.3	14.3	10.6	6.9	28.2	89.1	136.4	174.9
3. Chemicals, fertilizers, and rubber	.6	.3	1.3	1.7	30.1	42.5	7.5	6.7
4. Building materials and construction parts	.9	1.1	1.6	1.6	.9	1.2	3.5	5.3
5. Raw materials of vegetable and animal origin	3.9	2.3	3.9	4.5	5.6	6.6	8.2	10.7
6. Live animals not for slaughter 7. Raw materials for the production of foodstuffs	4.9	2.5	1.6					
8. Foodstuffs	.6	.2	.5	.4	.6	1.2	1.6	2.5
9. Industrial consumer goods	2.6	2.9	3.7	4.7	6.7	5.8	9.3	9.9
Unspecified export residual	37.3	36.7	68.6	165.1	160.4	38.9	93.7	156.4
Total [1]	64.2	60.4	92.4	186.0	234.0	191.0	264.3	369.4

U.S. IMPORTS FROM THE U.S.S.R. AT THE 1-DIGIT CTN LEVEL

1. Industrial machinery and transportation equipment	.5	1.5	1.4	2.6	3.6	7.3	6.7	9.7
2. Fuels, mineral raw materials, and metals	61.7	46.6	81.7	193.3	319.6	226.2	173.4	184.3
3. Chemicals, fertilizers, and rubber	.6	.8	1.1	1.4	9.7	4.1	4.9	4.4
4. Building materials and construction parts	1.5	1.6	2.1	3.3	1.7	1.2	3.5	3.6
5. Raw materials of vegetable and animal origin	4.3	3.5	4.6	5.9	9.5	8.6	11.4	15.6
6. Live animals not for slaughter 7. Raw materials for the production of foodstuffs	(2)	(2)	(2)	(2)	.5	(2)	.4	1.8
8. Foodstuffs	.6	.3	.7	.9	.7	1.3	2.3	4.3
9. Industrial consumer goods	3.0	3.3	3.9	6.5	5.0	5.7	18.1	11.1
Total [1]	72.3	57.6	95.5	214.0	350.2	254.5	220.9	234.6

[1] Because of rounding, the sum of 1-digit CTN categories may not equal the total.
[2] Negligible.

APPENDIX B

SOVIET IMPORTS FROM THE UNITED STATES AT THE 1-DIGIT CTN LEVEL

[In millions of U.S. dollars]

CTN category	1970	1971	1972	1973	1974	1975	1976	1977
1. Industrial machinery and transportation equipment	24.0	29.2	57.6	227.6	249.2	631.5	826.0	477.1
2. Fuels, mineral raw materials, and metals	26.0	31.3	16.9	29.6	17.5	22.7	10.4	
3. Chemicals, fertilizers, and rubber	11.7	17.8	13.4	21.9	56.7	85.9	54.3	47.6
4. Building materials and construction parts						23.6	10.3	7.0
5. Raw materials of vegetable and animal origin	46.7	42.9	34.2	23.5	30.7	48.2	21.1	23.9
6. Live animals not for slaughter 7. Raw materials for the production of foodstuffs	.1	.1	385.7	954.0	348.7	1,174.6	1,677.6	1,009.6
8. Foodstuffs	3.2	2.7	1.8	2.2	5.0	4.5	30.4	35.5
9. Industrial consumer	2.2	2.5	2.8	2.6	4.0	5.8	5.8	4.7
Unspecified import residual	.7	17.0	45.8	119.9	33.9	35.6	33.1	110.3
Total[1]	114.6	143.6	558.3	1,381.3	745.7	2,032.3	2,669.0	1,715.6

U.S. EXPORTS TO THE U.S.S.R. AT THE 1-DIGIT CTN LEVEL

1. Industrial machinery and transportation equipment	46.0	65.4	65.3	208.9	230.8	566.9	618.3	387.6
2. Fuels, mineral raw materials, and metals	25.8	27.0	13.4	17.3	12.9	31.5	59.8	60.8
3. Chemicals, fertilizers and rubber	5.4	16.2	9.3	17.7	35.6	57.4	35.7	38.8
4. Building materials and construction parts	.3	.2	.6	.4	1.7	3.1	40.9	25.0
5. Raw materials of vegetable and animal origin	33.8	30.8	25.4	19.8	29.2	40.9	32.7	42.7
6. Live animals not for slaughter 7. Raw materials for the production of foodstuffs.	(2)	14.3	421.0	904.7	278.0	1,098.9	1,456.3	977.7
8. Foodstuffs	2.3	2.5	3.3	10.7	9.1	16.9	27.7	42.2
9. Industrial consumer goods	4.7	5.2	8.1	8.0	10.4	18.2	34.2	38.5
Total[1]	118.2	161.6	546.7	1,187.6	607.9	1,834.1	2,306.0	1,623.6

[1] Because of rounding, the sum of 1-digit CTN categories may not equal the total.
[2] Negligible.

SOVIET ECONOMIC RELATIONS WITH NON-EUROPEAN CMEA: CUBA, VIETNAM, AND MONGOLIA

(By Lawrence H. Theriot and JeNelle Matheson*)

CONTENTS

CUBA

I. Introduction

When assessing bilateral Soviet relations with the countries of Eastern Europe, analysts generally accept an inherent linkage of political and economic factors. In contrast, such a linkage has not been sufficiently considered in analysis of Soviet relations with the non-European CMEA countries. Moscow's ties with Cuba, Vietnam, and Mongolia have traditionally been dealt with only in a political context.

*Office of East-West Policy and Planning, Department of Commerce. This is a staff research note. It should not be construed as a statement of Commerce Department policy.

The implications for the future, of Soviet economic relations with its non-European client states, have largly been ignored.

Cuba's close association with the U.S.S.R., dating back some 20 years, has grown since the early 1970's to a pervasive Cuban economic dependence and close political identification. The North Vietnamese-Soviet economic connection existed prior to 1975. However, only recently has it begun to assume a more longer term and economic/political rather than military-supportive nature. Therefore, the evolution and interaction of Cuba's economic/political ties with Moscow may offer insights into the future course of Soviet relations with unified Vietnam. Moreover, Cuba's experience may also have implications for Soviet relations with a number of other developing countries, especially in Africa.

Cuba and Vietnam: Early Soviet Ties Follow Similar Patterns

Cuba in 1959 and Vietnam in 1975 witnessed the establishment (or consolidation) of revolutionary, Communist governments. In both instances the U.S. reaction was political disengagement followed shortly by a complete economic embargo. In both instances the United States also urged other Western governments to take similar actions, although with only limited success.

Faced with severe economic dislocations from restricted trade ties with the West, both Cuba and Vietnam sought emergency economic support. The Soviet Union has proven to be a willing benefactor. Moscow's pattern, clearly demonstrated in Cuba, involved a quick response with essential economic support while slowly developing political ties that would eventually yield benefits of support from its Hanava client. On the other hand, Cuba's leaders then (and probably Vietnam's today) apparently assumed they could accept Soviet assistance as necessary for survival while continuing to exercise autonomy in pursuing their self-perceived interests.

However, extensively isolated from the non-Communist trading community, a small nation's economic dependence on a major power like the U.S.S.R. inevitably grows; its autonomy in foreign policy is reduced and some degree of subservience to Soviet global interests becomes unavoidable. For example, Cuba apparently supported the Soviet invasion of Czechoslovakia in 1968 only with great reluctance. More recent development in Southeast Asia and Africa may be further demonstrations of Soviet economic dependence influencing the foreign policies of their client states.

Only time will tell whether Hanoi and possibly others in Africa will follow Cuba's path of economic and, ultimately, political, dependence on Moscow. However, the economic factors underlying Moscow's relations with its developing country clients could impose significant costs and therefore limitations on both sides. We believe analysis of these factors has been seriously neglected.

This paper assesses the development and current status of Soviet economic relations with Cuba and Vietnam. It focuses on the costs the Soviets have incurred and are likely to continue to incur, as well as on the benefits they have or expect to derive. Mongolia is also dealt with briefly as an example of virtually total economic dependence on the U.S.S.R.

While the course of Vietnamese-Soviet economic relations seems to be paralleling the Cuban experience in some aspects, there are also fundamental differences which may prove important. Soviet economic ties with some of the emerging African governments are excluded from consideration because they are in the infancy of development. Nevertheless, the patterns the Soviets have established with Cuba and possibly Vietnam could be an indication of the future course of Soviet relations with some African countries.

II. Brief History of Cuban-Soviet Economic Relations

Aid to the New Revolution

After Fidel Castro assumed the post of Cuban Prime Minister in January 1959 the historically pervasive U.S. economic presence in its island neighbor began to unravel rapidly. In August 1960, U.S. oil refineries were nationalized for refusing to process Soviet supplied crude. Relations continued to deteriorate as the U.S. reduced, then eliminated entirely, its import quota for Cuban sugar and Havana nationalized all U.S.-owned properties (the value later appraised at $1.8 billion). The United States responded by embargoing all trade except shipments of food and medicines, which were also barred in 1962. The trade embargo was multilateralized in 1964 by the Organization of American States and Cuba's trade ties with the Western Hemisphere were severed with the exception of Mexico and Canada.

As the dominant U.S. position in the Cuban economy declined, ties with the Soviet Union grew apace. The February 1960 visit by Soviet Premier Mikoyan which resulted in signing of a Bilateral Trade and Clearing Agreement proved to be a decisive turning point. The U.S.S.R. extended MFN tariff status and agreed to annual purchases of a minimum of 1 million tons of sugar and to supply Cuba's needs for petroleum and refined products. Oil was a key economic support item since Cuba was (and is today) 95 percent dependent on imports for its petroleum needs and Havana had been cut off from traditional suppliers, Venezuela and the United States.

The highly advantageous nature of Cuba's trade relations with the Soviet Union was set early with sugar price set at subsidized levels more favorable than world market prices. The U.S.S.R. also allowed partial payment (initially 80 percent) to be made in Cuban goods rather than hard currency.

Actual trade volumes substantially exceeds agreed goals as the Soviets imported half of Cuban sugar production (3.345 million tons in 1961) and supplied more than 2 million tons of petroleum and products. Clearly the Soviets were acting as Havana's economic friend in need. As two-way U.S. trade declined precipitously from $1.1 billion to $20 million between 1958 and 1962, the Soviet share rose from virtually nil to $630 million.

Strains Develop as Economic Ties Grow

Rapidly expanding economic ties between the Soviets and Cuba were not without strains. Soviet capitulation to U.S. pressure and failure to consult Cuban leaders in removing MRBM's during the 1962

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crisis dramatically demonstrated to Havana that Soviet solidarity with the Cuban revolution had strict limits. Moreover, Moscow worried that its economic aid was being wasted by the often erratic economic management of the Cuban leadership. In 1962 the revolutionary government initiated an economic development policy that sharply reversed the traditional Cuban emphasis on agriculture in favor of forced industrialization. The goal was to eliminate Cuba's dependence on sugar, which had come to be identified as the essential source of Cuba's colonial domination by the United States.

There were other political frictions as well. Castro's strident nationalism, direct support of revolutionary factions in Latin America, his disdain for the old line, Moscow-oriented Cuban Communist Party (the PSP), and his cultivation of ties with the PRC, all gave the Soviet leadership some pause and engendered suspicion about Cuba's true motives and interests.

Continued erratic economic management epitomized by yet another reversal of policy to reemphasize sugar production ultimately forced Moscow to exert its economic leverage. By restricting oil deliveries, the Soviets effectively demonstrated the extent of Cuba's economic dependence.

The pervasive dominance of the Soviet Union in the Cuban economy is usually dated from 1970 after the disastrous attempt, personally identified with Castro, to produce 10 million tons of sugar (annual production had been averaging about 5.4 million tons). Although Cuba managed to produce 8.5 million tons of sugar in 1970, the economy was nearly wrecked as the industry and service sectors were seriously neglected to concentrate all available resources on the sugar harvest. This economic disaster was also a political setback for Castro who even made a public offer to resign. However, once again the generous hand of Soviet economic assistance was available and a long-term bilateral agreement on economic, scientific, and technical cooperation was signed in 1970 thereby providing another milestone in the entrenchment of Soviet economic ties. Subsequent joint commission meetings led to extensive Soviet assistance in many key economic sectors.

Most importantly, the Soviets helped maintain and modernize Cuba's sugar industry which today accounts for a substantial part of overall economic activity and 85 percent of Cuba's export earnings. The Soviets also pledged assistance for the nickel industry, at the time Cuba's only important nonagricultural export industry. As an island economy now almost completely dependent on long-distance trade routes, Cuba's maritime fleet and ports badly needed expansion and improvements which the Soviets also supplied. Soviet boats and crews formed the nucleus of a Cuban fishing fleet that has since become one of the examples of real success in economic cooperation. Cuba's total fish catch has grown from 22,000 tons in 1958 to 185,000 tons in 1977. The Soviets also began to supply infrastructure investments, mainly irrigation systems, needed for a viable citrus industry.

Bilateral economic negotiations in 1972 were another important milestone in the evolution of Cuban ties with the U.S.S.R. Cuba, under continued Soviet pressure to rationalize its economic management and adopt orthodox central planning, became a full member of CMEA.

Havana thereby agreed to permit close coordination (and unavoidably some degree of control) of its economic development plans within the Communist bloc. The number of technical advisers in Cuba's economic management structure rose dramatically—especially Soviets, but other East Europeans as well. In its induction into CMEA, Cuba was also afforded special developing member status, making it eligible for preferential treatment in its trade relations with the more developed European CMEA members. Economic aid, which had consisted almost exclusively of Soviet assistance, was now multilateralized, at least to some extent.

Involvement of Soviet specialists in economic planning increased sharply in 1973 in preparation of Cuba's first comprehensive 5-year plan for the 1976–80 period. Concurrent with its increased control over Cuban economic planning, Moscow restructured $4.5 billion of outstanding Cuban debts, allowing repayment (in sugar) to begin in 1986 and forgiving all interest accrued prior to 1972. Moscow also extended bilateral credits for balancing the 1973–75 trade account and offered a 1.1-billion-ruble credit line for financing industrial development during the 1976–80 plan. Assistance was to be concentrated in developing industrial uses for agricultural byproducts. An additional 270-million-ruble loan was extended for modernization of textile, nickel, and electric powerplants. This new display of Soviet generosity coincided with a visit to Havana by General Secretary Brezhnev, the first Soviet chief of state to visit Cuba.

More important for the future, the Soviet Union shifted the nature of its economic aid from direct loans to indirect subsidies through heavily preferential trade prices. Beginning in 1973 the Soviets agreed to pay a minimum 12 cents a pound for sugar and $5,540 a ton for nickel compared to then current world prices of 7.4 cents and $3,500 a ton.

However, what was to prove to be Moscow's most important economic concession came during subsequent negotiations for the 1976–80 plan, when it agreed to link prices paid for Cuban sugar to a basket of prices charged for Soviet exports, including oil and other products. Starting from a high base sugar price of 30 cents (then current market prices were the highest in history and peaked briefly at 66 cents in late 1974), Havana was assured the price paid for its sugar would increase to match any increased cost of Soviet products, including oil. This was of crucial importance since, after 1974, Soviet oil prices were set to rise for all CMEA members in accordance with a 5-year moving average of world oil prices. The terms of trade between the two most important products in Cuban-Soviet trade (that is, sugar and oil) were therefore fixed for the 5-year plan to 1980.

The increased control gained over Cuban economic planning proved much less effective than Moscow had probably expected. While the rigors of comprehensive planning, patterned on the Soviet model, imposed severely needed managerial discipline on Cuba's domestic and foreign trade sectors, plan goals proved overly optimistic primarily because the key economic variable, predicted world sugar prices, was set too high. Having overestimated hard currency earnings from record high sugar prices in 1974, Cuba in 1975 reverted to incurring large deficits in its hard currency trade. As sugar prices remained low throughout 1975 and 1976, Cuba was forced to renegotiate import con-

tracts, delay receiving some $300 million in imports and postpone or cancel numerous development projects tied to imports.

In a September 1976 speech, Castro announced an austerity policy, increased rationing of consumer goods and signaled a sharp cutback in hard currency imports. From a record high level of $1.6 billion in 1975, imports from the non-Communist countries declined to $1.3 billion in 1977, a sharp decline in real terms adjusted for the continued high level of Western inflation.

Havana thus clearly demonstrated that when it has the hard currency capability to do so, it will reorient its trade to non-Communist countries. In 1975, Cuba obtained 46 percent of its global imports from the non-Communist West compared with a more normal 30 percent in the early 1970's. However when the 5-year plan proved unrealistic and the new found prosperity only transient, Cuba was forced to return to dependence on its Soviet benefactors. The basic economic fact of overreliance on sugar remained largely unchanged since the early 1970's when Soviet planning technicians had assumed much of the responsibility for charting Cuba's economic future. The highly attractive subsidized terms of trade once again proved to be Havana's most important insurance policy. For Moscow, any anticipations that the cost of supporting Cuba had peaked, now proved illusory.

In 1977 trade with the Soviet Union accounted for 62 percent of Cuba's global two-way trade compared to 52 percent in 1970. Adding East European and Asian trading partners, Communist countries accounted for three-fourths of Cuba's 1977 trade turnover (see table 1).

In sharp contrast with continued large deficits in hard currency trade, Cuba has been able to achieve surpluses with the Communist countries since 1975; not coincidentially the year when the U.S.S.R. switched economic aid from direct loans to subsidized trade prices.[1]

TABLE 1.—CUBAN FOREIGN TRADE BY MAJOR AREA, SELECTED YEARS

[In millions of U.S. dollars]

	1957	1974	1975	1976	1977 [1]
Total exports, f.o.b	818	2,618	3,597	3,186	3,553
Communist countries	42	1,536	2,415	2,427	2,982
U.S.S.R.[2 3]	(42)	(981)	(2,011)	(2,027)	(2,521)
Non-Communist countries	776	1,082	1,207	759	571
Total imports, c.i.f	895	2,648	3,575	3,658	4,188
Communist countries	2	1,629	1,957	2,250	2,836
U.S.S.R.[3]	(4)	(1,240)	(1,531)	(1,800)	(2,267)
Non-Communist countries	893	1,019	1,656	1,408	1,352
Balance	−77	−30	+22	−472	−635
Communist countries	40	−93	458	177	146
U.S.S.R.	(42)	(−259)	(480)	(227)	(254)
Non-Communist countries	−117	+63	−449	−649	−781

[1] Estimated.
[2] Does not include above planned sugar exports to U.S.S.R. for hard currency totalling 2,650,000,000 tons since 1975.
[3] Inconsistencies with totals in tables II and III result from irreconcilable differences between Cuban and Soviet data sources.
[4] Negligible.

Source: Cuban data.

[1] Cuba's surplus with the U.S.S.R. is partly offset by Soviet shipping charges since it generally imports from Cuba on an FOB basis.

The composition of Cuban trade with the Soviet Union is what would be expected between a major industrial power and its developing country client. Cuban exports are dominated by sugar which comprised 92 percent of total exports by ruble value in 1977. (Sugar deliveries totaled 3.8 million tons [2] or 54 percent of total Cuban production in 1978.) Nickel accounted for 6.5 percent of 1977 exports while other products in declining order of importance were rum, cigarettes, and citrus fruit (see table 2).

TABLE 2.—SOVIET IMPORTS FROM CUBA

[Million rubles and quantities]

Product	1974		1975		1976		1977	
	Rubles (millions)	Quantity	Rubles (millions)	Quantity	Rubles (millions)	Quantity	Rubles (millions)	Quantity
Naptha [1]	0.287	20.6	1.0	20.8	NA	NA	NA	NA
Metal ores and concentrates [1]	81.053	NA	74.4	NA	94.3	NA	117.4	NA
Sugar [1]	611.2	1,856.0	1,344.3	2,964.0	1,397.8	3,068.0	1,675.4	3,652.0
Citrus [1]	4.1	21.2	3.0	16.2	4.3	22.3	5.3	27.9
of which Bananas [1]	.4	1.4	.3	.4	.1	.2		
Grapefruit [1]	2.7	16.2	2.3	13.6	2.9	16.7	3.7	21.7
Oranges [1]	.9	3.6	.4	.9	1.3	5.2	1.5	5.9
Liqueurs [2]	.6	38.5	2.1	129.6	1.9	120.4	1.0	63.7
Rum [2]	5.4	319.1	9.4	550.1	11.6	679.5	8.9	522.9
Cigarettes [3]	9.3	2.4	8.6	2.3	6.9	1.8	6.1	1.8
Cigars [4]	3.2	13.9	3.1	3.2	1.7	8.8	1.8	9.7
Books	.1		.2		.2		.2	
Stamps	1.1		1.2		1.1		.9	
Total	716.2		1,447.7		1,520.8		1,817.2	

[1] Thousand metric tons.
[2] Thousand decaliters.
[3] Billion units.
[4] Million units.

Source: Veneshniaia Torgovlia SSR.

Half of Soviet exports to Cuba are concentrated in raw materials and capital equipment. Petroleum and refined products accounted for 23 percent of the total ruble value of 1977 Soviet exports while machinery and transport equipment amounted to 27 percent. A variety of agricultural chemicals, food products, and durable consumer goods including appliances made up the remainder (see table 3).

In addition to the Soviets, Cuba also enjoys preferred prices from its Eastern European trading partners who currently pay 22 cents per pound for sugar. Again, payment is in soft currency at prices agreed in bilateral negotiations. Since little is known about the pricing of Eastern European exports to Cuba, it is impossible to determine the real net gains to Cuba.

III. Cuban Economic Dependence: Soviet Costs

Having surveyed the evolution of Cuban economic dependence on the Soviet Union, we turn to assessing the costs to the Soviets of continuing to underwrite the Cuban economy and conversely the economic benefits that accrue to Cuba.

[2] Of which 3 million were at subsidized protocol prices and 800,000 at free market prices.

Subsidized Terms of Trade: Oil

Since 1974, the key mechanism for Soviet economic aid has been subsidized trade prices through a linkage of export and import prices; that is, as Soviet prices for exports to Cuba increase, the prices the Soviets pay for Cuban products increase in tandem, guaranteeing maintenance of the Soviet subsidy. The economic subsidies involved, while more hidden, nonetheless are real and are most dramatically important in terms of oil and sugar.

TABLE 3.—MAJOR SOVIET EXPORTS TO CUBA, 1974–77

[In million of rubles]

	1974	1975	1976	1977
Machines, equipment, means of transport	229.5	278.1	366.5	447.3
Of which:				
Generating equipment	23.3	32.5	25.9	29.2
Hoisting gear	11.5	12.8	12.9	17.4
Road-building equipment	11.8	11.9	19.5	19.3
Tractors, agricultural machinery	41.0	49.2	66.1	38.7
Trucks and parts	35.2	37.5	45.8	57.5
Aircraft	6.0	5.5	14.5	42.6
Oil and oil products	135.8	248.2	288.2	375.2
Rolled ferrous metals	22.4	28.1	38.2	49.1
Rolled nonferrous metals	9.4	9.4	12.7	NA
Chemical products	15.6	16.9	12.0	12.2
Nitrogen fertilizers	10.4	15.0	26.5	36.4
Sawn lumber	23.7	24.8	20.5	25.7
Cotton fiber	22.5	18.7	23.7	24.0
Grain (except groats)	55.6	62.6	62.8	91.9
Canned meat	1.63	17.5	22.0	18.8
Milk products	8.4	9.2	10.7	12.3
Fish and fish products	17.7	20.1	16.6	21.6
Flour	38.1	62.7	67.2	67.3
Vegetable oils (edible)	22.5	28.1	26.5	33.6
Consumer goods	33.0	37.2	46.6	53.6
Subtotal	646.3	876.6	1,040.7	126.9
Total (including other items):				
Million rubles	926.1	1,141.3	1,351.3	1,634.9
Million dollars [1]	1,221.8	1,587.3	1,823.6	2,224.5

[1] Ruble-dollar conversion factors used: 1974—0.758; 1975—0.719; 1976—0.741; 1977—0.735.

Source: Veneshniaia Torgovlia SSR.

Oil constitutes about 23 percent by value, of total Soviet exports to Cuba. In 1977, the Soviet Union exported 9.2 million tons of petroleum and refined products to Cuba at an estimated crude oil equivalent price of $7.40 a barrel compared to the available world market price of about $12.50. The oil subsidy to Cuba, therefore, totaled $328 million in 1977 and the equivalent opportunity cost to the Soviet of lost hard currency export earnings equaled $840 million.

Soviet oil prices to Cuba have apparently risen in acordance with the floating intra-CMEA price mechanism in effect since 1974. However, Cuba appears to be continuing to enjoy an oil price significantly more favorable than that charged by the Soviets to Eastern Europe. Deliveries of oil products are expected to total an estimated 9.6 million tons during 1979 and possibly 10 million tons in 1980, about 11 percent of expected overall Soviet shipments to all CMEA member countries. During the 1981–85 plan, the U.S.S.R. is also expected to build Cuba's third oil refinery. When completed, annual refinery capacity will rise from present 6.5 to 9 million tons per year possibly resulting in an increase of Soviet crude exports to as much as 9 million while shipment of refined products decline sharply. Lost Soviet hard currency earnings on

crude deliveries alone would then total $955 million in 1980 if world oil prices remain at current levels or $1.1 billion if world prices rise just 10 percent. Clearly, the cost to the U.S.S.R. of supplying Cuban oil needs can only increase over time.

Sugar

Cuba's matching product under the preferential trade price mechanism is sugar. In 1975 the Soviets agreed to a base price of 30 cents per pound for preplanned annual Cuban sugar exports. As already noted, this base price was linked to a basket of Soviet export prices including oil. As a result, in 1978, to compensate for oil price increases, Cuban sugar deliveries were priced at about 40 cents per pound, compared to available free market price of 8 cents.[3]

This arrangement resulted in a sugar subsidy to Cuba of about $2.4 billion last year. In addition to the volume of sugar purchases agreed to in annual bilateral trade protocols, the Soviets have periodically bought extra sugar from Cuba to make up shortfalls in their own production and/or to relieve Cuba of surpluses unsalable on the free world market. Payment is in hard currency at existing world prices. These preplanned exports totaled 2.7 million tons between 1974–78, earning Cuba about $800 million in hard currency.

While most agricultural specialists believe the Soviets actually needed the extra Cuban sugar for domestic consumption, the possibility cannot be fully discounted that some part of the hard currency shipments are another form of indirect subsidy. If correct, such purchases represent another instance (together with oil) where economic assistance to Cuba costs the Soviets hard currency either directly (as in payment for sugar) or as an opportunity cost (as in lost earnings from oil deliveries which could be sold on the world market). In addition other known instances of indirect hard currency aid include Canadian wheat and flour which the Soviets buy for delivery to Cuba. Minimum annual shipments have been 800,000 tons averaging $120 million in value 1974–77. Cuban corn imports from Argentina and rice, ostensibly from the U.S.S.R., may also be covered by a similar Soviet purchase mechanism.

Nickel

Since 1973, the U.S.S.R. has also paid a preferential price for Cuban nickel. By 1977 that price had been increased to $6,075 per ton, compared to the then current world market price of about $4,500 per ton. Although the nickel price is not linked to the cost of Soviet imports, increases are allowed to match any rise in the world price. Cuban subsidies from nickel thus totaled an estimated $38 million in 1978.

Soviet Aid: Totals and Significance

Overall Soviet economic aid to Cuba is estimated to have totaled the equivalent of about $13 billion since 1960. Some 40 percent has been in the form of bilateral loans which will be repaid interest-free

[3] In spite of the index mechanism, Cuba's sugar-for-oil terms of trade have deteriorated since 1974 as the apparent Soviet price paid for sugar increased 39 percent while the apparent cost (in terms of crude equivalent) of Soviet oil and products rose by 122 percent.

over a 25-year period beginning in 1986. The remaining 60 percent consists of subsidies in the trade of sugar, petroleum, and nickel which are not repayable (See table 4).

While Cuba has achieved significant economic progress, especially since 1971, the importance of Soviet assistance can hardly be overemphasized. The combined flow of Soviet aid (repayable and subsidy grants) is estimated to have totaled the equivalent of $2.9 billion in 1978. In other words, last year, Soviet assistance equaled nearly one-fourth of Cuba's estimated $12 billion GNP, and the equivalent of about $300 per capita in economic support.

By way of contrast, the maximum likely Cuban gains from any resumption of trade ties with the United States would be substantially less important than Soviet assistance at present levels. Expected two-way U.S.-Cuban trade is unlikely to exceed $700 million.[4] Moreover, the bulk of both exports and imports with the United States would be diverted from existing trade flows with other Western countries and would not represent net additions to Havana's hard currency trade.

TABLE 4.—SOVIET ECONOMIC ASSISTANCE TO CUBA

[In equivalent millions of U.S. dollars]

	1961–74	1975	1976	1977	1978
Balance of payments aid	4,417	150	150	205	225
Trade and development aid	3,781	115	115	175	190
Interest charges	292	0	0	0	0
Other invisibles	344	35	35	35	35
Total repayable aid	4,417	4,567	4,717	4,922	5,147
Subsidies	1,155	901	1,357	1,772	2,713
Sugar subsidy	695	590	977	1,428	2,435
Petroleum subsidy	0	290	362	328	240
Nickel subsidy	91	31	18	16	38
Total grants	1,155	2,056	3,413	5,185	7,898
Total economic aid	5,572	6,623	8,130	10,107	13,045

Consequently, with its continued inherent weakness as basically a monoculture sugar-based economy, Cuba is likely to remain very dependent on Soviet aid for the forseeable future. Some of the important remaining questions are: What will the future cost be to the Soviet Union and how long will it be willingly incurred?

Hard Currency v. *Soft Currency Costs*

First an important caveat: Care must be taken in assessing Soviet economic relations with Cuba using U.S. dollars as a unit of account. Soviet-Cuban bilateral trade is essentally a barter exchange of Cuban sugar, nickel, tobacco, and citrus for a variety of Soviet products including oil. Exchange prices computed from Cuban or Soviet data are not indicative of hard currency flows; rather they are soft currency prices used for valuing the volume of goods exchanged under bilateral trade protocols. Prices are set by political negotiation and do not necessarily reflect real economic value or cost of alternative supply sources. The real economic benefits to Cuba and the equivalent

[4] For more details on the economics of Cuban trade, see "Cuban Foreign Trade: A Current Assessment," unpublished staff research note, Office of East-West Policy and Planning, Industry and Trade Administration, Department of Commerce.

cost to the U.S.S.R. depend on the terms of trade in real terms that result from these negotiations. Consequently, calculating the subsidy element by comparing soft currency value of trade flows with prevailing hard currency world prices gives only a general indicator of the value of Soviet subsidies to Cuba. Moreover, the relative gains to Cuba from imported Soviet manufactured goods (and thus the costs to U.S.S.R.), depends on alternatives available to each on hard currency world markets.

The Soviets may be charging high prices in supplying Cuba capital goods and equipment which, because of quality or service deficiencies, are not readily salable on the world market. If that is the case, in the exchange for Cuban sugar which is either consumed domestically or reexported for hard currency, what is apparently only a subsidy to Cuba in fact also accrues as a real economic benefit to the U.S.S.R. Who gains the most is impossible to determine.

Future Cost of Subsidies

The cost of the sugar-for-oil exchange to the U.S.S.R. will continue to rise as the world price of oil increases and the differential increases between the Soviet offered price for Cuban sugar and the stagnant world sugar price. Even if the International Sugar Agreement (the ISA is designed to raise free market prices by better balancing supply and demand) operates effectively, little upward movement is expected in world sugar prices for the foreseeable future.

Moreover, in 1978, deliveries to Cuba of oil and refined products represented 13 percent of total Soviet exports to the Eastern European members of CMEA.[5] If Soviet oil production levels off and declines as expected in the mid 1980's the calculus of economic and political costs of continuing to supply and subsidize Cuba, at the possible expense of Eastern Europe, will confront Soviet planners with difficult decisions.

Continuing to supply wheat and flour (and possibly rice and corn) purchased in the West for hard currency could add another drain on Soviet financial resources.

However, the future costs of the sugar subsidy are less clear. If Moscow continues to purchase substantial amounts of sugar for hard currency that will of course represent a direct hard currency cost. If the U.S.S.R. proves more willing to accept long-term reliance on Cuba for a substantial portion of its sugar consumption needs and diverts available land resources to alternative crops rather than increasing beet production, assured access to Cuban sugar would be an advantage. However, with the soft currency sugar price linked to oil and therefore high above expected world market levels, the subsidy will continue to be very costly.

The benefits of an assured market for nearly half its sugar production are clearly of immense importance to Cuba. Regardless of the quality or price of goods received in exchange (except for oil and other "hard goods," for example, grains, where the benefit is unambiguous) without the Soviet market, Cuba could not dispose of its current sugar

[5] 1978 total Soviet exports of crude and products to Eastern Europe were estimated at 72 million tons.

production (except at severely depressed prices) in face of stagnant world demand and increased competition from sugar substitutes such as corn sweeteners.

If the ISA continues to limit Cuban sugar exports to the world market, the Soviet market would become increasingly important were Havana to actually pursue its announced goal of 8.5 million tons of sugar annually by 1980. However if, as some observers expect, Cuba actually increases production only slightly above the 7 million tons produced last year, then Cuban dependence on sugar exports to the U.S.S.R. will have peaked in 1978. If an effectively operating ISA means a larger Cuban hard currency export quota (possibly up to 2.8 from the current 2.5 million tons) then the trend to increased reliance on the U.S.S.R. sugar market would reverse. However, continued Soviet purchases of half Cuba's sugar crop insures its predominant importance will continue.

Industrial Equipment and Know-How

In addition to subsidies from the sugar, nickel, and oil trading exchange, the Soviets have provided large amounts of economic aid as technical assistance and equipment in developing other Cuban industries. By end year 1977, the U.S.S.R. reportedly had remodeled or built 150 Cuban industrial facilities and were engaged on 200 installations. A partial listing of facilities built or under construction either wholly or in part with Soviet-supplied goods and know-how include:

Fertilizer plant.
Modernization of existing two oil refineries.
New 3,000-ton-capacity oil refinery.
Fuel storage tank farms.
Two oxygen plants.
Modernization of steel plant.
Expansion of machine-building plant.
Modernization of two nickel plants.
New 30,000-ton nickel plant.
A 440-megawatt nuclear powerplant.
Thermoelectric plants.
Long-distance high powerlines.
Unified national electric grid.
Reconstruction of 21 sugar mills.
Ground satellite station.
Railways and rolling stock.
Ships and port facilities.

Because of its importance to Cuba as a potential hard currency earner, Soviet aid in nickel has been and continues to be especially significant. With Soviet help, production at the two formerly U.S.-owned facilities at Nicaro and Mao Bay is being expanded from 37,000 to 47,000 tons. A third facility capable of 30,000 tons of output, currently under construction at Punta Gorda with Soviet assistance, is scheduled for completion in 1982.

The experience of Punta Gorda is generally characteristic of Soviet-Cuba joint development projects. Originally scheduled to open in 1980, coordination problems between enterprises and lack of Soviet priority

in supplying required equipment, particularly if hard currency expenditure is needed, have caused extensive delays. In apparent deference to Cuban requests, at one point the Soviets solicited participation by Western engineering firms capable of supplying more efficient technology than available from the U.S.S.R. or in the older existing Cuban plants. However, the Soviets subsequently reversed direction and apparently decided to replicate the existing 20-year-old nickel plant rather than use hard currency to purchase more efficient up-to-date Western design and equipment. This demonstrates once again that Soviet assistance to Cuba is likely to be strictly limited where scarce hard currency resources are required.

A fourth nickel plant which would increase Cuban production to 100,000 tons is to be built with multilateral CMEA assistance during the 1981–85 plan. However, even more difficult multilateral coordination problems are likely to result in substantial delays.

One Soviet project of major significance is constructing of a 440-megawatt nuclear power station near Cienfuegos in southwestern Cuba. This first Soviet-supplied nuclear power station in the Western Hemisphere is to be followed by a second 440-megawatt unit. This commitment to supply Cuba with nuclear power is at least indirect confirmation that the Soviets are aware of the ever-growing opportunity cost of supplying Cuban energy needs. However, with the anticipated delays, nuclear power can be at best only a partial answer. If completed as planned by 1985 (very doubtful) the first unit could supply 17 percent of Cuba's anticipated electrical power generation. Thus, nuclear energy will not begin to mitigate the Cuba oil drain until the 1990's while Soviet crude oil production shortages are expected to be crucial in the early to mid-1980's.

Industrial development assistance projects can involve direct and indirect costs to the Soviets in at least three ways. First, there are the opportunity costs of resources invested in Cuba where the anticipated economic return consists only of sugar imports at subsidized prices over the very long-term future (sugar deliveries are the accepted means for payment of Cuban debts to all Communist countries).

Second, for some industrial projects, such as the Punta Gorda nickel plant, Soviet cooperation may require provision of some technologies and equipment available only in the West for hard currency. While the Soviet Union is less reluctant to invest soft currency or "soft goods" in Cuba for a return of sugar, it is clearly more reluctant to supply either Western goods purchased for hard currency or its own "hard goods" (that is, those marketables in the West).

Third, most all CMEA countries face similar long-term economic problems including: Insufficient energy resources and dependence on Soviet supplies, extremely limited supplies of goods that can be exported for hard currency, and widespread needs for Western technology to upgrade and expand domestic industry. In addition to continued pressure from Havana for additional resources, the Soviets also constantly must face similar demands from much of Eastern Europe—and since 1975, from Vietnam. Furthermore, other developing countries (for example, Angola and Ethiopia) are apparently considering various forms of economic association with CMEA. Their needs for investment resources will predictably be massive. Faced with its own

ever-growing domestic demand for scarce investment resources, the Soviet Union can be expected to attempt to press other more developed members of CMEA, such as the GDR and Poland, to bear a larger portion of the cost of assisting Cuba and any other less developed countries which may join the CMEA bloc. However, with problems of their own, Eastern Europe can be expected to resist extending economic aid beyond token amounts and become increasingly dissatisfied with the heavy subsidies enjoyed by Cuba. This could force the Soviets to spend political capital within the CMEA structure to maintain Cuba's preferential trade status intact.

There may also be a direct cost to the U.S.S.R. When the Eastern Europeans must provide valuable "hard goods" to Cuba, they may demand reductions in their obligation to supply equivalent volumes to the U.S.S.R.

Debt Management

Managing its external debt is an additional area of economic assistance for Cuba that involves important direct and indirect costs to the Soviets. Direct Soviet soft currency ruble credits to Cuba since the 1960's total 5.1 billion. Repayment will commence after 1986 on an interest-free basis. An additional 1.1 billion rubles made available since 1975 is repayable after 1983 in sugar. The actual cost to the U.S.S.R. of soft currency debt to Cuba is incalculable depending as it does on the pricing of long-term sugar deliveries as repayment. However, the interest-free feature suggests a net loss in real terms to the U.S.S.R. In fact, some observers believe Cuba's debt will never be repaid in more than token amounts and will ultimately be largely written off by the Soviets.

In addition to direct soft currency Soviet loans, since 1974 Cuba has maintained membership in the CMEA banks, the International Bank for Economic Cooperation (IBEC) and the International Investment Bank (IIB).[6] IBEC provides hard and soft currency loans for development projects in member countries. Although no concrete data is available, Cuba is known to have drawn loans from both institutions. Hard currency credits could total up to several hundred million dollars.

Since decisions in CMEA organizations presumably require unanimous approval and since all CMEA countries face chronic shortages of hard currency, approval of loans to Cuba probably require substantial lobbying by CMEA's most influential member, the Soviet Union. Again, political capital has to be used on Cuba's behalf.

In addition to soft and hard currency debts to the U.S.S.R. and CMEA banks, Cuba's hard currency debt to the West has accumulated rapidly from an estimated $580 million in 1973 to $2.2 billion by end year 1977. However, Cuba is rarely if ever included in Western assessments of either CMEA or Soviet debt. Havana has used credits from governmental export finance programs and commercial banks to finance $1.8 billion in hard currency trade deficits, accumulated over the 1975–77 period. Cuba has been able to maintain a reasonably favorable credit rating with international banks who account for $870

[6] Although a full member, Cuba apparently has not paid in its capital assessment (part in hard currency) to either bank.

million or 40 percent of outstanding debt at the end of 1977. This has been possible in spite of its continued poor economic outlook and controversial foreign policies in Africa at least in part because many bankers presume the existence of a Soviet financial "umbrella" which serves as the ultimate guarantee behind Havana's debts. But the "umbrella" also means the Soviet Union bears a contingent liability for Cuban debts in addition to its own $11 billion outstanding hard currency debt and perhaps a similarily perceived "umbrella" liability for $43 billion of debt held by East Europe and the CMEA banks.

Furthermore indications are that Cuba is currently funding its hard currency debt on an extremely short-term basis. In mid-1978, fully 70 percent of Eurocurrency bank claims on Cuba consisted of trade credits and interbank deposit accounts with maturities of less than 6 months. Havana's cash flow position is therefore particularly vulnerable to changes in international money market conditions and banks' confidence in its creditworthiness. The necessity for additional direct Soviet hard currency aid for Havana to service its Western debts therefore cannot be ruled out.

This contingent liability for Cuban debts is clearly a negative influence on the Soviet's own international credit standing. That influence would surely increase if bankers perceived that Moscow was assuming responsibility for current and future hard currency debts of additional economic clients such as Vietnam, Angola, or Ethiopia.

Military Assistance: The Economic Impact

The Soviets have supplied Cuba with military equipment worth an estimated $1.5 billion since 1960. This too entails some opportunity costs for the Soviets. Prior to 1974, Soviet military equipment and assistance to Havana, had leveled off. Although Cuban forces were slowly upgraded, equipment was always defensive in nature and several generations old. However, successes in support of Soviet policies in Angola and Ethiopia may well have strengthened Cuba's bargaining position with the U.S.S.R. for more sophisticated military equipment and training.

Domestic pressures in Cuba for expanded and improved military forces are likely to mount for two reasons: First, the relative importance of the military establishment in the Cuban leadership has been bolstered by Africa successes. Second, in contrast to the European members of CMEA, Cuba's labor force is growing rapidly. However, the civilian economy, dominated by agriculture, is likely to prove increasingly incapable of providing new Cuban technocrats (products of an impressive educational system) with the industrial employment they expect. This seems likely to add some pressures to expand the military to absorb at least part of the surplus young labor force.

Although the amounts of military equipment supplied have been very small relative to Soviet stocks, anything supplied Cuba is then unavailable for direct supply to other potential client states. Alternative demands for Soviet military aid have been notably substantial of late. For example, some $1 billion of equipment was rapidly shipped to Ethiopia in 1978 and unknown amounts to Vietnam in 1979. Furthermore, deliveries of military hardware appear to coincide with

involvement of Cuban combat troops. Any repeat of the massive arms deliveries made to Ethiopia and Angola in some other area of conflict where Cubans might become involved could mean an increased drain of Soviet resources necessarily devoted to military assistance. Since available investment resources are always tight, the Soviet civilian economy can ill afford such additional drains.

Supplying Cuba's military with equipment also involves a degree of political risks to the Soviets because of the 1962 bilateral understanding with the United States that offensive, strategic type (never clearly defined) equipment would not be supplied.

IV. Gains to the Soviet Union From Economic Support of Cuba

This paper has concentrated on the evolution of direct and indirect costs to the Soviet Union of maintaining its economic support of Cuba. The costs have clearly been substantial and prospects are that maintaining Cuba as a client state in the manner to which Havana has recently become accustomed will no doubt become increasingly costly.

It is an irony of history that the Soviets have almost exactly replaced the United States as Cuba's dominant benefactor and most pervasive economic influence. The costs have indeed been high. We will now attempt to assess the nature of the return on its investment Moscow has derived from Cuba.

Economic Returns

While the net flow of economic resources has clearly been overwhelmingly in Cuba's favor, the U.S.S.R. has been able to extract some reciprocal economic benefits. However, given the very limited assortment of Cuban products, the choices have indeed been slim.

Principally important is sugar. At the current level of supply (3.8 million tons for the 1977–78 crop year) Cuba supplies about one-fourth of total Soviet consumption. With its notorious weather patterns, the availability of Cuban sugar also provides the U.S.S.R. assurance against a serious sugar beet crop failure. Nevertheless, the Soviets have continued their own efforts to expand sugar beet production, which if successful would diminish the need for Cuban imports. Of course, faced with a surplus of domestic and imported sugar at some future point, the Soviets could always sell the excess on the free world market. However, such sales could rebound against Cuba whose exports to the U.S.S.R. are excluded from its ISA quota on the understanding that Soviet imports will not be reexported and disrupt the free world market.

The U.S.S.R. currently imports 18,000 tons of nickel annually or about half of Cuban production. In addition, one-half the production of the new Punta Gorda plant, when completed, is committed to repay Soviet construction assistance. As the world's largest producer of nickel, the Soviets have no serious need for Cuban nickel but it is one of the few "hard goods" available and can free domestic production for exports. Cuba also exports refractory grade chromite ore to the U.S.S.R. (possibly 30,000 tons each year), and small quantities of tobacco products and rum are also exported. However, none of these products supply essential needs.

In recent years, the Cubans have sharply expanded production of one product that can surely satisfy a genuine Soviet demand—citrus. Production has increased steadily to 200,000 tons in 1976 and plans call for producing 250,000 tons in 1980. Soviet imports of Cuban citrus have risen sharply to about 60,000 tons. Because investment in transport, packaging, and quality control has lagged, fresh Cuban citrus is generally not competitive on the world markets. However, it is most welcomed by insatiable Soviet consumers.

One additional possible future Cuban export to the U.S.S.R. has received little attention: labor. In sharp contrast with the leveling off of Soviet labor force (and the rest of CMEA as well) Cuba faces a 2.8-percent growth through 1987. Recently Cuba has begun to emphasize export of technical assistance embodied in its workers. At present at least 10,000 Cuban "gastarbeiters" including doctors, nurses, construction workers, and sugar engineers are employed in several developing countries generating possibly as much as $50 million in hard currency earnings for Havana. The most ambitious projects are in Iraq and Libya.

Although in the past, thousands of Cubans have received technical training and education in the U.S.S.R., that flow could reverse in the years ahead if Cuba, like the East Europeans is required to contribute directly to Soviet development projects in return for continued access to Soviet raw materials. Havana's contribution however, could only be labor.

Political Returns

In conclusion, there has been some, albeit disproportionately small, economic return on the massive Soviet investments in Cuba. More visible, and perhaps more valuable, has been the political returns. While political issues are largely beyond the scope of this paper, it is important to point out that Soviet political gains from its Havana connection have recently become significant. Although Havana earlier may have been somewhat useful in support of Soviet foreign policy goals, especially in the U.N. and the nonalined movement, Cuba has only recently been able to aid Moscow's objectives in a tangible way. The willingness of Cuban leaders to commit their combat forces in direct support of Soviet political objectives (first demonstrated in Angola) clearly provides the Soviets with foreign policy options unavailable earlier.

It is also beyond the scope of this paper to add to the large volume of existing analysis on the issue of Cuban autonomy or Soviet control in Africa or to speculate about future Soviet political benefits from its Caribbean client. Rather, the purpose has been simply to illustrate the evolutionary process which ultimately has led to a pervasive Cuban economic dependence on the U.S.S.R. Viewed over the last 20 years, that economic dependence has clearly been matched by an ever-increasing degree of Soviet influence, and possibly even some control over Cuban foreign policy goals and objectives.

In the second part we will analyze the development of Soviet economic relations with the Socialist Republic of Vietnam (SRV) since 1975 in order to discern any possible parallels with the Cuban experience.

VIETNAM

I. Introduction

Although the U.S.S.R. has maintained relations with the Socialist Republic of Vietnam (identified as North Vietnam prior to 1975) since 1945, the evolution of that relationship into something resembling a closely knit economic/political alliance is a recent development. In fact, prior to 1975 North Vietnam managed, with varying degrees of success, to garner support from the Soviet Union and China while pledging allegiance to neither. Amid persistent rumors of a tilt in its relationship in favor of the Soviet Union, North Vietnam retained its economic and political ties with the People's Republic of China. With reunification of the country in 1975, the newly established Government of the Socialist Republic of Vietnam (referred to throughout the paper as Vietnam or the SRV) sought to strengthen its economic relationship with the West as well. After what appeared to be promising start in moderating the Sino-Soviet influence in its economic development, Vietnam's relations with both China and the U.S.S.R. changed suddenly in mid-1978. Since then, it appears that Vietnam's political and economic ties with the U.S.S.R. have been expanding rapidly, in a manner not unlike the evolution of Soviet-Cuban relations in the early 1970's.

II. Brief History of Soviet-Vietnamese Economic Relations

Prior to 1955, Soviet attitudes and actions toward Vietnam were tied to Soviet interests in Western Europe. As a result, the Soviet role in Vietnam between 1945 and 1954 was nonsupportive at best, despite the establishment in 1945 by Ho Chi Minh of a Communist-led independent government in Vietnam. Because Soviet actions before 1954 supported the French Communist party's interest rather than Ho Chi Minh's nationalistic goals, North Vietnam turned to China and the United States for assistance. However, the United States and the U.S.S.R. supported France in its attempts to regain control over Vietnam. China, on the other hand, responded to Ho Chi Minh's request for support by recognizing his government in 1950 and sending in arms, supplies and advisers in 1952. After the Geneva agreement in 1954, the U.S.S.R. became more supportive of the North Vietnamese Government and began developing economic ties through trade and aid. Between 1955 and 1964, the U.S.S.R. supplied North Vietnam with over $400 million in nonmilitary aid, more than 40 percent of North Vietnam's nonmilitary aid receipts. China also provided approximately $350 million in aid, while the Eastern European countries contributed $200 million. See table 5 for figures on aid to the SRV.

Just as early Soviet involvement in Vietnam was determined largely by U.S.S.R.-European relations, Soviet interest in Vietnam after 1960 was linked to its rivalry with China. Between 1965 and 1975, this rivalry was temporarily downplayed as both countries assisted North Vietnam in its fight against a common foe—the United States.

TABLE 5.—AID TO SOCIALIST REPUBLIC OF VIETNAM [1]

[In millions of U.S. dollars]

	1955–64 [2]	1965–75 [3]	1976–80 (estimate) [3]
Total	993	4,304	5,613
Communist countries	993	4,116	3,831
U.S.S.R.	440	1,778	2,500
People's Republic of China	352	1,491	[4] 600
Eastern Europe	201	844	719
Cuba		3	12
Non-Communist	NA	188	1,155

[1] Prior to 1975, was Democratic Republic of Vietnam or North Vietnam.
[2] Source: Citibank N.A., "Vietnam: An Economic Study," Hong Kong, September 1976.
[3] Source: Office of Economic Research, Central Intelligence Agency.
[4] Estimated Chinese aid receipts up to cutoff in mid-1978.

During the 1965–75 period, the U.S.S.R. poured more than $1.8 billion of nonmilitary aid into North Vietnam, paralleling its Cuba pattern. Like Cuba, North Vietnam also received fraternal support valued at some $840 million from the Eastern European countries. At the same time, North Vietnam enjoyed an option never fully exploited by Cuba. It received considerable amounts of aid from China. Between 1965 and 1975 Chinese aid is estimated to have reached $1.5 billion.

In the two decades following the French departure from Vietnam, the U.S.S.R. also supplied Hanoi with $300 to $500 million annually in military aid, whereas Chinese military aid during that period averaged roughly $35 million per year.

By 1975, Soviet economic influence in North Vietnam had become extensive. Of 220 projects scheduled for construction under agreements between Moscow and Hanoi, over 160 were in various stages of completion. As in Cuba, projects extended to every sector of the North Vietnamese economy and included Soviet aid in constructing dams and hydroelectric stations, flour mills, port facilities, highways and railroads, and various industrial facilities.

After 1975, with the United States out of the picture, the Sino-Soviet rivalry resurfaced and the struggle for influence in Vietnam intensified. Being more highly industrialized, the Soviets appeared to have a greater capacity to provide economic assistance than China, struggling with its own massive development problems. Fresh from similar negotiations in Havana, in 1975 the Soviets signed an agreement with Hanoi for economic and technical assistance. Under terms of the agreement, the Soviets pledged to send technical experts to Vietnam, and to provide economic, scientific, cultural, and technical training for Vietnamese personnel, as well as technical assistance for a number of major projects in Vietnam. More importantly, as it had with Cuba, Moscow extended MFN and substantial credits to Vietnam for the purchase of Soviet heavy industrial equipment, agricultural inputs, transport facilities, raw materials, oil, and food. Although no details are available on the negotiated terms of trade it is probable that Vietnam was accorded preferences similar to those granted Cuba with prices for Soviet oil and food set at subsidized levels compared to world market prices and at least partial payment allowed in Vietnamese goods rather than hard currency.

The 1975 bilateral assistance agreement was followed a year later by a similar agreement for construction of 40 industrial enterprises and other projects during 1976–80, including an iron and steel plant and a petroleum refinery and petrochemical complex. Clearly the U.S.S.R. was prepared to compete with China to become Vietnam's most important economic benefactor over the long term. Whatever Moscow's motives, however, Vietnam appeared unwilling to become economically dependent on any one nation. Rather, following Cuba's example in its efforts after 1973 to renew ties with the United States and other hemispheric neighbors, beginning in 1976 the SRV leadership sought to strengthen and expand its relations with any developed country capable of assisting it to rebuild its economy. Diplomatic overtures were made to many Western nations, including the United States and ASEAN countries, with the hope of reestablishing commercial relations that had been severed during long years of conflict. But Vietnam seemed even more flexible and pragmatic than Cuba in seeking to broaden its economic contacts. Joining multilateral organizations such as the IMF, the World Bank,[7] and the United Nations, Hanoi opened up new sources of aid. As a result, Vietnam's aid and trade patterns began to change somewhat, just as Cuba's did in 1974–75. Of the $5.6 billion in aid and credit pledged to Vietnam for the 1976–80 period, over 20 percent ($1.2 billion) was committed by non-Communist sources. Non-Communist aid to North Vietnam between 1971 and 1975 is estimated at $440 million, over 50 percent of that in grant aid.

Vietnam's trade diversified as well (see table 6). While North Vietnam conducted over 55 percent of its trade with the U.S.S.R. during the 1970–75 period compared to only 11 percent with the non-Communist countries, in 1977, 42 percent of its trade was with the U.S.S.R. and 43 percent with non-Communist countries. The biggest change occurred in Vietnam's imports from the West. With access to new sources of aid, Vietnam was able to expand imports from the West. Whereas the U.S.S.R. supplied North Vietnam with 50 percent of its total import needs in 1974, compared to only 13 percent from the non-Communist countries, by 1976 the Soviet share had dropped to 42 percent while the non-Communist share had risen to nearly 39 percent. Similarly, buoyed by record high sugar prices in 1974–75, Cuba diversified and expanded its economic ties with non-Communist Western nations. However, when sugar prices subsequently declined, Cuba was forced to reorient its trade even more heavily to its Eastern Communist trading partners.

Although Vietnam's attempts in 1975 and 1976 to chart an independent course were displeasing to Moscow, the Soviets could not exercise the same economic leverage they had used in Cuba in 1968 to redirect economic planning and insure support for their invasion of Czechoslovakia. In contrast with Cuba, Vietnam was more successful, at least temporarily, in avoiding continuously increasing dependence on Moscow. For one thing, the SRV was still receiving substantial aid from China, including 20 percent of its petroleum needs. Moreover, Vietnam was able to draw on new non-Communist sources of aid which promised significant assistance for its development

[7] Cuba withdrew from both in 1962 and has shown no interest in rejoining.

TABLE 6.—SOCIALIST REPUBLIC OF VIETNAM [1] FOREIGN TRADE BY MAJOR AREA, SELECTED YEARS

[In millions of U.S. dollars]

	1970	1974	1975 [2]	1970–75	1976 [2]	1977 [2]
Total exports, f.o.b. [3]	46.6	127.1	142.5	514.0	232.3	347.7
Communist countries	32.8	83.5	96.9	366.8	122.0	220.2
U.S.S.R.	(18.6)	(57.3)	(66.4)	(243.4)	(85.9)	(176.5)
Non-Communist countries	13.8	43.6	45.6	147.2	110.3	127.5
Total imports, c.i.f. [3]	293.8	429.1	492.1	1,993.8	744.9	956.6
Communist countries	285.3	372.1	367.3	1,769.1	448.8	522.4
U.S.S.R.	(185.0)	(253.8)	(220.6)	(1,121.4)	(313.9)	(372.9)
Non-Communist countries	8.5	57.0	124.8	224.7	293.1	434.2
Trade balance	−247.2	−302.0	−349.6	−1,479.8	−509.6	−608.9
Communist countries	−252.5	−288.6	−270.4	−1,402.3	−326.8	−302.2
U.S.S.R.	(−166.4)	(−196.5)	(−154.2)	(−878.0)	(−228.0)	(−196.4)
Non-Communist countries	+5.3	−13.4	−79.2	−77.5	−182.8	−306.7

[1] Prior to 1975 was Democratic Republic of Vietnam or North Vietnam.
[2] Estimate based on available data for Vietnam's trade with CMEA nations.
[3] Totals are somewhat understated since data on SRV trade with some non-Communist countries are unavailable.

goals in the long term. (Cuba also had access to official bilateral export credits after 1974, but its rapidly growing debt from continued hard currency trade deficits prevented Havana from using more than half of the available credit lines.) And finally, the Vietnamese economy was considerably more diversified than the Cuban economy, providing Vietnam more trading options.

While some political strains appeared in the Soviet-Vietnamese relationship, Moscow remained steadfast in its economic support of Vietnam. In fact, 1976 saw an increase in Soviet equipment exports to the SRV, largely as part of the Soviet commitment to assist Vietnam with some major programs, most notably in the agricultural, oil and gas drilling, and mining/construction areas. The U.S.S.R. also increased its agricultural exports to Vietnam in 1976. As indicated in table 7, the value of Soviet wheat exports to the SRV doubled between 1975 and 1976, while raw cotton exports tripled. Since the U.S.S.R. is a net importer of grains, it seems likely that (as in the case of Cuba) the Soviets supplied Vietnam with Western wheat, thereby helping the SRV offset agricultural production shortfalls. (Although some Western wheat found its way to Vietnam, Soviet grain shipments also included some poor quality Soviet wheat.) China also assisted Vietnam in meeting its food needs by giving 500,000 tons of rice in 1976.

Soviet assistance notwithstanding, by early 1977 it was evident that Vietnam's economic development program was in trouble and 5-year plan goals would not be met. This coincided with indications that Cuba's economic performance would also seriously miss 5-year plan goals. The Vietnamese leadership redoubled its efforts to obtain badly needed capital and technology from all available sources. Keeping one foot in the Soviet camp, Vietnam tried to woo Western investors by unveiling a new investment code in April 1977. (Similarly, Cuba in 1975 announced that foreign direct investment was acceptable "in principle.") The code, the most liberal ever promulgated by a Communist government was greeted with enthusiasm and optimism in the West.

TABLE 7.—MAJOR SOVIET EXPORTS TO THE SRV, 1974–77

[In millions of rubles]

Description	1974	1975	1976	1977
Machines, equipment and means of transportation	82.3	70.0	102.9	120.3
Of which:				
Metalworking machine tools	1.2	1.8	1.9	4.1
Power generating equipment	6.6	8.3	5.4	6.8
Electrotechnical equipment	1.7	1.2	.7	.8
Mining equipment	3.8	5.0	7.0	11.5
Drilling equipment	7.1	4.2	6.6	8.4
Of which:				
Hydrological drilling	.7	.1	.3	1.2
Oil drilling	6.0	3.5	5.9	6.7
Material handling equipment	1.0	.8	1.3	1.0
Construction equipment	3.1	2.7	2.5	1.4
Construction equipment parts	.9	.2	.5	.5
Agricultural and forestry equipment	4.0	2.1	5.1	4.5
Irrigation and reclamation equipment	1.1	3.3	.5	.9
Tractors	3.3	1.6	6.4	2.8
Tractor parts	1.3	1.8	1.8	3.8
Other agricultural equipment	.9	1.0	2.2	2.3
Diesel locomotives	.7	.8	.8	1.6
Trucks	9.2	3.8	7.8	8.3
Truck parts	4.0	3.4	4.4	5.6
Airplanes and related equipment	9.6	1.6	9.7	5.7
Cable and wire	2.4	1.9	1.6	2.6
Equipment for chemical industry	.2	.1	1.0	2.9
Petroleum and petroleum products	11.3	14.2	14.4	27.8
Rolled ferrous metals	9.4	7.2	8.4	11.0
Of which: Sheet steel	5.6	2.6	NA	NA
Cotton (raw)	3.9	5.5	16.8	18.9
Wheat flour	42.4	16.3	16.9	20.0
Wheat		7.5	23.1	25.7
Rice	6.1			
Cotton cloth	3.6	4.8	7.0	.3
Chemical products	.8	.9	1.2	1.0
Ammonia sulphate	2.9	3.2	2.2	4.2
Lumber products		1.0	1.4	1.3
Medicines	.6	.7	3.0	2.9
Subtotal	163.4	131.4	197.5	268.4
Other	28.9	27.3	35.0	5.8
Total:				
Million rubles	192.3	158.7	232.5	274.2
Million dollars[2]	253.8	220.6	313.9	372.9

[1] Data for scrapers only. 1977 data for other types of construction equipment not available. Soviet scraper exports to SRV in 1976 valued at 30 0000 rubles.

[2] Ruble-dollar conversion factors used: 1974—0.758; 1975—0.719; 1976—0.741; 1977—0.735.

Source: Veneshniaia Torgovia SSR.

Unfortunately, it yielded no concrete investments in the SRV. Moreover, by the end of 1977, it was clear that despite some progress in individual industrial sectors, Vietnam's overall economic performance had been dismal. Poor weather, insect damage, lack of fertilizers, bureaucratic mismanagement, and resistance by farmers in the South to producing more than subsistence levels of grain left Vietnam 1.5 million tons short of grain needed to feed its populace. However, just as it had increased support of Cuba when sugar prices plunged in 1975, the Soviets supplied sufficient economic aid to allow its client to muddle through. In 1977, Vietnam imported the equivalent of $62 million in wheat and wheat flour from the U.S.S.R. and $40 million in Western grain. While a large portion of the Western grain was probably shipped under aid agreements, it is virtually certain that the U.S.S.R. supplied Vietnam with agricultural products on extremely favorable soft currency terms.

Vietnam's poor economic performance in 1977 was one of a series of events which together clearly signaled a turning point in the SRV's economic and political relations with the Soviet Union. On the political

side, maintaining China as an alternative ally and benefactor became increasingly unfeasible. In early 1978, Vietnam's conflict with Cambodia, which had been smoldering since 1975, finally erupted into full-scale war. The U.S.S.R. immediately alined with the SRV, while China (with its own interests in Cambodia) remained officially neutral. Sino-Vietnamese relations continued to deteriorate, however, and by February China and Vietnam were engaged in skirmishes along their common border. The Vietnamese decision in March 1978 to fully nationalize the private commercial sector in the south (long the domain of resident Chinese) resulted in a mass exodus of Chinese from Vietnam and ultimately precipitated a complete Sino-Vietnamese split. In summer 1978, China cancelled its $300 million a year aid program to Vietnam including 80 known aid projects.

Faced with continuing delays in agricultural self-sufficiency, potential loss of Western aid due to both political issues and absorption problems, a rising hard currency trade deficit, and the ever-increasing military drain on already scarce resources, Vietnam acceeded to Soviet pressure and in June 1978 joined CMEA. According to Soviet officials, CMEA will take over most of the abandoned Chinese projects and will provide preferential prices for Vietnam's major export products. Once again the Cuban pattern (that is, CMEA membership and subsidies) is apparently being followed.

Moreover, as with Cuba after 1973, Moscow was able to tighten its economic grip on Vietnam, since membership in CMEA carries with it the responsibility to coordinate 5-year plans. Thus, although degrees of coordination vary, the Soviet Union is likely to have an important role in planning Vietnam's future economic development.

Soviet-Vietnamese ties were strengthened even further with the signing of a Treaty of Friendship and Cooperation in November 1978 binding the two countries more closely together against their now common foe—China. This treaty was immediately followed with economic and technical agreements that when fully implemented will sharply increase Soviet aid to Vietnam. Under terms of the economic and technical agreements, the U.S.S.R. agreed to help improve strategic railroads between Hanoi and Haiphong and between Hanoi and Ho Chi Minh City. (Cuba's main rail line has been entirely rebuilt with Soviet equipment and aid.)

The importance of Soviet aid was underscored in 1978 when Vietnam suffered a disastrous crop failure, its third in a row. Unable to acquire the 2.9 million tons needed to make up for domestic production shortfalls as gifts or loans from other countries, and able to pay for only a small quantity of imports, the SRV turned to the U.S.S.R., its traditional supplier of emergency food aid. Although no figures are available, it is virtually certain that Moscow, as it has several times with Cuba, again came to the rescue with substantial amounts of grain.

In January 1979, perhaps bolstered by Soviet political and military support implied by the Friendship and Cooperation Treaty, Vietnam invaded Cambodia. When China then retaliated by invading the SRV, the Soviet commitment to Vietnam was severely tested, reminiscent of the situation it faced during the 1962 Cuban missile crisis.

Although it is clearly premature to assess the political implications of very recent events on Soviet-Vietnamese relations, it is certain that

Vietnam is under even greater economic pressure now than before, while its options are more narrow than ever. Invading Cambodia has meant condemnation and counterinvasion by China, as well as widespread disapproval in the non-Communist West. Like Havana after the 1970 sugar disaster, Hanoi would now appear to have very limited options. If the Soviets follow their pattern in Cuba and accept the role of Vietnam's principal economic benefactor, the costs to the U.S.S.R will surely continue to increase. Moreover, as was the case in Cuba in the early 1970's, what the Soviets expect in return is very difficult to foresee at this point.

III. Vietnamese Economic Dependence—Soviet Costs

Like Cuban dependence, Soviet economic support of Vietnam involves direct and indirect costs that though primarily economic are also political.

As with Cuba, bilateral trade is probably the most important mechanism of Soviet economic support in Vietnam. The economic costs to the Soviets of trade with Vietnam derive primarily from the low subsidized sale prices of important Soviet goods such as oil and grain. The SRV, like Cuba, undoubtedly enjoys such subsidies by virture of its "developing country" status in CMEA. Unfortunately, in examining these costs we are hampered by an almost complete lack of information on SRV-Soviet terms of trade. Unlike Cuba, the SRV has never been very specific about the nature of its bilateral ties with the Soviet Union.[8] Hence, the scope of this analysis is necessarily limited.

The Soviet subsidy is particularly important in Soviet-SRV oil trade. However, without specific information on the terms of trade it is impossible to precisely determine the extent of this subsidy. Nevertheless, from available trade data we are able to approximate the volume and price of Soviet petroleum product exports to the SRV. (Soviet petroleum exports to Vietnam are predominantly gasoline and other fuels.) Between 1965 and 1975, Soviet deliveries of petroleum and refined products totaled approximately 3 million tons (equivalent to $132 million by value). Although volume figures are not available, the ruble value of Soviet petroleum deliveries to the SRV in 1976 reached the equivalent of $19.5 million and in 1977 jumped sharply to $37.8 million, bringing the total value of Soviet petroleum exports to Vietnam for the 12-year period to the equivalent of nearly $190 million. Depending on the amount of hard currency paid by Vietnam for petroleum products (we know that at least some of the deliveries are paid for with hard currency) the total cost to the Soviet Union of supplying Vietnam with petroleum products from 1965 through 1977 could be equivalent to as much as $180 million, or more.

What is clear from the available data, however, is that the "price" per ton (in equivalent U.S. dollars) charged by the U.S.S.R. for its oil product deliveries to the SRV has recently declined somewhat in sharp contrast to rising world prices for crude. Between 1965 and 1969 the Soviet price per ton of petroleum and petroleum products shipped

[8] Cuba has frequently described its Soviet trade relations in great detail, as an exemplary model for exchanges between developed and developing countries which should be followed by the capitalist world.

to Vietnam remained fairly steady (roughly equivalent to $41 per ton), in line with prevailing world market prices for crude. After declining slightly to the equivalent of $38 per ton in 1970 and 1971 the price rose to $54 per ton in 1972 and $58 per ton in 1973, probably reflecting Soviet adjustments for the jump in world crude prices. However, as Soviet-Vietnamese economic relations broadened in 1974 and 1975, Soviet oil export prices apparently began to drop, despite steady increases in world market prices. In 1974, the value of Soviet petroleum product exports to Vietnam (in equivalent U.S. dollars) was $51 per ton. The trend continued downward in 1975 and 1976 when Soviet petroleum exports to Vietnam were valued at $44 per ton. In 1977, the value of these exports rose to $54 per ton. While this was below world market and intra-CMEA prices, it was exactly the same "price" charged by the Soviets for their petroleum exports to Cuba in 1977.

Soviet exports to Vietnam of wheat, flour, and rice also entail economic burdens in the form of direct costs. Since at least some, and probably most, grain is supplied on a soft currency basis (as in Cuba) or gratis as emergency food aid, the Soviets as net grain importers must incur a hard currency cost to purchase grain from Western sources. Soviet grain exports to Vietnam between 1965 and 1977 totaled 289 million rubles (equivalent to $365 million), 86 million rubles in 1976–1977 alone. Hence, the cost to the U.S.S.R. has been roughly equivalent to $365 million less whatever the SRV has paid for in hard currency. Table 7 presents major Vietnamese imports from the U.S.S.R. between 1974 and 1977.

Aside from hard currency costs, the Soviet Union incurs other costs from its technical assistance program. Through the numerous agreements noted earlier, the Soviets have committed themselves to providing equipment and trained personnel to assist Vietnam in various projects. In 1975, the number of Soviet technicians in Vietnam was estimated at 2,000 and has certainly increased since then. If CMEA takes over most of the abandoned PRC projects, as is its declared intention, it will mean sending in additional technicians, at least some of them from the U.S.S.R. In view of the worsening manpower shortage in the Soviet Union, supplying skilled technicians to Vietnam could be increasingly costly.

The problem may be even more acute in technical areas which have a high development priority in the Soviet Union. A prime example is oil and gas exploration. In July 1978, Hanoi and Moscow agreed on measures to build up Soviet technical assistance in oil and gas prospecting. This is one area where the Soviets would be particularly hard pressed to divert skilled technicians from domestic projects to work in Vietnam.

Perhaps more important for long-term Soviet interests are potential political costs associated with continued economic support of Vietnam. The SRV is not the only CMEA member country with a critical need for Soviet oil, equipment and technical manpower; other CMEA nations are also supplied with varying amounts of these scarce resources. The massive economic assistance program for Cuba is a significant example. Vietnam's accession to CMEA may have been initially welcomed by the U.S.S.R. but it was probably viewed with considerably less enthusiasm by the East European membership.

Whereas the Soviet Union gains important political benefits from Vietnam's membership in CMEA (especially a powerful ally on China's southern border and a foothold in Southeast Asia), other CMEA members may see the SRV only as a further drain on their already overburdened resources. Accepting additional pressures on their own economies to subsidize Vietnamese development in return for long-term political and economic gains (which flow predominantly to the U.S.S.R.) must be particularly unpalatable. Clearly, Moscow may be using up valuable political capital among its European allies to extract support for the SRV in addition to the steadily growing burden of Cuba. How long the U.S.S.R. will be willing to pay this political price is, of course, open to speculation and could present the Soviets some difficult choices in the next decade.

IV. Vietnamese Economic Dependence—Soviet Benefits

Thus far the discussion has concentrated on the evolution of Soviet-Vietnamese economic relations and resultant costs to the U.S.S.R. The Soviets are clearly committed to playing a dominant role in Vietnam's economic development. The decision could be an increasingly costly one, both economically and politically. A look at the benefits which the Soviets hope to derive may help place developments in a proper perspective.

Although Soviet economic aid and trade flows to Vietnam far exceed any current economic return to the U.S.S.R., there have been some economic benefits. The most obvious of these are trade related.

In return for its exports of equipment, petroleum, and agricultural products, the U.S.S.R. imports from the SRV primarily consumer goods such as clothing, carpets, handicrafts, and foodstuffs. Since 1975 the Soviet Union has also imported Vietnamese rubber and rubber goods. (See table 8 for Soviet imports from the SRV.)

Not only do Vietnamese exports help satisfy massive Soviet demand for consumer-oriented goods, but they also result in direct and indirect economic benefits to the Soviet Union. For example, Soviet imports of Vietnamese vodka have been increasing since 1960. It is possible that the U.S.S.R. imports Vietnamese vodka for domestic consumption, freeing its own readily marketable vodka for export to hard currency markets.

An indirect economic benefit is hard currency earnings saved through Soviet access to Vietnam's rubber resources. Prior to 1975, the Soviet Union had no trade relations with the then Government of South Vietnam. However, after 1975 Hanoi was able to tap the country's large rubber resources in the South and in 1976 Soviet imports of Vietnamese rubber reached the equivalent of $6.4 million. (Data on Soviet rubber imports after 1976 is unavailable.) To the extent that Vietnam provides an alternative source of rubber (the U.S.S.R. has traditionally imported much of its rubber from Malaysia—equivalent to over $640 million between 1970 and 1975), the Soviets realize a net hard currency savings.

However, by far the single most important economic benefit to the U.S.S.R. hinges on development of Vietnam's potentially large, but as yet unproven, oil reserves, estimated by some industry experts to be

TABLE 8.—MAJOR SOVIET IMPORTS FROM THE SRV, 1974–77

[In millions of rubles]

Description	1974	1975	1976	1977
Tin	0.3	0.1	0.2	
Rubber, resins, and resin-based goods			4.7	
Parquet bordering	.1	.2	2.0	8.3
Tea	1.1	1.0	2.6	3.9
Pineapples		.1	.8	1.1
Bananas	.4	.6	1.0	1.1
Vodka	1.1	1.4	2.5	4.2
Liqueurs	1.7	2.1	2.3	3.0
Carpets	.5	.4	1.0	4.4
Overcoats and outer clothing	22.0	21.5	14.0	44.6
Knitted clothing	1.2	1.7	1.6	1.3
Rubber footwear	.2	.4	1.1	.9
Sport shoes	2.5	3.7	5.4	2.8
Cultural and household goods	4.1	5.1	9.7	12.5
Reed rugs and mats	5.1	6.0	6.3	9.1
Subtotal	40.2	44.2	55.8	99.4
Other	3.2	3.6	7.8	30.4
Total:				
Million rubles	43.4	47.8	63.6	129.8
Million dollars [1]	57.3	66.4	85.9	176.5

[1] Ruble-dollar conversion factors used: 1974—0.758; 1975—0.719; 1976—0.741; and 1977—0.735.

Source: Veneshniaia Torgovlia SSR.

capable of producing 1 million barrels per day (e.g., more than Malaysia and less than Indonesia). If these estimates prove accurate, in addition to freeing the 2 million barrels of Soviet supplied products for other uses, Vietnamese oil production of 1 million barrels annually holds out the prospect of large new sources of oil which might be available for Soviet use to meet its domestic and CMEA supply requirements. However, even at the most optimistic pace of development, SRV oil production would not reach marketable quantities until the mid-to-late 1980's and would therefore ease the economic burden of supporting Vietnam only over the longer term.

Although political issues are beyond the immediate economic scope of this paper, Moscow's political gains from increasingly close ties with Hanoi should also be noted. Some observers have drawn close parallels between Cuba's direct military support of Soviet goals in Africa and Vietnamese activities in Southeast Asia, which also appear to fit well into Soviet objectives. As occurred in Cuba, a closer linkage to Soviet policies could develop as Vietnamese economic dependency grows.

In summary, during the long and not always smooth course of Soviet-Vietnamese economic relations, the U.S.S.R. has been consistently willing to pay the economic price of at least a minimum level of economic support for its Southeast Asian client. Thus far the bilateral relationship has developed much as the Soviet-Cuban relationship, with Soviet costs far exceeding any economic benefits. In both instances, therefore, political considerations loom large both as motivation for Soviet largesse and as potential sources of problems in future Soviet relations with European CMEA. But the Cuban-Vietnam parallel may end there for although Cuba, however reluctantly, has become locked into an economic/political alliance for which there appears to be virtually no viable alternative, Vietnam's future is still largely undecided. Because Vietnam's economy is more diversi-

fied, richer in natural resources (especially oil), and not yet as dependent on the Soviet Union, it is possible that the SRV can still maintain more economic and, hence, political independence than Cuba has. In the final analysis, oil will play the key role. Rapid development of this crucial resource could significantly influence the future course of SRV relations with both Communist and non-Communist countries.

MONGOLIA

I. Introduction

Unlike Cuba and Vietnam, the economy of the Mongolian People's Republic (referred to throughout this paper as the MPR or Mongolia) has been very closely linked with the Soviet Union almost since its establishment in 1924. It remains today as dependent on the U.S.S.R. as it has ever been and there is no evidence that its status will change.

For its part, the Soviet Union continues to foot the bill for Mongolia's efforts to diversify its agriculture-based economy. In return for its investment, Moscow has gained some minor economic advantages and some major political benefits. Whereas the Soviet economic relationships with Cuba, and even more so Vietnam, are still evolving, Mongolia's path appears to be fixed.

II. Brief History of Mongolian-Soviet Economic Relations

With the collapse of the Manchu Dynasty in 1911, China, Japan, and the Soviet Union struggled for dominance in Mongolia. The Soviets eventually prevailed and in 1921 a pro-Communist Government was established with Soviet help. In 1924 the Mongolian People's Republic was proclaimed and was immediately guided and protected by the U.S.S.R. Soviet troops prevented a Japanese takeover in 1938 and have since been called upon periodically to put down insurrections.

The tenor of Soviet-Mongolian relations was set early on when in 1946 the two countries signed a Treaty of Friendship, Cooperation, and Mutual Assistance. Economic bonds between the two countries were cemented that same year with the signing of an Agreement on Economic and Cultural Cooperation. This agreement served as the basis for economic relations and provided for negotiation of protocols on trade and cultural exchanges, as well as the activities of Soviet engineers, technicians, and other specialists in the MPR.

After China recognized Mongolia in 1950, under pressure from the Soviet Union, the MPR received some Chinese economic assistance, largely in the form of labor for housing and road construction. However, with the Sino-Soviet split in 1960 the U.S.S.R. once again became the principal source of economic assistance and the primary political forces. Since then Mongolia has consistently backed Soviet policies and Moscow in return has provided generously for Mongolia's economic needs. In fact, without Soviet equipment, manpower, and capital, Mongolia would have remained an undeveloped agricultural nation.

Soviet aid to Mongolia prior to 1945 was largely military in nature. After 1945 and the signing of the Treaty of Friendship, Cooperation,

and Mutual Assistance, Soviet aid took the form of credits and grants. Between 1945 and 1964 the U.S.S.R. provided the MPR with the equivalent of $700 million in economic assistance. In addition to the grants and loans which were vital to Mongolian industrial development, the Soviet Union also provided equally valuable technical assistance on a variety of projects, including a petroleum refinery built in the 1950's. (In 1973, the last year for which information was available, production at the refinery was almost nil.)

Following the Sino-Soviet break the pace of Soviet-Mongolian economic relations accelerated. In 1960 Mongolia joined CMEA and in 1966 signed another Treaty of Friendship which replaced the 1946 Treaty and Agreement on Economic Cooperation. This 20-year treaty provides for Soviet defense of Mongolia and permits construction of Soviet bases on Mongolian soil. During the 1961–65 period, the Soviet Union assisted Mongolia in some 90 projects including an open-pit coal mine, thermal electric power station, power transmission line, and a wide-gage railroad.

Soviet aid increased after 1965 and the MPR was provided additional grants and loans equivalent to $550 million between 1966 and 1970. This figure was reportedly exceeded during the next 5 years and it is likely that Soviet aid between 1975 and 1980 will also surpass the $500 million equivalent mark. In addition to grants, the Soviet Union continued to provide enormous amounts of technical assistance. Mongolia's first power system went into operation in the late 1960's, and the large molybdenum-copper project at Erdenet was begun during the 1971–75 period.

Largely as a result of massive Soviet assistance, by 1978 over 1 percent of Mongolia's total 1,545,000 square kilometers was cultivated. In addition, it is estimated that the industrial enterprises constructed with Soviet aid by 1978 were contributing more than 40 percent of Mongolia's total industrial output. For some industries, the percentage was even greater; for example, electric power (90 percent) and coal mining (80 percent). During the current 5-year plan period through 1980, Moscow has committed itself to assist the MPR on more than 240 projects, including a new fuel and power complex in central Mongolia, and agricultural projects such as irrigation systems, land cultivation, and animal husbandry.

III. Mongolian Economic Dependence—Soviet Costs and Benefits

The costs to the U.S.S.R. of developing and sustaining the Mongolian economy have been substantial. In addition to the costs of its technical assistance programs in Mongolia, the Soviet Union has incurred considerable economic costs in its trade with the MPR.

Since 1970, Mongolia has accumulated a trade deficit with the U.S.S.R. of 1.7 billion rubles, equivalent to over $2 billion (see table 9). Since Mongolia's sources of hard currency are exceedingly limited (only 4 percent of its trade is outside the soft currency CMEA network and Western aid is estimated to have been $10 to $15 million between 1970 and 1976), the trade deficit was clearly financed by Soviet credits.

TABLE 9.—MONGOLIAN TRADE WITH U.S.S.R., 1970–77

[In equivalent U.S. millions of dollars]

	1970	1971	1972	1973	1974	1975	1976	1977
Mongolian imports	197.9	181.8	254.3	338.3	376.5	493.6	640.8	748.5
Mongolian exports	58.4	79.4	93.2	118.7	157.2	174.2	188.7	171.5
Balance	−139.5	−102.4	−161.1	−219.6	−219.3	−319.4	−452.1	−577.0

In addition to underwriting Mongolia's large and ever-increasing trade deficit, another cost to the U.S.S.R. derives from its petroleum and refined product exports to the MPR. Since 1965, the Soviet Union has supplied Mongolia with petroleum worth the equivalent of nearly $220 million (the bulk being refined products). While the terms of trade are unknown, it is likely that as with Cuba and Vietnam, these Soviet exports are provided at below market prices. And as indicated by the jump in value of 1976–77 exports, the costs to the Soviet Union of supplying petroleum products to Mongolia is likely to continue to increase over time. (See table 10 for a list of Soviet exports to the MPR, 1974–77.)

The costs to the U.S.S.R. in terms of technical manpower drain to Cuba and Vietnam have been noted before. However, Mongolia poses even greater problems since tens of thousands of Soviet technicians, advisers, and even laborers have already been committed to managing the MPR economy.

TABLE 10.—MAJOR SOVIET EXPORTS TO MONGOLIA, 1974–77

[In millions of rubles]

	1974	1975	1976	1977
Machines, equipment, means of transport	167.7	221.6	315.6	375.9
Oil and oil products	12.5	13.1	25.7	35.0
Chemicals	1.4	1.3	1.4	1.8
Rubber	1.6	.4		
Rubber goods	.2	.2		
Construction materials	1.7	1.7	2.9	4.9
Lumber and paper products	2.0	2.5	3.4	4.2
Rope, hemp, nets	2.5	2.7	3.2	3.9
Tea	2.4	2.4	2.1	2.2
Meat and dairy products	2.6	3.0	4.4	1.8
Flour products	3.7	3.3	8.0	7.4
Sugar and vegetable oil	4.5	4.9	8.2	10.3
Cotton, woolen fabrics	14.4	15.0	14.7	15.9
Clothing	17.5	18.6	16.9	5.1
Shoes	4.3	5.1	5.1	3.1
Pharmaceuticals	3.3	3.9	3.7	3.7
Cultural and household goods	5.2	5.4	6.5	7.7
Wheat		1.4		4.6
Other	49.7	48.7	52.9	62.8
Total:				
Million rubles	285.2	355.1	474.7	550.4
Million dollars [1]	376.5	493.6	640.8	748.5

[1] Ruble-dollar conversion factors used: 1974—0.758; 1975—0.719; 1976—0.741; 1977—0.735.

Source: Veneshniaia Torgovlia SSR.

While the economic costs to the U.S.S.R. of Mongolian economic dependence are substantial, there are some economic returns. Mongolia is a major source of food for the Soviets. As indicated in table 11, Soviet imports of Mongolian cattle, meat, and dairy products

totaled 285 million rubles, equivalent to $385 million between 1974 and 1977. In addition, during that period the Soviet Union imported over 98 million rubles worth of wool and nearly 36 million rubles worth of fluorite for its steel industry. Mongolia has supplied an estimated 50 percent of U.S.S.R. fluorite needs.

However, by far the most important returns to the U.S.S.R. on its economic investment in Mongolia have been political. In 1944, the Soviets annexed Tannu Tuva, a large province in northern Mongolia. Of more importance to the U.S.S.R. than the territory, however, is the installation of Soviet military bases in Mongolia and the stationing of Soviet troops along the Sino-Mongolian border. The Soviet presence in Mongolia is a painful thorn in China's side and possibly the single most important motivation for continued Soviet support of the Mongolian economy.

TABLE 11.—SOVIET IMPORTS FROM MONGOLIA

[In millions of rubles]

	1974	1975	1976	1977
Fluorite	6.9	9.2	9.5	10.1
Wool	22.4	23.8	26.0	26.3
Beef cattle (for slaughter)	45.9	42.2	39.8	37.9
Meat and dairy products	26.8	28.2	37.8	26.1
Casein	.5	.5	.6	.7
Other	16.7	21.4	26.1	25.1
Total:				
Million rubles	119.1	125.3	139.8	126.1
Million dollars [1]	157.2	174.2	188.7	171.5

[1] Ruble-dollar conversion factors used: 1974—0.758; 1975—0.719; 1976—0.741; 1977—0.735.

Source: Veneshniaia Torgovlia SSR.

General Conclusions

The Soviets appear to follow a similar pattern in establishing economic ties with developing country client states. Cuba, Vietnam, and Mongolia can be viewed as three countries in different stages of evolution according to this pattern. The three are similar in that investments of Soviet resources yield a disproportionately small current economic return, but both the actual and potential political returns are large.

Although Moscow has willingly incurred the resource drain from its long term support of Cuba and Mongolia, the addition of Vietnam as a client state could raise the costs substantially. Should the pattern be repeated with developing countries elsewhere, especially in Africa, the resource drain could become particularly costly for the already hard pressed Soviet economy to handle.

SOVIET ASSIMILATION OF WESTERN TECHNOLOGY: A SURVEY OF U.K. EXPORTERS' EXPERIENCE

(By Philip Hanson and Malcolm R. Hill*)

CONTENTS

TABLES

I. INTRODUCTION

There is now a fairly substantial body of work on the economics of technology transfer from the West to the U.S.S.R. in the post-Stalin era. A conceptual framework for the study of international transfers of technology generally has been developed in the literature on the economics of technological change and in the so-called product-cycle theory of international trade.[1] The forms and dimensions of transfer from the West to the U.S.S.R. and Eastern Europe have been reviewed in a number of works.[2] A few studies have gone further, and have developed estimates of the impact of imported machinery and/

*Philip Hanson, Center for Russian and East European Studies, Department of Industrial Economics and Business Studies, University of Birmingham, U.K. Malcolm R. Hill, Department of Management Studies, Loughborough University of Technology, U.K. The authors acknowledge the support of the Stanford Research Institute in commissioning and funding this study, the assistance of Mark Earle and Heinrich Vogel in clarifying certain questions of method and objectives, and the cooperation of executives of U.K. machine-tool, chemical, and chemical-plant companies, who provided important insights as well as factual information.

This paper is an early version of a more comprehensive paper to be completed under contract with Department of State's External Research Office, the Department of Commerce and the Department of Treasury. The views expressed herein are solely those of the author.

[1] See, for example, Gomulka (1971), Mansfield (1955), Nabseth and Ray (1974), OECD (1970), Vernon (1966). Differences of approach and terminology in a number of studies are reviewed in Hanson (1976).

[2] For example, Gomulka (1978), Green and Levine (1977), Hanson (1976, 1978), Hayden (1976), Saunders (1977), Sutton (1973). On China see also Dernberger (1977) and Heymann (1975).

or know-how on the output of the industrial sector or of individual industries in the U.S.S.R. and Poland.[3]

Complementary to this body of work is a group of studies, both theoretical-institutional and quantitative, of the domestic processes of innovation and diffusion in the U.S.S.R.[4] Possible institutional and policy changes in the U.S.S.R. arising from the import of Western technology have been discussed in many writings, and perhaps most systematically by Hardt and Holliday.[5] Insights in the processes of West-East technology transfer can also be derived from a study of East-West technology transfer.[6]

It is generally agreed that Soviet imports of Western machinery and know-how, which are constrained by balance-of-payments considerations to levels that are low relative to Soviet investment, have nonetheless been of some importance in raising Soviet output. Econometric estimates of the contribution of such imports as a source of growth in Soviet industry since 1950 are, however, conflicting.[7] And case-study evidence suggests that examples of rapid and extensive domestic adaptation, diffusion, and updating of imported Western technology are not easy to find.

One difficulty has been the absence of systematic information about certain aspects of Soviet assimilation of Western technology that are critical to the degree of success of Soviet assimilation—and hence to the overall impact of the technology embodied in such imports as a source of growth in the Soviet economy. Among these aspects, leadtimes in assimilation are of particular interest. The success of any strategy of "reducing technology gaps" by commercial importation of machinery and know-how, wherever the transferor's technology is itself advancing, must depend in part on the leadtimes required by the transferee to acquire, install, and begin operating imported machinery.

The present paper is a brief, preliminary report of a study designed to compile information on leadtimes and related aspects of Soviet assimilation of imported Western technology by drawing on the experience of West European exporters. This paper deals with the results of the SRI-sponsored survey of United Kingdom exporters of machine tools and chemical plant, carried out by the authors in the late summer of 1978. A parallel survey of West German exporters, coordinated by Dr. Heinrich Vogel, has also recently been completed; preliminary indications are that the West German findings are broadly consistent with those presented here.

Machine tools and chemical equipment are two areas of major Soviet importation of Western technology in embodied form over the past 25 years. The survey elicited information about comparative Soviet and West European leadtimes, about factors influencing Soviet leadtimes, about output and manning levels on installed imported equipment, and (to a limited extent) on subsequent Soviet diffusion of the imported technologies. The survey questionnaire is given in the appendix.

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[3] Gomulka (1978), Green and Levine (1977), Hanson (1979), Weitzman (1978).
[4] For example, Amann, Cooper, and Davis (1977), Berliner (1976), Slama and Vogel (1975 and 1976).
[5] Hardt (1976), Hardt and Holliday (1978).
[6] Kiser (1977).
[7] For example, Green and Levine (1977) and Weitzman (1978).

The interviewing and analysis of survey replies for the machine-tool exporters were carried out by Hill, and for the chemical-plant exporters by Hanson.

II. Machine-Tool Technology Transfer

A. Soviet Machine-Tool Technology

Since its initial establishment of a machine-tool industry in the early 1930's, the U.S.S.R. has clearly developed a strong base for machine-tool design and production, as evidenced by the achievement of the Soviet engineering industry over the past 40 years. The Experimental Scientific-Research Institute for Metalcutting Machine Tools in Moscow, together with its experimental factory (Stankokonstruktsiya), are capable of developing and manufacturing advanced types of machine tools, whilst the large number of specialized design offices (SKB's) and drawing offices in individual factories have also assimilated quite high levels of design expertise.[8] Furthermore, although the majority of Soviet machine-tool factories appear to have specialized in the large batch manufacture of general purpose machine tools,[9] there is evidence to strongly suggest that they also have the capability to manufacture the more technologically sophisticated machine tools.[10] Finally, many user industries and factories have the requisite expertise to design and build some of the advanced machines which they also require for their own use.[11]

In spite of these developments in Soviet machine-tool design and production capacity, however, there is evidence to suggest that the industry has also experienced the following problems:

(*a*) A lag behind its Western counterparts in terms of its capability to produce machine tools of similar accuracy, dynamic rigidity, and reliability.[12]

(*b*) Insufficient design and production capacity to meet the recent high demands of certain large end-user industries (for example, the automotive industry) for special purpose machine tools,

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[8] The design competence of these organizations can be noted by the accounts of advanced machine tools designed by them published in the monthly house journal of the Ministry of the Machine Tool and Tooling Industry—Stanki i Instrument.

[9] Soviet data for as early as 1964 stated that eight models of machine tools were produced in quantities greater than 2,000 per year, and a further 9 models were produced in quantities varying between 1,000 and 2,000 per year (Demchenko (1964), p. 273). Furthermore, at approximately the same time, 32 Soviet machine tool factories produced machines in quantities greater than 1,000 per year, including 8 factories producing more than 3,000 machines per year (see Chernykh (1965), p. 32).

[10] See footnote 8 above.

[11] Dashchenko and Nakhapetyan (1964), pp. 140, 141, give examples of special purpose unit machines and transfer lines developed by a Soviet production engineering establishment (The Scientific-Research Institute for Production Technology in the Motor Industry) and factory (ZIL factory, Moscow) within the motor industry.

[12] See Berry and Hill (1977) in which particular attention was paid to the quality of Soviet milling machines, center lathes and grinding machines using Soviet state standards, other Soviet technical publications on machine tools, and interviews with British purchasers of Soviet-produced machine tools as sources of information. In most of these cases it was found that the accuracy requirements of Soviet machine tools, as specified in Soviet state standards, was generally lower than those adhered to by British producers of similar equipment, during the 1960's, but the situation appeared to have improved somewhat as the U.S.S.R. has introduced new standards in the 1970's. It is the present authors' opinion, however, that a wider survey of the quality of more machine types, together with important components and assemblies, is required to achieve more definite conclusions.

transfer machines, and link lines.[13] Furthermore, problems in the technical development of these products [14] may have been heightened by administrative barriers between industrial ministries tending to limit the development and supply of requisite proprietary items such as hydraulic, penumatic, and control devices.

(*c*) A comparatively late entry into the development and batch production of numerically controlled machine tools, caused by administrative barriers between control equipment suppliers and the machine tool industry and shortcomings in the availability of appropriate computer hardware and software.[15]

It is important to bear in mind, however, that if surveys were carried out on machine tool industries in each of the advanced Western industrial nations, it is probable that technological lags and shortcomings in production capacity would also be found for many individual national industries as a result of specialization [16]—a factor which influences the comparatively high level of international trade in machine tools amongst the advanced industrial nations. Furthermore, it would probably be economically inefficient for any national industry to attempt to achieve complete leadership in every field of machine tool technology, and the U.S.S.R. is probably no exception to this general rule, in spite of the fact that Soviet leaders have attempted to follow patterns of autarky and rapid technological advance for political reasons. In such circumstances it is consequently realistic for Soviet industry to absorb certain aspects of machine tool technological know-how from advanced Western industrial nations in those important fields where it is technologically lagging, and where it would be impractical to develop domestically the technology or requisite production capacity in view of other tasks to be undertaken.

B. Machine-Tool Technology Transfer From Western Countries

1. MACHINE-TOOL IMPORTS FROM WESTERN COUNTRIES

An initial investigation was consequently carried out on Soviet official statistics for the units of machine tools produced, imported and exported during the 1971–75 period, since a common data base of "physical units" existed in both production and foreign trade

[13] During the 1966–70 and 1971–75 plans, for example, the Soviet production of cars and trucks increased from some 581,000 in 1965 to some 869,000 in 1970, and some 1,897,000 in 1975. At the same time, the Soviet output of machine tools only increased from 186,000 in 1965 to 202,000 in 1970, and 231,000 in 1975. Clearly the rate of expansion of this important machine tool user industry was far greater than the rate of increase of Soviet domestic machine tool capacity, even when the increased values of Soviet machine tool output during this period are taken into account (712 million rubles in 1965, 978 million rubles in 1970, and 1,493 million rubles in 1975, all expressed in 1967 factory wholesale prices. (Narodnoe khozyaistvo SSSR v 1975 godu, pp. 259, 265.)

[14] Two Soviet texts give a useful account of Soviet designs of this type of equipment, namely Yarkov (1965) and Boltsov (1972), whilst another Soviet text gives a useful account of the operation of these machines in Soviet industrial practice (see Volchkevich (1969)). For a more contemporary account of the operation of these types of equipment in practice, see also Machines and Tooling (1972), No. 2, pp. 5–10. Machine and Tooling (1975), No. 8, passim.

[15] See Berry and Cooper (1977), for a description of Soviet design and technology in the field of numerically controlled machine tools.

[16] See, for example, a survey carried out by the Research and Technical Committee of the Institution of Production Engineers which included the question of imports of certain machine tools into the U.K. (Institution of Production Engineers (1968)).

statistics. The results of this initial investigation revealed that Western supplies of machine tools accounted for some 15–30 percent of the total of machine tools imported, but only some 1–2 percent of the quantity of machine tools consumed by the Soviet economy in view of the high output of the domestic Soviet industry in relation to its level of foreign trade (see table 1 below).

TABLE 1.—SOVIET PRODUCTION, EXPORTS AND IMPORTS OF MACHINE TOOLS

[In units]

	1971	1972	1973	1974	1975
Imports from Western suppliers [1]	1,800	3,300	3,800	2,500	2,200
Total imports [2]	11,900	16,100	12,900	11,400	12,000
Total exports [2]	11,900	11,400	14,000	16,300	17,600
Production [3]	207,000	211,000	214,000	226,000	231,000
Consumption [4]	207,000	215,700	212,900	221,100	225,400
Imports from Western suppliers as percent of total imports	15.1	20.5	29.5	21.9	18.3
Imports from Western suppliers as percent of consumption	.9	1.5	1.8	1.1	1.0

[1] Imports from United Kingdom, Italy, France, Federal Republic of Germany, Switzerland, United States, and Japan for FTN class 100 (metalcutting machine tools) from Vneshnaya torgovlya SSSR za . . published annually. Figures rounded to nearest 100 units.

[2] Total Soviet imports and exports for FTN class 100 from source quoted footnote 1 above. Figures rounded to nearest 100 units.

[3] Source: Narodnoe khozyaistvo SSSR v. 1975 godu; p. 259.

[4] Production plus total imports minus total exports.

It was considered by the present authors, however, that the estimates based on production and foreign trade data in physical units alone led to an understatement of the importance of Western machine tool supplies to the Soviet economy. When data on the values of Western machine tool imports were taken into account, it was apparent that the average value of a machine tool imported into the U.S.S.R. from the Western economies was some 2 to 3 times higher than the average value of a machine tool imported from the Socialist countries of Eastern Europe (see table 2 below), suggesting that Western imports tended to fall into the high technology area of Soviet machine tool consumption. Furthermore, Soviet imports of metalcutting machinery would also include products listed in import statistics under the category of "lines of metalcutting machine tools" and also a substantial proportion of "production equipment for automobile factories," for which the Western countries were near-exclusive suppliers (see table 3 below). If it is assumed that machine tools account for some 50 percent of the latter trade category [17] it can be estimated that Western

TABLE 2.—AVERAGE UNIT VALUES OF SOVIET MACHINE-TOOL IMPORTS

	1971	1972	1973	1974	1975
Imports of machine tools from Socialist countries [1] (thousand rubles)	93,936	92,279	109,218	101,242	137,821
Imports of machine tools from Socialist countries [1] (quantity)	8,701	10,468	7,518	6,115	7,032
Average value of an imported machine tool from the Socialist countries (rubles)	10,796	8,815	14,528	16,556	19,599
Imports of machine tools from Western countries [2] (thousand rubles)	55,919	94,622	129,955	87,817	93,953
Imports of machine tools from Western countries [2] (quantity)	1,827	3,315	3,762	2,488	2,241
Average value of an imported machine tool from Western countries (rubles)	30,607	28,543	34,544	35,296	41,924

[1] I.e. Imports of FTN class 100 from Bulgaria, Hungary, German Democratic Republic, Poland, Romania, Czechoslovakia abstracted from Vneshnaya torgovlya SSSR za . . .

[2] See footnote 1, table 1 above.

[17] See footnote (2) to table 3.

countries accounted for some 50 to 60 percent of imports of metalcutting equipment by the U.S.S.R. from 1971–75 (see table 3 below).

TABLE 3.—SOVIET IMPORTS OF METALCUTTING EQUIPMENT

[By value, thousands of rubles, current foreign trade prices]

	1971	1972	1973	1974	1975
Total imports of machine tools [1] (FTN class 100) (thousand rubles)	155,641	231,478	252,962	211,703	252,947
Total imports of "lines of metalcutting machine tools" [1] (FTN class 10401) (thousand rubles)	NA	38,401	58,382	34,925	84,545
Estimated total imports of metalcutting equipment in "production equipment for automobile factories" [2] (FTN class 10514) (thousand rubles)	31,481	30,000	64,486	168,823	143,761
Imports of machine tools from Western countries [1] (FTN class 100) (thousand rubles)	55,919	94,622	129,955	87,817	93,953
Imports of "lines of metalcutting equipment" from Western countries [1] (FTN class 10401) (thousand rubles)	NA	34,986	47,837	22,713	49,332
Estimated imports from Western countries of metalcutting equipment in "production equipment for automobile factories" [2] (FTN class 10514) (thousand rubles)	28,987	26,555	51,210	146,985	122,251
Estimated total imports of metalcutting equipment [3] (thousand rubles)	NA	299,878	375,830	415,451	481,253
Estimated total imports of metalcutting equipment from Western countries [4] (thousand rubles)	NA	156,163	228,902	257,515	265,536
Percent of estimated total imports of metalcutting equipment obtained from Western countries	NA	52	61	62	55

[1] Source, see footnote 1, table 1 above.

[2] It is assumed that metalcutting equipment accounts for approximately 50 percent of machinery and equipment invested in the motor industry (see the 1972 Soviet census of machinery and equipment reported in Narodnoe khozyaistvo v. 1974 godu, pp. 60–83. Furthermore, Kravtsov (1973), p. 39, reports that metalcutting equipment accounts for 58.5 percent of the stock of production equipment in the motor industry. Consequently, it has been assumed that imports of production equipment for the motor industry follow a similar structure to that of production equipment already in use in the industry, i.e. 50 percent of imports of FTN class No. 10514, which are reported in Soviet official statistics as follows (all figures in thousands of rubles):

	1971	1972	1973	1974	1975
Total	62,962	59,999	128,792	337,645	287,521
Imports from West	57,974	53,111	102,220	293,970	244,502

[3] I.e., total imports of machine tools plus total imports of lines of metalcutting machine tools plus estimated total imports of metalcutting equipment for the motor industry.

[4] As footnote 3 above, but for Western countries.

The problem still remained, however, of attempting to relate the importance of Western imports to Soviet consumption of machine tools in value terms, since Soviet machine tool output data in value terms is recorded in 1967 factory wholesale prices,[18] whilst export and import data are expressed in foreign trade prices. In addition, one Western source [19] claimed that Soviet official statistics for machine-tool exports (FTN class 100) tended to understate the total value of exported metalcutting equipment since they did not include machine tools exported as a part of complete plants, with the result that estimates of consumption would be overstated. One way out of this dilemma was considered to be to assume that Soviet exported machine tools were a representative sample of Soviet domestic production of machine tools, and that consequently the average value of a Soviet domestically produced machine tool could be considered equal to the average value of an exported Soviet machine tool, for comparative purposes. Furthermore, the Soviet consumption of machine tools could

[18] See, for example, "Narodnoe khozyaistvo v 1975 godu," p. 259.

[19] See Kostinsky (1974), pp. 16–21.

be adjusted to allow for higher values of machine-tool exports than those shown in official Soviet foreign trade statistics. It is recognized that some of these assumptions were arbitrary to a certain extent, but were nevertheless considered to be reasonable for our purposes. Working to these assumptions, it was estimated that imports of metalcutting machinery from Western countries accounted for more than 10 percent of Soviet consumption of machine tools during the 1971–75 period (see table 4 below).

TABLE 4.—ESTIMATES OF SOVIET CONSUMPTION OF METALCUTTING EQUIPMENT

	1971	1972	1973	1974	1975
Production of machine tools [1] (units)	107,000	211,000	214,000	216,000	231,000
Average value of a Soviet exporting machine tool [2] (rubles)	6,615	7,340	6,797	7,378	8,028
Estimated value of Soviet machine tool output in foreign trade prices [3] (thousand rubles)	1,369,305	1,548,740	1,454,558	1,667,428	1,854,468
Exports of machine tools by the U.S.S.R.[4] (FTN class 100) (thousand rubles)	78,730	83,678	95,115	120,267	141,213
1.4 times exports of machine tools by the U.S.S.R.[5] (thousand rubles)	110,222	117,149	133,217	168,374	197,698
Total estimated imports of metalcutting equipment by the U.S.S.R.[6] (thousand rubles)	N.A.	299,878	375,830	415,451	481,253
Total estimated consumption of metalcutting equipment by the U.S.S.R.[7] (thousand rubles)	N.A.	1,731,469	1,697,171	1,914,505	2,138,023
Estimated imports of metalcutting equipment from Western countries [8] (thousand rubles)	N.A.	156,163	228,902	257,515	265,536
Estimated proportion of Soviet consumption of metalcutting equipment accounted for by imports of metalcutting equipment from Western countries [9] (percent)	N.A.	9	13.5	13.5	12.4

[1] See table 1 above.
[2] Soviet foreign trade statistics list Soviet exports of metalcutting machine tools (FTN class 100) as follows:

	1971	1972	1973	1974	1975
Exports of machine tools (thousand rubles)	78,730	83,678	95,155	120,267	141,213
Exports of machine tools (units)	11,900	11,400	14,000	16,300	17,591

[3] I.e., production times average value of a Soviet exported machine tool.
[4] See footnote 2 above.
[5] Kostinsky (1974), pp. 16–21, estimates that the total value of Soviet exports of machine tools is underestimated by some 30 percent in FTN class 100 since account is not taken of machine tools provided in exports of complete plant. Hence Soviet figures for export values of machine tools have been multiplied by a factor of 1.4.
[6] See table 3 above.
[7] Estimated value of Soviet machine tool output plus total estimated imports of metalcutting equipment by the U.S.S.R. minus 1.4 times exports of machine tools by the U.S.S.R.
[8] See table 3 above.
[9] Estimated imports of metalcutting equipment from Western countries times 100 percent divided by total estimated consumption of metalcutting equipment by the U.S.S.R.

2. AVENUES FOR MACHINE TOOL TECHNOLOGY TRANSFER FROM WESTERN COUNTRIES

Machine tool technology can be transferred from Western countries to the U.S.S.R. through the following avenues: [20]

(*a*) A study of Western technical literature for know-how which could be transferred to Soviet machine design and development;

(*b*) Participation in technical seminars;

(*c*) Participation in intergovernmental discussion on machine tool technology;

[20] See, for example, Hanson (1975), and the Chase World Information Corp. (1977), pp. 133–174.

(*d*) Participation in discussions on machine tool technology with Western companies;

(*e*) Purchase of licenses for design and production;

(*f*) Purchase of machine tools from Western companies; and

(*g*) Purchase of complete machine tool factories or processing sections from Western companies.

It was considered likely by the present authors that (e), (f), and (g) above would provide the most complete avenues for technological transfer from the West to the U.S.S.R. since more relevant information was likely to be obtained by the Soviet side from Western companies, in view of the sales possibilities perceived by these companies if such information was provided. The greatest incentive to the Soviet side, however, apart from securing production capacity, was considered to be the subsequent experience to be gained in the day-to-day operation of the actual machines supplied, especially when the expansion of a particular user industry was occurring at too fast a rate for the domestic equipment suppliers to develop and produce the necessary equipment.

The study was consequently concerned with an evaluation of the manner in which the U.S.S.R. attempted to absorb Western machine tool technology into its own industry through its foreign trade process. Particular attention was paid to the technology transferred, and the time scales over which the technology was absorbed into Soviet industry.

C. Survey of British Machine Tool Exporters to the U.S.S.R.

1. INTRODUCTION

In order to obtain information on this topic, it was decided to interview British business executives with experience of the export of machine tools to the U.S.S.R., since these executives were considered to be one of the main available sources of information on the operation of this Soviet technology absorption mechanism. Several companies were approached by means of an introductory letter, chiefly those engaged in the design and production of machine tools for use in the Soviet motor industry, since available Soviet and British foreign trade statistics suggested that this industry accounted for a large proportion of Soviet machine tool purchases from Britain during the late 1960's and the 1970's.[21] In those cases where a positive response was received, a questionnaire was forwarded to the company to form a standardized structure for discussion at a subsequent interview (see appendix below).[22] The topics discussed during the interview were categorized as follows:

Technical background.
Proposal and contract.
Acceptance and installation.
Utilization.
Diffusion.

[21] See Hill (1979).
[22] A similar approach for collecting information was found to be successful in a previous survey carried out by the present author (see Hill (1978)).

The information obtained from these interviews, in which eight companies participated, was then written up in the form of a series of separate case studies. The eight companies which provided the information could be categorized as follows:

Two designers and producers of special purpose transfer machines and link lines for automotive components;

A designer and builder of special-purpose gear-cutting machinery.

A designer and producer of numerically controlled machine tools;

Two designers and producers of automatic turning machines;

A designer and producer of precision grinding machines; and

A designer and producer of automotive components and of associated production equipment.

2. COMMENTS AND CONCLUSIONS FROM THE MACHINE TOOL SURVEY

It was found that the companies visited during the survey appeared to represent a cross section of British engineering companies engaged in the export marketing of machine tools to the U.S.S.R. during the late 1960's and the early 1970's. In almost every case, the company was responsible for the design and build of a machining system to repetitively produce one component or a range of components. This usually included the machine tool itself with associated tooling and automated component loading and unloading equipment; component transfer equipment was also provided in some cases. Each company also usually packed the equipment together with associated technical documentation for delivery from a British port, and the majority of companies also subsequently installed and commissioned the plant in a Soviet factory.

The executives interviewed in the survey had several years of experience in the Soviet export market and were consequently found to be invaluable information sources on Western technology transfer to the U.S.S.R. through its foreign trade system. Each of the executives cooperated by providing information on the topics raised in the questionnaire, although not necessarily in an exact fashion for reasons of commercial secrecy or because the information was not always available in the company's files. Nevertheless, it was considered that sufficient information was forthcoming to meet the objectives of the survey, and that the structured interview method served as a useful means of providing a focus for the discussion.

In the majority of cases, the machines were purchased to carry out a specific production task in a particular Soviet factory, usually representing important production capacity to that factory. It was usually felt that Soviet purchasing policy was initiated as a result of shortcomings in Soviet production capacity for machine tools, but once imports were recognized as a necessity, Soviet buyers clearly required advanced production technology at suitable deliveries and prices to achieve required productivity. Most of the executives considered their exported equipment to be technologically superior to comparative Soviet-produced items chiefly in terms of accuracy, reli-

ability, and quality of finish, but it was difficult to relate such parameters to a time period of technological lag.

In most cases the companies commented on the lengthy time intervals between the receipt of an initial inquiry from a Soviet purchaser and final agreement on a technical proposal prior to the signing of a contract. This lengthy time interval could sometimes be explained by the size and technical complexity of the equipment requiring lengthy times for the examination of proposals, although even when allowance was made for this it appeared that in several cases this stage in the purchasing procedure took longer than 2 years—some three times longer than the normal time with a West European customer. This lengthy time interval was attributed to communication delays within the foreign trade organization itself and also between the foreign trade organization and the user factory. The general workload on the two main foreign trade organizations importing machine tools was also high at that time as a consequence of the large number of inquiries and orders being handled by them. Furthermore, the precontract stage was also frequently lengthened by the normal Soviet practice of highly contended commercial negotiation.

It became apparent, therefore, that Soviet bureaucratic procedures considerably lengthened the initial stage of Soviet technology acquisition from the West. On the other hand, Soviet production engineers had the opportunity to become extremely well-informed on the technical characteristics of the equipment which they wished to buy through the receipt of relevant detailed technical information in the proposals from Western companies, and the opportunity for several technical discussions with specialists from those companies—a rare and possibly privileged opportunity in the general conditions of restricted and controlled access to the West. Soviet production engineers should consequently have had sufficient time and opportunity to make the most rational purchasing decision in terms of their quality and output requirements. Furthermore, in the usual Soviet conditions of scarce foreign currency, extended proposal and negotiation times frequently allowed Soviet buyers to receive extremely favorable commercial conditions, particularly if other capital goods markets were generally depressed. The present author would argue, therefore, that extended purchasing times were probably a small price for Soviet buyers to pay for the technical and commercial conditions thereby gained, although more research may be necessary to clarify this point.

In many cases, the companies had to take great care to meet delivery dates in view of the generally thorough, and sometimes overacademic, procedures followed by resident Soviet inspectors, and the lengthy time intervals to reach decisions if external consultation was required by the inspector. If great care was not taken by the company, deliveries could easily become extended beyond the expected completion date. From the viewpoint of the Soviet buyer, however, the disadvantages of lateness at this stage may be a comparatively small price to pay for the opportunities to gain more technical information on the operation of the equipment from its designer and manufacturer, and assurance that the equipment conformed exactly to requirements since reference back to the seller after shipping is not easy through the Soviet

bureaucracy. Furthermore, since many of the machines were purchased for installation in new factories or extensions, conditions onsite may have made it expedient to delay the delivery of certain items of plant.

The most lengthy delays in Soviet assimilation of Western machine tool technology, however, would appear to occur at the installation and commissioning stages, chiefly as a consequence of Soviet project management and resource allocation. The installation and operating personnel encountered onsite were not always of a very high caliber, and were seldom sufficiently motivated and adequately equipped by normal Western standards. Furthermore, the workpieces offered for machine acceptance and commissioning were frequently of a poorer quality than that anticipated during the original machine proposal stage and testing in the United Kingdom. Such technical and organizational problems frequently caused installation and commissioning times to be extended to about three times the length of similar installations in advanced Western countries. It is necessary to mention, however, that differences were noted between the levels of expertise in project management at different Soviet factory sites—in the case of the latest Soviet new truck factory project it was considered that conditions were generally quite orderly, although this was probably due to the fact that overall responsibility for this factory rested with a Deputy Minister of the automobile industry. Furthermore, in some cases, equipment supplied by the companies had been installed with apparent success by the Soviet factories themselves.

It became clear, therefore, that the total time cycle of technology absorption from receipt of enquiry to final commissioning was lengthy in the case of the U.S.S.R. purchasing Western machinery. It is difficult to put an exact figure on this, but an estimate of between two and three times the expected timespan for a factory in an advanced Western nation purchasing a similar item of plant would not appear to be too inaccurate. Many of the causes of these delays would appear to be caused by Soviet "bureaucratic inefficiencies" and poor project management—this latter aspect appearing to be particularly surprising in view of the fact that a large part of the total price of the machine was usually paid for on delivery, and one would consequently expect the customer to be further motivated to rapid installation and commissioning.

The only apparent advantage to the Soviet buyer to mitigate these lengthy time delays would appear to be the opportunity to gain more detailed technical information on his plant purchases, especially by contact with relevant Western engineers at the proposal, build, and installation stages when these specialists are usually being stretched to their full technical capabilities. Several Western studies [23] have demonstrated the key role played by the movement of trained individuals in the technology transfer process ("technology on the hoof") and in view of the general restrictions on Western/Soviet technical contact it is suggested that the opportunities provided by the foreign trade process for frequent and sustained contact by Soviet organizations with trained Western engineers is the nearest that these organizations can go to this type of technology transfer.

[23] See, for example, Langrish (1972), pp. 42–49.

Few of the executives interviewed in this survey had further information on the performance of their equipment following installation, and none had any concrete evidence of the copying of their technical ideas by Soviet engineers, although this latter stage of technology transfer may not occur until the equipment has had a long trial in practice.

Some of the executives interviewed considered Soviet factories to be comparatively overmanned by Western standards, ascribing this to the lower levels of skill and motivation among the Soviet work force, particularly in such unsupervised activities as mechanical maintenance, and the general Soviet policy of full employment.

In conclusion, therefore, these structured interviews with British technical and commercial executives having experience in almost all aspects of technology transfer to the U.S.S.R. through the foreign trade mechanism, have served as a useful "snapshot" of various features of Soviet behavior in the process of absorption of Western technology. Many of these features may appear to be "inefficient" by Western business economic standards, but by Soviet criteria they may serve as important stages in the successful acquisition of advanced Western manufacturing technology.

III. Chemical Technology Transfer

A. Background

It is well known that the Soviet chemical industry is one sector of the Soviet economy that has received imports of Western machinery and equipment on a particularly large scale.[24] This has been the case since the start of Khrushchev's chemicalization drive in 1958.

Minimum estimates of the share of imported Western machinery in total Soviet domestic supplies of chemical equipment put it at about one-sixth in the late 1960's, rising (with a dip around 1970) to about one-fifth in 1976. Alternative estimates, employing ruble-dollar conversion rates less favorable to the ruble, generate shares of one-fifth rising to one-quarter. Even these higher estimates, it might be argued, fail to convey the real importance of these imports.

Western machinery has frequently been purchased as part of a turnkey-plant package deal including licenses, know-how and training. Such turnkey projects have been critical to the development of most major lines of chemical production, including plastics, manmade fibers, and agricultural chemicals.

Our survey consisted of a series of questionnaire-based interviews during the summer and autumn of 1978 with a number of United Kingdom chemical companies and chemical plant contractors. Detailed (though not necessarily complete) questionnaire answers were obtained on 32 individual projects, with contract dates ranging from the late 1950's to the mid-1970's. The great majority (27) were turnkey projects, either for a totally new plant or for an additional production unit at an existing chemical Kombinat.

The sample of projects appeared to be broadly representative of the main types of Soviet chemical-plant projects incorporating Western

[24] Rushing (1976), Amann (1977), Hanson (1978), Simmons (1978).

hardware, except that it did not include any ammonia or mineral fertilizer plants. United Kingdom exporters' experience is extensive, since the United Kingdom's share of Soviet chemical-machinery imports from the West in the mid-sixties was of the order of two-fifths—though in the early seventies it was more of the order of 10 to 20 percent. In considering the survey findings, certain characteristics of chemical-plant projects in general should be borne in mind.

First, the negotiation of the main contract will normally be a complex exercise. Typically, the specialist plant contractor will be working in conjunction with one or more licensors of the processes the plant is to implement. The licensor is commonly a chemical company and not a specialist chemical plant contractor. The contractor will also, typically, coordinate machinery deliveries from a number of specialist equipment manufacturers, so that the main contract is likely to be linked with a number of subcontracts.

Second, most projects have unique features requiring extensive detailed design engineering for the specific project.

Third, the delivery of equipment is likely to be phased over a substantial period of time. The delivery and installation phases therefore commonly overlap.

Fourth, many contracts in the U.S.S.R., Eastern Europe, and the Third World (and the great majority of those in the present sample) are for design, supply, supervisory erection, and commissioning. The completion of installation work is therefore not such a salient date in the exercise for the contractor as the commissioning and handing over of the plant.

Fifth, the commissioning process is itself, typically, a major, multistage procedure involving checking of installed equipment, test runs of segments of the plant, debugging, and possibly a preliminary, minimum-load testing of full-cycle operation before the first full test run.

If the present sample is representative, it appears that leadtimes and other aspects of assimilation are substantially affected by systemic and procedural factors on the Soviet side. We shall summarize first the numerical findings and then respondents' observations on factors affecting leadtimes and related aspects of Soviet projects.

B. Survey Findings

Leadtimes.—From first inquiry to completion (handing over) of the 26 turnkey projects in the sample for which full leadtime data were available took an average of 6 years and 10 months. The shortest leadtime (for a relatively minor extension) was just over 2 years; the longest (for a project of less than the sample average size—took 11½ years. Typically, these projects were judged by the respondents to take about 3½ to 4 years longer than a characteristic West European leadtime of 2¼ to 3½ years.

Of the characteristic Soviet "excess" overall leadtime, around 9 to 10 months would be attributable, typically, to the lengthening (compared with a typical West European client) of the negotiating phase. The major source of this "excess" leadtime, however, is attributable to various factors that tend to prolong the phase from main contract to handing over of plant—the extra length typically experienced in this phase of Soviet projects being put in the range of 2½ to 3 years.

Table 5 summarizes the information on leadtimes, in unweighted arithmetic means. Table 6 shows respondents' judgments (where these were given) of the excess of Soviet leadtime over expected West European leadtimes on comparable projects.

TABLE 5.—*Unweighted arithmetic means of leadtime and value data*

	Leadtime (months)
A: For all contracts for which the data are available:	
Leadtime A (contract negotiation) (N=31)	18
Leadtime B (contract to completion of delivery) (N=24)	30
Leadtime B–D (contract to completion) (N=27)	62
Leadtime A–D (overall) (N=26)	82
1978 value of contract (N=28)	38
B: For contracts for which value and leadtime data are available (N=24):	
Leadtime A	18
Leadtime B–D	62
Leadtime A–D	80
1978 contract value	38

NOTES: Leadtime data are mostly accurate and were provided with some confidence by respondents. Some of the leadtimes for the earliest projects, however, and negotiating (A) leadtimes in particular, are approximate, and were provided by respondents with appropriate caution, from memory or from incomplete records. Four of the later B–D and A–D leadtimes contain an element of forecasting. They refer to projects in hand for which the respondent felt a forecast of completion date could be made with some confidence. (In one of these cases, the leadtime figures represent midpoints of ranges.)

"Completion" refers, in almost all cases, to the completion of commissioning and the hand-over of the plant to Soviet operation.

"." signifies "not available."

Source: Survey of exporters.

TABLE 6.—*Respondents' judgments of "excess" (Soviet project less West European project) leadtimes (months)*

	Months
Leadtime A (N=10):	
3 projects	about 8
3 projects	9–12
4 projects	about 10
A average 9–10 months.	
Leadtime B–D (N=13):	
1 project	10
1 project	24
1 project	27
3 projects	range 13–28
3 projects	range 32–48
1 project	30
1 project	36
1 project	42
1 project	range 40–50
B–D average 26–35 months.	

NOTE: The above (judgmental) data were derived from the survey in two ways. First, in reply to question 4(a), some respondents gave direct answers with respect to specific projects, referring to B–D, rather than A–D leadtimes. Second, several respondents preferred to volunteer a generalization about typical Soviet-Western leadtime relationships, for A and/or B–D leadtimes, mostly in the form of statements that Soviet leadtime was difference in months was derived by applying these ratios to the absolute leadtime data in (say) "30 to 100 percent longer" or "twice as long, as a rule." In the latter cases, a leadtime months for Soviet projects given by the respondent in question, excluding projects in which factors on the Western side had been identified as a cause of significant delay (there were two such instances), and also excluding projects on which leadtime data had been provided in summary form, without discussion of specific factors affecting the project in question. (The characteristic leadtimes in West European chemical projects that were given by the survey respondents were checked against a recent survey of investment leadtimes in the United Kingdom (CBI 1978) and were found to correspond closely with this direct survey evidence. This point will be discussed more fully in the SRI report.)

Manning levels in the operation of the completed plant were sometimes described as being similar to United Kingdom or West European levels but were usually found to be higher. For some 13 projects for which fairly firm (though rough) estimates were offered by re-

spondents, the average excess of manning levels (unweighted arithmetic mean of projects) was from 50 percent of West European levels (taking the lower figure where a range was offered by the respondent) to 70 percent (taking the higher figure where a range was offered).

TABLE 7.—*Respondents' judgments of comparative Soviet-West European manning levels on completed chemical plants*

Soviet labor force/West European labor force:	*Number of projects*
1	2
1–1.3	3
1.1	2
2	3
2–3	3
Unweighted arithmetic mean, 1.5–1.7	(N=13)

NOTE: Differences in standard-practice shift coefficients were generally held not to be important. Respondents were mostly making a shift-for-shift comparison for facilities that would be subject to continuous operation in both the U.S.S.R. and the West.
Source: Survey of exporters.

Output levels on the completed plants after they had been handed over were frequently not known, or were inferred from various circumstances or from trade gossip rather than direct observation. Almost all plants have been operated at rated (more precisely, at contract-guaranteed) output levels before handing over, in order to complete the United Kingdom company's contractual obligations. In a few cases output was fairly reliably known to have fallen, subsequently, below those levels. In rather more cases, it appeared that the guaranteed output level had not subsequently been exceeded, though a Western user would normally have been expected to extract from the plant more than the guaranteed level of output, after a period of modifications, improving operating skills and debottlenecking. In a few cases, subsequent output levels had been raised above guarantee levels and subsequent utilization was judged to be, in this sense (disregarding manning levels), quite good by Western standards. Overall, nine plants were reckoned to be operating at output levels less than those that would be expected in the West, three at about the same as expected Western levels, and one contract (relating, however, to four plants) was reckoned to be generating output at levels probably above what would be expected in the West.

Diffusion was even harder for the respondents to assess than subsequent output levels, and all statements on this point were cautious. Some instances of successful Soviet copying of individual items of machinery were quoted, but some instances of attempted whole-plant copying that had failed were also quoted, and the general impression in most (not all) cases was that the Soviets had not subsequently acquired the capability to replicate the plant they had imported

A number of features specific to Soviet projects appeared from respondents' answers to be of some significance for the cost and duration of the Soviet assimilation process.

First, the familiar FTO/final-user separation was perceived as tending (in comparison with negotiations with Western customers) to make technical and commercial aspects of the negotiations relatively distinct, and often in some degree sequential.

Second, there was well-nigh universal agreement that Soviet initial inquiries tended to be unusually vague and unspecific. For this reason,

they were frequently not recognized, by firms new to the market, as definite requests for a tender: only after some experience did the contractors cease to wait for further details and, instead, begin to acquire the habit of putting forward initial proposals containing their own best guesses about some of the details of the Soviet requirement.

Third, Soviet requirements for detailed design documentation (partly in the negotiating phase, but mainly in the period immediately following the signature of the main contract) are regarded as exceptionally heavy. So are the requirements for detailed operating instructions. These requirements tend to lengthen the project lead-time.

Fourth, several plant contractors referred to the importance of Soviet inspection of equipment in the United Kingdom before its acceptance for shipping to the U.S.S.R. This was normally rigorous, and was felt on occasions to be excessively so, in that time might be taken up over minor points of no operational significance. Given the constraints of shipping schedules, Soviet port facilities, and the schedules for return visits by Soviet inspectors, it was felt that insubstantial quibbles had on occasion led to delivery delays that would not otherwise have occurred.

Fifth, the respondents in several cases referred to a standard Soviet procedural requirement (for Soviet construction organizations) that at least 80 percent of the equipment to be delivered should be actually onsite before the assembly and installation of equipment can begin. Delivery and installation phases would normally overlap much more than this, as we have noted above, in Western practice.

Sixth, problems in project planning and management had obtruded in a number of cases. Three instances of late changes in plant location were mentioned, though only one was blamed for delays. In several cases delays in bringing related plants (upstream or downstream) into operation were mentioned as delaying factors. In a couple of instances, the ordering of a major item of equipment was just forgotten. Delays in construction work were frequent, with the construction labor force liable to fluctuate unpredictably. In some cases labor was withdrawn from the site without warning for long periods of time: in one case, for as much as 12 months.

Finally, skills were generally found to be low by West European standards. This was observed for a wide range of activities: construction work; plant operation and maintenance; production engineering (some individual Soviet research and design engineers, in contrast, came in for high praise for their professional knowledge); middle management (again, some Soviet managers, generally fairly senior ones such as plant directors and senior ministry staff, were, by contrast, judged to be very competent).

At the most general level of comment on the influence of the Soviet system, all respondents drew attention to one or more of the following adverse influences on assimilative capacity: slow decisionmaking (often seen as a case of "too many committees"); the prevalent concern of Soviet officials to guarantee themselves against any possibility of being held responsible for failure; a general lack of entrepreneurship (interestingly, some respondents felt that they had encountered

a kind of entrepreneurial dynamism on the part of some Soviet officials, but noted that the scope for making entrepreneurial decisions was restricted to a very small number of people); and a persistent tendency to overmanning—which several respondents perceived as something imposed on unwilling managers by the party-state machine on "welfare" grounds.

Offsetting these systemic defects in at least some degree were two features which most respondents referred to in one form or another: the system's ability, on occasion, to resolve a difficulty by mobilizing resources to do so; for example, by flooding a long-delayed construction project with labor, including soldiers and students; and the existence of some dynamic and competent officials who, if sufficiently highly placed, could bulldoze their way through the usual procedural difficulties and get something done in a hurry.

C. The Influence of Project Size and of Soviet Learning

With the chemical-project data collected in this survey, it is possible to attempt a test of two hypotheses about Soviet assimilation of Western technology. The first is that leadtimes will tend to be longer, the larger the project. The second is that there will tend to be a reduction over time in the leadtimes for successive projects, as a result of learning processes on the Soviet side (and on the part of Western firms, if the same firms remain active in the Soviet market).

In favor of the first hypothesis is the apparently commonsense proposition that a project of large value will normally entail a larger volume of construction and installation work than a similar project of smaller value, and that, in the negotiating phase and the detailed design-engineering phase, there will be more technical points to resolve than there would be for a smaller project. (In neither the construction nor the negotiating or design phase can the work easily be compressed into the same time scale as for a smaller project simply by allotting more resources of men and equipment to it; the need to coordinate decisionmaking and to perform some tasks before others for technical reasons will normally limit any compression of leadtimes by such means.)

Against the first hypothesis, however, is the point (frequently made by respondents in this survey) that there is no necessary relationship between the complexity and difficulty of a project and its size. The more experience the supplier has with implementing the technology in question, the less the leadtime will tend to be.[25] There is no reason to expect either of these variables—age of technology and narrowness of tolerances—to be positively correlated with plant size.

The a priori arguments about a possible Soviet "learning curve" in chemical projects are similarly balanced—some for, some against a tendency (other things equal) for leadtimes to be reduced over time. Negotiating times might tend to shorten as mutual trust developed between partners with an increasing number of successful joint projects behind them. In the present survey, both the United Kingdom firms visited and the individual respondents had all been involved in Soviet projects for substantial periods of time, so that this factor might

[25] Teece (1976).

be expected to be present in this particular sample of projects. Indeed, most of the respondents felt that there had been a real growth of mutual confidence and familiarity over time and that this was tending to expedite negotiations.

On the other hand, the rigidity of certain Soviet procedural requirements was also stressed, and so was persistent concern of the FTO's and users to impose very precise guarantee requirements and to secure commercial "concessions" even when these entailed delays which reduced the overall cost-effectiveness of the deal to the Soviet economy. These factors were not perceived as diminishing over time. Nor was it felt by most respondents that key Soviet capabilities in engineering, in construction management, and in supply coordination had shown any clear improvement over time. Where there had been improvements—in Soviet development and design expertise in the industry—the view of some (not all) respondents was that this had had the paradoxical result of lengthening the negotiating phase since the Soviet side, in later deals, could and did raise more technical issues.

Some tests of these hypotheses are provided by attempting a statistical "explanation" of the variation in our survey data on leadtimes (in months) by the variations in (*a*) project-size (value in 1978 $ mn.), and (*b*) the date of contract (as a measure of the duration of the relevant Soviet learning process, expressed as years 1 through 20).

With data from the survey, multiple linear regressions were calculated (using ordinary least squares) with leadtime as the dependent variable and contract dates and values as the independent variables. This was done separately for negotiating leadtime (A), contract-to-completion leadtime (B–D) and overall leadtime (A–D). The results are set out in table 8.

TABLE 8.—LEADTIMES, CONTRACT DATES AND CONTRACT VALUES: REGRESSION RESULTS FOR A SAMPLE OF SOVIET CHEMICAL-PLANT PROJECTS

Lead-time	n	Constant term (months)	Regression coefficients		$\bar{R}^2$
			Contract date	Contract value	
A	28	13.7	+0.215 (0.7608)	+0.036 (1.0370)	−0.0120
B–D	24	59.8	−0.552 (−0.6411)	(+0.137) (1.4535)	0.0156
A–D	24	73.4	−0.35 (−0.1430)	(+0.159) (1.5213)	0.0135

Note: bracketed figures are t statistics; $\bar{R}^2$ is the R^2 adjusted for degrees of freedom. Correlation between contract dates and values is very close to zero.

Source: data derived from the survey of exporters.

Clearly these tests provide no support for the hypotheses that leadtimes have been reduced by a learning process or that larger projects generally take longer. The overwhelming bulk of the variance in leadtimes is unexplained by the variances in contract dates and values, so that the constant terms come out extremely close to the arithmetic means of the leadtimes (see table 5). The regression coefficients are in no cases significant at the 5-percent or even the 10-percent level.

These tests of a small sample of Soviet chemical projects, with just two independent variables and only linear regressions attempted, cannot be described as a decisive refutation of the hypotheses in question.

However, they do indicate that learning processes and project size have probably not been dominant influences on leadtimes in this sector over the past two decades.

IV. Conclusions

The picture of Soviet assimilation of Western technology that comes out of the survey is not one that supports extreme views of any kind about Soviet performance. On the whole, the picture is not very impressive: Assimilation takes longer than in Western Europe; in the case of chemical technology, where evidence for a learning process could be assessed, there was no sign of a systematic reduction in leadtimes with experience; subsequent manning levels tend to be on the high side and output levels on the low side, at least in the chemical industry; and successful domestic diffusion and modification appear to be limited.

At the same time, the plants in the survey got into production and stayed in production, and in some cases have been operating well by most standards. They, and other Western-supplied plants and machinery, have transformed large parts of the Soviet chemical and motor industries and are the major source (in some cases, the sole source) of current Soviet production of a wide range of important products; and there has at least been some diffusion.

A. Implications for Models of West-East Technology Transfer

This survey evidence casts doubt on some of the assumptions made in some aggregative, econometric studies which have tended to yield very high measures of the impact of imported technology on Soviet output.

The assumption, for instance, of a average 1-year lag between import of equipment and the start of output from that equipment is clearly wrong for chemical plants. It is doubtful also for machine tools, especially when they are purchased as an integrated manufacturing system.

In the chemical plant survey, information on the date of completion of deliveries showed that this averaged 30 months from the date of contract in the 24 cases for which data were available. Deliveries were typically spaced out over substantial periods, however, with the peak rate of delivery usually coming well before completion of deliveries. Suppose we tentatively put that typical peak in deliveries for a turnkey project at 24 months after contract. The best guess at average leadtime between peak deliveries and the start of the impact on production would then be just over 3 years.

It is unlikely that this lag will be as long as 3 years, on average, for machine tools, since the total value of the contract and the scale of deliveries are usually smaller. Individual machines and machining sections, moreover, may be capable of being installed and beginning to operate independently of any other installation work in progress at the plant. However, when the machine tools are imported as an integrated manufacturing system, closely dependent on the state of the rest of the plant, the assumption of an average 1-year lag between import and the start of fully effective utilization is likely, again, to be too optimistic.

Another "optimistic" assumption, which implies that, for the purpose of assessing long-run aggregate impact, "systematic" factors are

trivial, is also called into doubt by the information on manning and output levels. This information is rather sketchy, and not too much weight can be put on it, but it does tend to determine confidence in a strong assumption that has been utilized in some models of the international technology transfer process (Gomulka 1971 and Sylwestrowicz 1976).

This is the assumption that machinery imported from country A to country B tends, so to speak, to "carry with it" A's labor productivity levels and implant them in B. It may well be reasonable to assume a general tendency in that direction, but any use of the assumption in a strong form would be likely, on the evidence of this survey, to lead to substantial quantitative overestimates of the impact of imported machinery on labor productivity levels.

Quite apart from the delaying effects of long leadtimes in the Soviet case, our present evidence suggests that in chemicals imported plant may commonly be operated at somewhat lower output levels and with at least half as much manpower again as is normal in its country of origin—i.e., with a labor productivity of little over one-half of that in the exporting country. In the case of machine tools our evidence suggests a somewhat different picture: Output and manning levels that are satisfactory by West European standards are quite often achieved, but only after a relatively long period of "assimilation" following the startup of production.

Appendix

Questionnaire

1. Technical Background

(*a*) Could you please describe (in general terms) the main technical features and capacity of the equipment exported to the U.S.S.R.?

(*b*) Are any of these technical feaures covered by patents for which the U.S.S.R. became a licensee?

(*c*) If comparable equipment existed already, do you consider that the Soviet engineering industry was capable, at the time when you first discussed this proposal, of producing equipment embodying similar technical features?

If not, could you please give some estimate of the degree of technical lag between Soviet-produced equipment and that designed and manufactured by your company?

If so, why do you consider that the Soviet Union imported equipment from your company?

(*d*) Can you please give some indication of the degree to which the Soviet customer also had to carry out technical developments to enable your equipment to operate successfully in his manufacturing system?

(*e*) Was the equipment installed in a new plant or in one already in operation?

2. Proposal and Contract

(*a*) When was the initial inquiry received?

(*b*) When was the initial proposal submitted?

(*c*) Were subsequent proposals necessary?

If so, how did they differ technically from the original proposals?

(*d*) When was the contract signed?

(*e*) Was the time taken to reach a finally agreed proposal longer than, shorter than, or about the same as the time you would expect to take with, say, a West European customer?

If the time taken was different, to what factor or factors would you attribute the difference?

3. Acceptance and Installation

(*a*) What were the contractual dates for delivery?
(*b*) What were the contractual dates for final acceptance on site by the customer? and for meeting the guaranteed standards?
(*c*) Were these dates observed?
If not, what was the difference in time?
Could you please advance the reasons for this?
In your experience, were these reasons similar to those encountered in other markets for analogous equipment?

4. Total Time From Initial Enquiry to Installation

(*a*) What was the difference in time taken from initial enquiry to final acceptance, compared with the time that you would normally expect this entire sequence to take with a West European customer?
(*b*) If there was a difference, to what factor or factors would you attribute it?

5. Utilization

(*a*) Do you have any information about the utilization of the equipment after its installation?
If the answer to (*a*) is yes:
(*b*) Was the machinery utilized as fully as you would expect the same machinery to be utilized in a West European factory?
(*c*) If not, can you advance reasons for this?
(*d*) If the answer to (*b*) is yes, was the time taken to achieve a normal rate of utilization longer than, shorter than, or about the same as you would expect to observe in a West European company?
(*e*) If longer, by how much?
(*f*) If shorter, by how much?
(*g*) Was the level of manning similar to, greater than, or less than you would expect to observe in a West European company?
(*h*) Can you comment on any factors that affected the time taken to achieve normal utilization of the machinery?
(*i*) Can you comment on any factors that affected manning levels?

6. Diffusion

(*a*) Do you know if any basic principles or technical refinements incorporated in the machinery supplied by your company, and not previously utilized in the Soviet Union, have subsequently been incorporated in the design of Soviet-built machinery?
If the answer to (*a*) is yes:
(*b*) Please describe the instances known to you.
(*c*) What period of time elapsed between the delivery of the British machinery and the production of Soviet machinery incorporating some features of the British machinery?
(*d*) Would you expect a similar process of learning and "reproduction" to occur in, say, a West European country?
(*e*) If the answer to (*d*) is yes, would you expect this process to take a longer or shorter time than in the U.S.S.R.?
(*f*) Please describe any features of the Soviet industrial scene which you have reason to believe would either hinder or facilitate the spread of successful reproduction of Western technological know-how; for example, incentive systems, the organization of R. & D. and design, availability of skilled workers, material supplies.

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AN ASSESSMENT OF THE U.S.S.R.–U.S. SCIENTIFIC AND TECHNICAL EXCHANGE PROGRAMS

(By Francis W. Rushing and Catherine P. Ailes*)

CONTENTS

SUMMARY

This paper provides a general review of the rationale for and design and implementation of the various U.S.–U.S.S.R. exchange programs in science and technology, and a general assesment of the nature and extent of the political and cultural, economic, and scientific benefits accruing to the United States through its participation. It is the general conclusion of the paper that while gains in the political and economic areas resulting from the exchanges have been minimal, the programs, when judged on their own merit in terms of their cultural and scientific impact, have produced significant benefits to the United States in several areas. Continued emphasis on selection of projects from among those areas in which Soviet scientific expertise either surpasses or is on a par with that of the United States should insure that the exchanges are of mutual benefit.

*Francis Rushing is an associate professor at Georgia State University and an analyst at SRI International. Catherine Ailes is an analyst at SRI International.

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I. Introduction

Official exchanges of scientists and engineers between the United States and the Soviet Union date back to the late 1950's. In the past 7 years, however, as the result of the signing of a broad set of intergovernmental agreements for cooperation in various fields of science and technology, a marked expansion has occurred in the number of scientists participating in such exchanges and the amount of scientific and technical information that has flowed from one country to another.

The broadening of the scope of cooperation and the acceleration in the pace of the exchanges has brought significant public attention to the exchanges in the United States. As a consequence, there has been increased emphasis on assessments of the programs in order to justify their continued support within the U.S. Government, academic and business communities, and with the public at large.[1] It is the purpose of this paper to review the rationale for and the design and implementation of the exchange programs, and provide a general evaluation of the impact and benefits accruing to the United States through its participation.

II. Description of the Exchange Programs

The principal scientific and technical exchanges currently taking place between the United States and the Soviet Union are organized under four programs: the interacademy exchanges, the exchanges facilitated by the bilateral agreements, and the U.S.–U.S.S.R. exchange programs of the International Research and Exchanges Board and the Council for the International Exchange of Scholars. The general structure and organization of each of these programs, which are summarized in the table below, will be discussed briefly in turn.

[1] Two particularly informative analyses of these programs using data from surveys of participants have been prepared in recent years. See Carl Kaysen, Chairman, "Review of U.S.-U.S.S.R. Interacademy Exchanges and Relations," prepared for National Science Foundation (Washington, D.C.; National Technical Information Service, 1977); and Richard Garwin, Chairman, "Review of the U.S.-U.S.S.R. Agreement on Cooperation in the Fields of Science and Technology" (Washington, D.C.: National Academy of Sciences, 1977).

UNITED STATES-SOVIET AGREEMENTS INVOLVING SCIENTIFIC AND TECHNOLOGICAL EXCHANGES AND COOPERATION

Agreement	Start date	Responsible agencies		Organization
		United States	Soviet	
Interacademy exchange	1959	National Academy of Sciences	Academy of Sciences	Exchanges of individual scholars for 1mo. lecture or survey visits, or 3- to 12-mo. research visits.
Bilateral science and technology agreement [1]	1972	Office of Science and Technology Policy and Department of State.	State Committee for Science and Technology.	Exchanges of scientists, specialists and information joint research and program development in basic and applied sciences; arrangement of joint symposia; courses and conferences; facilitation of contact between U.S. firms and Soviet enterprises; and other forms of cooperation as may be mutually agreed upon.
International Research and Exchanges Board (IREX).	1958–59	American Council of Learned Societies and Social Science Research Council.	Ministry of Higher and Secondary Specialized Education and Academy of Sciences.	Exchange of scholars in sciences and humanities for 5- to 12-mo. research visits, or 9-week language-teacher training.
Council for the International Exchange of Scholars (CIES).	1958	American Council on Education	Ministry of Higher and Secondary Specialized Education.	Fulbright-Hays research grants to scholars and exchange of lecturers with Soviet universities.

[1] The S. & T. agreement is 1 of 11 bilaterals concluded between 1972 and 1974.

A. Interacademy Exchanges

The National Academy of Sciences of the United States and the Academy of Sciences of the U.S.S.R. have conducted a formal exchange program in science and technology since 1959. To date, more than 400 United States and 400 Soviet scientists have participated in the exchanges.

Over the years, the emphasis in the interacademy program has shifted from the short to the longer term visits. Long-term visitors in both countries tend to stay in one laboratory for an extended period, making tours of other facilities in their last few weeks. Soviet scientists visiting the United States under the interacademy program have had access to research being conducted in a broad range of academic, Government, and industrial laboratories and installations. However, one of the limitations of this program for the U.S. participants has been that the organization of the program in the Soviet Union has largely restricted visiting American scientists to establishments within the Soviet Academy network, with only minimal access to university and industrial facilities.

Initially, participation of American scientists in the interacademy exchanges was by invitation only, based on recommendations of members of the National Academy of Sciences or of other senior American scientists. This process of selecting participants was later expanded to allow scientists to apply for the program. U.S. coordinators have frequently pressed for provisions whereby the receiving side could indicate individual scientists of the other country whom they wished to be invited to participate in the exchanges; however, the Soviet Union has generally insisted on the right of each side to determine its own participants.

The primary focus of the interacademy exchange program is on the basic sciences. During its 20 years of existence, the program has covered many fields of research, including mathematics, physics/astronomy, Earth and atmospheric sciences, biology, chemistry, engineering, and social sciences (introduced more recently into the scope of the exchanges). The principal areas of Soviet interest seem to be physics, electrical engineering, chemistry, and biology, while physics, Earth sciences, biology, and astronomy rank at the top of the U.S. list in terms of number of participating scientists by field.[2]

B. The Agreement for Cooperation in the Fields of Science and Technology and Other Bilaterals

The Moscow Summit of May 1972 provided the foundation for 11 intergovernmental agreements for cooperation in various fields of science and technology. These are shown in the table below.

Research under these agreements focuses on the applied sciences, with each agreement defining a specific area of mutual interest and cooperation. These agreements have offered opportunities for unprecedented numbers of scientists to participate in exchange programs with

[2] Carl Kaysen, chairman, op. cit., p. 88.

UNITED STATES-U.S.S.R. BILATERAL AGREEMENTS FOR COOPERATION IN SCIENCE AND TECHNOLOGY

Agreement	U.S. responsible agency	U.S.S.R. responsible agency
Science and technology	Office of Science and Technology Policy (OSTP).	State Committee for Science and Technology (SCST).
Environmental protection	Environmental Protection Agency (EPA).	Main Administration of the Hydrometeorological Service (Hydromet)
Medical science and public welfare	Department of Health, Education, and Welfare (HEW).	Ministry of Health.
Space	National Aeronautics and Space Administration (NASA).	Academy of Sciences.
Transportation	Department of Transportation	State Committee for Science and Technology (SCST).
World oceans	National Oceanic and Atmospheric Administration (NOAA).	Academy of Sciences.
Atomic energy	Department of Energy (DOE)	State Committee for Utilization of Atomic Energy.
Energy	do	Ministry of Power and Electrification.
Agriculture	Department of Agriculture (USDA)	Ministry of Agriculture.
Housing and other construction	Department of Housing and Urban Development (HUD).	State Committee for Construction Affairs (Gosstroy).
Artificial heart (administered under the health agreement).	Department of Health, Education, and Welfare (HEW).	Ministry of Health.

the U.S.S.R. In 1977 alone, 1,508 United States and Soviet scientists took part in the exchanges.[3]

The Agreement for Cooperation in the Fields of Science and Technology, first signed in May 1972 and renewed for 5 years in July 1977, is the senior of the bilaterals and served as the model for the format and organization of the 10 subsequent accords. This paper concentrates on the S. & T. Agreement as being basically representative of the bilaterals in general, although somewhat more flexible in that limitation on fields of collaboration under the S. & T. Agreement are not as restrictive as those under the companion accords.

Activities under the S. & T. Agreement are supervised by a Joint Commission, composed of leading science policymakers from both Governments. The Joint Commission reviews proposals for cooperation in specific areas, makes suggestions and recommendations, develops programs and designates organizations to implement them, and acts in an overall supervisory capacity to insure proper implementation.

Proposals for areas of cooperation come from Government agencies, scientific societies, industrial associations, and individual scientists, and are reviewed and evaluated by the Joint Commission and its support staff within the National Science Foundation. Once accepted, projects are subject to frequent reassessment, and it is expected that a project in which the original objectives have been fulfilled, or one which is no longer fruitful, will be terminated.

Projects are carried out in joint working groups, which operate virtually autonomously in their research, reporting back annually to the Joint Commission and submitting progress reports to be published in a quarterly newsletter. On the U.S. side, cooperation under the S. & T. Agreement incorporates scientists from the public and private sectors, allowing them to act in coordination as representatives of research efforts in their respective fields rather than representing specific institutional or corporate interests.

[3] Internal memorandum from Bureau of Oceans and International Environmental and Scientific Affairs, Department of State, U.S.-U.S.S.R. Programs Secretariat, to U.S. Working Group Chairmen and Project Coordinators, Nov. 2, 1978, p. 3.

As of the Sixth Annual Meeting of the Joint Commission on Scientific and Technial Cooperation held in Moscow in February 1979, cooperative programs were proceeding successfully in 11 working groups: Application of Computers to Management, Chemical Catalysis, Electrometallurgy and Materials, Microbiology, Physics, Science Policy, Scientific and Technical Information, Water Resources, Forestry, Intellectual Property, and Metrology. The Commission recently approved the establishment of new working groups in four areas: Corrosion, Heat and Mass Transfer, Earth Sciences, and Polymer Sciences. The working groups encompass various subtopics, and the success and ease of cooperation is far from uniform. Improved mechanisms for communication and evaluation, as evidenced, for example, by the Physics Working Group's inclusion of preliminary information exchange and briefing and debriefing of participants in its most recent work plan, will facilitate the successful implementation of specific research projects.

Thus far the working groups have largely occupied themselves with designing programs and exchanging scientists and specialists. Some working groups, however, have been able to establish joint research efforts, which are generally viewed as the most promising cooperative arrangements for the future. Presumably joint research activities will receive greater emphasis as Soviet and American scientists become better acquainted with one another and their respective areas of research. Such joint research efforts will require longer visits by individual scientists than have been the rule thus far.

Article 4 of the S. & T. Agreement provides for the negotiation and conclusion of agreements to cooperate by agencies, organizations, and firms of both countries. These agreements generally take the form of statements of intent to cooperate, which must then be followed up by direct commercial contracts or protocols in order for any actual cooperative activity to occur. Although a number of U.S. firms have signed such cooperative agreements with the Soviet State Committee for Science and Technology, these have only rarely led to the signing of commercial contracts or protocols.[4]

C. Other U.S.-U.S.S.R. Exchange Programs

In addition to the interchange of personnel and information under the bilaterals and the interacademy program, there are a number of nongovernmental exchange programs in science and technology that are active. The most significant of these in terms of the number of scientists exchanged annually are those of the International Research and Exchanges Board (IREX) and the Council for the International Exchange of Scholars.

IREX exchange programs with the Soviet Union tend to be concentrated in the social sciences and humanities. As is the case with the interacademy exchanges, participants apply for the program and visit the Soviet Union for short or longer periods of research. Research is generally conducted on an individual basis, although pro-

[4] Lawrence Theriot, "U.S. Governmental and Private Industry Cooperation With the Soviet Union in the Fields of Science and Technology." "Soviet Economy in a New Perspective" (Joint Economic Committee, 1976), p. 752.

visions for joint research in the humanities have recently been added. IREX participants include a large number of graduate students and young faculty as well as some senior scholars. Unlike the majority of scientists engaged in the interacademy and bilateral programs, IREX scholars generally have defined research needs which can be met only by archival or other local resources which are not available outside of the region designated for the exchange visit.

The senior Fulbright-Hays program, administered by the Council for the International Exchange of Scholars (CIES), has included an exchange of lecturers with the Soviet Union since 1972. Approximately 60 percent of the lecturers involved in the programs have been natural and physical scientists, while 40 percent have been in the social sciences and humanities.[5] The program operates on the basis of requests from the host country, which generally indicate the fields in which participants are preferred, but often also indicate specific lecturers by name. The ability to specify individual scientists to be involved in the program is an outgrowth of the increasing familiarity of scholars with the work of their colleagues in the other country, a situation which has largely resulted from activities under the interacademy, bilateral, and IREX exchanges.

In addition to the exchange of lecturers with the Soviet Union, CIES administers senior Fulbright-Hays grants to individual American scholars for study in about 90 countries, one of which is the Soviet Union.

D. Analysis of Alternative Structural Approaches of the Exchange Programs

The interacademy, IREX, and CIES exchanges have offered a specific form of individualized United States-Soviet collaboration in science and technology for two decades. The conclusion of the bilateral S. & T. Agreement in 1972 introduced a form of cooperation which has a somewhat different emphasis and structure. The interacademy-type exchanges and the bilateral agreements yield different benefits, and generally complement one another rather than competing. The bilaterals are programmatically organized for the most part, directed at the advancement of fields of research, although there are collateral benefits to individual scientists. Research under the bilaterals tends to be in the applied rather than the fundamental sciences. Such goal-oriented, centralized programs as occur under the bilaterals are better vehicles for coordinating joint research with the U.S.S.R., because this orientation is strong in the Soviet research administration. In addition, access to research institutes outside of the Academy of Sciences network which were not formally accessible to American scientists has been opened up under the bilaterals.

As compared with the bilaterals, the interacademy exchanges are distinguished by being more or less nongovernmental (on the U.S. side), somewhat decentralized, oriented toward the research needs of individual scientists, and principally directed toward fundamental research rather than applied. The interacademy exchanges thus pre-

[5] Carl Kaysen, chairman, op. cit., p. 136.

serve the opportunities for nonaffiliated scientists to pursue fields not covered under the bilaterals. This lends itself more easily to the general orientation of research administration in the United States, which is highly decentralized and shaped largely by the initiatives of industrial or academic researchers.

III. United States and Soviet Expectations With Regard to Scientific and Technical Exchanges

The form of cooperative activities in science and technology, and the benefits obtained from them, are to a large extent shaped by the expectations and objectives of the United States and U.S.S.R. respectively. These perceptions in turn are generated by the political requirements as well as the economic and technological needs of the two countries. Thus, an examination of the goals and expectations of the United States and the U.S.S.R. in participating in scientific exchange programs facilitates greater understanding of the various cooperative efforts and improves the accuracy of an assessment of the impact and benefits of the exchanges.

A. U.S. Goals and Expectations

The objectives of the United States in promoting scientific and technological exchanges with the U.S.S.R. have from the first been predominantly political. The development of independent scientific and technological ties with the U.S.S.R. is expected to create personal commitments, a deeper understanding of cultural differences and vested interests, through which tensions between the two nations are likely to be reduced. Because science and technology have no political content in and of themselves, they have been viewed as a particularly suitable medium for cooperation between two traditionally antagonistic states.

The interacademy exchange program that began in 1959 was one of the earliest means of reestablishing direct relations between the United States and the U.S.S.R. following a relaxation of the cold war. The Kaysen panel identified four goals which it felt had been important to the United States in the creation of the interacademy program: To establish contact with individuals and institutions in the Soviet scientific community, to obtain greater knowledge of Soviet strengths in science and engineering, to contribute to improved U.S.-U.S.S.R. relations generally, and ultimately to "normalize" scientific contacts between the two countries.[6] This delineation of U.S. objectives demonstrates the preponderance of political goals on the U.S. side in the early years of the exchanges.

The signing of the first bilateral agreements in science and technology at the Moscow Summit in 1972 initiated a period of marked expansion in scientific and technological cooperation between the United States and the U.S.S.R. The main objective of the S. & T. Agreement as stated in article 2 is to combine the efforts of scientists of the United States and the U.S.S.R., and to promote the progress of science and technology for the benefit of both countries and of mankind. Cooperation was to be developed on the basis of "mutual benefit, equality, and reciprocity."

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[6] Carl Kaysen, Chairman, op. cit., p. 26–27.

However, apart from the scientific and technological benefits that were desired from more formalized and extensive exchanges, the bilateral agreements were clearly a part of the détente diplomacy from which they originated. The major objective was therefore embedded in the principles of the Moscow Summit: the necessity of avoiding confrontation and the desire to stabilize relations. The principal significance of the expansion in scientific interchange envisioned at the signing of the earliest bilateral agreements was generally agreed by U.S. observers to be its potential contribution to increased intergovernmental contact, greater economic interdependence, and the reduction of tensions generally.

In most recent assessments of the impact of détente on U.S.-U.S.S.R. relations, it has become obvious to a number of observers that a normalization of relations across a broad spectrum has not occurred and that relations between the United States and the U.S.S.R. remain competitive rather than cooperative. In light of the disillusionment which has succeeded the high expectations of the early days of détente, it is not surprising that the scientific and technological exchanges with the U.S.S.R. are now being judged more on their own merit and less as a medium for improved relations between superpowers. The notion that the United States is superior to the Soviet Union in many areas of science and technology has given rise to a concern that the United States must be giving away more than it is getting in return. This concern has resulted in a closer scrutiny of individual projects under the various bilateral agreements to insure that the principle of mutual benefit and reciprocity is being met in the exchange of scientific and technical information and capabilities. It is generally agreed that the principle of reciprocity should be broadly applied to the exchange program as a whole, but that projects in which there is a clear indication that the United States is receiving very few benefits or that the U.S.S.R. is noncooperative should be terminated or combined with projects which exhibit a greater potential for success.

B. Soviet Goals and Expectations

Soviet goals and expectations for the scientific and technological exchanges with the United States appear to have undergone some changes since the first formal exchange agreements were negotiated in the late 1950's. While there are no official Soviet policy statements directly related to the scientific exchanges with the United States, some indication of Soviet objectives in pursuing the exchanges is provided by statements of the Soviet leadership containing their assessment of the scientific and technological performance of the U.S.S.R. relative to that of the United States and of the weight that should be given to drawing on Western scientific achievements as a means of sustaining economic growth.

The Sovet leadership has long regarded the achievement of scientific and technological superiority not only as major goal in itself, but also as a prerequisite for the attainment of other strengths and capabilities to increase the chance of Soviet success in its competition with the Western World. Science and technology is viewed as an important instrument as well as a product of the struggle between the socialist and the capitalist systems.

The exchange agreement between the National Academy of Sciences of the United States and the Academy of Sciences of the U.S.S.R. was signed against the backdrop of the astonishing successes achieved by the early Soviet space endeavors. The Soviet Union, exhilarated by its recent space exploits and the high rate of technological achievement and economic growth experienced during the 1950's, was desirous of broadening its efforts to achieve world preeminence in science and technology and thereby enhance its power and influence abroad. Thus, a major Soviet objective during the early years of the exchange seems to have been one of gaining recognition of Soviet strengths in science and technology, and increasing international prestige.[7]

However, while Soviet economic growth had been rapid, domestic innovation had been (and continues to be) a persistent problem. In a sense, the very real achievements in a number of high-visibility areas were made possible by the Soviet ability to direct vast resources to those areas. Thus, while in the early years of the interacademy exchanges Soviet strength in basic science was revealed, it was not this strength that had been responsible for the growth of the economy as a whole.

By the early 1970's when the bilateral agreements growing out of the Moscow accords were negotiated, the Soviet leadership was increasingly aware that the Soviet Union had not been able to sustain its rapid rate of technological achievement and economic growth, and that the U.S.S.R. was, contrary to earlier optimistic expectations, falling further behind the United States in the general development and utilization of science and technology rather than narrowing the gap. Scientists and engineers had achieved remarkable successes in a number of fields, but the concentration on the development of basic heavy industry and advanced military technology had led to an imbalance in the economic structure with major deficiencies in the development of the consumer and commercial technology areas. The strict compartmentalization of military research establishments, to which had been allocated not only the major critical resources but the most qualified of the scientific and technological personnel as well, prevented any meaningful spinoff of the advanced scientific knowledge, inventions, or management practices of the defense sector to other areas of the economy. Soviet leaders became ever more aware that the success of the Soviet Union in the competition between the two systems would require efforts directed at a broader range of scientific and technical areas than had earlier been surmised.

The sources which the Soviet Union had previously relied upon as inputs to their extensively oriented economic growth—that is, reserves of labor, capital, and natural resources—were diminishing and would not provide the needed basis to maintain growth of productive output at a rate at all comparable to that experienced in previous years. In the face of a need to maintain a continuous rate of military buildup coupled with a commitment to increase the standard of living of Soviet citizens, the only avenue of approach that was available to the Soviet leadership was to concentrate on intensive forms of economic develop-

[7] See Carl Kaysen, Chairman, op. cit., p. 8; and Dodd L. Harvey and Linda C. Ciecoritti, "United States-Soviet Cooperation in Space," Miami, Fla.; Center for Advanced International Studies, 1974, p. ix.

ment involving a growth in production and labor productivity through qualitative means—that is, by utilizing scientific and technological breakthroughs, by increasing the qualifications of the labor force, and by improving management techniques. A major concern therefore centered around the inability of the Soviet economy adequately to transform the results of scientific and technological progress into increased productivity. Problems ranged from a lack of incentive for innovation in productive techniques, largely due to the bureaucratic, risk-averse nature of the economy, to inadequacies in the management and administration of scientific and technological research.

The need for the acquisition of Western scientific and technological advances was clear. In formulating the ninth 5-year plan (1971–75), Soviet leaders opted for a major program of importing advanced technology and equipment from the West as a source of gains in productivity and a solution to the economic deficiencies and management problems evident from their past record. In line with such changes in the perception of the scientific and technological performance of the U.S.S.R. relative to that of the West and the importance of the acquisition of Western technology for domestic economic growth, the Soviet Union's goals and objectives for international science and technology exchanges shifted to accommodate the changing perception of its scientific and technological needs. Thus, an underlying Soviet objective at the outset of cooperation under the bilateral science and technology agreement was the improvement of economic and trade relations with the United States, especially in areas involving science and technology.

While the Soviet Union had a clear need to acquire Western science and technology, Soviet political motivations in the signing of the science and technology exchange agreements were not insignificant. With the sudden improvement in United States-Chinese relations in 1971–72, the Soviet leadership was concerned about the prospect of United States-Chinese collusion against the U.S.S.R., and was accordingly anxious to improve and stabilize its relations with the West for political as well as for economic reasons. However, within the context of the importance of reducing political tensions, the Soviet Union's economic objectives were evident in its clear preference for applied research and technology as the focus of the exchanges as compared with the stronger preference for basic research evidenced by the United States. In this connection, the Garwin Panel noted that three of the areas of cooperation proposed by the Soviet Union—computers and industrial controls, chemical catalysis, and mechanization of labor-consuming industries—were directly related to areas in which the Soviet economy was experiencing particular problems. In addition, the provisions of article 4 of the S. & T. Agreement calling for direct cooperation between agencies, firms, and organizations of both countries were included at Soviet insistence.[8]

In the years since the S. & T. Agreement was first signed, the Soviet leadership has probably come to the realization that its original goal of the acquisition of U.S. technology through Soviet participation in the exchanges is not being achieved. Technology transfer in connection with the S. & T. Agreement, either through the

[8] Richard Garwin, Chairman, op. cit., p. 32.

exchanges directly carried out by the joint working groups or through industrial agreements under article 4, has been minimal.[9] While a major Soviet goal for the S. & T. exchanges is probably still one of the acquisition of technology, in the last few years some observers have noted that the Soviet leadership appears to have reduced somewhat its expectations of what is likely to be accomplished by the exchanges. The focus at present seems to be on a more general appreciation of the advantages of cooperation with the United States in scientific research, and an anticipation that continued cooperation and the concurrent reduction in political tensions will in the long term result inevitably in economic and social benefits to the U.S.S.R.

IV. Impact and Benefits of S. & T. Exchange Programs

The review of United States and Soviet goals and expectations for scientific and technological exchanges in the preceding section did not uncover specific definable goals for each program; however, there are broad objectives applied by each side to its overall participation in these exchange programs. These objectives are of three general types: Political and cultural, economic, and scientific. In this section, the impact and benefits of the science and technology exchange programs are assessed within the framework of these three categories of objectives.

A. Political and Cultural

Although there has been and continues to be a persuasive argument that positive benefits have accrued from the exchanges in the area of scientific information and research (as we shall discuss below), there are few either within or outside of the U.S. Government who would support the continuation of the exchanges purely on the merits of their scientific benefits to the research and business communities in the United States. Historically and currently, political and cultural factors have been a strong influence on the conduct and perpetuation of the program.

Soviet motivation, on the other hand, seems to have shifted from a strong emphasis on political considerations in the earlier years of the exchanges, to the desire in recent years to open up the flow of scientific and technical information to the Soviet Union for the economic benefits which it is perceived will result from this flow. Even under these conditions, however, Soviet authorities have not been willing to sacrifice their political objectives for scientific or economic gains.

There seems to be solid agreement among U.S. policymakers and participants in the various programs that the opening of communications between the two scientific communities has raised our level of understanding of how the Soviet system works and how Soviet scientific and technical research and applications are designed and conducted. Exposure of Soviet scientists and technical personnel to the United States, its personnel and institutions, has also been judged to be of some value in developing a broader base for future mutual understanding and cooperation in the scientific area. However, there is little indica-

[9] Lawrence Theriot, op. cit., p. 752.

tion that such understanding and cooperation in the purely functional area of science and technology has had much of an impact on increased political cooperation between the United States and the U.S.S.R. overall. Rather, the general political environment has a greater effect on the conduct of scientific and technical cooperation than the reverse.

All of the exchange programs are influenced to some extent by the general atmosphere of United States-Soviet relations, but this is particularly true of the bilaterals, which originated with U.S.-U.S.S.R. détente policies and are administered directly by the U.S. Government. The Interacademy, IREX and CIES programs are somewhat less vulnerable to fluctuations in United States-Soviet relations than the bilaterals, as they are organized and administered primarily by and for scholars with little direct U.S. Government interference. During a period of intergovernmental tension in 1977–78, there was a reduction in cooperation and overall activity under the bilateral agreements, while neither the United States nor the U.S.S.R. was able successfully to employ the exchanges as an instrument to achieve its political goals in the short run. Despite this inevitable factor in the success of the exchanges, it seems that the foundation for scientific cooperation established through personal contact between scientists of the two countries does not erode significantly during such periods of increased intergovernmental tensions.

The question of human rights in particular permeates the interaction of the exchange programs with political and cultural factors. While U.S. scientists have consistently expressed concern over the repression of their Soviet colleagues, in the past year, with the trial and sentencing of such prominent dissident Soviet scientists as Yuri Orlov and Anatoly Shcharansky, the U.S. scientific community has become increasingly outspoken on the issue of human rights. Trips, seminars and meetings have been canceled by individuals and groups, many of whom have a strong personal commitment to scientific exchange with the Soviet Union. Petitions and statements protesting actions by Soviet authorities that are in violation of world-recognized standards of human rights have been signed by many prominent U.S. scientists, including several Nobel laureates. Most recently, in March 1979 a statement was signed by more than 2,400 U.S. scientists pledging to curtail scientific cooperation with the Soviet Union until the release of Shcharansky and Orlov from prison. The majority of those scientists pledged to suspend all cooperation with the U.S.S.R., while the remainder stated that they would continue to collaborate with Soviet scientists visiting the United States but would not attend any meetings or conferences in the U.S.S.R. In addition, the scientists stated that they would oppose any transfer of advanced technology to the Soviet Union as well as any expansion of the science and technology exchanges.

Despite the growing number of U.S. scientists who have decided to limit their participation in the exchanges, a large proportion of American scientists are still committed to their continuation, in the belief that the channels of communication opened by the exchanges make the Soviet authorities more vulnerable to outside criticism of their repressive political conditions and that a total isolation of Soviet scientists from their Western colleagues may simply allow for in-

creased repression.[10] The current policy of the U.S. Government on this issue, as stated by the President's Science Adviser at recent hearings before the House Committee on Science and Technology, encourages individual scientists to decide for themselves, according to their own consciences, whether they wish to limit their participation in the exchanges in protest of Soviet Government treatment of dissident scientists; it was affirmed, however, that it is the responsibility of the U.S. Government to make that decision on behalf of its own employees. In July 1978, when the Soviet Union announced that the trial of Shcharansky would take place during the same week in which the U.S.-U.S.S.R. Joint Commission on Science and Technology was scheduled to hold its annual meeting in Moscow, President Carter, as an expression of concern over the treatment of Soviet dissidents and the arrest of an American citizen in Moscow, indefinitely postponed the meeting of the Joint Commission and placed a freeze on most high-level official trips to the U.S.S.R. However, by early 1979, as relations between the United States and the U.S.S.R. improved, that moratorium quietly ended and the Joint Commission meeting was rescheduled.

The Soviet Union has repeatedly asserted that such protests are viewed as outside intervention in the internal affairs of the U.S.S.R. and are not acceptable as a condition for the science and technology exchanges. At the time that the Joint Commission meeting was canceled, an article in Ekonomicheskaya Gazeta accused the present U.S. administration of following a "restrictive policy" regarding the scientific and technological exchanges with the U.S.S.R., and went on to claim that "such actions are causing justified dissatisfaction among those representatives of scientific and business circles in the United States who favor development of scientific-technical exchanges with the U.S.S.R., which experience tells us are advantageous to both parties."[11] A recent commentary aired over Radio Moscow accused the American scientists who pledged to curtail scientific cooperation with the Soviet Union of "irresponsibility" in not ascertaining the facts involved in the cases of Shcharansky and Orlov and of being "voluntary or involuntary participants in a political campaign intended to worsen relations with the Soviet Union." The commentary suggested that the scientists were making a "great mistake" in thinking that their threat might succeed in influencing the policies or actions of the Soviet Government.[12]

Part of the confusion over what action on the part of American scientists is preferable stems from conflicting opinions of the effect the various courses of action open to them are likely to produce on Soviet authorities. Personal discussions held by American scientists with their Soviet colleagues about this issue show differences of opinion among Soviet scientists themselves. One U.S. scientist reported that the "invariable reaction—of his Soviet colleagues—was that such postpone-

[10] Dr. Frank Press, statement before House Subcommittee on Domestic and International Scientific Planning, Analysis and Cooperation, Oct. 5, 1978, p. 4.

[11] Ekonomicheskaya Gazeta (Economic Gazette), XXXI, 1978, "Recent Scientific-Technical Cooperation with Capitalist Countries," (U.S. Department of Commerce Joint Publications Research Service translation No. 7149, Aug. 11, 1978, p. 7).

[12] Foreign Broadcast Information Service, "U.S. Scientists' Support of Orlov, Shcharansky Denounced," Soviet Union, Mar. 19, 1979, pp. A1–A2.

ments are not likely to have a positive impact on Soviet politics, which these scientists felt, are not understood by American scientists." Another U.S. scientist, however, reported that his discussions with Soviet scientists had led him to the opinion that the signing of petitions, at least, may have some long-term positive effect.[13] To confuse matters more, many Western observers subscribe to the theory that the more contact that occurs between Soviet citizens and the West, the more repressive Soviet internal policies become.

There are some individual cases in which scientists who for years had been denied exit visas were, after many appeals by members of the international scientific community, allowed by the Soviet authorities to emigrate. However, there is no evidence that the scientific and technical exchanges have had any overall impact on Soviet treatment of dissident or nonconformist scientists. The Kaysen report suggests that, on the contrary, the controls seems to be tightening rather than relaxing.[14]

B. Economic

The signing of the bilateral agreements in 1972 was part of a broad thrust of intergovernmental cooperation in which economic factors played an important role. The Soviet Union, as noted above, was strongly motivated by internal economic pressures to establish a relationship in which Soviet-American commercial relationships could be expanded, particularly with respect to the transfer of technology. While the economic factors were clearly subordinate to political considerations in terms of U.S. motivations, the U.S. Government also perceived that a more normal relationship with the U.S.S.R. would open opportunities for U.S. business to export to a large, basically untapped market.

Most observers today agree that the direct impact of the bilateral science and technology agreements on either the flow of advanced technology to the Soviet Union or increased United States-Soviet trade has been minimal. Technology transfer in connection with the S. & T. Agreement, either as a function of the exchange activities directly carried out by the joint working groups or as a result of commercial contracts growing out of cooperative agreements under article 4, has not occurred to any significant extent.

The potential for transferring technology is an element of all the exchanges, although the evidence indicates that exchange activities which essentially involve basic research—primarily the interacademy, Fulbright-Hays, and IREX programs—have resulted in the transferral of basic research knowledge and procedures rather than technology with direct application to economic production. Even under the bilateral agreements, however, where the potential for technology transfer is greater, careful oversight and control by U.S. negotiators have insured that the programs are sufficiently restricted that the Soviet Union has not been able to use them for the purpose of unilateral gain of superior technology.

Only a relatively small number of the cooperative agreements between U.S. businesses and Soviet organizations signed since 1972 have

[13] Charles DeLisi and Dale P. Cruikshank, letters to Science, vol. 201, No. 4355, Aug. 11, 1978, p. 482.
[14] Karl Kaysen, Chairman, op. cit., p. 172.

resulted in actual commercial contracts, although most have been signed by the U.S. firms in anticipation of such commercial contracts. In any case, few have fostered any direct transfer of technology. The transfers that have occurred were principally the result of commercial relations which are outside the exchange or cooperative programs, and were usually in the form of the sale of equipment or licensing of processes.

The return flow of technology to the United States has been minimal. The benefits to the U.S. economy from enhanced relationships with the U.S.S.R. seem to be an increase in the understanding by U.S. business managers and technical personnel of the Soviet system, greater person-to-person interaction, and the development of greater Soviet awareness of unique U.S. technology.

C. Scientific

The benefits in terms of scientific information and expertise that have accrued to the United States as a result of its participation in exchange programs with the U.S.S.R. are perceived by different groups to be of widely different magnitudes. In part, this variability in the perception of the scientific impact of the exchanges is due to differing interpretations as to what constitutes benefits. Three general categories are identifiable as areas in which scientific benefits can be derived: increased awareness of Soviet scientific capabilities, an increase in U.S. scientific capabilities, and the generation of new scientific knowledge.

One point of consensus about the exchange programs is that they have significantly broadened the knowledge of U.S. scientists about Soviet scientific capabilities. The information gained by U.S. scientists from onsite visits to the U.S.S.R. rate very high among participants in the programs as a positive outcome. In many cases, U.S. participants learned not only of specific procedures followed by Soviet researchers, but also of how their activities are organized and directed. At times, U.S. participants were impressed by the high quality of Soviet scientific research and procedures; at times they were surprised by the crudeness of Soviet scientific instruments and equipment.

The judgment of American scientists as to the impact of the exchanges on increasing U.S. scientific capabilities is diverse, largely because the exchanges have produced very different results in different fields. While an examination of the available evidence leaves one with the feeling that, on balance, the U.S.S.R. is enhancing its scientific capabilities more than the United States, there are selected cases in which the U.S. scientific community has derived considerable scientific benefits. For example, magnetohydrodynamics is an area in which Soviet expertise is advanced compared to that of the United States, largely because of heavy investments in such technology during the late 1960's when the United States was focusing on other alternative energy sources. In 1977 under the Bilateral Energy Agreement, U.S. scientists began participating in joint testing of an advanced experimental magnetohydrodynamic device at the Moscow Institute of High Temperature Physics, combining the Soviet magnetohydrodynamic technology with advanced U.S. technology involving superconducting

magnets.[15] In a similar case, U.S. scientists have been cooperating with Soviet colleagues on plasma arc melting technology, an area in which U.S. achievements, because of greater attention having been devoted to alternative techniques, lag well behind those of the Soviet Union. A sample ingot of high nitrogen steel manufactured in the U.S.S.R. by the plasma arc melting process was provided to the United States for testing. The tests revealed that the steel was strong, ductile, easily formed, and corrosion resistant, and therefore a potential source of good quality, relatively inexpensive metal for a variety of applications.[16]

Other cases which U.S. scientists have benefited from Soviet techniques include the use of the drugs flurafur and asaly in the treatment of cancer, the utilization of Soviet earthquake science data in successfully predicting small earthquakes in California and New York, and the gain of Soviet knowledge and expertise in electron beam coating.[17] Such cases serve to dispel the notion that all scientific benefits from the exchanges are derived by the U.S.S.R. While it is true that in many areas of science, the general state of U.S. knowledge is superior to that of the Soviet Union, this is by no means universally true. Careful selection of projects from those areas in which Soviet science is as advanced or more advanced than that of the United States should insure continued scientific benefits to the United States.

The creation of new scientific knowledge as an offshoot of the exchanges seems to have been concentrated in those programs in which scholars have worked onsite for extended periods of time. Thus the interacademy, IREX, and senior Fulbright-Hays programs, because they usually involve longer term research visits than generally take place under the bilaterals, have had the greatest potential for generating new scientific knowledge. The Kaysen panel reported numerous cases in which joint or independent research sponsored by the interacademy and IREX exchange programs has resulted in publication of findings in scientific journals.[18]

In many cases however, the new scientific knowledge that is acquired by a U.S. participant is assimilated and surfaces embodied in his own publications as opposed to being directly identified as resulting from the exchange programs.

Findings and recommendations of participants and evaluators of the exchange programs with the U.S.S.R. have often indicated that long term as opposed to shorter term research visits and joint as opposed to parallel research projects have a greater potential of achieving scientific results that are of benefit to the United States. As a result, in recent years, U.S. negotiators of the bilateral programs have placed increased emphasis on joint research and on extending the period of time of direct contact between U.S. and U.S.S.R. participants. In addition, the focus has been on more specific projects which have a high potential for successful completion in some prescribed form,

[15] "Background Paper in Conjunction With Statement by Acting Assistant Secretary of State Thomas R. Pickering Before the House Subcommittee on Domestic and International Scientific Planning Analysis and Cooperation, Oct. 4, 1978," memorandum op. cit., p. 4.

[16] National Science Foundation, "Trailblazing for Détente," Mosaic, VIII, No. 6, November/December 1977, p. 4–5.

[17] National Science Foundation. "Trailblazing for Détente," op. cit., p. 6, and "Background Paper" memorandum, op. cit., p. 7.

[18] Carl Kaysen, chairman, op. cit., pp. 68 and 82.

and on the conclusion of projects with specific research results in a form that can be disseminated to the broader U.S. scientific community.

V. Conclusion

This paper has reviewed the rationale for and design and implementation of the various scientific and technical exchanges between the United States and the U.S.S.R. and provided a general overview of the impact of the programs in their political and cultural, economic, and scientific dimensions. As was discussed above, the principle motivations underlying the initiation of the exchanges in the late fifties and the increase in the pace and scope of such exchanges in the early seventies differed significantly for the Soviet Union and the United States: Economic motivations were particularly strong for the Soviet Union, while political factors were predominant from the U.S. perspective. Today it is clear that neither of these expectations has been adequately met. The technology transfer and increase in U.S.–U.S.S.R. trade which has occurred in recent years do not appear to be direct outgrowths of the exchanges, and the thesis that functional cooperation leads to increased political cooperation has not been borne out by experience. With wider U.S. recognition that the United States-Soviet relations in general have not significantly shifted from competition to cooperation, the scientific and technical exchanges, as other areas of United States-Soviet interaction, have come to be assessed more on the basis of their benefits per se rather than primarily as building blocks for a normalization of relations with the U.S.S.R. on a broad front.

In a large number of areas in which U.S. scientific capabilities and expertise far surpass those of the Soviet Union, there is little or no potential that an enhancement of U.S. scientific capabilities will result from cooperation with the Soviet Union. However, there are specific areas of science and technology on which the Soviet Union has placed a great deal of emphasis in past years while the United States has been concentrating its resources on other techniques and research approaches. In such areas the United States stands to benefit considerably from access to Soviet expertise. As noted above, when the exchanges have focused on areas in which Soviet scientific capabilities and techniques are as advanced or more advanced than those of the United States, the United States has derived significant benefit. While there is evidence to support the contention that the U.S.S.R. has enhanced its scientific capabilities through scientific and technical cooperation with the United States somewhat more than has the United States, careful attention to the selection of projects from those areas in which Soviet scientific achievements are most evident should enable a mutual balance of scientific benefits to ensue.

The general consensus among U.S. scholars and Government officials is that, on net, scientific and technological exchange programs with the U.S.S.R. are desirable and should be continued. The general structure and functioning of the exchange programs is usually given a fairly high rating by U.S. participants. There is, however, a strong feeling that the current level of activity under these programs, if not the specific type of activity, is appropriate and should not be expanded.

Moreover, there are several aspects of the programs which the participants feel should be modified. These include the following:

Better coordination between and within the various exchange programs;

Better flow of information among the differing working groups and individual scholars; [19]

A more systematic means of publishing and disseminating the findings of specific research projects to the U.S. scientific community at large;

Increased effort to maintain the quality of U.S. participants in the program;

Increased joint research under the programs;

Development of a procedure of assessing the various programs to determine which ones are the most effective, which should be phased out, and what new areas should be initiated;

Increased efforts to pursuade the Soviet Union to permit U.S. scholars to invite specific Soviet scientists to participate in the exchanges;

More specific topics for research adopted with specific timeframes for generating results; and

Clear statement to Soviet authorities that U.S. scientists as individuals may boycott the exchange programs if the Soviet Government refuses to recognize certain basic human rights.

Although the above suggestions for improving the scientific and technical exchange programs with the U.S.S.R. are not exhaustive, the implementation of these suggestions holds the prospect of enhancing the benefits derived by the United States from its participation.

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SOVIET INVESTMENT IN THE INDUSTRIALIZED WESTERN ECONOMIES AND IN THE DEVELOPING ECONOMIES OF THE THIRD WORLD

(By Carl H. McMillan*)

CONTENTS

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I. SUMMARY AND MAJOR CONCLUSIONS

This study focuses on the phenomenon of Soviet direct investment in the "capitalist" economies.[1] There are now well over 100, wholly or partly owned Soviet companies abroad, most established since 1970. These companies are distinguished from Soviet airline, travel, and other representative offices abroad by their establishment as juridically independent enterprises within the legal framework of the host countries. They are located in a wide range of countries and industries, in the West and in the South. Apart from the seven Soviet banks and three insurance companies abroad, they range from simple agencies to marketing companies with extensive retail and service networks, and include engineering-consulting firms, fishing and fish-processing ventures, shipping lines, and even manufacturing facilities.

*The author is associate professor of economics and director, Institute of Soviet and East European Studies, Carleton University, Ottawa. The research upon which this study is based was supported by a grant from the Canada Council. Reid Henry and Bruce Morgan provided valuable assistance and helpful suggestions.

[1] Soviet statistical yearbooks have traditionally divided the world into "socialist" and "capitalist" camps. The latter has been subdivided into "industrially developed" and "developing" countries.

Many Soviet companies abroad are wholly owned; and in most of the remaining cases, Soviet majority equity or the nature of Soviet participation indicate that the companies are effectively controlled by enterprises in the Soviet Union. They may therefore be regarded as "subsidiary" companies, and Soviet investment in them as "direct foreign investment," entailing operational control as well as ownership of assets abroad. As parents of foreign subsidiaries, organizations in the U.S.S.R. have taken on the character of "multinational enterprises." Twenty-two Soviet foreign trade enterprises, banks, or other organizations have been identified as having a majority interest in one or more companies abroad, and thus as falling clearly within the U.N. definition of a multinational enterprise.

The major conclusions to be drawn from an analysis of Soviet direct foreign investment are as follows:

(1) Direct foreign investment by the U.S.S.R., while enjoying some early precedents, is essentially a phenomenon of the 1970's and is an important component of the Soviet Union's new external economic orientation.

(2) The establishment of a network of foreign subsidiaries constitutes one of the more striking institutional changes in the traditional Soviet mechanism for the conduct of external economic relations to have accompanied the new policy orientation.

(3) The principal object of Soviet investment abroad has been the establishment of an effective infrastructure through which to expand exports to the West, especially manufactures.

(4) Soviet direct foreign investment therefore has important implications for the future growth of East-West trade, especially as some important prior sources of growth (Western credits, oil exports) lose their earlier dynamism.

(5) Soviet investments in the Third World serve primarily to promote sales of Soviet machinery, equipment, and technology in these markets. They are also used to gain access to scarce raw materials, notably fish. Organized more frequently as joint equity ventures with host country enterprises, they are emphasized as a desirable, new form for Soviet industrial cooperation with the South. As yet, however, the U.S.S.R. lags behind some CMEA countries in the extent of its investments in the developing countries.

(6) An observable, evolutionary trend extends Soviet foreign investment into new areas, especially into production and ancillary activities. This evolution, combined with rising Soviet investment in financial, transport, and other service sectors, has resulted in a significant, qualitative change in the Soviet economic "presence" abroad.

(7) Direct foreign investment by the U.S.S.R. represents a pragmatic response, despite ideological objections, to changing international circumstances. It constitutes important evidence of the Soviet Union's commitment to its new external economic strategy. Direct investment by the U.S.S.R. and the other CMEA countries adds a potentially important, new dimension to the already vexed question of the role of multinational enterprise in the world economy.

(8) The evidence presently available does not suggest that most Soviet companies abroad behave significantly differently from Western foreign subsidiary companies. Their activities nevertheless require

further study to determine whether they pose problems for host countries which demand special regulatory responses. Meanwhile, their growing importance provides Western governments with a basis for urging more direct access to the Soviet economy for Western firms, according to the principle of commercial reciprocity.

II. Investment Strategy

Direct foreign investment is an integral part of the new external economic strategy pursued by the U.S.S.R in the 1970's. Soviet external economic policies have formed an aggressive strategy, one through which the U.S.S.R. has sought to play a more active role in the world economy, commensurate with its inherent economic power. We are accustomed to according to the U.S.S.R. superpower status in international politics; we now witness the beginnings of its assumption of a similar role in international economics.

The goals of this new external economic assertiveness have been clearly stated by Soviet leaders and have been widely discussed in the Soviet Union and abroad. The paramount overall objective has been economic, to create more effective linkages to the world economy in order to bolster sagging Soviet industrial productivity and to raise Soviet consumption levels.[2] A secondary objective has been to establish an economic presence which would complement the Soviet Union's political and military power in world affairs. This parallel, political objective has been most evident in relations with the Third World, but economic and political objectives have been jointly pursued in relations with the West as well.[3]

New policies have required new instruments. In pursuit of these goals, the U.S.S.R. has initiated a network of long-term trade and industrial cooperation agreements with all of the major Western industrial countries. It has also entered into a series of agreements with Western firms for technical and scientific exchanges and for cooperation in industrial projects.[4] The objective has been not only to expand traditional contacts but also to establish qualitatively new and different relationships. Investment in companies abroad, frequently in partnership with foreign individuals or firms, must be seen as an important aspect of this approach.

Within the dictates of this new external orientation, Soviet investment has been determined by the same basic forces which have stimulated the postwar rise in direct foreign investment in the West: rapid technological change in the world economy accompanied by increased product and functional specialization and sharpened commercial competition on world markets. Anxious to expand and improve Soviet participation in the international economy, foreign trade planners and officials in the U.S.S.R. have contemplated a world where firms have increasingly exploited commercial and technical advantages in foreign

[2] These linkages were reviewed by Marshall Goldman in the last Joint Economic Committee compendium on the Soviet economy. However, Goldman's view is of a passive U.S.S.R., "allowing itself to become intertwined into the world economy." See Goldman (1976), p. 95.

[3] In an interesting, recent paper, Philip Hanson (1978) has sought to measure the impact of political and economic factors in Soviet relations with Western trading partners.

[4] See the contributions by Theriot and Smith in the 1976 Joint Economic Committee compendium.

markets directly, through subsidiaries established within these market areas. It is scarcely surprising that they should have decided that their own international success depended upon the pursuit of a similar investment strategy.

Most Soviet investments in the industrialized West have therefore been made in support of Soviet exports, especially exports of industrial products. Massive Soviet imports of Western plant and technology undertaken in the 1970's have been financed primarily by a combination of increased earnings from traditional raw materials exports (petroleum, gold) and Western credits. It is recognized, however, that in the longer run the structure of exports to the West must be made to reflect the degree of Soviet industrialization.[5] While principally for export expansion, Soviet foreign investments in the West have extended to other hard-currency-earning pursuits, especially in the financial and transport sectors.

The developing countries also provide an increasingly important outlet for Soviet industrial goods, and have therefore similarly attracted export-promoting investment. They constitute a market which is generally easier to penetrate and is also more rapidly growing (especially in the richer, oil-exporting economies). With the exception of the fishing industry, Soviet investment has not as yet been directed at foreign sourcing of raw materials in the Third World.

Investment in the developing economies of the South accord with the more pragmatic approaches adopted by the Brezhnev leadership to relations with the Third World.[6] These approaches stress the establishment of zones of influence based more firmly on economic relationships. As a result, emphasis has shifted from the unilateral aid projects characteristic of earlier periods in Soviet-LDC relations to the creation of continuing, stable relationships, based on a "mutually profitable division of labor." Industrial cooperation is central to this strategy and joint ventures are regarded as a desirable format for it.[7]

III. Overall Nature and Extent of Investment

The Soviet Union does not publish balance-of-payments data, in which outflows of direct foreign investment would normally be recorded; nor do even the principal Western host countries, in their published statistics, break down direct investment inflows by country of origin. Neither side publishes comprehensive lists of companies in which there is Soviet equity.

In these circumstances, data on Soviet foreign investments have had to be constructed from scattered sources, Soviet and foreign, published and unpublished, and then checked for accuracy.[8] In this way it has been possible to identify and document 117 companies abroad with

[5] Ericson (1976) has examined Soviet policies in this area.

[6] See Valkanier (1971) and Lowenthal (1977).

[7] A recent Soviet affirmation of this approach may be found in Bogomolov (1978) which stresses that Socialist economic cooperation with the Third World should be directed less to individual construction projects and more to the development of "inter-sectoral, territorial, industrial, and agro-industrial complexes" which offer opportunities for "new forms of cooperation" such as "mixed and joint enterprises."

[8] The data base thus derived is the principal source of the material presented in this paper. The author has interviewed Soviet trade mission officials and executives of Soviet companies abroad to gain further understanding of Soviet foreign investment goals and activities.

Soviet equity participation, as of March 1979. Of these, 92 are located in 17 Western industrial countries, while 25 are found in 19 developing countries.[9] Tables 1 and 2 show the distribution of these companies by country of location.

TABLE 1.—NUMBER AND DISTRIBUTION BY PRINCIPAL ACTIVITY OF SOVIET COMPANIES (WHOLLY OR JOINTLY OWNED) LOCATED IN OECD COUNTRIES, AS OF MARCH 1979

OECD region and country	Activity							
	Trading	Trading and marketing [1]	Marketing and manufacturing [2]	Natural resource exploitation [3]	Other services			Total
					Fin [4]	Tpt [5]	Other [6]	
Europe:								
Austria	1	0	0	0	2	1	0	4
Belgium-Luxembourg	1	5	1	0	1	2	1	11
Denmark	0	1	0	0	0	0	0	1
Finland	0	4	1	0	0	1	1	7
France	2	1	3	1	2	2	1	12
Federal Republic of Germany	5	0	1	0	2	3	0	11
Italy	3	2	0	0	0	2	1	8
Netherlands	1	1	0	0	0	0	1	3
Norway	0	3	0	0	0	0	0	3
Spain	0	0	0	1	0	0	2	3
Sweden	1	1	0	0	0	1	0	3
Switzerland	0	0	0	0	1	0	0	1
United Kingdom	2	3	0	0	3	2	0	10
North America:								
Canada	0	4	0	0	0	1	0	5
United States	0	1	0	1	0	2	1	[7] 5
Pacific region:								
Australia	0	2	0	0	0	2	0	4
Japan	0	0	0	0	0	1	0	1
Total	16	28	6	3	11	20	8	92
Percent	17	30	6.5	3.2	12	22	8.7	100

[1] Includes such related functions as product modification, distribution, and servicing.
[2] Includes assembly operations and materials processing.
[3] Activities related to the extraction and processing of foreign raw materials, including fish.
[4] Financial services, such as banking, insurance, and equipment leasing.
[5] Transportation services.
[6] Other services, including technical and commercial consulting, and engineering services.
[7] The 5 companies in the United States are Amtorg Trading Corp. (general agent for United States–U.S.S.R. trade), Belarus Machinery Ltd. (tractor sales and service), Morflot America Shipping, Inc. (shipping agency), Sovfracht, Ltd. (chartering agency) and United States–U.S.S.R. Marine Resources, Inc. (fishing venture). Amtorg is classified under "other services", because in addition to its intermediary, trading functions, it provides a range of commercial consulting and promotional services.

Sources: East-West Project, Carleton University.

The tables reveal that Soviet foreign investments have been concentrated in Western Europe. Six Western European economies (France, Germany, Belgium-Luxembourg, the United Kingdom, Italy, and Finland) are the locus of more than half of all Soviet companies established abroad. Since direct investment tends to follow exports, it is not surprising to find Soviet companies clustered in those Western economies with which the U.S.S.R. has the most active trade relations. There is also a tendency to establish companies in major commercial and banking centers (London, Paris, Singapore) or in countries whose laws and regulations are more hospitable to foreign investment (Belgium). Soviet companies are much less concentrated

[9] The figure for the West may be regarded as reasonably accurate, and the 92 companies are listed, together with basic information on each, in Morgan (revised 1979). The figure for the South is less firm: doubtful cases are indicated in table 2, but important instances of Soviet investment in the LDC's may remain unidentified. (A report issued by the CIA in September 1977 identified a total of 84 Soviet companies in both West and South.)

TABLE 2.—NUMBER AND DISTRIBUTION BY PRINCIPAL ACTIVITY OF SOVIET COMPANIES (WHOLLY OR JOINTLY OWNED) LOCATED IN DEVELOPING COUNTRIES, AS OF MARCH 1979

Developing region and country	Activity								
					Other services				
	Trading	Trading and marketing[1]	Marketing and manufacturing[2]	Natural resource exploitation[3]	Fin[4]	Tpt[5]	Other[6]	Unknown[7]	Total
Africa:									
Angola	0	0	0	1	0	0	0	0	1
Cameroon	0	1	0	0	0	0	0	0	1
Ethopia	0	1	0	0	0	0	0	0	1
Morocco	0	1	0	0	0	0	0	0	1
Mozambique	0	0	0	1	0	0	0	0	1
Nigeria	0	0	1	0	0	0	0	0	1
Sierra Leone	0	0	0	1	0	0	0	0	1
Somalia	0	0	0	1	0	0	0	0	1
Asia:									
Afghanistan	0	0	0	0	0	1	0	0	1
India	0	0	0	0	0	0	0	[8] 1	1
Philippines	0	0	0	0	0	1	0	0	1
Singapore	0	0	0	1	2	1	0	0	4
Latin America:									
Argentina	0	1	0	0	0	0	0	0	1
Mexico	0	[9] 1	[8] 1	0	0	0	0	0	2
Venezuela	0	[9] 1	0	0	0	0	0	0	1
Middle East:									
Egypt	0	0	0	0	0	0	0	[8] 1	1
Iran	0	0	0	0	1	1	0	[8] 1	3
Iraq	0	0	0	1	0	0	0	0	1
Lebanon	0	0	0	0	1	0	0		1
Total	0	6	2	6	4	4	0	3	25
Percent	0	24	8	24	16	16	0	12	100

[1] Includes such related functions as product modification, distribution, and servicing.
[2] Includes assembly operations and materials processing.
[3] Activities related to the extraction and processing of foreign raw materials, including fish.
[4] Financial services, such as banking, insurance, and equipment leasing. 3 of the 4 Soviet banks and financial companies in the developing countries are branches of affiliates of Moscow Narodny Bank Ltd. of London.
[5] Transportation services.
[6] Other services, including technical and commercial consulting, and engineering services.
[7] Instances where principal activity could not be determined on the basis of available information.
[8] Identification tentative; Soviet equity unconfirmed.
[9] A joint Mexican-Venezuelan-Cuban-Soviet oil company is located in both Mexico and Venezuela.

Source: East-West Project, Carleton University.

in the South than in the West, with only Singapore, Iran, and Mexico hosting two or more companies with Soviet equity.

Tables 1 and 2 also reveal the wide range of economic purposes for which Soviet foreign investments have been made. Of the 114 companies whose principal activity could be clearly established, 50 (44 percent) are engaged primarily in the trading and marketing of Soviet products. Another 47 (41 percent) are located in other service industries, with transport services accounting for half of these and financial services for 15. Only 17 of the 114 companies (15 percent) are engaged in some form of production. Again we find a difference in the pattern of investment in West and South, with a proportionately greater share of Soviet investments in the South directed to the sphere of material production, and a lower proportion engaged primarily in trading, marketing, and other services.

The predominant legal form for Soviet investments in both West and South is the joint stock company.[10] In the case of the 90 Soviet companies abroad (in both areas) in which the ownership structure

[10] The limited liability company is also used. Within these forms, the organization of Soviet companies abroad varies according to conditions imposed by host country legislation. The legal and organizational aspects are described by Voznesenskaia (1977).

could be determined, 30 percent are wholly Soviet owned, while in another 51 percent Soviet equity represents a majority holding. In only 10 percent is Soviet equity equal to that of foreign investors, and in less than 9 percent does Soviet equity represent a minority interest. The data show a clear Soviet preference for control through majority ownership.

Once more, however, there is a difference to be noted in the pattern, here in terms of ownership, between Soviet investments in the West and in the South. In the South, Soviet equity can be identified as equal to that of local partners, or to represent a minority interest, in 57 percent of the cases; while in the West, equal or minority equity is the identifiable ownership pattern in only 12 percent. Thus on the criterion of degree of equity, Soviet operational control is clearly established by the data in the overwhelming majority (88 percent) of companies in the West; whereas in the South it is established in only 43 percent of the cases. On these grounds, although Soviet companies in the West may typically be regarded as "subsidiaries," the label should be applied more cautiously in the South, where the term "joint equity venture" is more apt in many cases.

In the West (but not in the South), the U.S.S.R. is by far the largest CMEA foreign investor. Soviet companies are more numerous and are on average larger and more diversified in function than are companies established in the OECD countries by other CMEA countries.[11]

The capitalization of the 92 companies in the West in which Soviet participation has been established is estimated at close to $290 million.[12] Most of this capital ($280 million) is Soviet equity. The total includes more than $240 million invested in nine wholly owned Soviet banks and insurance companies abroad. Soviet investors are estimated to have contributed approximately 80 percent of the $50 million of equity invested in companies established in other sectors, with the balance provided by Western partners.

Data on the capitalization of the 25 Soviet companies in the Third World is sketchy. A very rough estimate on the basis of the information available places total capital invested in these companies at between $30 and $35 million. Since Soviet equity participation in companies in the South is, on average, lower than in the West, the Soviet share of total capital invested in them is proportionately lower, an estimated $16 million.

The real value of Soviet foreign investment has been increasing rapidly, through the establishment of new, and the expansion of existing, companies. Of the 117 companies with Soviet equity in the West and South, an estimated two-thirds have been formed since 1970. Soviet foreign investments are diversifying as well as expanding. While the spate of new banks established in Western Europe in the early 1970's has abated, investments are increasingly being directed to other service activities and to the extractive and manufacturing sectors. Follow-

[11] See McMillan (1979) for a discussion of the more general phenomenon of CMEA foreign investment and for comparative data on investments by individual countries.

[12] Since data on capital assets could not be obtained in every instance, average values were computed and ascribed to comparable companies for which no figures were available. Because the functional diversity of Soviet foreign investments permits no single measure of their size and extent, we shall apply other measures (value of assets, sales turnover) in our discussion of the principal functional categories below.

ing general Western practice, expansion and diversification are financed, wherever possible, through reinvested profits and local borrowings rather than through the export of capital from the home country.

IV. Functional Attributes

A. Trading and Marketing

We have seen that nearly half of the Soviet companies abroad are engaged primarily in trading and marketing. Each typically operates within the range of products exported by its parent, foreign trade enterprise (FTE) in the U.S.S.R. Presently, most are engaged in the marketing of Soviet machinery and industrial equipment (machine tools, agricultural machinery, and transport equipment are the principal categories); but some handle intermediate industrial products (especially chemicals), or primary and semiprocessed goods (petroleum, lumber products). A few deal in foodstuffs and various consumer manufactures.

Soviet trading companies abroad are by no means a new phenomenon. The oldest, the Russian Wood Agency, Ltd., was established in London in 1923. Their number has greatly increased, however, in just the last decade. Moreover, the newly established companies tend to handle manufactured goods rather than primary products. At the same time the range of functions performed has expanded, to include a number of marketing operations as well as purely trading activities. There has thus been a rapid evolution from a handful of trading companies, dealing in a few, traditional, resource-intensive exports, to a substantial number of more diversified, marketing companies, handling a more representative range of Soviet industrial products.

Increased investment in marketing facilities abroad in the 1970's has been a response to the exacerbation of two longstanding problems in Soviet foreign trade. The U.S.S.R. has suffered chronic deficits in its hard currency balance of trade, and underlying this imbalance has been an unresolved structural problem. The composition of exports to the West has failed to reflect the U.S.S.R.'s increasing industrialization, and there has been continued reliance on traditional raw materials exports. These old problems have grown in severity as large-scale imports of Western capital goods and technology have produced mounting trade deficits, and as the resulting indebtedness to the West has reached record proportions. At the same time, the secular rise in the production costs of traditional raw materials exports, and the prospect of their increasing domestic scarcity, while temporarily alleviated by improved terms of trade, have dictated a longer term search for new exportables. These circumstances have prompted a drive to increase hard currency earnings through an expanded volume of exports, especially exports of manufactured goods.

The expansion of manufactured exports has been pursued through a combination of policy measures and institutional changes. The Soviet leadership has emphasized the need to gear domestic investment to the development of new, export-oriented industries. At the same time, there has been increased attention to the techniques of export marketing, and a recognition that traditional instruments are no longer adequate to the task.

Exports of primary products could, for the most part, be adequately handled by official, Soviet trade delegations established abroad, or by foreign agents, employed on commission. Cultivation of a continuing market in the West for industrial machinery and equipment or for consumer manufactures, on the other hand, requires not only detailed knowledge of product technology and the needs and preferences of customers, but rapid and flexible servicing of their demands. Trade delegation officials cannot generally cope with the specialized knowledge and attention required by more sophisticated products and markets. Local agents have also been increasingly regarded as unsatisfactory to the purpose. Their interests are seen as frequently failing to coincide with those of the Soviet enterprises which they are hired to represent. Pursuit of profits often encourages them to pay less attention to Soviet products than to the more readily marketable products of other clients, which may in some cases be in direct competition to Soviet exports. Subsidiary companies, on the other hand, provide exclusive marketing services, are more likely to keep parent FTE's informed of competitive developments and can undertake more ambitious advertising and promotional campaigns.[13]

The infrastructure required for the marketing and servicing abroad of machinery and equipment (warehousing and support facilities, dealer networks, and technical service centers) has further dictated direct investment in foreign subsidiaries. The response to this infrastructural requirement is shown in tables 1 and 2 which reveal that the overwhelming majority of Soviet trading companies abroad now engage in such related, marketing functions as product modificaton and servicing.

While these ancillary activities are commonplace in the international marketing of industrial equipment and consumer durables, in the Soviet case poor or inappropriate finishing or styling have added to the need for special facilities abroad to adapt products to more demanding Western markets. Varying technical standards and consumer preferences have dictated the establishment within national markets of facilities for presale product servicing and/or adaptation. Large foreign markets have required the creation of networks of distribution and technical service centers.

The Soviet All-Union Association (V/O) Stankoimport, for example, has established foreign marketing companies in several Western countries. In Canada, its subsidiary Stan-Canada Machinery Ltd. has an impressive, multimillion-dollar headquarters building in Toronto, with large showrooms for its line of machine tools and built-in warehousing and staging areas. Similar, but smaller facilities have been established in Montreal; and others are contemplated for western Canada.

The average value of capital invested in Soviet companies abroad engaged in trading, marketing, and ancillary operations is approximately $700,000. The capitalization of individual companies ranges widely, however, from well under $100,000 for small agency companies to several millions of dollars for large firms engaged in a broader range of services. For example, the Soviet oil company Nafta-GB Ltd.,

[13] The rationale for Soviet investment in foreign marketing facilities is well presented by Engibarov (1977).

headquartered in London, had a capitalization in 1978 of over $2 million, reflecting investments in its sizable storage and distribution facilities. Hard currency constraints often dictate that a Soviet parent enterprise limit its direct capital contribution, and invest indirectly by extending generous supplier credits to its foreign marketing subsidiaries. Such loans can be an important source of working capital for these companies.

The value of sales is a better measure of the activities of Soviet companies abroad engaged in trading, marketing, and closely related services. The total value in 1977 of Soviet exports arranged through such companies is estimated at over $2.3 billion. In the West alone, the value of goods imported from the U.S.S.R. in 1977 by Soviet subsidiaries is estimated at $2.1 billion, or 18.5 percent of total Soviet exports in that year to the 17 OECD countries in which they were located.

In comparison with their East European counterparts, Soviet companies in the West tend to concentrate more on industrial than consumer goods and to specialize in a narrower product range. This product specialization has in turn forced Soviet trading companies more frequently into functional diversification, extending their operations into distribution and servicing. In consequence, Soviet companies are much larger on average than other Comecon marketing companies in the West, as measured both by value of fixed assets and by sales turnover.

Hard data on the performance of Soviet marketing companies abroad are too spotty to permit generalization; moreover, in many cases the record is too short to permit reasonable assessment. Mistakes have been made both in the initial investment decision and in the subsequent management of subsidiaries. There are also examples, especially in the Scandinavian and some other Western European countries where Soviet companies have a longer history, of well-established companies which have undergone a record of impressive expansion to enjoy a substantial share of the local market.

In seeking to develop foreign markets for Soviet manufactures, Soviet subsidiaries have faced serious difficulties. They have not only had to surmount significant tariff and nontariff barriers to Soviet imports, but more importantly have had to confront buyer unfamiliarity with, and even prejudice against, Soviet products.[14] Many were just getting started in the mid-1970's when Western markets for their products began to collapse.

They have also had to contend with serious backup problems. The establishment of foreign subsidiaries has not resolved chronic problems of poor quality and erratic supply from producers at home. These have often prevented subsidiaries from serving foreign markets in the more flexible manner intended. Effective product servicing, for example, requires more than qualified staff and well-equipped local facilities; it demands a continuous supply of spare parts, in adequate volume and assortment.[15]

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[14] These barriers have varied in nature and intensity from country to country; quantitative restrictions (in Western Europe), lack of MFN (in the United States) and the administration generally of antidumping regulations have been the most important.

[15] The equity participation in a number of foreign companies of V/O Zapchastexport (which exports spare parts for several important categories of Soviet machinery and equipment) has been designed to alleviate the parts supply problem.

The divergence of interests which potentially exists in any parent-subsidiary relationship is compounded in the Soviet case, because while the subsidiary operates in a market context, the parent works under the strictures of a central economic plan. Subsidiaries tend to be concerned with profits, for profitability is the basis of their survival and expansion in the market. At the same time, they have had to be concerned with sales turnover targets imposed by parents. Thus the objectives of parent and subsidiary have not always been in harmony. Any such divergence of interests is wider, or at least more apparent, when ownership is shared with a foreign partner. This is no doubt an important reason why most Soviet marketing companies in the West (especially those which represent a substantial investment) are wholly, or overwhelmingly, Soviet owned; and why in several cases, Soviet enterprises have bought out their foreign partners after several years of operation.

The proliferation and expansion of Soviet marketing companies abroad in the 1970's represents an important evolutionary development in the Soviet foreign trade system, of which they constitute an organic extension. As a result, the locus of operational decisionmaking in Soviet foreign trade has been shifted outwards, away from Moscow. Western firms are increasingly able to negotiate commercial contracts with Soviet FTE's through the latter's foreign subsidiaries.[16] The new format combines the convenience of negotiating in the West with the advantage of dealing directly with an agency of the responsible FTE. Soviet trading companies abroad can also play an important role in countertrade arrangements; and in fact may possess exclusive marketing rights for specified Soviet products in designated foreign markets. They may also act as purchasing agents for Soviet parent enterprises, although purchases for export to the U.S.S.R. at present constitute a small share of their total turnover. Some have even undertaken to represent Western firms in Moscow. For example, the large Soviet chemical firm in France, Sogo et Cie, S.A., has a representative office in Moscow through which it is prepared to handle the affairs of Western clients.

B. Production

Soviet investment in facilities for foreign production is as yet quite limited. Tables 1 and 2 show that 17 Soviet companies abroad have been identified as engaging in some form of material production (including both manufacturing and natural resource exploitation). Eight of these are located in the developing countries, so that the share of Soviet investment in the Third World undertaken directly in the sphere of production is much higher (32 percent) than in the industrialized West (9 percent).

1. MANUFACTURING

We have been able to identify only eight Soviet companies abroad as engaged in some form of manufacturing, and the identification of

[16] New procedures instituted in 1978, intended to facilitate contracting abroad by liberalizing signing requirements, reflect the fact that an increasing number of major contracts are signed outside the U.S.S.R. See East-West Markets, July 10, 1978, p. 4.

one of these remains tentative (see table 2). Most of these companies are engaged in limited forms of manufacture: they prepare a product for sale on foreign markets on the basis of materials or components, most of which have been shipped from the U.S.S.R.

These processing and assembly operations have been established in order to serve local markets more effectively by undertaking the final stage of manufacture abroad, and by adding Western components as necessary to meet local market requirements. Transport costs and higher tariffs on finished goods have contributed in individual cases to the decision to shift the final stage of processing abroad. For example, in 1976 V/O Mashpriborintorg established a factory in Besançon, the French watch capital, to mount Soviet watch mechanisms in French watch cases. The EEC tariff on watches was reportedly a factor in the investment decision.[17] The Slava enterprise, employing some 60 to 100 workers, began operations in 1977 with an annual output of 250,000 watches.

Such operations are more typically performed as ancillary functions by the larger and more specialized Soviet marketing companies abroad. For example, Konela O/Y, a subsidiary of V/O Avtoexport, is its parent's exclusive agent in Finland and has a nationwide sales and service network through which it markets Soviet automobiles, motorcycles, and trucks. In order to improve its market share, Konela has become heavily involved in the presale preparation, and in some cases extensive alteration of the vehicles, including the installation of Western components.[18]

2. NATURAL RESOURCE EXTRACTION AND PROCESSING

Nine companies are involved in the exploitation of foreign natural resources. All of these are joint ventures established abroad by Sovrybflot, an enterprise subordinate to the Soviet Ministry of Fisheries. These joint ventures follow a consistent pattern, regardless of location. Equity is typically shared equally (50–50) by Sovrybflot and its foreign partner(s).[19] The joint venture provides port and service facilities to the Soviet fishing fleet and its factory ships, and markets part of the processed catch locally, while the remainder stays in Soviet hands for domestic consumption or reexport.[20]

The establishment of such joint ventures is in large part a Soviet response to the establishment of national, 200-mile coastal economic zones.[21] These regulated zones threatened in the mid-1970's to disrupt the operations of the Soviet fishing fleet, in which the U.S.S.R. had invested heavily over the previous decade. Joint ventures permit Sovrybflot to share in the partner's national privileges with regard to catch quotas. Joint ventures also insure access to support facilities on shore, and in this respect may in some areas have potential strategic significance.

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[17] "Soviet Business and Trade." May 26, 1976, p. 4.
[18] See McMillan (1977), app. F, for further details on Konela's activities.
[19] In at least two of the fishing ventures in the Third World (Iraq and Sierra Leone) Soviet equity is less than 50 percent.
[20] McMillan (1977), app. K, provides several examples of such ventures.
[21] Martens (1978) discusses the Soviet and East European response to the creation of a U.S. zone.

Outside the fishery industry, the Soviet Union has thus far not employed equity investment as an instrument by which to gain access to Third World raw materials, as have several East European countries (especially Romania, but also Poland and Czechoslovakia). Of course, the Soviet need is less pressing, given its own rich natural resource endowments. In the case of those mineral resources in which it has shown an interest (for example, bauxite, phosphates), it has tended to "invest" in them indirectly, by providing liberal credits for LDC imports of the Soviet capital goods and technology required for their exploitation, and by taking repayment in the form of a designated share of the resulting output (the so-called compensation format).

C. Financing

The trading functions of Soviet companies abroad, as well as their related marketing and manufacturing activities, are supported by a well-established infrastructure of Soviet banks and other financial companies. While this complementarity of function with respect to East-West trade remains fundamental, it is important to note that Soviet financial operations have extended to other, unrelated areas of banking and insurance.

Soviet banks have operated abroad since shortly after the Revolution. With the postwar expansion of the older banks and the addition of new banks and branches in the course of the 1960's and 1970's, there is by now a well-established Soviet presence in international banking, especially in Western Europe. The phenomenon of wholly owned Soviet banks operating extensively, and on the whole successfully, within the capitalist banking sector has attracted a considerable amount of popular, as well as more scholarly, attention in the West.[22]

There are now seven Soviet banks abroad which, together with their branches, are located in nine different countries. Most are concentrated in the principal Western European financial centers: London, Paris, Zurich, Frankfurt, Vienna. There are also Soviet banks operating in financial centers of the Third World: Beirut, Teheran, and Singapore.

Table 3 lists the seven banks and their branches, and provides basic information on their age, ownership, and size. While the oldest banks have been operating for more than half a century, the majority have been founded in the last decade and a half, in a wave of bank expansion which began with the establishment in 1963 of a Beirut branch by the Moscow Narodny Bank Ltd. of London. All seven are wholly owned by Soviet banks and other Soviet economic organizations, at home and abroad. Gosbank is a partner in all, and Vneshtorgbank in all but one. The combined assets of the seven Soviet banks had by 1976–77 reached nearly $8 billion. Three-fourths of these assets, however, are held by the two oldest and largest Soviet banks abroad, Moscow Narodny and the Banque Commerciale pour l'Europe du Nord, S.A., of Paris ("Eurobank").

Soviet banks abroad serve a variety of useful purposes for their Soviet owners. They provide a channel to Western national and international money markets for the financing of Soviet imports of Western plant and technology. They facilitate the investment of CMEA

[22] The most important recent study is by Rabin (1977).

TABLE 3.—SOVIET BANKS LOCATED ABROAD, AS OF MARCH 1979

Name	Year established	Ownership[1]	Millions of U.S. dollars	
			Capital[2]	Assets[2]
Moscow Narodny Bank Ltd., London (branch banks in Beirut, Singapore).	1919	Gosbank, 16 percent, Vneshtorgbank, 84 percent.	73	2,480
Banque Commerciale pour l'Europe du Nord (Eurobank) S.A., Paris.	1921	Gosbank, 48 percent; Vneshtorgbank, 21 percent; other soviet interests, 31 percent.[3]	72	2,925
Russo-Iranian Bank, Teheran (branch in Isfahan).	1923	Gosbank, 16 percent; Vneshtorgbank, 84 percent.	4	171
Wozchod Handels Bank AG., Zurich	1966	Gosbank; Moscow Narodny Bank Ltd., 100 percent.	27	248
Ost-West Handelsbank AG., Frankfurt	1971	Gosbank, 24 percent; Vneshtorgbank, 18 percent; other Soviet interests, 58 percent.[3]	26	757
Donau-Bank, AG., Vienna	1974	Gosbank, 60 percent; Vneshtorgbank, 40 percent.	7	220
East-West United Bank, S.A., Luxembourg	1974	Gosbank, 15 percent; Vneshtorgbank, 13 percent; other Soviet interests, 72 percent.[3]	16	806

[1] All Soviet banks abroad are 100 percent owned by Soviet interests.
[2] All capital and asset figures are for end-1976 with following exceptions: capital and assets of Moscow Narodny and Eurobank are end-1977 and capital of Russo-Iranian bank is end-1968.
[3] Includes other Soviet domestic banks, other Soviet banks abroad, and Soviet FTE's.

Source: East-West Project, Carleton University.

hard currency funds in the West. They also help to insure the privacy of Soviet financial operations abroad; and this last function has been especially important with regard to maintaining the secrecy of Soviet gold sales on international markets. They provide useful financial data and analysis of international monetary developments, to which their operations within the Western banking sector give them access. They also allow Soviet banking officials to gain experience and expertise in international finance. Over the postwar period, most of these functions have been conducted as well on behalf of other CMEA countries. With the more recent increase in the banking facilities in Europe of other Comecon countries (Poland, Hungary, Romania, Cuba), this intermediary role has declined in importance, however.[23]

Individual banks were either established to perform, or have subsequently developed, particular functions.[24] Thus Moscow Narodny, which styles itself "The Bank for East-West Trade," has sought to attract Western funds for the financing of East-West commerce. Eurobank, on the other hand, has functioned primarily as an intermediary in inter-bank operations, allowing the hard currency funds of Soviet and other banks in the East to be placed profitably in Western banking institutions. Wozchod Handels Bank, AG, is principally engaged in gold sales on the Zurich market. The Ost-West Handels bank AG of Frankfurt finances Soviet-FRG trade, in particular the sale on the Frankfurt exchange of Soviet diamonds and other precious stones.[25] The East-West United Bank SA, of Luxembourg, the most recent Soviet bank to be established in the West (1974), has taken advantage

[23] Wilczynski (1976) and Glazewski (1978) describe the expansion of Comecon banking facilities in Europe.
[24] See Rabin, op. cit., for a discussion of the activities of Soviet banks abroad founded prior to 1973.
[25] In this respect, it may be noted that V/O Almazjuvilerexport established a Frankfurt subsdiary (Russalmaz AG) in 1975 to trade in gems, precious metals, and jewelry.

of the legislative conditions for international banking in Luxembourg to engage in Euromarket operations and to finance Soviet trade with the Benelux countries. It is interesting to note that all of the Soviet banks in Europe took an equity share in East-West United Bank, suggesting that they too may have wished to make use of it as a flexible instrument for operations on Eurocurrency markets.

The operations of Soviet banks have been increasingly directed to the generation of long-term funds to finance Soviet hard currency imports. For this purpose, Soviet banks have been especially active in Eurocurrency financing. The activities of both Moscow Narodny and Eurobank in fact involved them in a signficant way in the formation of the Eurocurrency markets in the late 1950s and early 1960s.[26] By no means all of the Soviet banks' participations in international financing have been on behalf of Eastern clients or in support of East-West trade. Moscow Narodny, in particular, has engaged in international financial operations not directly related to East-West trade. It has also been active in domestic financing in the United Kingdom.

Through the operations of its banks in Europe, as well as banks located directly in the LDCs, the U.S.S.R. has sought to extend its commercial and financial presence in the Third World. Moscow Narodny has long served as the London correspondent for client banks in the LDCs and has participated in the financing of trade and capital projects in the Third World. The opening of a branch in Beirut in 1963 was clearly intended to boost Soviet exports, especially of manufactures, to the entire Middle East.[27] After slow initial growth, the branch bank reportedly prospered in the late 1960s and early 1970s, and despite the disruptions of the Lebanese civil war, was reported still in operation in late 1978.

The opening of a Moscow Narodny branch in Singapore, in 1971, further extended Soviet banking operations into the Third World. While the bank was intended primarily to assist the development of Soviet trade with Southeast Asia and Australasia, it also provided a channel through which Moscow Narodny could operate conveniently on the Asian-dollar market. The bank grew rapidly until 1976 when it ran into serious difficulties. At that time, a number of the highly risky ventures which it had financed (reportedly including a Bangkok gambling casino and speculative land development schemes throughout Southeast Asia and Australia) proved unsound; and by the end of 1976 it was faced with bad or doubtful debts amounting to an estimated $100 million.[28] The bank's difficulties attracted a good deal of rather gleeful Western publicity to what was in fact an exception to the generally sound and successful record of Soviet banking operations abroad. After a change of management, the bank remains operative on a less flamboyant scale, although faced in the courts with several suits resulting from the affair.

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[26] Robbie (1976) has documented this involvement.

[27] Rabin, op. cit., pp. 128–129.

[28] Cf. Wilczynski (1978), p. 35. As a result of defaults on its loans, the bank has acquired control of properties in Singapore and Hong Kong. Some observers have seen the entire incident as a deliberate ploy to acquire important assets which would purportedly otherwise not have been allowed into Soviet hands. (See Soviet Analyst, Oct. 11, 1978, pp. 5–6 and Times-Post News Service dispatch from Hong Kong in The Citizen, Ottawa, Oct. 19, 1978, p. 49.) Monab Nominees Pte. Ltd., another Singapore subsidiary of the London bank, may be the vehicle through which Soviet equity in these properties is held.

The vicissitudes experienced by the Soviet banks in the Middle East and Southeast Asia show that Soviet investments are not immune to the risks endemic to more politically and economically volatile areas. The Soviet bank in Teheran has a much longer history; and while it is the only one of a number of joint Soviet-Persian ventures established in the early 1920's to survive, its fortunes have followed, and will undoubtedly continue to follow, the course of Soviet-Iranian relations. Wholly Soviet-owned since 1954, its primary function is to promote bilateral trade. As table 3 shows, it remains small, although a branch was opened in Isfahan in 1974. (Reports as this goes to press suggest that the Soviet bank may be nationalized with other foreign banks by Iran's new revolutionary government.)

The two principal Soviet banks abroad, Moscow Narodny and Eurobank, extended their activities into other new areas with the establishment in 1973 of two joint ventures for lease financing with Western partners. In both cases the partners selected were prominent capitalist banks. Moscow Narodny's venture with Morgan Grenfell is located in London and operates under the name "East-West Leasing"; while its Paris counterpart is "Promolease," jointly established by Eurobank and Credit Lyonnais. The activities of these companies are not limited to the lease of Western capital equipment to Soviet and East European enterprises; they also rent equipment purchased from CMEA countries to Western clients.

Insurance, like banking, is a well-established area of Soviet financial activity abroad. In contrast to the leasing ventures just described, Soviet insurance companies in the West have a long history and are wholly Soviet owned—in this case the parent is the Soviet state insurance company Ingosstrakh. Two of the three Ingosstrakh subsidiaries were established before the war; the oldest, Black Sea and Baltic General Insurance Co. Ltd. of London, was established in 1925, while its German counterpart, Schwarzmeer and Ostee Transportversicherungs AG, was first founded in Hamburg in 1927 and reestablished after the war. The third, Garant Versicherungs AG, is based in Vienna and has been in operation since 1958. All three underwrite Western export and import transactions with the Soviet Union and other socialist countries, and thus, like the Soviet banks and leasing companies, they are primarily intended to facilitate East-West trade. However, their trade financing now extends beyond marine and overland transport insurance to a full set of insurance services related to East-West trade: nonpayment insurance, manufacturing-risk insurance, and insurance designed to cover risks incurred over the installation and run-in periods of capital projects. Diversification has also extended to profitable insurance services not related to East-West trade, such as accident, fire, and life insurance. Garant provides transit insurance for goods shipped from Western Europe overland to Asia through Eastern Europe and the U.S.S.R. Black Sea and Baltic is even reported to have participated in the underwriting of U.S. direct investments in the developing countries, under the expropriation insurance program of the U.S. Overseas Private Investment Corporation (OPIC).[29]

[29] The Times, London, Apr. 24, 1972, as reported and discussed in a Radio Liberty Dispatch, Apr. 27, 1972. While this may have been simply a cooperative gesture at the height of détente, it may well also have been intended to encourage Western firms to subcontract portions of Third World projects to CMEA suppliers.

D. Transport and Other Sources

The remaining functional categories under which Soviet foreign investments are reported in tables 1 and 2 are transport services and a miscellaneous service category. Soviet companies in this last category provide various technical services.

1. TRANSPORT COMPANIES

Soviet transport companies abroad are involved in both maritime and overland transport. Most perform agency functions, but some are engaged in actual transport, or closely related, activities.

Thirteen are subsidiaries of V/O Sovinflot, the general agent of Soviet shipping lines, subordinate to the Ministry of the Merchant Marine. They form part of Sovinflot's extensive network abroad, which includes as well representative offices and foreign agents employed on commission. Sovinflot's subsidiary companies abroad secure cargoes, coordinate liner activities, and generally provide agency services for Soviet shipping lines. They also organize stevedoring and other services for Soviet vessels in local ports. Brokerage functions in the chartering of both Soviet and foreign ships are performed by the family of companies abroad controlled by V/O Sovfracht.

The establishment of Soviet companies in major world maritime centers reflects the rapid development of the Soviet merchant fleet and its operation on a global scale.[30] In order to establish direct foreign bases for its activities, Sovinflot has bought into, or taken over, foreign agencies, and in some cases has founded new firms. These investments have been designed to insure that local agency and support operations are managed in accordance with Sovinflot's increasing foreign interests and to reduce its hard currency outlays in agency commissions and fees. By establishing its own agencies and facilities in key locations abroad, Sovinflot is following an institutional path well broken by its major Western competitors.

In North America, for example, Sovinflot has established an umbrella company in New Jersey, Morflot America Shipping Inc., with agency responsibility for American ports. On the Northwest coast, Morflot Freightliners Ltd., based in Vancouver, represents Soviet Far Eastern shipping lines, which are heavily engaged in crosshauling between Japan and British Columbia.

Soviet shipping companies abroad also engage directly in sea transport. For example, Saimaa Line O/Y, a Finnish-Soviet shipping company, transports container and bulk cargoes between Western Europe and the U.S.S.R., thereby relieving pressure on Soviet Baltic ports.

V/O Sojuzvneshtrans, subordinate to the Ministry of Foreign Trade, is responsible for the transportation of goods into and out of the U.S.S.R. Goods shipped overland between Europe and Asia, through the U.S.S.R., have become an increasingly important area of its responsibility. As a result, Sojuzvneshtrans has established subsidiary companies in Cologne, Vienna, Teheran, and Kabul to provide storage, transport, and forwarding services, and to coordinate the activities of foreign agents employed for the transportation of goods in transit.

[30] Cf. Haymen (1976).

2. OTHER SERVICES

The Soviet companies listed under "other services" in table 1 (none has been identified in this category in the developing countries) are for the most part engaged in the provision of various technical services. For example, V/O Electronorgtechnica, which is responsible for the export and import of Soviet electronics equipment and parts, has established three subsidiary companies in Western Europe (in Finland, the Netherlands, and Belgium) to provide computer services to Western clients. These companies are seeking to develop a Western European market for Soviet computers by renting and servicing equipment, producing related software, and adapting Western peripheral equipment to Soviet-made, Minsk, and Ryad computers. They are also well placed to report to their parent in Moscow on developments in the Western computer industry. Other Soviet companies in this category provide technical services to the fishing and shipping industries; still others act as more general engineering and commercial consultants.

V. Soviet "Multinationals"?

Given the facts presented in the preceding sections on the nature and extent of Soviet investment in business enterprises abroad, the following question naturally poses itself. Are we witnessing the multinationalization of Soviet enterprise? [31]

We have identified 44 economic organizations in the Soviet Union which hold equity in at least one company located outside the U.S.S.R Of these, 22 have a majority, and therefore clearly controlling, interest in at least one foreign company. An equity interest (majority or minority) in two or more companies abroad is held by 32 enterprises and banks in the U.S.S.R., while 19 hold equity in five or more companies abroad. Moreover, a number of Soviet companies abroad have themselves become direct foreign investors, establishing their own branches or subsidiaries in other countries. Many have also participated as minority partners in the establishment, with enterprises in the U.S.S.R., of new Soviet companies abroad, often outside their own countries of location.

In the course of the preceding discussion, we have made reference to a number of organizations in the U.S.S.R. with multinational investments (Ingosstrakh, Sovrybflot, Electronorgtechnica, among others). One further example may serve to illustrate the foreign investment activity of Soviet enterprises.

V/O Avtoexport is, under the Ministry of Foreign Trade, the Soviet state monopoly for the export of motor vehicles. It sells abroad the products of over 130 Soviet enterprises in the automotive industry, including passenger cars, trucks, buses, motorcycles, specialized vehicles, garage and repair equipment, and spare parts. While its major export markets are in the socialist countries, Avtoexport's sales to the West have been growing at annual rates of 15 to 20 percent and are gaining in relative importance. Avtoexport markets

[31] This question is discussed at greater length in McMillan (1979). Here only the outlines of the argument will be presented, and solely in terms of Soviet foreign investment.

abroad through an international network of over 3,500 authorized dealers and service centers. In important markets such as the United Kingdom and the United States (in both of which the Satra company is its agent for the Lada car), it has chosen to work through a local company rather than to invest directly in its own facilities. On the other hand, in Scandinavia (Finland, Norway, and Sweden) and in the Benelux area, it has made extensive direct investments. Its Belgian subsidiary, Scaldia-Volga, has a large technical-commercial headquarters facility in Diegem, near Brussels, and showrooms and service centers in all the large Belgian cities. With its own Dutch subsidiary, Scaldia-Volga operates a network of (several hundred) dealers and agencies throughout Belgium and the Netherlands. The company maintains a terminal for its cars in the port of Antwerp, and also has a branch office in Switzerland. In addition to its European subsidiaries, Avtoexport has established two companies in Africa, in Cameroon, and in Nigeria.

Soviet companies abroad are staffed largely by local employees. Moscow Narodny Bank is reported to employ some 300 persons, of whom only a dozen are Soviet citizens; while Eurobank had a local staff of over 350 in 1977.[32] Some of the Soviet companies engaged in marketing and production also employ several hundred host country nationals. In some firms, local employees occupy senior positions, especially in sales management, and may even hold a small equity in the company. Local technical staff have on occasion been sent to the Soviet Union for periods of training.

Soviet nationals tend to occupy top management posts and to form the nucleus of the technical staff in most companies abroad. They are typically permanent employees of the Soviet parent enterprise, and are sent abroad for extended tours of duty. In the case of companies owned by several Soviet organizations, the Soviet staff may consist of personnel assigned by more than one Soviet enterprise. Soviet managers of foreign companies will, in the course of their careers with a parent enterprise, often have held several foreign posts, and as a result many are highly experienced in international business. At the senior level within the Ministry of Foreign Trade (the Ministry to which the majority of Soviet companies abroad are indirectly subordinate), officials may move among positions as chief executive officers of large foreign subsidiaries, as heads of trade missions abroad and as divisional chiefs in the Ministry.

A sizable number of individual Soviet enterprises (at least 22) fall under the U.N. definition of a "multinational," which applies the term to "all enterprises which control assets—factories, mines, sales offices, and the like—in two or more countries."[33] In its totality, Soviet foreign investment has created a geographically extended, multinational network of companies with complex corporate interrelationships. If Soviet foreign trade enterprises and other economic organizations are regarded as elements of a monolithic whole (the "command" economy) and their subsidiaries abroad are viewed as parts of a centralized, multinational system forming the foreign cor-

[32] Wilczynski (1978, p. 46) and Rabin (1977, p. 209).
[33] U.N. Department of Economic and Social Affairs, "Multinational Corporations in World Development," New York, 1973, p. 5.

porate "empire" of a "U.S.S.R. Inc.," then the economic power which foreign investments represent grows in significance. While in terms of the number of companies established and the values of direct investment they represent, the entire Soviet network is not exceptional by the standards of the larger Western multinationals, it is significant in terms of its rapid growth, geographical and functional diversity, and of course, the economic and political power which stands behind it.

Is this image farfetched? The degree of effective centralization of planning and management in the Soviet system can easily be exaggerated. Nevertheless, ministerial organs can pursue a global foreign investment strategy at a level which transcends the authority of the enterprises which are formally the "parents" of foreign subsidiaries.[34] Rabin (1977, p. 50ff) suggests that the network of Soviet banks abroad is controlled by a "supervisory council" in Moscow.

Soviet foreign investment activity is not yet multinational in the standard Western sense of having established extensive foreign production facilities, integrated into a corporate international division of labor. Some Eastern European countries have moved much farther than the U.S.S.R. toward an internationalization of their production operations, especially in Third World locations. Why has the Soviet Union lagged in this regard? Political and ideological objections to following capitalist firms along this contentious route may weigh heavier in the case of the U.S.S.R. which, because of its claims to leadership of the international Communist movement, must be especially concerned about its international image. On the other hand, practical reasons may have been equally important deterrents. There is the time factor. Foreign production tends to follow exports, and Soviet manufactures are still in the process of developing export markets. In this respect, the gradual extension of the activities of Soviet marketing companies abroad into the sphere of production would appear to signal a potentially significant trend. There is also, however, the strict separation of foreign trade from production in the Soviet economic system. The Soviet organizations which are empowered to undertake foreign investments are the specialized foreign trade enterprises; while production enterprises, which would normally be expected to take the initiative in the transfer of production abroad, are isolated from foreign activities.

VI. Prospects and Policy Issues

Soviet foreign investment continues to grow rapidly. In 1970, there were 38 Soviet companies abroad. By early 1979, their number had reached 117.[35] Twenty-six new companies were formed in the 2-year period from 1976 to 1978. Many established companies have expanded and diversified their operations.

The growth of activities based on foreign equity investment shows no signs of abating. With networks of companies covering most of the more desirable Western locations now in place, future growth is less

[34] Legally, of course, Soviet foreign trade enterprises are juridically independent entities and have long been recognized as such by Western courts.

[35] The date of founding could not be definitely established for 15 of the 117, but all, or most, appear to have been founded after 1970.

likely to be so simply revealed in terms of increases in numbers of companies abroad; and we shall have to look to other indicators to measure growth in terms of the expansion of existing companies. Soviet banks, for example, now have subsidiaries in the major Western European financial centers and in strategic locations in the Middle East and Asia. The major remaining gap is North America, where the establishment of a Soviet bank has long been rumored.[36]

The area of most likely continued investment is foreign marketing and servicing, as pressures mount to find new sources of hard currency earnings. For this reason, additional investments in facilities for foreign processing or assembly of intermediate products imported from the U.S.S.R. also seem in prospect. There is plenty of room for expansion of investment activity in the Third World, where the establishment of joint companies has lagged despite obvious interest in providing the LDC's with an effective alternative to Western direct investment.

The growth and diversification of Soviet foreign investment add new dimensions to the evolution of international investment activity and to the course of East-West relations. They therefore raise policy issues in both these areas.

Concern in host countries about direct investment by the U.S.S.R. centers on its being undertaken by: (1) A centralized foreign state; and (2) a foreign state which is regarded as basically hostile. Direct foreign investment by state-owned corporations is common enough in the West. A number of large Western multinationals are publicly owned. Soviet direct investment arouses special concern because of the more centralized governmental control to which it is subject, and because of the possibility that it may be used for purposes inimical to the political, as well as economic interests of host countries.

Published reports of the use of foreign subsidiaries for political purposes are nevertheles quite rare. The Soviet director of Elorg BV, the Soviet computer services company in the Netherlands, was expelled from that country in April 1976, following Dutch allegations that he had used the company's resources to obtain confidential information on NATO aircraft production.[37] The use of Eurobank to exercise financial control over the French Communist Party is alleged in a book recently published in France.[38] On the other hand, private Western multinationals have also on occasion been reported implicated in covert political activities.[39] Therefore this would not appear to be a policy issue for host governments which is unique to Soviet direct investment.

In these circumstances, the operational record of Soviet companies abroad is crucial. Available evidence indicates that they follow familiar commercial norms and that their operations do not differ markedly from those of other foreign-owned firms. Many of the older Soviet companies abroad, especially the larger banks and insurance com-

[36] National banking legislation prevents the establishment of branches or subsidiaries in some desirable locations. This is the case of Canada, although long-impending changes in the Canadian Bank Act could open up opportunities. While foreign banking is permitted in the United States, visa and other administrative restrictions may have acted as deterrents.

[37] East-West Markets, May 31, 1976, pp. 11–12.

[38] Reviewed in the Economist, Feb. 24, 1979, p. 46.

[39] The role which ITT is alleged to have played in the fall of the Allende government in Chile is an example.

panies, have built up solid business reputations. Because of its policy significance, Soviet foreign investment activity should nevertheless be the subject of continuing, objective study.

The Soviet Union's move into the area of international investment is a further step toward its full participation in the mainstream of international economic relations. Significant investments in financial, commercial, and production facilities abroad raise its stake in the order and stability of international markets, and are an indication of its commitment to continued, active participation in the international economy. The practical training abroad of an increasing number of Soviet personnel serves to improve understanding of the market system and possibly even to instill some appreciation of its value.

We have seen that a major goal of Soviet foreign investment activity has been to bridge the gap between the cumbersome, centrally planned domestic production system and the flexible and innovative trading mechanism required to compete successfully on Western markets. In this respect, the shift of operations to foreign locations represents an attempt at partial reform of the traditional foreign trade system. As such, it should be welcomed in the West. To the extent that it succeeds in its primary purpose of adapting Soviet products and services to Western requirements, the benefits accruing to the West from imports from the U.S.S.R. should increase accordingly. Moreover, given the large and persistent imbalances in Soviet trade with the West, improvement in Soviet export performance and the development of additional sources of hard currency earnings are the major hope for the establishment of a healthy base for continued expansion of East-West trade.

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SOVIET ECONOMIC AND MILITARY AID TO THE LESS DEVELOPED COUNTRIES, 1954–78

(By Orah Cooper and Carol Fogarty*)

CONTENTS

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INTRODUCTION

The U.S.S.R. launched its aid program in the mid-1950's to promote Moscow's foreign policy interests in the Third World. In the 24 years since then, the U.S.S.R. has responded to aid opportunities in target areas throughout the world with nearly $47 billion of economic and military pledges to 73 countries. It has trained 50,000 students from 98 developing countries in academic disciplines and nearly 75,000 LDC nationals in military and technical skills. The record for Soviet personnel serving in LDC's in a single year (1978) was nearly 28,000 economic technicians and 11,000 military technical personnel (not including troops stationed in Egypt in the early 1970's).

Moscow's basic political objectives have remained constant—to erode Western influence and substitute its own; to counteract the Chinese challenge to its "leadership" of national liberation movements; and eventually to persuade Third World countries that Soviet Communism offers the only viable solution to their economic problems. To accomplish these objectives, Moscow has provided less developed countries with alternative sources of arms, capital, and technical services on

*Research analysts with the Office of Economic Research, Central Intelligence Agency.

attractive terms. Initially, the Soviets gave preference to emerging states that followed a "noncapitalist path of development" and were on the road toward becoming "national democratic states." Ideology was overtaken by pragmatism in the mid-1960's, when aid was offered with less concern for the political orientation of potential clients.

Anxious to assert a big power image in the Third World, the Soviets tried to fill the vacuum left by the withdrawal of colonial powers, while securing a foothold in areas of strategic importance. Moscow found arms its most direct and fastest route to influence in these countries, which often were able to obtain economic assistance from non-Communist sources, but not military aid.[1] The Soviets also provided military personnel and advanced weapons systems to states and nationalist groups ripe for conflict, most recently to the Arab belligerents in the Middle East and for nationalist movements in southern Africa.

Nearly two-thirds of Moscow's $47 billion commitment and three-fourths of its $32 billion of deliveries since 1954 have been military related. In the first years of the program when some developing countries were reluctant to accept large amounts of military assistance from Moscow, economic commitments roughly equaled the military. In the past 10 years, military aid has outrun the economic 2½ to 1, and for most of those years the Soviets have held second rank, after the United States, as an LDC arms supplier.

Moscow has never been able to compete on a broad scale with the West, either in the size or kind of economic aid programs it has offered. Nonetheless, the heavy regional concentration and high visibility of its program often have given Soviet aid an impact beyond its size. Military aid has been competitive and has given Moscow prestige as a major international arms supplier. While major Western powers would not or could not provide the modern weaponry developing countries craved, Moscow responded rapidly, often with favorable payment conditions. Because many new states felt that their political futures and even their survival hung on military stature and assured arms supplies, the Soviets were able to entangle many military clients in a web that deepened and prolonged their dependence on the U.S.S.R.

Moscow can respond quickly to crises with air- and sea-lifts of large numbers of men and materiel to trouble spots. Its most spectacular operation was in the 1973 Middle East war when the Soviets poured $4 billion worth of arms into Arab belligerents' inventories within 15 months. The 1975 venture into Angola was another bold display of Soviet supply capability. This was followed in 1977–78 by massive support to Ethiopia—on a scale unprecedented in the Soviet arms supply record for a single country.

Economic assistance is viewed by Moscow as a low-cost expedient for forging links with the developing world. On few occasions has this aid—or the trade which has emanated from it—been cut off as a result of political changes in LDC's, strained relations between LDC's and the U.S.S.R., or changes in Soviet military supply policy toward a particular LDC. In Egypt, for example, Moscow's aid and trade programs continue in spite of Cairo's abrogation of major military and friendship treaties in 1976. While economic aid provides the mate-

[1] Military sales and aid are used synonymously throughout this paper.

rials, personnel, and ideas to encourage the growth of socialist institutions in aid-receiving countries, it also has established relationships which sometimes help assure the U.S.S.R. certain strategic raw materials and goods and services from the LDC.

Operations of the Program

Moscow's first important use of aid was in Egypt. Using Czechoslovakia as a front, the Soviets answered Nasser's call in 1955 for arms with a $250 million military aid package. The accord opened the door for a large Soviet military and economic presence in the Middle East. Egypt's acceptance of Soviet arms was followed by Western refusal to construct the Aswan Dam and a Soviet economic aid commitment to Egypt that reached nearly $1½ billion. The $4 billion arms supply relationship that evolved required some 17,000 Soviet military personnel (including troops) in 1971 to maintain it and created a relationship that crippled Egyptian military readiness after the cutoff of Soviet supplies.

Economic and military assistance programs usually have worked in tandem. Generally, major military aid recipients accepted arms aid first, often during periods of perceived threats. These have frequently come with liberal terms, such as: (*a*) Discounts from list prices, which averaged 40 percent but were as high as 75 percent; (*b*) repayments stretched over 8 to 10 years, at 2 percent interest; and (*c*) payments in LDC commodities, rather than hard currency. Terms are no longer as concessional, and most sales, even to long-established recipients, are at higher prices than in the past and often for hard currency or oil. Discounts are no longer typical and in some cases prices may even be above those charged other customers.

Moscow's economic and military aid has been limited by historic ties and political affinities of LDC's. Thus, despite apparent Soviet willingness to sell to almost any less-developed country, arms sales have been heavily concentrated in the same areas where Soviet economic aid has been extended. The largest share of the military and economic assistance has gone to nations on the Soviet borders, as well as to radical North African-Middle Eastern States. Together these countries have received more than 55 percent of Soviet economic aid commitments and nearly 50 percent of the military.

Military

By 1974–78, Soviet military sales accounted for about 20 percent of the nearly $125 billion world sales to LDC's, while deliveries represented more than 25 percent.[2] Through these sales less developed countries were able to obtain a wide array of modern military equipment, including their first jet fighters, supersonic jets, guided missile systems, and missile attack boats. Soviet sales in 1974–78 averaged $3.3 billion annually (in actual prices charged; $4 billion in U.S. production costs), and accounted for 55 percent of the nearly $30 billion of LDC arms orders placed with the Soviet Union in 1955–78.

[2] The Soviet share of world arms sales and deliveries is derived from estimates of what it would have cost to produce and export the Soviet arms in the United States. By using U.S. costs, Soviet sales are put more nearly on a world market price basis for greater comparability with other supplier costs. In general, U.S. costing raises estimates of Soviet arms sales and deliveries (from the actual prices charged by the Soviets) by about a third.

Economic

The Soviet $17 billion economic aid program has had a very different history. Deliveries have been slow, LDC's could get the aid elsewhere, and they could often obtain newer technology from non-Communist sources. Project aid, the backbone of the program and always difficult to administer, has sometimes brought more grief than blessings. The program, initiated in 1954 by the flamboyant Khrushchev, pledged large amounts of development assistance which Moscow later found it could not always deliver as rapidly as expected by LDC's. After the first decade of aid and only 40 percent of the $3 billion commitment was delivered, commitments were made after more careful studies to assure project viability. Gradually fewer open lines of credit for development were offered. These were first replaced by commitments to specific projects and more recently by more general framework agreements. These newer agreements in principle, which specify broad outlines for cooperation, are intended to allow flexibility in project negotiations and implementation.

The basic operation of the economic aid program has not changed much over the more than two decades of its history:

(*a*) Economic aid is still targeted at a few recipients that receive large credits often for highly visible, heavy industrial projects in the public sector.

(*b*) Almost all Soviet aid is tied to equipment purchases in the U.S.S.R. Rarely are commodities or hard currency extended.

(*c*) Moscow provides extensive technical assistance to help overcome the lack of local skills in implementing and operating aid projects. The U.S.S.R. dispatched nearly 28,000 Soviet technicians to LDC's in 1977 and 1978, of which 65 percent acted as advisers and training officers on Soviet aid-assisted projects. These technicians have conducted geological surveys, drawn up plant designs, and supervised and performed technical tasks in the construction and operation of some 1,100 projects which the U.S.S.R. has built or is building in LDC's. Large numbers of Third World personnel are still going to the U.S.S.R. for training, in addition to some 550,000 that have been trained locally.

(*d*) At least 95 percent of Soviet economic aid must be repaid—traditionally over 12 years at 2½ to 3 percent interest. Occasionally the terms are more lenient, such as those usually given Afghanistan (which allow up to 50 years for repayment) and recent credits to India (20 years plus a 3-year grace). Especially since the mid-1960's, however, credits have sometimes carried commercial-like terms that include down payments, allow only 5 to 10 years for amortization, and carry high rates of interest. Most Soviet credits are repaid in commodities, often in the output of plants built with Russian aid. Soviet terms compare with average U.S. terms for official development assistance of more than 35 years and less than 3 percent interest; also, grant aid has comprised more than half of U.S. aid in recent years.

(*e*) Increasingly, the U.S.S.R. has extended economic assistance that will yield mutual benefits, such as border dams in Iran, pipelines to carry natural gas from Iran and Afghanistan to the

U.S.S.R., oil exploration in Iraq in return for oil, and geological surveys and exploration for minerals which the U.S.S.R. has conducted in at least 30 countries of the developing world. The most recent example is the 1978 accord with Morocco to exploit phosphates with which Morocco will repay its debt to the U.S.S.R.

The Shifting Aid Picture

Military

Soviet arms sales more than doubled in 1974–78, compared to 1969–73 (in a world market that had quadrupled), based largely on the massive resupply and buildup in the Middle East since the October 1973 war and huge amounts of aid to Ethiopia in the past 2 years. In addition, the Russians moved more heavily into commercial sales, as opposed to concessional aid, because of the availability of large OPEC funding for arms.

Before 1974, Moscow's military customers had included:

Egypt, its only $4 billion customer;
Syria, a $2.3 billion client;
India and Iraq, each in the $1.5 to $2 billion class;
Indonesia, an $875 million client before 1965;
Iran, Afghanistan, and Algeria, whose orders ranged from $350 to $600 million; and
Some two dozen LDC's that received small, often negligible, amounts of arms.

The larger sales following the 1973 war were accompanied by both accelerated training programs for LDC personnel in the Soviet Union and additional Soviet and Cuban support cadre in less developed countries that had purchased new modern equipment. The numbers of Soviet advisers and maintenance personnel in the LDC's rose to some 6,700 in 1974 and to 11,000 in 1978 with the largest numbers stationed in the Arab radical states and in Ethiopia (1978).

Kuwait and Iran bought military equipment in the U.S.S.R. (a $50 million Kuwaiti order for missiles in 1977 and Iran's $800 million worth of ground equipment after 1973). Other oil producers (Algeria, Iraq, and Libya) placed over $7 billion of orders for Soviet equipment after 1973, which accounted for more than 40 percent of Moscow's $16.5 billion of arms sales in 1974–78. At least another 15 percent of Soviet sales were placed by LDC customers whose purchases were financed by rich Arab States.

The loss of Moscow's most important customer, Egypt, was the most notable change in Soviet arms client patterns after 1973. The loss was accompanied by: (*a*) the emergence of Libya as Moscow's largest arms buyer (after 1973); (*b*) the marked expansion of Soviet sales to Iraq, Syria, Algeria, and India; and (*c*) the dramatic $2 billion supply relationship established with Ethiopia in 1977–78—unprecedented in sub-Saharan arms procurement history. Moscow also added half a billion dollars of orders to its 1973 initial arms sales to Peru—its only Latin American customer (apparently a temporary one).

While these initiatives clearly reflect Soviet geopolitical interests, reemphasizing Moscow's determination to maintain a presence in the Middle East and Indian Ocean areas, the Russians clearly have profited from these sales, which now cover a large deficit in Soviet trade with LDC's and supplement Soviet hard currency earnings.

Economic

Fewer changes have occured in Soviet economic assistance. The most notable has been a shift to the use of broad "framework" agreements and an increase in the number of large commercial accords. The framework accords are agreements in principle which usually agree to explore possibilities for cooperation in designated areas, without allocating definite amounts of aid until project by project studies are completed. Accords are then drawn for each project either with supplier-type credits, commercial arrangements, concessionary aid terms, or a combination of these arrangements for different parts of the package. At the same time that Moscow introduced framework agreements, it tried to synchronize its own requirements and production plans with those of LDC's through joint Soviet-LDC committees. Moscow also has tried to expand its economic relationships through joint ventures (still limited to shipping and fishing), which Moscow is using in the case of fisheries to circumvent some of the limitations imposed on its own fishing fleet by the 200-mile territorial waters limits.

Despite possibly harder terms in the overall, Moscow has continued to extend its largest credits to a selective few. In general, the size of credits has increased. Partly because of higher project costs and also because of the kinds of project support provided, commitments in the past 5 years rose 1½ times over those in the previous 5 years. Extensions in 1974–78 thus have accounted for almost half of the total amount of aid provided over the entire program period. Deliveries went up 25 percent in 1974–78 but without marked improvement in the rate of drawdown.

THE PROGRAM 1977–78

Despite a definite upward annual bias in Soviet military and economic commitments to LDC's in the latter part of the 1970's annual pledges have fluctuated widely because of : (*a*) changing political exigencies and, for the military, emergency and resupply operations; (*b*) long periods required for implementing economic aid and for absorbing military receipts into LDC inventories; (*c*) prolonged negotiations required for finalizing economic and military agreements and the lack of an annual rhythm in signing accords; (*d*) economic or political constraints within the U.S.S.R., which affect aid determinations; and (*e*) the apparent lack of LDC interest, in some cases, in accepting Soviet offers or initiating requests.

The most dramatic swings in Soviet aid history occurred for both the economic and military programs in 1977–78. Military pledges jumped to an all time record ($5.2 billion) in 1977 and then plummeted in 1978 to their lowest level since 1973 ($1.8 billion). On the other hand, more than $3.7 billion of new economic assistance in 1978

followed the 1977 7-year program low and broke all former Soviet economic aid extension records. These transactions demonstrated Moscow's continuing interest in expanding and reinforcing its Third World connections. On the other hand, the kinds of agreements signed in 1977–78 made it apparent again that Russian aid had become as pragmatic as it is political. Moscow's military support to Ethiopia had a strong geopolitical basis, the assistance for mining phosphates in Morocco was motivated by economic factors.

The increasingly commercial cast of Soviet assistance has been noted in: (*a*) the harder repayment terms and higher prices for most military sales; and (*b*) the $1.5 billion of hard currency earnings Moscow has gleaned annually over the past several years from military sales (possibly as much as $2 billion in 1978). It also is reflected in an interest in exploiting aid possibilities which eventually will provide goods to help support Soviet domestic industrial operations. The most noteworthy recent example of Soviet interest in LDC's material supply potential is the widely publicized $2 billion Moroccan phosphate deal, signed in 1978. In this latest Soviet initiative to cultivate external long-term supply sources for raw materials, the U.S.S.R. is hedging against possible domestic shortages, either as a result of resource depletion or prohibitive extraction or processing costs. Under the Soviet-Moroccan accord, the Russians have contracted for their first phosphate imports, with a 30-year supply line of 10 million tons a year.

Military

Moscow has been pushing its more lucrative, more easily effected military sales program. Sales for the 2-year period (1977–78) were high despite the 1978 decline and despite Indian, Iraqi, and Syrian purchases of large amounts of Western equipment in their first important moves to diversify arms supply sources. India broke a 17-year tradition by placing a $2 billion order for Anglo-French Jaguars, which it selected in preference to the MIG–23 and SU–20 aircraft offered by the Russians. Iraq also bought $2 billion of arms (largely Mirage aircraft) from the West in the past 2 years, more than double its total previous purchases. The $240 million Syrian purchase of the Franco-German Hot and Milan anti-tank missile systems was Damascus' largest order ever placed in the West.

In addition to continuing a heavy supply program to its already important arms customers, Moscow's most decisive supply action was in the Horn of Africa. Following political decisions made late in 1976, the U.S.S.R. shifted its alliance from Somalia to Ethiopia in an arms buildup unprecedented in size or character in the sub-Sahara. The $2 billion of modern weaponry to Ethiopia provided a class of sophistication new to the region and far beyond the capabilities of the Ethiopian military establishment to operate or maintain. Thus, in 1977 Addis Ababa sent a continent of about 300 military trainees to the U.S.S.R. following this in 1978 with almost a thousand. At the same time, about 1,300 to 1,500 Russian technicians in Ethiopia (in 1978) performed training and maintenance functions.

Arms for Ethiopia accounted for about 30 percent of total Soviet arms sales in 1977–78. Four of Moscow's traditionally large arms customers—Libya, Algeria, Syria, and India—accounted for another 55 percent of total Soviet sales with their nearly $4 billion of orders for a wide range of weapons. Among the remaining 22 less-developed countries that purchased arms from the U.S.S.R. in 1977–78, countries with Soviet supplied arsenals such as Afghanistan, South Yemen, and Iraq bought more than $600 million of weaponry; Tanzania bought air and ground equipment, and Peru contracted for aircraft.

Deliveries under these accords scored new records in 1977 and 1978, rising to almost $4 billion in the latter year. These deliveries enabled military hardware to maintain its top rank as Moscow's most important export to the Third World. By the end of 1978 the Soviets had delivered about 85 percent of their total arms commitment to Third World clients. The 1977–78 deliveries included an impressive array of first time Soviet exports of advanced weaponry to the Third World, such as:

MIG–25 jet fighters to Algeria and Libya;
IL–76 transports to Iraq; and
SU–22 jet fighter-bombers to Peru.

Among other important deliveries were: the first MIG–23 jet fighters to sub-Sahara (Ethiopia); and the late model MIG–21 bis to Syria and Ethiopia. Syria also received continuing supplies of surface-to-air missiles, OSA–II guided missile patrol boats, T–62 tanks, and a wide assortment of ground armaments.

The heavy flow of advanced weaponry which the U.S.S.R. is pouring into LDC inventories has created an added burden on Soviet services for training local personnel in maintenance and use of the equipment. About 1,900 LDC nationals were in the Soviet Union at the end of 1978 for training. At the same time, almost 11,000 Soviets (double the number in 1973) were in less developed countries in advisory-training roles to assemble and maintain equipment and instruct local units in combat techniques and the use and maintenance of new weapons.

Syria, which claimed the largest number of Russian technical personnel in 1973, continued as the top claimant in 1978, by which time it had received $2 billion of additional Soviet weapons. The next largest Soviet technical contingents were in Ethiopia, Libya, and Angola, each of these countries had received large arms shipments after 1973. At the same time, the 1,500 Soviets stationed in Somalia early in 1977 all had departed by yearend.

Economic

Soviet economic aid, still a program of opportunity, depends not only on Moscow's assessment of cost-benefits but also on LDC response to aid overtures and the kind of assistance offered. Soviet commitments rebounded to an alltime high in 1978 from their 8-year 1977 low. The $3.7 billion of credits extended in 1978 was more than double the previous record year, 1975, and represents more than a fifth of all Soviet economic assistance committed to the Third World over the 24 years of the Soviet aid program. The 1978 peak followed $400 million of extensions in 1977.

Even the 1978 data tend to understate the full extent of Russian economic aid initiative because many new accords carry no price tag. These general "framework" agreements depend on project consideration, which draw actual allocations out over long periods. In 1977–78 framework agreements were signed with Afghanistan, Costa Rica, Guyana, Morocco, Mozambique, Syria, and Ethiopia. Only in the case of Morocco and Syria have definite commitments already been made for specific projects. These amount to $2.3 billion.

Eighty-five percent of the aid extended in 1977 went to India—Moscow's first new aid to that country in more than a decade. Because a large part of the credit will be for an alumina plant in which the Russians have a special interest, and because of Soviet eagerness to cement ties with this important Chinese neighbor, the terms of the credit were more concessionary than in earlier aid to India. The only other important agreement in 1977 was a $30 million credit to Jamaica—Moscow's first to that country—for geological prospecting, a cement plant and training schools. During 1977 the Soviets also entered into large contracts, probably mostly on commercial terms, for: (*a*) a second gas pipeline from Iran to the Soviet border; (*b*) a dam in Iraq to irrigate 1.6 million hectares of land and to provide 500 MW of power; and (*c*) a 240 MW powerplant in Iraq.

The large pledges in 1978 stemmed almost entirely from the $2 billion Soviet-Moroccan accord—the U.S.S.R.'s largest commitment to a single project in the Third World—and $1.2 billion of industrial development credits to Turkey. The aid to Turkey increases the amount of credits made available under a 1975 framework agreement for financing (a) expansion of the Soviet-built steel and aluminum plants, (b) powerplants, and (c) a new oil refinery. Looking to the future, Soviet and Turkish authorities also are viewing other possibilities for cooperation, which could involve billions of dollars of additional Soviet assistance.

Pakistan was the only other important aid recipient in 1978. A $220 million credit for financing increased costs at the Karachi steel mill brings Soviet aid to the project up to $650 million, three-quarters of Moscow's total aid to Pakistan. Smaller amounts of aid also went to South and North Yemen, a token amount was extended to Latin America for power projects, and virtually nothing to sub-Saharan Africa despite big expectations in Angola and Ethiopia.

Soviet nonmilitary technical personnel in the Third World rose on the average by a third between 1975–76 and 1977–78. While large increases in the number present were noted in Africa, the Middle East, and South Asia, the African share of the more than 25,000 technicians present each year (in 1977–78) gained 5 percentage points over 1975–76. A large percentage of the Soviets stationed in Africa continued to work outside the aid program; Soviet aid projects in Africa probably employed only half the Soviet technicians present on the continent. The rest of the Russians worked as administrators, teachers, and doctors on commercial construction jobs (as in Algeria, Libya, and Nigeria). Soviet technical personnel assigned to other areas of the Third World worked more often on aid projects, except in a few countries such as Iraq and Iran, where the Soviets had captured large commercial contracts. Altogether the Soviets earned an estimated $50 to

$75 million of hard currency a year from the nonproject, nonaid technical services it provided in 1977–78.

Effectiveness of the Program

Reduced Western influence in Third World countries has not necessarily led to a corresponding rise in Soviet influence. New governments often have translated anticolonialist positions into strong nationalist policies jealous of any foreign influence. Despite the commitment of some LDC governments to a "Socialist" system, they usually have wanted their own brand of socialism, and have not been attracted to Soviet Communist ideology, either by economic or military aid. Nonetheless, the Russians take a long-term view of the effectiveness of their program. While they continue to forge closer ties with a group of strategically situated LDC's, the Soviets enjoy economic returns from both military and economic aid.

Military assistance has been less problem-ridden than economic aid despite occasional setbacks—notably in Indonesia (in the mid-sixties) and more recently in Egypt and Somalia. For the most part they have had only a temporary effect on Moscow's expanding Third World arms sales. Thus, Soviet sales of military hardware more than doubled in the 5 years after the cutoff of supplies to Egypt, compared with the 5 years before.

Economic aid is often more able to endure strains created by new political alinements and changes in government. This holds true despite the disenchantment which often sets in during and after the economic aid implementation period. Time-consuming surveys and feasibility studies required before construction work, as well as institutional, human, and economic obstacles in many LDC's have hampered Soviet (as well as other) programs. The U.S.S.R. has compounded the difficulties of administering its aid program by furnishing only materials, equipment, and technical guidance for projects.

Advantages to both donor and recipient have gone beyond the mere size of the exchanges as each party gains from the relationship. Many of Moscow's arms clients have had their aspirations for international power and prestige satisfied, while Moscow has built an LDC presence. In recent years, Moscow also has garnered a windfall in hard currency and has kept its trade with LDC's out of the red with arms sales. The ranking position of the U.S.S.R. as an LDC arms supplier, the sophistication of the weapons it provides and the dependent relationship it has created, all have contributed to a big power image for Moscow. Soviet military technical assistance also has exposed LDC's to Soviet military institutions and techniques and undoubtedly has established important personal relationships with LDC military leaders. Moscow through its aid program has obtained base rights in several countries, the use of port facilities in Iraq and Syria (and previously in Egypt); during its venture into Angola, Mali and Guinea made their airports available; Moscow has used facilities in India (and previously in Somalia) for naval and air intelligence operations.

The Soviets also must view economic assistance as productive and inexpensive. Foreign aid has imposed a negligible drain on Soviet domestic resources, despite burdens sometimes created by aid require-

ments levied against an already taut planning cycle. In return for aid the U.S.S.R. has received bauxite from Guinea, oil from Iraq, natural gas from Iran and Afghanistan, and alumina from Turkey and India. The closer economic relations expanded Soviet-LDC trade to $12 billion in 1977 (20 times above 1955 level), representing 17 percent of total Soviet trade. Moscow's largest aid clients have become its major LDC trading partners. Egypt, India, Iran, and Iraq together accounted for nearly half of Soviet 1974–77 nonmilitary trade with the Third World. Countries in the Middle East and South Asia were largely responsible for the almost 100-percent increase in Soviet-LDC trade between 1973 and 1977.

The U.S.S.R. also must consider its recent Moroccan deal a coup. This latest effort to expand long-term procurement possibilities for strategic materials is part of Moscow's continuing effort to supplement its own supplies. Since the early 1960's Russian geologists have inventoried the metals and minerals reserves of at least 12 countries in Africa, 5 in the Middle East, 2 in South Asia, and 1 in Latin America. Gas and petroleum exploration and exploitation assistance was provided 14 less developed countries. Until now the return flow has been limited to gas and oil, bauxite, and iron ore. By 1978, the U.S.S.R. was receiving: (*a*) 13 billion cubic meters of natural gas a year from Iran and Afghanistan through Soviet-built pipelines, as repayment for economic and military aid; (*b*) 6 to 7 million tons of crude oil annually from Iraq and Syria from fields the Russians had helped to develop; and (*c*) 2.5 million tons of bauxite from Soviet developed mines in Guinea.

Economic aid also made positive contributions to the development of some LDC's. For example, Soviet plants in India account for: 80 percent of India's output of metallurgical equipment; 60 percent of heavy electrical equipment; more than half of India's oil production; and a third of its steel output and a fifth of the electric energy generated.

In several instances when the U.S.S.R. jumped in with aid offers for major installations turned down by other donors, Moscow gained extra prestige. The Bokaro steel mill in India and the Isfahan mill in Iran are classic examples. Moscow scored in some countries by its help for developing public sector industrial complexes, though in some cases the administrative woes and underutilized capacity have dampened the recipients original fervor. In Egypt Soviet aid provided: 70 percent of Egypt's power equipment; all of Egypt's aluminum production; three-fourths of the capacity at Egypt's only steel mill at Helwan; and refineries that fill half of Egypt's domestic needs.

Prospects in the Early 1980's

While Moscow shifts its program tactics from time to time to accommodate to new political or economic currents, no reduction in the scale or content of the aid program nor in Moscow's strategy for leadership in the Third World has become apparent. Instead of backing off in the face of new massive OPEC funding for Moscow's most important aid clients, the U.S.S.R. continued its small economic program even in oil-rich states, profiting from their wealth through larger arms sales and big commercial deals.

Military

On the military front, there are no signs of a letup in the Soviet sales effort. A slowdown might come from a market that is saturated momentarily and is winding down its orders. The heavy sales of the past few years will in themselves dampen chances for large new orders because of the time it takes for LDC's to absorb the large stocks of modern weaponry pouring into their inventories. The recent quest for alternative arms sources by some of Russia's largest customers (that is, Iraq and India) could also lead to a gradual reduction in the scale of orders by some major Soviet buyers.

If the world arms market settles into a more even annual procurement pattern, Soviet sales probably also will follow suit, with annual sales falling into the $2 to $3 billion range. At a minimum the U.S.S.R. will supply complementary equipment and large quantities of spare parts and technical support to countries that have been large Soviet arms buyers in the past. With the possibilities for increasing levels of instability in the Middle East, South Asia, and southern Africa, the U.S.S.R. stands ready to offer rapid delivery of large quantities of equipment and services which would push Soviet sales even higher than before.

Economic

Economic assistance, while not expected to equal the 1978 record again in the next several years, should follow a more even pattern as definite commitments are negotiated under existing and new general framework agreements. Moscow is expected to maintain its aid tempo in traditional client areas—more often under framework agreements; at other times through specific accords for project assistance, as provided India in 1977. The Soviets also are expected to expand patterns of joint participation (in planning as well as in certain enterprises). They will continue to try to expand the commercial aspects of their program. Commercially oriented aid overtures to Latin America especially should gain momentum, as Moscow exerts pressures on Mexico for sales of all types of machinery and equipment. Moscow will undoubtedly pursue negotiations with Jamaica and Guyana to exploit their bauxite deposits as part of its research for additional supplies to satisfy the U.S.S.R.'s own needs.

NOTE ON SOURCES

The detailed information on Soviet foreign aid contained in this study is drawn from numerous official and non-official publications available to the public. A primary source for data concerning the Soviet program in the LDC's—aid extensions, drawings on credits, and technical assistance—is the annual reviews of the Communist aid programs published by the Central Intelligence Agency. The most recent of the series, "Communist Aid to Less Developed Countries of the Free World, 1977" was published in November 1978.

Official publications, journals, and newspapers from LDC's and the U.S.S.R. also have been invaluable sources, particularly the U.S.S.R. Ministry of Foreign Trade's foreign trade yearbook series and monthly foreign trade magazines. Other useful sources include publications of the United Nations and the Organization for Economic Cooperation and Development.

APPENDIX

TABLE 1.—SOVIET ECONOMIC ASSISTANCE TO LDC's

[In millions of U.S. dollars]

	1956–78	1956–73	1974	1975	1976	1977	1978
Agreements [1]	17,090	9,255	815	1,935	980	400	3,705
Africa	3,990	1,360	55	100	435	30	2,010
East Asia	260	160	100				
Latin America	965	410	215	255	40	30	15
Middle East	6,920	3,770	200	1,050	500		1,400
South Asia	4,955	3,555	245	530	5	340	280
Deliveries [1]	7,595	4,965	705	500	460	540	430
Africa	1,025	675	85	70	65	70	60
East Asia	145	145	(2)	(2)			
Latin America	195	85	15	15	35	25	20
Middle East	3,340	2,105	245	320	225	280	165
South Asia	2,890	1,955	355	95	135	165	185

[1] Components may not add to totals shown because of rounding.
[2] Negligible.

TABLE 2.—SOVIET ECONOMIC CREDITS AND GRANTS TO SELECTED LDC's

[In millions of U.S. dollars]

	Total 1954–78	1977	1978
Total	17,090	400	3,705
Africa	3,990	30	2,010
North Africa	2,920		2,000
Algeria	715		
Morocco	2,100		2,000
Other	105		
Sub-Saharan Africa	1,070	30	10
Angola	15	5	1
Ethiopia	105		Negligible
Ghana	95		
Guinea	210		
Somalia	165		
Sudan	65		
Tanzania	40	18	
Other	375	7	9
East Asia	260		
Indonesia	215		
Other	45		
Latin America	965	30	15
Argentina	225		
Brazil	90		
Chile	240		
Colombia	210		
Jamaica	30	30	
Other	170		15
Middle East	6,920		1,400
Egypt	1,440		
Iran	1,165		
Iraq	705		
North Yemen	145		40
South Yemen	200		90
Syria	765		
Turkey	2,380		1,200
Other	120		70
South Asia	4,955	340	280
Afghanistan	1,265		
India	2,280	340	
Pakistan	920		220
Other	490		60

TABLE 3.—SOVIET ECONOMIC TECHNICIANS IN LDC's [1]

[Number of persons]

	1977	1978
Total	22,390	27,620
Africa	7,520	11,575
North Africa	3,120	6,680
Algeria	2,650	6,000
Libya	100	200
Morocco	150	250
Other	220	230
Sub-Saharan Africa	4,400	4,895
Angola	200	400
Ethiopia	150	600
Guinea	500	450
Mali	350	450
Other	3,200	2,995
East Asia	65	35
Latin America	490	350
Argentina	5	35
Bolivia	150	100
Brazil	25	25
Other	310	190
Middle East	11,195	11,885
Egypt	1,000	750
Iran	3,400	4,000
Iraq	3,800	3,950
Syria	1,200	1,100
Turkey	1,000	1,250
Other	795	835
South Asia	3,120	3,775
Afghanistan	1,300	2,000
India	1,100	1,000
Pakistan	500	575
Other	220	200

[1] Minimum estimates of number present for a period of 1 month or more. Numbers are rounded to the nearest 5.

TABLE 4.—SOVIET MILITARY RELATIONS WITH LDC's

[In millions of U.S. dollars]

	Total 1956–78	1956–73	1974	1975	1976	1977	1978
Agreements [1]	29,655	13,035	4,225	2,035	3,375	5,215	1,765
North Africa	4,965	485	1,825	535	----------	1,800	315
Middle East	14,960	8,860	2,025	640	2,100	1,235	100
Other	9,730	3,690	375	860	1,275	2,180	1,350
Deliveries [1]	25,310	11,240	2,310	1,845	2,575	3,515	3,825
North Africa	3,875	435	150	380	810	925	1,175
Middle East	13,800	7,755	1,780	975	1,065	1,125	1,095
Other	7,635	3,050	380	490	700	1,465	1,555

[1] Components may not add to totals shown because of rounding.

TABLE 5.—SOVIET MILITARY TECHNICIANS IN LDC's[1]

[Number of persons]

	1977	1978
Total	10,200	10,800
Algeria	600	1,000
Egypt	1,000	1,300
Ethiopia	145	150
India	1,050	1,100
Iraq	990	1,300
Libya	2,170	2,400
Syria	4,245	3,550
Other		

[1] Minimum estimates of number present for a period of 1 month or more. Numbers are rounded to the nearest 5.

THE SOVIET MERCHANT FLEET: ITS ECONOMIC ROLE AND ITS IMPACT ON WESTERN SHIPOWNERS

(By William Carr)

CONTENTS

SUMMARY

Since the early 1960's, Moscow has aggressively expanded its maritime assets, quadrupling the size of its merchant fleet and making it one of the 10 largest in the world. With less than 3 percent of world tonnage, the Soviet fleet is overshadowed by those of leading shipowning countries like Japan whose fleet is 3½ times larger. At the same time, it is roughly matched by the U.S.-flag fleet. Soviet fleet expansion has permitted some penetration of shipping markets formerly monopolized by Western shipowners. Soviet competition has been limited, however, by persistent deficiencies in fleet quality and the large share of tonnage earmarked for Soviet domestic and foreign trade.

Longstanding qualitative deficiencies afflict the fleet's two largest components. In the liner fleet, 95 percent of the tonnage consists of outmoded general purpose freighters. Such ships are not competitive on major international liner routes, where faster and more specialized container and roll-on/roll-off (ro/ro) ships of Western fleets predominate. Because of shallow drafts in most Soviet ports, Soviet tankers average only 20,000-deadweight tons (dwt), less than one-third the world average.

Despite a rapid increase in the carriage of cross trade goods between foreign ports, the Soviet fleet is still predominantly employed in the

carriage of Soviet trade. Shipments by the fleet in 1977 were allocated as follows: Soviet exports and imports, 51 percent; Soviet internal trade, 35 percent; and cross trades, 14 percent. In both its own and the cross trades, the fleet's role is predominately economic. In 1977, the merchant fleet contributed 7 percent of the U.S.S.R.'s gross hard currency income, a figure surpassed only by the oil, timber, and gold mining industries. Of this hard currency, 72 percent was earned in the carriage of Soviet exports and 28 percent in carriage of cross trade cargoes.

Although Soviet ships carry more cross trade cargo as tramp ships under foreign charter than they do as liners, the Soviet fleet's greatest impact on United States and other Western shipowners derives from its cross trading activity in the liner trades. This occurs because most Soviet cargo lines: (*a*) operate outside the Western-dominated system of cartels or "conferences" that set rates charged by member lines on the world's key trade routes; and (*b*) charge rates below conference levels and—according to some—below cost. Because of the inferior service it provides on most routes due to heavy reliance on general purpose ships, the Soviet fleet probably could not attract cargoes without cutting rates. As it is, Soviet ships managed to win a 4-percent share in liner services linking the United States with Japan and Europe in 1977, at the expense of United States and other Western competitors. Low rates for container shipments between Europe and Japan via the Trans-Siberian Landbridge similarly took 5 percent of business away from Western containership operators on that route. With Western governments taking stronger steps to counter Soviet pricing policies, the Soviets have taken limited measures to abate their rate cutting in United States and other trades. No progress has been made in convincing them to join conferences.

Soviet cross trade activity on the more competitive tramp charter market, often involving back-haul cargoes carried by ships returning from the delivery of bulk Soviet exports, evokes few complaints from Western owners. The volume of cross trade cargo carried by Soviet tramps in the West is half the volume of Soviet exports and imports carried on chartered foreign ships.

Deliveries to the Soviet merchant fleet under the 1976–80 5 year plan will upgrade a small portion of the Soviet liner fleet with modern ro/ro vessels and full containerships. With greatest emphasis on ro/ro ships—some of which are up to the highest Western standards—Soviet competition with Western operators on some routes will intensify, but the number of lines affected will be small.

The heaviest deliveries under the plan will consist of tankers and dry bulk carriers for the Soviet tramp fleet. By permitting Soviet ships to carry a higher percentage of exports and imports, acquisition of these ships will benefit the U.S.S.R. hard-currency balance of payments. It will also take an appreciable volume of business away from non-U.S. Western shipowners currently engaged in Soviet trade. The role of U.S. ships in bilateral trade with the U.S.S.R. will presumably not be affected because it is determined by the cargo-sharing provisions of the United States-Soviet Maritime Agreement.

FLEET GROWTH, 1960–77

1. The U.S.S.R. has been trying to restore and expand its merchant fleet ever since World War II, but the volume of annual ship deliveries remained low until the mid-1960's (see table 1). The upturn in deliveries stemmed from a surge in the volume of Soviet seaborne foreign trade, which grew at rates averaging more than 30 percent a year in 1959–61. To counter the resultant increase in its dependence on foreign ships in international trade, the U.S.S.R. undertook the most ambitious ship acquisition program in its history. Yearly deliveries rose from 400,000 dwt in 1961 to a record high of 1.3 million dwt in 1964 and averaged more than 800,000 dwt through 1970, causing fleet tonnage to nearly triple. Following a temporary cutback in 1971 and 1972, delieveries picked up again, reaching a new high of 1.4 million dwt in 1976.

2. Four key motives underlie Soviet merchant fleet expansion:

(*a*) The desire to fulfill basic economic and security needs, that is, to carry all Soviet coastal cargoes and vital imports and meet the routine peacetime demands of the Soviet Armed Forces;

(*b*) The desire to assure carriage of all economic and military aid cargos to Communist and Third World client countries in Soviet bottoms;

(*c*) The need to earn and conserve foreign exchange; and

(*d*) the creation of a large contingency capability for overseas deployment and resupply of Soviet military forces.

TABLE 1.—SOVIET MERCHANT FLEET SIZE AND GROWTH

[Deadweight tons in millions]

Year	Inventory as of December 31		Net increase in Tonnage		Deliveries during year (deadweight Tons)
	Number	Deadweight tons	Deadweight tons	Percent	
1959	590	3.3	0.3	6	0.4
1960	650	3.9	.6	18	.6
1961	680	4.2	.3	8	.4
1962	740	4.8	.6	14	.7
1963	820	5.7	.9	19	.9
1964	900	6.9	1.2	21	1.3
1965	990	8.0	1.1	16	1.2
1966	1,070	8.9	.9	12	1.0
1967	1,150	9.7	.8	9	.8
1968	1,230	10.4	.7	8	.8
1969	1,310	11.2	.8	7	.8
1970	1,400	11.9	.7	7	.8
1971	1,440	12.3	.4	3	.5
1972	1,460	12.6	.3	2	.5
1973	1,500	13.4	.8	6	1.0
1974	1,570	14.1	.7	5	.9
1975	1,620	15.0	.9	6	1.1
1976	1,670	16.3	1.3	9	1.4
1977	1,710	17.2	.9	5	.9

Most requirements for the first motive had been met prior to 1962 when the U.S.S.R. began to accelerate its fleet expansion. Before the end of the 1960's, sufficient tonnage had been acquired to fulfill aid requirements despite the full-time commitment of almost 2 million dwt to Cuba and North Vietnam as the result of U.S. efforts to keep West-

ern ships from trading with those countries. Once the needs of its aid program were covered, the U.S.S.R. stepped up efforts to acquire ships for carrying commercial trade for its own and foreign shippers in order to save and earn foreign exchange.

3. Except for support to military aid programs and to troops deployed to Cuba during the missile crisis in 1961, the Soviet merchant fleet has not been called upon to fulfill its obvious military contingency role. Nevertheless, the addition to the Soviet fleet of freighters, tankers, and—since 1974—ro/ro ships has doubtless been motivated by a concern for military contingencies as well as for the economic and political needs these ships serve.

Fleet Status, December 31, 1977

Size and World Standing

4. On December 31, 1977, the Soviet merchant fleet numbered more than 1,700 ships with a total capacity of 17.2 million dwt. With 3 percent of world tonnage, it ranked 9th largest, slightly ahead of the U.S.-flag fleet (see table 2). Despite its having quadrupled in capacity since 1961, the Soviet fleet continues to be overshadowed in terms of quality and capacity by the fleets of leading shipowning nations such as Japan, the United Kingdom, and Norway.

TABLE 2.—WORLD MERCHANT FLEET TONNAGE BY FLAG, DECEMBER 31, 1977

	Million deadweight tons	Percent of world fleet
World total	628.4	100
Liberia [1]	155.0	25
Japan	61.7	10
United Kingdom	53.9	9
Greece	53.1	8
Norway	48.1	8
Panama [1]	31.3	5
France	20.0	3
Italy	17.6	3
U.S.S.R.	17.2	3
United States (active) [2]	17.0	3
Other	153.5	24

[1] The fleets of Liberia and Panama are "flag of convenience" fleets, owned by United States, Greek, overseas Chinese, and other foreign firms.
[2] Excluding about 2.7 million deadweight tons of obsolete Government-owned tonnage in the reserve fleet.

Composition

5. Dry cargo ships—the backbone of the Soviet fleet—accounted for nearly 11 million dwt, 62 percent of total tonnage. Of these, 6.8 million dwt or 40 percent of fleet capacity were vessels suitable for liner service [1] (see table 3). The liner segment is thus the largest in the Soviet fleet. Among national liner fleets around the world, the Soviet fleet ranks second in capacity, behind that of Greece.

6. Tankers comprise the second largest component of the Soviet fleet, accounting for 6.1 million dwt or 36 percent of capacity. Timber carriers form the next largest segment with a total capacity of 2.0 million

[1] Scheduled services that offer prescribed numbers of sailings per month for general cargo on given trade routes.

dwt and 12 percent of total tonnage, followed by dry bulk carriers with 1.7 million dwt and 10 percent of total tonnage.

7. The most serious qualitative weaknesses of the Soviet fleet are (a) the small average size of its ships and (b) the large number of older general purpose dry cargo ships in its big liner fleet.[2] Because few Soviet ports can handle dry cargo ships larger than 30,000 dwt or tankers over 50,000 dwt—the average size of Soviet ships has always been well below world standards:

TABLE 3.—SOVIET MERCHANT FLEET COMPOSITION, DEC 31, 1977

	Number	Deadweight tons	Percent of deadweight tons	Average deadweight tonnage
Total	1,708	17,205,166	100	10,073
Dry cargo	1,395	10,662,660	62	7,643
Liner types	842	6,796,286	40	8,072
General purpose	(803)	(6,485,420)	(38)	8,076
Full container	(15)	(128,197)	(1)	8,546
Roll-on/Roll-off	(24)	(182,699)	(1)	7,611
Refrigerator	32	157,826	1	4,932
Timber carrier	396	2,048,617	12	5,173
Bulk carrier	125	1,659,931	10	13,279
Combination oil/dry bulk	4	369,213	2	92,303
Tanker	309	6,173,293	36	19,978

At yearend 1977, the average Soviet ship was 10,000 dwt compared with a world average of 26,000 dwt.

Soviet tankers averaged 20,000 dwt compared with a world average of 64,000 dwt and its dry bulk carriers averaged 13,000 dwt compared with a world average of 36,000 dwt. Soviet timber carriers and containerships are also undersized.

Soviet ship sizes are close to world standards only in their general purpose liner fleet and small ro/ro and refrigerator fleets.

8. The preponderance of outmoded general purpose vessels in the Soviet liner fleet has severely hindered Soviet efforts to expand into other countries' liner trades. Although such ships are well suited for coastal deliveries to Soviet Far Eastern and Northern Sea Route ports and for trade with many LDC's, they are not competitive on major international routes such as the North Pacific, the North Atlantic, and Europe-Far East, where the faster and more efficient container and ro/ro ships of Western fleets predominate.

Fleet Employment

9. Roughly 75 percent of Soviet merchant fleet tonnage is engaged in direct support of the Soviet economy. Most of the remainder is occupied with delivery of economic and military aid cargoes to Communist and Third World client countries, such as Vietnam, Cuba, and Ethiopia. Probably about 1 percent of capacity is required for the routine support rendered by the merchant fleet to the Soviet armed forces.

[2] At the end of 1977, these uncompetitive ships made up 38 percent of total fleet tonnage. Modern full container and ro/ro ships which accounted for the remainder of the liner fleet made up only 2 percent of total tonnage; few were as large or as fast as their best Western counterparts.

This usually entails the assignment of small freighters and tankers for deliveries of supplies and fuel to isolated military bases along the Northern Sea Route and in the Far East and to naval task forces in Soviet waters and on the high seas.

Domestic Coastal Trade

Domestic trading activities, in which the Soviet fleet has a monopoly, consist largely of bulk cargo movements in the Black Sea, Caspian Sea, and Far Eastern basins and the delivery of general cargo to remote ports in the Far East and along the Northern Sea Route. Domestic cargo movement totaled about 78 million tons in 1977, or 35 percent of the total cargo carried by the fleet (see table 4).

TABLE 4.—CARGO TONNAGE CARRIED BY THE SOVIET MERCHANT FLEET IN THE U.S.S.R.'s AND OTHER COUNTRIES' TRADES

[Metric tons in millions]

Trade category	1977		1976		1975		1970		1965	
	Metric tons	Percent	Metric tons	Percent	Metric tons	Percent	Metric tons	Percent	Metric tons	Percent
Total	220.3	100	214.5	100	200.0	100	161.9	100	119.3	100
Soviet	190.1	86	184.1	86	170.0	85	146.9	91	111.8	94
International	112.4	51	104.1	49	90.9	45	75.3	47	50.0	42
Domestic (cabotage)	77.7	35	80.0	37	79.1	40	71.6	44	61.8	52
Cross trade	30.2	14	30.4	14	30.0	15	15.0	9	7.5	6

Soviet Seaborne Foreign Trade

10. In 1977, Soviet seaborne foreign trade reached 187 million tons, of which Soviet ships carried 60 percent (see tabulation). In addition, the Soviet fleet moved 30 million tons of cross trade cargoes for foreign shippers between non-Soviet ports, bringing total cargo handled by the Soviet fleet in international trade to almost 143 million tons.

	Million tons	Percent
Total Soviet seaborne foreign trade in 1977	187.1	100
Soviet ships	112.4	60
Foreign ships	74.7	40

11. The chief role of the U.S.S.R.'s fleet is the delivery of exports which make up 82 percent of Soviet seaborne foreign trade. The fleet's most remunerative activity is the movement of Soviet oil, coal, and other bulk commodities to Western Europe and Japan. The carriage of Soviet exports yielded $710 million in 1977, 72 percent of fleet hard currency earnings.

12. Hard currency earnings by the Soviet fleet from all sources in 1977 came to about $980 million 7 percent of the U.S.S.R.'s total hard currency earnings. The fleet's contribution was greater than that of any

single manufacturing industry and was exceeded only by the oil, gold mining, and timber industries (see table 5). The hard currency operating and capital costs of the fleet are low. The U.S.S.R. obtains most of its ships either from its own shipyards or from East European and Finnish builders, which are paid through clearing accounts.

TABLE 5.—SOVIET HARD CURRENCY EARNINGS IN 1977 [1]

	Million U.S. dollars	Percent
Total	14,684	100
Gold sales (nonmonetary)	1,618	11
Exports (f.o.b.):		
Merchandise	11,666	79
Crude oil and petroleum products	5,557	38
Wood and wood products	1,038	7
Diamonds	606	4
Coal and coke	358	2
Metals	174	1
Cotton	514	4
Natural gas	566	4
Manufactures and other (residual)	2,853	19
Services	1,400	10
Ocean shipping	980	7
Tourism	420	3

[1] Gross.

Cross Trading

13. Hard currency earnings not attributable to the carriage of exports stem largely from participation in cross trades linking foreign ports. Soviet carriage of cross trade cargoes grew from 7.5 million tons in 1965 to 15 million tons in 1970 and averaged more than 30 million tons per year in 1975–77. Initially, Soviet ships carried cross trade cargoes only on a tramp basis when returning to the U.S.S.R. after delivery of exports or when chartered out to foreign shippers for the winter months when the icing of northern ports reduces Soviet shipping needs. The volume of cross trade cargoes carried by Soviet tramp ships is still much greater than that carried by Soviet liner services (see tabulation). Some of the tramp cargoes carried in the cross trades during 1977—Canadian flour moving to Cuba and Middle Eastern oil moving to Eastern Europe, for example—were carried for Communist and LDC trading partners with payment through soft currency clearing accounts. Other cargoes—such as Persian Gulf oil and Philippine copra moving to Western Europe on a backhaul basis, brought the fleet hard currency revenues totaling close to $270 million.

SHIPMENTS BY THE SOVIET MERCHANT FLEET IN FOREIGN NAVIGATION, 1977

[In millions of metric tons]

	Tramp	Liner	Total
Soviet trade	104.4	8.0	112.4
Cross trade	24.7	5.5	30.2
Total	129.1	13.5	142.5

Liner Operations

14. By the late 1960's, Soviet liners had begun to carry cross trade cargoes and Soviet liner services had been established for the express purpose of cross trading to earn foreign exchange. In 1964, the U.S.S.R. had 31 international cargo lines, all handling only Soviet traffic. By mid-1978, the total number of Soviet lines had risen to 72—36 engaged largely or entirely in cross trades (see table 6). The greatest boost to Soviet cross trade liner activity resulted from the improvement in shipping relations with the United States after the signing of the United States-Soviet Maritime Agreement in 1972. On June 30, 1978, the U.S.S.R. was operating at least 11 liner services in the trans-Pacific and trans-Atlantic trades of the United States. More than 90 percent of the cargo consisted of goods in U.S. trade with non-Communist countries, generating hard currency shipping revenue for the U.S.S.R. United States-Soviet bilateral liner trade totalled only 326,000 tons in 1977—49 percent carried by U.S. ships, 34 percent by Soviet ships, and 16 percent by third flag ships.

TABLE 6.—*U.S.S.R.: International cargo lines, June 30, 1978*

LINES OPERATED UNILATERALLY BY SOVIET STEAMSHIP COMPANIES

Company	*Route*
Baltic	Soviet Baltic/Western Europe/east coast United Kingdom (London)—east coast United States (BALTATLANTIC).[1 2 3]
Do	Soviet Baltic/Mediterranean Europe—Australia.[2 3]
Do	New Zealand westbound to Western Europe.[2]
Do	Soviet Baltic/Western Europe—west coast South America (BALT-PACIFIC).[1]
Do	Soviet Baltic/Western Europe—Central America, Venezuela, and West Indies (BALT-CARIBBEAN).[1]
Do	Soviet Baltic–Netherlands/Belgium–Finland (BALT-SCAN).[1 2]
Do	Soviet Baltic–east coast United Kingdom (Hull)–West Germany–East Germany.[1 4]
Do	Soviet Baltic–West Germany–east coast United Kingdom (London or Hull)–East coast Sweden (Stockholm) (TRANS-SIBERIAN CONTAINER SERVICE)[1 3]
Do	Soviet Baltic–east coast United Kingdom (Hull)–west coast Sweden (Malmo).[4]
Do	Soviet Baltic–West Germany/Netherlands.[1 2]
Do	Soviet Baltic–Cuba.[4]
Do	Soviet Baltic–Belgium.[3]
Do	Soviet Baltic–east coast United Kingdom (Hull)–Belgium–Finland.[1 3]
Do	Soviet Baltic/Western Europe/east coast United Kingdom–gulf coasts United States and Mexico (BALT-GULF).[1 2 3 4]
Do	Gulf and east coasts of the United States–Red Sea/Persian Gulf.[1 3 4]
Do	Soviet Baltic–Sweden–Italy–Egypt–Western Europe (SCAN–MED–CONT).[1]
Baltic/Latvian	Soviet Baltic/Western Europe–Portugal/Spain (PORTOBALTICA).[3 4]

See footnotes at end of table.

LINES OPERATED UNILATERALLY BY SOVIET STEAMSHIP COMPANIES—continued

Company	*Route*
Baltic/Estonian	Soviet Baltic/Western Europe–East Africa/Indian Ocean (BESTA).
Estonian/Danube	Soviet Baltic/Western Europe–Eastern Mediterranean (BALT–LEVANT).[2]
Estonian	Soviet Baltic–east coast Sweden.
Do	Soviet Baltic–Denmark/Norway–Eastern Mediterranean (BALT–LEVANT).[2]
Do	Soviet Baltic–Denmark–Norway.[4]
Do	Western Europe–east coast United Kingdom (Hull)–Finland (TRANSCAUCASIAN CONTAINER SERVICE).[1 3 4]
Do	Soviet Baltic–Zaire/Angola.
Latvian	Soviet Baltic/east coast United Kingdom (London)/Western Europe–North Africa (RICONA LINE).[1]
Do	West Germany–east coast United Kingdom (Hull).[1 3]
Do	Soviet Baltic–west coast United Kingdom (Ellesmere Port)–Ireland.[4]
Do	Soviet Baltic–Belgium.[4]
Do	Soviet Baltic/east coast United Kingdom (London)/Western Europe–North Africa/Malta/Eastern Mediterranean (RINELA).[1 3]
Danube	Soviet Danube–Near East (Lebanon, Syria, Egypt, and Cyprus).
Do	Soviet Danube–Turkey.
Do	Soviet Danube–North Africa.
Do	Soviet Danube–Greece.
Black Sea	Soviet Black Sea–Persian Gulf (Iraq).
Do	Soviet Black Sea–Syria.
Do	East and gulf coasts United States–Red Sea/Persian Gulf.[1 4]
Do	Soviet Black Sea–Vietnam.
Do	Soviet Black Sea–Cuba.
Do	Soviet Black Sea–Southeast Asia–Mediterranean Europe–Western Europe–east coast United Kingdom (London) (ODESSA OCEAN).[1 3]
Do	Soviet Black Sea/Mediterranean–east coast United States, BLASCO MED–ATLANTIC).[2 3]
Do	Soviet Black Sea/Mediterranean–gulf coast United States (GULF–MED).[2 3]
Do	Soviet Black Sea–Red Sea/East Africa.[3 4]
Azov	Soviet Black Sea–Greece.
Do	Soviet Black Sea–Turkey/Greece.
Do	Soviet Black Sea–Italy–North Africa (ASITCO).[3 4]
Do	Soviet Black Sea–Near East.
Caspian	Iran (Caspian)–Baltic–North Sea (via Volga–Baltic Waterway) [1]
Far East	Soviet Far East/Southeast Asia–west coast Canada and United States (STRAITS PACIFIC).[1]
Do	Hong Kong/Japan–west coast Canada and United States (FESCO PACIFIC).[1 3]
Do	Soviet Far East/Japan–Southeast Asia/India (FESCO INDIA).[1]
Do	Soviet Far East/Japan/Southeast Asia–Australia.[1 3]
Do	Soviet Far East–Hong Kong.[1 3]
Do	Soviet Far East/Japan/Southeast Asia–India–gulf and east coasts United States (FESCO ATLANTIC and GULF).[1]
Do	West coast United States–Australia–Japan.[1 3]
Do	Singapore–Thailand–Philippines–Hong Kong.[1 3]

See footnotes at end of table.

LINES OPERATED JOINTLY BY SOVIET AND FOREIGN STEAMSHIP COMPANIES

Soviet Company	*Route and nationality of foreign partners*
Murmansk	Communist Baltic/Western Europe/west coast United Kingdom–Great Lakes and east coast Canada (POLARCTIC) [1]—Polish.
Baltic	Soviet Baltic–east coast United Kingdom (London) [2]—British.
Do	Soviet Baltic/Western Europe–east coast South America (BALTAMERICA) [2]—Polish and East German.
Estonian	Soviet Baltic–West Germany—West German.
Do	Baltic/Western Europe–West Africa (UNIAFRICA) [2]—Polish and East German.
Latvian	Soviet Baltic–west coast United Kingdom–Ireland [2]—British.
Do	Soviet Baltic–East Germany [2]—East German.
Do	Soviet Baltic–France (Atlantic) [3 4]—French.
Do	Soviet Baltic–Netherlands [3]—Dutch.
Do	Soviet Baltic–Belgium [3]—Belgian.
Lithuanian	Soviet Baltic–West Germany—West German.
Black Sea	Soviet Black Sea–Bulgaria [3 4]—Bulgarian.
Do	Soviet Black Sea–Egypt [3]—Egyptian.
Do	Soviet Black Sea–India/Sri Lanka/Pakistan/Bangladesh—Indian.
Do	Soviet Black Sea–France (Mediterranean)—French.
Azov	Soviet Black Sea–Algeria—Algerian.
Far East	Soviet Far East–Japan [2 3]—Japanese.

[1] An independent line operating largely or entirely in the cross (or transit) trades.
[2] A conference line operating largely or entirely in the cross trades.
[3] Line offering full or partial container service.
[4] Line offering full or partial roll-on/roll-off service.

15. Another stimulus to Soviet liner operations has been the development of the Trans-Siberian Landbridge (TSLB) for the movement of container cargo between the Far East and Europe. Cargoes moving in both directions on the TSLB totaled close to 1 million tons in 1977 and accounted for about 16 percent of the cross trade cargoes carried by Soviet liners. Westbound cargoes in this service—about two-thirds of the total—move on Soviet container ships from Japan, Hong Kong, Singapore, and the Philippines to the Soviet Far Eastern ports of Nakhodka and Vladivostok. The cargoes then move across the U.S.S.R. by rail, some for further shipment by rail to destinations in Europe and others for pickup by Soviet container ships in Baltic and Black Sea ports for delivery to Western Europe. At least 18 Soviet cargo lines in the West and three in the Far East carry TSLB containers.

Impact of Soviet Shipping Operations on Western Shipowners

In the Liner Trades

16. The impact of Soviet shipping operations on Western shipowners has been greatest in the liner field even though the U.S.S.R.'s tramp ships carry four times more cross trade cargo. The expansion of Soviet liner services into the cross trades at low rates has taken business away from the Western conference [3] lines that dominate these trades. Spokesmen for the Western lines content that the Soviets, in seeking to attract business, charge rates that are below cost—an asser-

[3] Conferences are organizations of steamship companies operating cargo lines on given trade routes. They set the rates charged by member lines and allot sailings among them. Nonconference lines often operate on the same routes as "independents" or "outsiders".

tion that is difficult to substantiate due to the nature of the Communist economic system, Soviet cost accounting practices, and a lack of data.

17. The Soviets have undeniably made inroads by cutting rates. Between 1974 and 1977 the volume of liner cargo moved by Soviet ships to and from U.S. ports grew by almost two-thirds, from 1.1 million tons to 1.8 million tons or 3.8 peresent of total U.S. liner trade (see table 7).

TABLE 7.—U.S. LINER TRADE

Year	Total (million tons)	In Soviet ships		In U.S. ships	
		Million tons	Percent	Million tons	Percent
1974	51.4	1.1	2.1	15.3	29.8
1975	44.3	1.0	2.3	13.6	30.7
1976	49.8	1.4	2.9	15.4	30.9
1977	47.8	1.8	3.8	14.4	30.2

In 1977, almost all of the tonnage carried by the Soviets consisted of cross trade cargo; only 100,000 tons were goods in U.S./Soviet bilateral trade. Gross earnings from these operations probably exceeded $100 million.

18. In the Europe-Far East container trade, non-Soviet shipowners probably lost about 5 percent of their business to the Soviets in 1977 because of the low intermodal rates on the Trans-Siberian Landbridge. As of June 1978, rates for container shipments on through bills of lading via the TSLB were running about 20 percent below conference rates charged by Western container lines offering services by sea.

19. The largest sore spot in Soviet-Western shipping relations continues to be the Western Europe-East Africa trade. According to West European shipowners, the U.S.S.R.'s Baltic-East Africa Line (BESTA) persists in excessive rate cutting and is demanding an unreasonably large share of the trade in negotiations over conference membership. Most of the ships assigned to the line would be sailing even if no cross trade cargoes were involved because they serve countries such as South Yemen, Ethiopia, Tanzania, and Mozambique, in which Moscow has major aid programs. The cross trade cargoes the Soviet ships carry in competition with Western carriers on the route enable the U.S.S.R. to derive commercial profits from an activity whose benefits would otherwise be largely political.

20. The U.S.S.R. operates a majority of its cargo lines as independents; in mid-1978 only seven were affiliated with conferences. By remaining outside the conference system, the Soviets are free to set their own rates. The Soviets choose to do this because so many of their ships are neither fast nor modern enough to compete in terms of service.

21. The Soviet fleet is least competitive on routes where Western lines use ships with the latest technology—large ro/ro and cellular container ships with high operating speeds and fast turnaround times. The U.S.S.R. has committed most of its full container and ro/ro ships larger than 7,000 Dwt to the highly competitive routes carrying the trade of the United States with Europe and Japan. Even so, as of mid-1978, five Soviet lines on these routes were still operating exclusively with slow, conventional breakbulk ships; the three major lines—BaltAtlantic and Balt-Gulf on the North Atlantic ad Fesco Pacific

on the North Pacific—were operating with mixtures of breakbulk, timber, cellular container, and ro/ro ships.

22. In the summer of 1977 a key North Atlantic conference proposed a scheme whereby Soviet lines between Western Europe and the U.S. east coast would join the conference but be permitted to charge rates below those of other members. The Soviets were to be allowed to charge lower rates until their equipment was brought up to conference standards. Conference backers withdrew their plan in the face of opposition from key U.S. Government departments. The proposal was revived early in 1978 but again withdrawn.

23. Despite the lack of progress in conference entry, the U.S.S.R. seems to have moderated its rate cutting practices in many trades. This moderation appears to have been in response to the growing threat of countermeasures by the United States, Japanese, and certain West European governments. In July 1976, the Soviets agreed in the Bakke "Memorandum of Understanding" to bring all of their liner rates in U.S. trade to levels at least as high as those of other nonconference lines. Since then, Soviet rates in trade to and from the United States on the North Atlantic have remained largely within the traditional 15-percent margin for nonconference outsiders. In April 1977, Soviet lines trading between the U.S. west coast and Japan narrowed the gap between their rates and those of the conferences to about 10 percent. Prior to that, the Soviet line trading between Hong Kong and the U.S. west coast began collaborating with other carriers on that route under a loose conference-like arrangement; "Talking Agreement 10107" which permitted the Soviets to charge rates 5 percent under those of most other carriers. In July of 1978, the Soviets provisionally raised their Hong Kong-United States rates to the level charged by other parties to the agreement.

24. Most Western governments have been slow to act in discouraging Soviet liner rate cutting. Only the United States has both a system for monitoring Soviet rate cutting and penetration of its liner trades and a law on the books that permits the use of sanctions against unjustifiably low rates. A number of other Western nations have the legal authority to discourage Soviet rate cutting but are still trying to establish effective monitoring mechanisms.

25. Most of the Western shipping nations realize that efforts to deter Soviet rate cutting and liner trade penetration will be more effective if carried out multilaterally. The various international forums in which the issue of countermeasures against Soviet liner rate cutting has been raised include the OECD (the United States, Western Europe, and Japan), NATO (the United States and Western Europe), the Consultative Shipping Group (Western Europe and Japan), and the European Economic Community (EEC). The most tangible progress to date has occurred within the EEC, which has a limited monitoring program underway.

In the Tramping (Charter) Business

26. Tramp activity by Soviet bulk carriers and tankers in the cross trades has caused little concern among Western shipowners, in part because the latter do a big charter business in Soviet trade. The tonnage carried by chartered Western vessels in the U.S.S.R.'s import/export trade is about twice that carried by chartered Soviet tramps in

cross trades between Western countries. Most cross trading activity by Soviet tramps is performed on a backhaul basis by vessels returning to the U.S.S.R. from the delivery of exports or as an accommodation for client countries such as Cuba and Bulgaria. Other reasons for Western complaisance over Soviet tramping lie in the nature of the charter market, a highly competitive one in which rates fluctuate freely. The world tanker and bulk carrier fleets and charter markets are too large for the small Soviet fleets to have any measurable influence on rates. At the same time, Soviet fleet managers, aware of the need to maximize their tramp vessels' earnings, have no incentive to weaken the market.

Outlook Through 1980

27. The goal for fleet expansion in the current 5-year plan (1976–1980) probably will be exceeded. Fleet size by the end of 1980 will be close to 19.3 million dwt, compared with the original target of 18.4 million dwt. Allocation of fleet tonnage by ship type at the end of 1980 is shown in table 8. Although acquisitions will be somewhat greater than initially called for overfulfillment of the plan will result primarily from failure to retire overage vessels at the pace originally contemplated. Losses and retirements during 1976–1980 probably will total 650,000 dwt, only half the tonnage implied in the original plan. Acquisitions of ships unforeseen when the plan first came out could total 400,000 dwt, half consisting of combination carriers and half of ro/ro ships, tankers, containerships, and refrigerator ships. Deliveries of general purpose ships to the liner fleet, however, will be about 150,000 dwt less than initially planned.

Table 8.—*Projected fleet composition, Dec. 31, 1980*

	Million deadweight tons
Total	**19.3**
Dry cargo	**11.1**
Liner types	**6.9**
General purpose	(6.3)
Full container	(.2)
Ro/ro	(.3)
Barge carrier	(.1)
Refrigerator	**.2**
Timber carrier	**2.1**
Bulk carrier	**1.9**
Combination	**1.1**
Tanker	**7.1**

28. By early 1980 the Soviet liner fleet should receive enough modern ships to replace the slow, inefficient break-bulk ships being used in fulfilling the schedules of its major transpacific and transatlantic container services. As seen in table 9, deliveries planned for 1978–1980 include six additional *Khudozhnik Saryan*-class full containerships and at least seven large, fast ro/ros of the *Kapitan Smirnov* and *Skul'ptor Konenkov* classes which are also suitable for container service. The crucial test of professed Soviet willingness to join conferences when their equipment is competitive will come when the first of these lines has a full complement of *Khudozhnik Saryans*, or ships of that class. plus modern ro/ro units.

TABLE 9.—SOVIET LINER FLEET: HOLDINGS AND ACQUISITIONS OF FULL CONTAINER AND ROLL-ON/ROLL-OFF SHIPS

Ship type and class: Builder	Speed (knots)	Approximate deadweight tons	Container capacity [1]	Inventory, Dec. 31, 1977			Planned for delivery, 1978–80			Planned to be in service, Dec. 31, 1980		
				Number	Deadweight tons	Containers	Number	Deadweight tons	Containers	Number	Deadweight tons	Containers
Total				39	310,866	15,792	18	241,120	11,442	57	551,986	27,234
Full container				15	128,197	6,740	6	86,940	4,392	21	215,137	11,132
Khudozhnik Saryan: East Germany	20.8	14,490	732	4	57,960	2,928	6	86,940	4,392	10	144,900	7,320
Aleksandr Fadeyev: U.S.S.R.	17.0	6,350	400	5	32,617	2,000	0	0	0	5	32,617	2,000
Sestroretsk: U.S.S.R.	15.0	6,170	302	6	37,620	1,812	0	0	0	6	37,620	1,812
Roll-on/roll-off				24	182,669	9,052	12	154,180	7,050	36	336,849	16,102
Magnitogorsk: Finland	22.0	21,000	1,368	2	42,004	2,736	0	0	0	2	42,004	2,736
Kapitan Smirnov: U.S.S.R.	27.0	18,000	1,000	0	0	0	3	54,000	3,000	3	54,000	3,000
Skulptor Konenkov: Poland	20.5	17,500	771	2	36,920	1,548	3	55,380	2,322	5	92,300	3,870
Izvestiya: Denmark	16.5	12,800	380	0	0	0	2	25,600	760	2	25,600	760
Inzhener Machulskiy: Finland	16.8	6,030	239	10	57,895	2,390	0	0	0	10	57,895	2,390
Ivan Skuridin: U.S.S.R.	17.0	4,800	242	4	19,200	968	4	19,200	968	8	38,400	1,936
Akademik Tupolev: France	17.0	4,200	235	6	26,650	1,410	0	0	0	6	26,650	1,410

[1] In 20-ft equivalent units (TEU's).

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