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SUBMITTED TO THE

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OF THE

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LETTERS OF TRANSMITTAL

APRIL 23, 1970.

To the Members of the Joint Economic Committee:

Transmitted herewith for the use of the members of the Joint Economic Committee and other Members of Congress, is a volume of materials on the economies of Eastern Europe entitled "Economic Developments in Countries in Eastern Europe," prepared for the Subcommittee on Foreign Economic Policy.

The views expressed in this document do not necessarily represent the views of the members of the committee or the committee staff, but are statements of issues and alternatives intended to enlarge public knowledge of the subject and to provide a focus for further discussion.

WRIGHT PATMAN,
Chairman, Joint Economic Committee.

APRIL 22, 1970.

Hon. WRIGHT PATMAN,
Chairman, Joint Economic Committee,
Washington, D.C.

DEAR MR. CHAIRMAN: Transmitted herewith for use by the Joint Economic Committee, the Congress, and the interested public is a factual and analytical study of the economy of Eastern Europe, entitled "Economic Developments in Countries in Eastern Europe." This is a compilation of invited papers prepared for the Subcommittee on Foreign Economic Policy designed to meet the interests of the committee and the Congress in an up-to-date body of actual data and interpretative comment on the state of the domestic economy of Eastern Europe, including the record of its recent experience in economic development, and its relations with the rest of the world.

In the past years the committee through a similar collection of expert studies has contributed substantially to understanding of the strengths and weaknesses of the Soviet and Chinese economies.

This extensive compilation was organized by the staff in the hope that it would provide a valuable source book for further committee studies of the subject. It is hoped too, that it will serve as an aid and a stimulus to private scholars working on this subject. The committee is deeply indebted to the experts who gave so generously of their time and expertise and I would like to take this opportunity on behalf of the subcommittee of expressing our gratitude for their invaluable efforts without which this study would not have been possible.

At the same time the subcommittee received the wholehearted cooperation from several agencies of the Federal Government and from

private research agencies and I would like to express our thanks to them.

Finally, on behalf of the committee I wish to take this opportunity to express our sincere gratitude to the Legislative Reference Service for making available the services of the late Leon M. Herman—who helped plan the scope of the research and contributions—and, upon his regrettable and untimely death, the services of Vladimir N. Pregelj who admirably assisted us in the compilation of the study.

It is understood that the views contained in this study are not necessarily those of the subcommittee or its individual members or the staff.

HALE BOGGS,
Chairman, Subcommittee on Foreign Economic Policy.

APRIL 21, 1970.

Hon. HALE BOGGS,
Chairman, Subcommittee on Foreign Economic Policy, Joint Economic Committee, U.S. Congress, Washington, D.C.

DEAR MR. CHAIRMAN: Transmitted herewith is a volume of materials on the economy of Eastern Europe, entitled, "Economic Developments in Countries of Eastern Europe." The study has been prepared in the form of a compendium, containing a series of selected papers contributed by invited specialists who are recognized authorities on Eastern Europe. The experts have been drawn from the ranks of several departments of the Federal Government and from private research agencies. The papers they have submitted, in response to our request, cover the broad range of topics dealing with the recent performance of Eastern European economy. Included among the topics are: economic development and policy, rates of growth, capital formation, planning and management, the defense burden, transportation, agriculture, industry, population, employment, labor incentives, education and research, international trade, and foreign economic aid.

The Subcommittee on Foreign Economic Policy of the Joint Economic Committee undertook the present study, you will recall, with a view to providing a body of basic information on the economy of Eastern European countries that would be useful in helping to focus public discussion on one of the critical problems of our times; namely, the correlation between the forces working toward stability and the forces tending toward upheaval within this vital area of the European community. It is hoped, furthermore, that the facts and ideas presented in this survey of available information will help to shed light on the alternatives facing the United States in ordering our relations with the countries in Eastern Europe within the foreseeable future. The shape of these relations is certain to be significant for the internal development of these countries and critical to the issue of war and peace in the world.

The contributors to the study have been most considerate of our needs and generous in giving of their time and expertise to provide not only basic information but indispensable analytical perspective

on this important subject. The individual specialists who have participated in the preparation of the study are:

Thad P. Alton	Hertha W. Heiss
Terence E. Byrne	Robert T. Hinaman
J. T. Crawford	Nancy M. Kling
Laszlo Czirjak	Gregor Lazarcik
Imogene Edwards	Robert L. LeBoeuf
Andrew Elias	Paul F. Myers
John P. Hardt	J. G. Polach
Marilyn Harper	Edwin M. Snell

The committee received wholehearted cooperation from the Bureau of the Census, the Department of State, the Central Intelligence Agency, and the Library of Congress; also, from the Research Analysis Corp. and the Riverside Institute.

It should be clearly understood that the views expressed in these papers are those of the individual contributors and do not necessarily represent the positions of the respective executive departments, the members of the Joint Economic Committee or individual members thereof, or the committee staff.

We were indeed fortunate in having the services of the late Leon M. Herman, senior specialist, who initially supervised the study. Upon his passing, the Library of Congress made available the services of Vladimir N. Pregelj who assisted us in the completion of the study.

JOHN R. STARK,
Executive Director.

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COMPENDIUM AUTHORS

[Alphabetical Listing]

INTRODUCTION

The Communist nations in Europe have been of special but fluctuating interest to policymakers and the informed public in the United States. The August 1968 Soviet invasion of Czechoslovakia again heightened American interest in Eastern Europe. The Communist nations of Europe, including the six under more direct Soviet influence (East Germany, Poland, Czechoslovakia, Hungary, Rumania and Bulgaria) and Communist Yugoslavia, outside direct Soviet influence, have each had their turn at the center of U.S. interest only to find themselves recede into a kind of anonymity. A factor in this interest in the East European countries is their role in the Soviet Communist orbit. Their economic capability—aggregating some two-thirds the level of Soviet GNP—is among the more positive contributions to the Soviet Communist camp. Economics has likewise been central to their attraction of the West, including Western Europe and the United States, to the East European countries. This economic attraction of the West is fortified by the deep seated Western identity of many of the East Europeans, especially the Czechs, Poles, and Germans.

The Joint Economic Committee, for some years, has been providing evaluations on the performance of the Soviet economy. Periodically, major assessments were made in the *Comparisons of the United States and Soviet Economics*, 1959; *Dimensions of Soviet Economic Power*, 1962; and *New Directions in the Soviet Economy*, 1966. Annual updatings of these major benchmark studies have been provided on a periodic basis, the most recent was the *Soviet Economic Performance*, 1966-67 that was published in 1968. To this series on the Soviet economy was added a major two-volume study on Mainland China, *Economic Profile of Mainland China*, published in 1967. Now the Committee has called upon a group of leading economic specialists within the government and wider community to evaluate the economies of Eastern Europe against their twenty year record and future prospects. This, like the Chinese and major Soviet volume, is intended as a benchmark volume.

Issues in East European Assessment

A number of issues or focal points may be suggested as guiding the compilation of this evaluation of economic performance in Eastern Europe. Insights obtained on these issues from this volume may provide some guidelines for U.S. policymakers and the informed public.

1. What effect has Soviet influence had on the East European countries in terms of their priorities, performance, economic institutions, etc., and how has this influence varied?

Rarely has a nation (in modern times) dominated the economic life of other countries in the way the Soviet Union has extended its in-

fluence to Eastern Europe in the last two decades. Without actual absorption of the formerly independent countries of Eastern Europe into the Union of Soviet Socialist Republics, the Soviet Union has nonetheless provided very narrow parameters within which economic decisions could be made in the Eastern European countries. Even Yugoslavia, the most independent of the Communist nations in Europe, is still influenced by the Soviet type of economic development and administration adopted after World War II. A clear understanding of this particular type of partnership is essential for obtaining insights in the character of the East European economies and their performance. The reassertion of the Soviet right to direct involvement in the internal affairs of Czechoslovakia—rationalized *ex post* by the assertion of the Brezhnev doctrine in September 1968—was a part of a continuous pattern of limiting the sovereign power of the East European nations.

2. How have the East European countries performed over time and how does their record compare with the performance of other countries such as those in Western Europe in a comparable time period?

At the end of World War II, all of Europe faced the common problem of economic recovery and development. Wartime destruction imposed not only its costs but also its opportunities in developing more modern economic facilities and new economic institutions. Western Europe, with the aid, encouragement and influence of the United States, somewhat unevenly, but nonetheless impressively, moved toward economic recovery and the development of more modern, viable productive facilities and institutions. Communist countries project improved economic performance as a central advantage of their system and accept it as a major criterion for success in a Soviet type state. The East European countries were thus encouraged to give high priority to economic performance. Post-World War Western Europe likewise accepted economic revival and development as a primary aim. Eastern Europe might have followed a route similar to Western Europe; it did not. A major difference in the approaches in the East and West of Europe was the priority given to their own recovery and development as well as the importance attached to modernization and revitalization of the economic institutions. Faced with the problem of vast destruction within their own country, the Soviet leaders chose to impose economic burdens on the East European countries, both in terms of resource claims and the imposition of Soviet type institutions. In contrast, the United States, not faced with wartime devastation, could and did channel massive resources into Western Europe and encouraged the modernization and revitalization of their economic institutions. The general thrust of the Marshall Plan and the Soviet counterpart, Molotov Plan, have moderated and varied over time as post-war recovery was attained, but the direction, priorities and legacy of the initial thrust still obtains. The American economic policy toward Europe, designed in Marshall Plan days to foster a modern, productive European economic community, still tends to foster those aims. The Soviet policy of "Russia first" in recovery and development and guided by political aims frustrating the development of a vital East European economic community, still has the same gen-

eral thrust. The Molotov Plan, originated as a political response to a Czech desire in 1948 to join the Marshall Plan, symbolized and influenced the general policy line.

3. Within Eastern Europe there have been wide divergences in Soviet influence from the control expressed in East Germany to that in Yugoslavia from the break in relations in 1948 to date. These divergences have also drawn from differences in the levels of economic development, resource availability, ethnic characteristics, etc. How have these differences affected the development of the individual economies? To what extent are factors other than Soviet control determinative in the course of East European development and the differences of performance in East European nations from their counterpart countries in Western Europe?

In few areas of the world do national identity and traditional characteristics appear to be more ingrained than in East Europe. Some reservations about describing unique national characteristics of various countries of the world which seem appropriate elsewhere seems less so in describing Germans, Poles, Hungarians, etc. Moreover, the institutions of the urban and rural economies of these states have long traditions and persistence beyond their ethnic character. The extent to which these characteristics have influenced and may continue to influence the economic development and performance of Eastern Europe is another central point of interest and an issue on which the successive papers may throw some light. The traditional conflict of East European peasant and the State finds a new form in the resistance to Soviet-type collectivization, but the roots of conflict are deep in the history of the region. These and other impediments to change, reinforced by the monolithic Soviet system, have led to a degree of homogeneity in institutions and performance. At the same time, differences persist. Of the more developed nations, the differences are perhaps most striking in East Germany as compared to Yugoslavia: the former closer to the Soviet model, the latter at some way station between East and West European economic change.

4. What are the options open to the East European leaders in the years ahead on economic policy? How will their perception of required performance change and what prospects are there for substantive improvement in their ability to follow policies likely to be successful in fulfilling their felt needs?

Economic reform continues in Eastern Europe since the Czech invasion, not only in Yugoslavia beyond the direct influence of Soviet military power but even in Hungary with its own history of Soviet military involvement. This evidence suggests that East European countries will continue to press for changes in their economic resource allocation and administration in order to address one of their major perceived problems, that of falling economic performance. Some insights in the directions open to the countries of Eastern Europe may be provided by this compendium of papers. East Germany, on the one hand, still very much under direct Soviet influence, and Yugoslavia on the other hand, moving farther and farther from the Soviet Stalinist model of political and economic development, provide different frames of reference. Still under direct Soviet political and military

influence and increasingly dependent on Soviet sources of raw materials, e.g., petroleum, metals and wheat, the East Europeans have difficulty turning their economic faces West. Yet their economics badly need the capital goods of the West and an infusion of some of the Western economic efficiency for improved planning and management. The amelioration of these antagonistic attractions is outside Eastern Europe—in Moscow, Washington and the West European capitals.

Implications

East European developments have been among the most frustrating of all those foreign activities of interest to U.S. policymakers and informed public. Methods for influencing political and military affairs seem to be minimal or non-existent. Economic links with Eastern Europe and potential leverage on East European development, however, provides a singular, albeit complex, route for influence. Limited by extreme shortages of hard currency and ability to earn purchasing power in the West, the East European countries appear to be progressively turning their attention to problems of modernization which only appear to be susceptible of improvement by expanded economic trade and aid with Western Europe and the United States. The Soviet Union itself has parallel interests, but as a larger country, still has a greater option of self-sufficiency. Nonetheless, following a policy of increased economic intercourse with the West delimits the Soviet ability to restrict East European economic intercourse.

The prospects for influence through economic understanding and increasing economic activity are complex. Periodic reexamination of East-West trade restrictions and practices reveal some of the opportunities and difficulties in changing American trade policy. Western trade policy may be, nonetheless, the most attractive, albeit limited, route for increased United States influence on developments in Eastern Europe.

EAST EUROPEAN ECONOMIC DEVELOPMENT: TWO DECADES OF INTERRELATIONSHIPS AND INTERACTIONS WITH THE SOVIET UNION

By JOHN P. HARDT*

CONTENTS

INTRODUCTION

The purpose of this essay is to describe patterns of economic development in the six Communist countries of Eastern Europe (East Germany, Poland, Czechoslovakia, Hungary, Rumania and Bulgaria) as examples of Soviet type processes; to provide some explanation of the similarities to and divergences from the Soviet model; and to indicate some central factors likely to influence future economic prospects in Eastern Europe. Evaluation of the 50 years of Soviet economic development in terms of stages of development and the Stalinist conceptual model for industrialization as contained in essays elsewhere by the same author are used as frames of reference in this analysis.[1]

*Acknowledgment is due Mrs. Barbara Rosenfeld for substantive assistance, and Dr. Edwin Snell, Dr. Charles Thomson, Mr. Murray Feshbach, Dr. Stanley Cohn, and the late Mr. Leon Herman for reading and commenting on various drafts of the paper.

[1] "Soviet Economic Development and Policy Alternatives" *in* Vladimir Treml (ed.), *The Development of the Soviet Economy: Plan and Performance,* New York, Praeger, 1968, and with Carl Modig, "The Industrialization of Soviet Russia in the First Half Century" *in* Kurt London (ed.), *Soviet Union: Fifty Years of Communism,* Baltimore, Johns Hopkins, 1968. See also Annual Surveys of the Economic Commission for Europe, Geneva, United Nations; Maurice Ernst, "Postwar Economic Growth in Eastern Europe," *in* U.S. Congress, Joint Economic Committee, *New Directions of the Soviet Economy,* Washington, GPO, pp. 873–916; Michael Gamarnikow, *Economic Reforms in Eastern Europe,* Detroit, Wayne University Press, 1968; Jerzy F. Karcz (ed.), *Soviet and East European Agriculture,* Berkeley, Univ. of California Press, 1967; Alfred Zauberman, *Industrial Progress in Poland, Czechoslovakia and East Germany 1937–62,* London, Oxford University Press, 1964; Nicolas Spulber, *The Economics of Communist Eastern Europe,* Cambridge, M.I.T. Press, 1957. Michael Kaser, *COMECON, Integration Problems of the Planned Economies,* London, Oxford Press, 1967; Nicolas Spulber, *The State and Economic Development in Eastern Europe,* New York, Random House, 1966.

Application of Soviet-type development in Eastern Europe resulted in a pattern of performance similar to that of the Soviet Union: in the short run, high industrial growth, and in the long run, overall economic retardation. The East European countries differ from the Soviet Union in the facet of control of their economic policies and institutions by an external power, the Soviet Union; in the western-oriented, national character of their development; and in the small size of their economies. Internal disruptions, arising from resistance of western-oriented East Europeans to direct Soviet intervention and to Soviet-type institutional control and direction have caused continuing conflict in peasant/state and worker/state relations. Additional problems have arisen out of their dependence on foreign trade. All these pressures have contributed to instability and fluctuations greater than in either the Soviet Union or the West.

The direction and structure of East European trade has been designed primarily to accord with Soviet economic and strategic priorities, at considerable cost to East Europe's own economic development. The arrangement has not been without cost to the Soviet Union itself; its strategic interests in the area are apparently considered to justify these expenditures. The Soviet Union has maintained this unequal economic relationship by direct economic and Party controls. The Soviets imposed their high-cost model of development by regulating external economic relations and by encouraging adoption of Soviet-type institutions, e.g., collectivized agriculture, labor-management control, physical output/command type planning, and a bilateral state trading monopoly. In time the material cost to the East European countries of the Soviet relationship has been reduced, and the benefits to Soviet development diminished—although the benefit reduction has probably outrun the cost diminution. But the retarding effect of Soviet-type institutions continues, even though significant diversion of resources to the Soviets has ended. Rising capital-output requirements and lower labor productivity are the measurable manifestations of East Europe's economic slowdown; underlying the deterioration in performance is the inability to readjust Soviet-type institutions to meet longer term economic requirements.

Twenty years of Soviet-type development have made the East European economies, once widely varied in per capita income, industrial development, and natural endowment, more similar in performance, problems and prospects. Czechoslovakia, the most advanced at the outset, and least affected by war destruction and early Soviet reparation policy, in later years has slipped back in the pack; while the less developed countries, such as Rumania, early adversely affected by Soviet reparations and joint partnerships, have moved ahead. The Soviet legacy of homogeneous institutions, performance and problems is pointed up sharply by comparison to the integrating influence U.S. economic policy has tended to have in Western Europe through the Common Market.

An overarching factor guiding and limiting East European economic development has been the sovereignty asserted by the Soviet Union. This has evolved from the very direct expression in the occupation of East Germany in 1945 and the implementation of the reparations policy, to the enunciation of the post-August Brezhnev doctrine

in 1968, reasserting a continual right to intervene in internal policies of East European nations. Although the application and and enunciation of the Brezhnev doctrine may properly be interpreted as a tightening of Soviet controls, it may be viewed in the longer run, dating from 1945, as only a short-term narrowing in a trend in widening the limits within which the East European nations could choose alternative courses. Within this longer term trend there have been cycles of reaction and liberalism. Certainly the August invasion expressed a reactionary policy. In the past, in 1953, and 1956, the reactions punctuated by use of Soviet military force have been followed by relaxation of control. This may occur again.

Soviet involvement has been concerned with the proper allocation of resources to Warsaw Pact military uses and to trade with the U.S.S.R., as well as with the retention of certain Soviet-type institutions, which ensure Party control and involvement in the economy. But economic retardation in the Soviet Union and the East European countries and acceptance of a need for change have provided in the post-Stalin years a permissive environment within which reforms have been proceeding.

After two decades of Soviet-type economic development East European leaders are faced with the need to improve economic performance, and with difficult policy choices toward that end. Their problems, for purposes of analysis, may be grouped in two categories: resource allocation and planning/management. First, how can their resources be allocated differently to improve economic performance? The resource allocation problem is to meet more exacting, sharply-rising demands with only slowly rising supplies of goods and services. If they attempt to proceed largely without outside aid, that is, if they attempt to stimulate growth and efficiency while relying basically on their own resources, they must revamp the priorities dictated by their former obligation of meeting Soviet needs. This will involve agonizing choices, since the resources are so limited. On the other hand, if they attempt to resolve the problem by utilizing credits, tourism, and joint ventures with the West, they must deal with the resulting increased pressure on the Party's political and control machinery.

Second, how can their Soviet-type economic planning and management institutions be reformed to enhance their efficiency? Efforts to resolve the planning-management dilemma by liberal Party leaders and professional economists run against Soviet policy constraints as well as the institutional rigidity of the Soviet-type system. It is possible that the limits of change the Soviets permit will widen. But professionalization of the economic planning and management appears to require a withdrawal of the Party bureaucrats to implicit positions of power and control, a step back that they will not take easily. If these politically difficult decisions are not taken, economic performance is not apt to improve, especially in the advanced countries, i.e., Czechoslovakia, East Germany, and Hungary, where pressure for economic change is greatest. The success of the East European leaders in putting their economies on the path of growth and efficiency will turn on their ability to develop professionalism in economic planning and management and to overcome the diseconomies of small-scale operation nationally and at the enterprise level. It is apparent that Soviet and indigenous Party involvement in economic decision making will

continue to constrain economic change. Even under the most favorable circumstances of Soviet permisiveness on change and indigenous Party flexibility, adoption of a better pattern of resources allocation and improved planning and management will show long-term rather than short-term results. If the reforms are made, they will lead to a diminution of Party control of the economy, and likely of Party control over other areas, e.g., military as well, a prospect that the Party fears just as it desires the progress that economic reform promises.

Future projections require an appraisal of some of the development factors in the past, perhaps answering the questions:

What did Stalinist type development in Eastern Europe accomplish and what were its shortcomings? In brief, the following objectives were attained: provision of resources for economic recovery in the Soviet bloc, especially in the U.S.S.R.; provision of resources for modernization and expansion of the East European military forces; and establishment of a heavy industrial base in the individual countries. In this process the apparent economic stagnation of the interwar period was forcibly overcome, but there was a major shortcoming. The traditional protectionist small-scale atomistic character of the economies was not changed despite the fact that at that time overwhelming Soviet sovereignty could have overriden nationalistic and individualistic East European resistance to larger economic units, interregional relationships and specialization. Instead, the attainment of Stalinist-type objectives reinforced traditional autarky, nonspecialization, inappropriate specialization and small scale economies. Soviet failure or unwillingness to perceive and solve these traditional East European problems has left them to plague Eastern Europe's subsequent development as a viable economic region. That the Soviets did not act to encourage integration at a time when they were politically able to do so represents, from the political point of view, an expression of their "divide and conquer" approach to Eastern Europe, but from an economic point of view, the most significant missed opportunity of their dominance.

What longer-term effects did the Stalinist development have on economic performance in the post-Stalinist period? In the longer term, direct Soviet impositions ended. A credible case can be made that Eastern Europe became a cost to Soviet development through its requirements for raw materials, food, petroleum, etc. and through the level of intra-bloc prices. However, the following aspects of earlier Stalinist control persisted and contributed to the post-Stalin deterioration in economic performance:

(*a*) Continuing Soviet and local party involvement in the economy, which limited economic reform in crucial areas: relations with the West, and Party control over resource decisions and administration;

(*b*) Resistance within the Party to change by institutions set up to carry out Stalinist objectives, especially in planning, management, agriculture, and foreign trade;

(*c*) The cumulative cost of deferred requirements in resources necessary to improve factor productivity, e.g., capital efficiency and labor productivity.

These longer-term effects of short-term Stalinist attainments are reinforced by continued East European nationalism and individualism, which frustrate efforts toward larger-scale specialization within the region, and among industrial and agricultural enterprises.

Yugoslavia is not directly considered in this analysis as the processes of political control and economic development in that country were more independent of Soviet influence than in the six Eastern European countries considered here. Albania is omitted with much less concern about its relevance. Yugoslav development, although not burdened by direct Soviet involvement, did utilize Soviet-type institutions with similar results. Moreover, the Yugoslav example and experience has been an influence on East European reforms and is instructive on the likely direction and implications of change.

In the immediate post-World War II period, Eastern Europe presented a picture of diverse economies in East Germany, Poland, Czechoslovakia, Hungary, Rumania and Bulgaria. Two decades of Soviet sovereignty and Soviet-type institutions have modified this economic heterogeneity. The less developed have become more industrialized and grown faster, and economic performance throughout has been similar. But perhaps the most enduring aspect of Soviet control is the common legacy of institutional rigidity and resultant problems in economic performance.

I. Soviet-Type Development in Eastern Europe

Two decades of economic development in Eastern Europe have certain basic similarities to the half-century of Soviet economic development. A Stalinist period, about 1950–1955, for most countries, was preceded by a period of postwar recovery and establishment of Communist party control (1945–1950) and followed by a post-Stalinist period of modification in the basic pattern of development (1956 to date). The annual growth rates during the Stalinist periods were higher than during the post-Stalin periods as noted in Table 1.

TABLE 1.—ECONOMIC GROWTH—U.S.S.R. AND EASTERN EUROPE (AVERAGE ANNUAL RATES)

Countries	Stalinist Periods		Post-Stalinist Periods	
	Year	Rate	Year	Rate
U.S.S.R.[1]	1928–37	4.8–11.9	1958–64	5.3
	1950–58	7.1		
East Germany [2]	1950–55	11.4	1956–60	7.0
			1960–65	3.5
Poland [2]	1950–55	8.6	1956–60	6.6
			1960–65	5.9
Czechoslovakia [2]	1950–55	8.0	1956–60	7.1
			1960–65	1.8
Hungary [2]	1950–55	6.3	1956–60	6.5
			1960–65	4.7
Rumania [2]	1950–55	13.9	1956–60	7.0
			1960–65	8.7
Bulgaria [2]	1950–55	12.2	1956–60	9.7
			1960–65	6.5

[1] Lower limit based on valuation of ruble cost in 1937 prices; upper limit on valuation in 1928 prices. As the Stalinist growth continued in the U.S.S.R. through 1958, the longer period is used. Stanley Cohn, "Soviet Economy: Performance and Growth" in Treml, op. cit., p. 30.

[2] Economic Bulletin for Europe, vol. 18, no. 1, 1967, p. 39. Ernst estimates correct upward bias in this official data submitted to the Economic Commission for Europe, for example, for total East Europe, 1951–55—5.7 percent; 1956–60—5.2 percent; 1961–64—3.6 percent; 1951–64—4.9 percent growth in gross national product. Ernst, op. cit.

In the early period, prior to 1950, the economies of Eastern Europe came under direct Soviet occupation; Czechoslovakia was the last to come under Communist rule. During the Stalinist period, ideologically, the Party leadership of the East European countries shared the precepts and priorities of the Soviet First Secretary. Politically, many of them owed their very survival to his continuing support and were required, as evidenced by the Prague trials in 1952, to show that support to survive physically. In this Stalinist context, East European economic plans were designed *as if* they followed the following conceptual model:

First, export plans designed to meet Soviet industrial development requirements and production and support plans for the military forces in Eastern Europe, while satisfying certain minimum domestic consumption requirements.

Second, a maximal increase in the heavy industrial underpinnings of each state in the following sectors: coal and other energy, steel and other metal production, and machine building. Each of these sectors had to be expanded as rapidly as possible, based on the level of technology of the times, in order to meet Soviet bloc requirements.

Third, a residual allocation of resources to the following sectors to meet the needs of consumers: light industry, foodstuffs, investment in the infrastructure of the economy (transportation, housing, etc.) and replacement and modernization of existing plant and equipment.

The central overriding objectives, especially during the Stalinist period (1950–1955) concerned the establishment and augmentation of heavy industry as the basis of Soviet bloc economic and military power. These objectives were shared with the Soviet Union directly and related specifically to the fulfillment of Soviet domestic aims. In the post-Stalin period (1956 to date), these objectives have been served by the revised Comecon and Warsaw Pact arrangements. Following the Stalinist policy probably did not require Soviet direction because many of the East European leaders appeared to find it compatible with their own perception of priorities. Indeed, the Czech reformers, perhaps quite honestly, referred to the Stalinist period as appropriate in its time. Even after the Stalinist example had gone out of fashion in the Soviet Union, the Rumanians chose to follow some of its central dictates.

The primary aim of establishing an industrial base in each country was attained: the industrial share rose to about one-half to over two-thirds of the source of national income in the six countries of Eastern Europe (See Table 2.) The growth in gross national product (GNP) at factor cost in the 1951–1964 period was preponderantly in industry, e.g., the increase by sector in East Germany and Czechoslovakia was 72 and 68 percent in industry, 28 and 34 percent in services, and zero and minus two percent in agriculture, respectively.[2] Poland had the highest agricultural percentage increase of 11 percent, which was atypical (See Table 2.). The Soviet relation by 1963 in structural terms ranked between Hungary and Poland (Table 3).

[2] Ernst, *op. cit.*, p. 883.

TABLE 2.—COMPOSITION OF GROWTH IN GNP AND EMPLOYMENT[1]

Country	Gross national product growth, 1951–64 (percent of aggregate increase in period)				Growth in employment, 1951–62 (annual average rate, in percent)		
	Industry, including construction	Agriculture, including forestry	Services	Total	Industry	Agriculture	Total
Czechoslovakia	68	−2	34	100	3.1	−3.2	1.0
East Germany	72	0	28	100	−.1	−3.0	0
Hungary	59	9	32	100	4.6	−2.1	1.2
Poland	66	11	23	100	3.5	−.8	1.1
Rumania	(2)	(2)	(2)	----------	3.6	−.2	1.0
Bulgaria	59	9	32	100	5.2	−1.3	.5

[1] Ernst, op. cit., pp. 883, 893. The negative East German employment growth was, in part, due to the prewall (1962) labor exodus.
[2] Not available.

TABLE 3.—LEVEL OF INDUSTRIAL DEVELOPMENT OF EASTERN EUROPE AND SOVIET UNION, 1963[1]

[In percent]

Countries	Origin of national income, 1963				Employment in agriculture
	Industry	Agriculture	All others	Total	
Czechoslovakia	67	13	20	100	22
Eastern Germany	66	10	24	100	17
Hungary	62	19	19	100	34
Soviet Union	58	17	25	100	34
Poland	51	23	26	100	44
Rumania	47	30	23	100	60
Bulgaria	45	37	18	100	49

[1] Economic Bulletin for Europe, vol. 18, no. 1, p. 32; cf. L. Semenov "Technical Progress and the Structure of Industrial Production of Comecon Countries," Voprosy ekonomiki, no. 12, December 1968, pp. 112–121.

Not all the countries moved with equal pace into and through the Stalinist period. Indeed, Stalinist economic control of industrial and agricultural income was modified in East Germany, perhaps due to the open border with West Berlin, until the Wall was built in 1961. Rumania did not proceed to develop a steel and chemical industry and complete collectivization until the same late date. However, each country increased its industrial output at the expense of agriculture. By contrast (cf. Table 3), in 1938 agriculture had accounted for roughly twice as much of the national income: Czechoslovakia 23 percent; Hungary 30 percent; Poland 44 percent; Rumania and Bulgaria over 50 percent.[3]

This rapid industrial expansion provided the means for increasing the effectiveness of these countries' military forces. Integrated Warsaw Pact forces were created out of the heterogenously-supplied infantry, horse-drawn national forces of the 1945–1950 period. They are modernized, mechanized, all supplied with Soviet-type equipment, and formidable in capability. The production capability of the more strategic northern tier (East Germany, Czechoslovakia, and Poland) and its state of readiness was substantially better than the southern tier's.[4] That the Warsaw Pact forces may have become less reliable and effective as a political result of the August Soviet invasion of Czecho-

[3] Spulber, *State*, p. 29.
[4] Institute of Strategic Studies, *The Military Balance: 1963–64*, London, 1963; and *The Military Balance, 1968–69*, London, 1968.

slovakia does not entirely vitiate the military effect of earlier economic policy.

Based on its declared objectives, Stalinist development in Eastern Europe in the 1950–1955 period might be adjudged a short-term success: an industrial base was laid—albeit unevenly and at high cost—in each country; modernization and improvement of the Warsaw Pact forces was well under way; Soviet bloc development—closely identified with Soviet domestic priorities—received significant contributions from the East European countries. Moreover, the dynamism of East Europe under Soviet control contrasts favorably with the general stagnation of the inter-war period of the thirties.[5] A Stalinist might argue that deferment of investment in modernization and the infrastructure, the labor mobilization program, etc., were justified by short-term results. Moreover, breakdowns in control in Berlin in 1953, and in Poland and Hungary in 1956, might be explained as results of the destalinization program initiated in the U.S.S.R. and permitted in Eastern Europe, rather than as an intrinsic feature of a Stalinist system.

Nonetheless, it is apparent that problems as well as successes have followed the Soviet pattern. For example, inattention to agricultural development has resulted in serious food deficits. Traditional food exporting countries in Eastern Europe have been required to rely on imports to maintain an adequate diet. Moreover, in the post-Stalin period, there has been, as in the Soviet Union itself, a downturn in economic performance, reflecting needs for reforms in planning and management, modernization of economic institutions, and changes in the pattern of resource allocation.

That the formidable quantitative accomplishment in establishing the East European industrial base was not paralleled in agriculture is clearly indicated by the aggravation of foodstuff shortages. By the period 1959–1961, all the Comecon countries except Rumania and the U.S.S.R. were adjudged wheat deficit countries and were projected to continue so during 1970–1975.[6] The U.S.S.R. in poor years is still a deficit country as the net imports of 5.3 million and 4.7 million metric tons of wheat, respectively in 1964 and 1965, indicated.

At least by 1962, East Europe as a whole began consistently consuming more energy than it produced.[7] In 1968, Jaroslav Polach estimated the deficiency at 27 million tons HCE (425 compared to 398) with no promise of change in the trend, especially in petroleum products.[8]

As in the post-Stalin period of Soviet economic development, problems of modernization in industry, transportation, agriculture and other sectors surfaced in East Europe. At the same time, proliferating economic claimants were calling for a broader resource allocation

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[5] The average annual rate of national income growth in Eastern Europe and Yugoslavia in the period 1929–1939 was small to negative (per capita growth rate in brackets): Czechoslovakia—0.4 [−0.5]; Hungary—2.1 [1.4]; Poland—1.6 [0.3]; Rumania—2.1 [0.8]; Bulgaria—4.2 [3.2]; Yugoslavia—1.8 [0.2] (Spulber, *State*, p. 58).

[6] R. J. Hemp and S. C. Schmidt, "Prospects for United States Wheat Exports to the Soviet Bloc," *Illinois Agricultural Economics*, January 1968, as reprinted in U.S. Senate Banking and Currency Committee hearings on "East-West Trade," Part 3, July 1968, p. 1380; Hertha W. Heiss, "The Soviet Union in the World Market," *in New Directions of Soviet Economy*, p. 928.

[7] Jaroslav Polach, "The Energy Gap in the Communist World," *East Europe*, April 1969, p. 21.

[8] *Ibid.* HCE represents hard coal equivalent of 7,000 kilocalories or 28,000 BTU per kilogram.

pattern. With political relaxation of the Stalinist control system in the Soviet Union, over Eastern Europe, and within the Eastern European countries themselves—the necessary administrative capability for effectuating the Stalinist model was sharply reduced.

In East Europe and the Soviet Union alike, widening shortfalls in actual performance under perceived potential have underscored the need for changes in resource allocation and in the system of planning and management. Attempts of the various East European countries at change have often led them to diverge from the Soviet pattern. Problems have arisen—as in Czechoslovakia, most recently—when these economic changes have threatened to run afoul of Soviet interest in holding the line on political change.[9]

II. East European Divergences From the Soviet Pattern

Although the general process was similar, East European development varied from the Soviet pattern. East European options and capabilities in their twenty years of Communist economic development were different from those in the fifty years of Soviet Russian development in many specifics: The exogenous factor, i.e., Soviet influence on the economic process, the national character of the states, and the comparative size of the national economies involved have been the most significant factors differentiating East European from Soviet development. National-ethnic characteristics affected application of the Soviet Stalinist model and produced considerable conflict in peasant/state and worker/state relations. Restrictive bilateral foreign trade machinery imposed by the Soviet type institutions was particularly constraining on the small East European economies, and has tended to perpetuate their small-scale protectionist character, at the expense of efficiency and growth, just as in the pre-Communist period. These factors of internal conflict and inflexible foreign trade institutions have contributed to pronounced economic fluctuations in East Europe, with a resultant drain on resources that might otherwise have been available for development. Moreover, Soviet impositions on the economies of Eastern Europe through reparations, and other unequal aspects of their relationships, plus the absence of aid, especially for recovery and initial industrial growth, meant that the East European economies suffered a burden not experienced by West European economies or even by the Soviet economy in its first two Five-Year Plan periods (1928–1937).

The homogenizing effect of Soviet control and Soviet type institutions was probably a byproduct of Soviet policy rather than an explicit intent. The Soviet-dictated policy of broad industrial diversification fell more heavily on the more developed Czechoslovak and East German economies than on the other East European economies.[10] The

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[9] A. N. Barkovskii (et al.), *Problemy koordinatsii narodnokhoziaistvennykh planov stran SEV* (Problems in Coordination of the National Economic Plans of Comecon countries), Moscow, Mezhdunarodnye otnoshenila, 1968; N. I. Ivanov, *Mezhdunarodnye ekonomicheskie otnoshenlia novogo tipa* (International Economic Relation of a New Type), Moscow, Ekonomika, 1968: T. V. Riabushkin (ed.), *Pokazateli ekonomicheskogo razvitiia sotsialisticheskikh stran* (Indicators of Economic Development in Socialist Countries), Moscow, Mysl', 1966.

[10] The dispersion of industrial output per capita lessened in the 1950–1965 period, with the U.S.S.R. as 1.0 (1950 in parentheses): Rumania—0.5 (0.3); Bulgaria—0.7 (0.4); Hungary—0.8 (0.8); Poland—0.8 (0.7); Czechoslovakia—1.2 (1.5); East Germany—1.5 (n.a.). O. K. Rybakov, *Metodologiia sravnenila ekonomicheskikh pokazatelei stran sotsializma* (Methodology for Comparison of the Economic Indicators of Socialist Countries), Moscow, Mysl', 1968, p. 34.

earlier impact of reparations and joint partnerships fell heavily only on the developed East German economy. As a result the rate of economic growth was inversely related to per capita GNP, and the economic slowdown has affected most seriously the more developed economies in recent years.[11] The result has been that the structure of the economy tended toward the Soviet pattern of heavy industrial emphasis, as noted earlier; but most similar were the institutions of economic planning and management.

LIMITED EAST EUROPEAN SOVEREIGNTY

In spite of some verbiage about equality among the East European countries and the Soviet Union, the dominant role of the U.S.S.R. has continued throughout the postwar period. To be sure the policy epitomized by East German occupation in 1945–1947 has been modified significantly among the East European countries over the twenty year period. Still the policy and preferences of the Soviet Union have continued to be *a* if not *the* dominating factor in the economic life of the individual East European countries.

The direction and structure of East European trade was designed, particularly during the Stalinist period, as if its primary purpose were to relieve Soviet industrial production bottlenecks through the export of machinery and other industrial products. These very exports, given the similarity between Soviet and East European development priorities, were often those needed to relieve critical bottlenecks in East Europe itself. Instead, trade provided the East European countries with foodstuffs and raw materials that, at least initially, were, although in short supply, less critical to both the Soviet and East European economic development processes. Trade did provide the East European countries with foodstuffs and critical raw materials, though in less than sufficient quantity. The fact that the Soviets could not produce enough for their own recovery and for East Europe, too, held back recovery and growth in Eastern Europe, especially East Germany, during the early 1950's. The East European countries therefore were forced not only to change artificially the geographical direction of trade to an unfamiliar trading partner, but also to reverse the structure of trade. Whereas they had traditionally supplied raw materials and light industrial products, they now became suppliers of products of heavy industry.[12] By meeting an annual Soviet "shopping list" of imports, the East European countries were also encouraged to forego specialization and diversified production.[13] In this sense, one might suggest they were forced to act like a developed country trading with an underdeveloped country. Since they were not, in fact, developed countries, the effect on their economies was an imbalance in development and the cost to their own future overall development was considerable. The result was a substantial gain to Soviet postwar development at considerable cost to the East European countries, although economically the Soviets gained *less* than the East Europeans lost. This provides a striking contrast to the Marshall Plan relationship of the

[11] Ernst, *op. cit.*, p. 881.
[12] Spulber, *State*, p. 88.
[13] Ernst, *op. cit.*, pp. 903 f.

United States with Western Europe, whereby the Western Europeans gained more from our help than it cost us to provide it.

Another negative aspect of the Soviet-East European trade relationship stemmed from the fact that the size of the East European countries made them rely on foreign trade more heavily than the U.S.S.R. The more advanced countries such as Czechoslovakia and East Germany had a special need for external trade. Just as foreign trade is more important to the United Kingdom than to the larger, more self-sufficient United States, so is foreign trade more critical to a country the size of Czechoslovakia than it is to the Soviet Union. It seems fair to say that Soviet-imposed restrictions on the Eastern European countries' ability to import from outside Comecon (in areas not easily relieved within Comecon), have amounted to greater constraints on economic growth than have the United Kingdom's balance of payments problems.

In the Stalinist and pre-Stalinist periods, there were a number of direct mechanisms for controlling the supply, specifications and prices of commodities in this unequal relationship between Eastern Europe and the Soviet Union. Among the mechanisms used were forced reparations, joint partnerships, and integration or coordination of Soviet and East European economic plans and foreign trade. The Stalinist period was well summarized by Nicolas Spulber in 1957 in the following:

> 1. It might be said that, notwithstanding the substantial political changes in these countries since the armistice, the cost of the war participation of Hungary, Romania, and Bulgaria on the Nazi side has placed on them a burden of debt to Russia for a period of not less than 12 years (1944–45–1956). First in the form of reparations, second in the form of joint companies, which grew mostly out of the German assets, and third in the form of the sale and transfer of those assets back to these countries, the Soviet Union has pressed its claims almost inflexibly. It is against this background that we should judge what the Soviet Union claims to have "given" these countries.
>
> 2. It is difficult to establish a dependable estimate of the peak of the heaviest claims of the Soviet Union as related to the capacity of payment of these countries. Specifically, it is difficult to decide whether this peak was reached during the period of reconstruction, i.e., up to 1948–49, when national income grew slowly and the reparations were extremely heavy, or during the first development period, i.e., from 1948–49 to 1953, when the net material product started to grow rapidly and reparations decreased substantially, but a large part of this net material product accrued to the joint companies and was controlled completely by Soviet Russia.
>
> 3. The coordination ("integration") of the plans and production of these economies with the plans and output of Soviet Russia was only partly the responsibility of the joint companies, for the joint companies cut across the plans, for instance, of Hungary and Romania and represented up to a certain point a self-sustaining network developing more *against* than *together* with the economies in which they prospered. Hence their liquidation should

facilitate the organization of all-round planning, especially in Hungary and Romania. The coordination of the economic plans and foreign trade of the countries considered with those of Soviet Russia can be accomplished by other and more appropriate means such as, for instance, the Council of Economic Mutual Assistance (CEMA). The sale and transfer to these countries of the Soviet share of the joint companies is thus a sort of *special extension of the process of nationalization* to the last spheres outside agriculture, which up to 1954 had not been under the control of the respective states.[14]

An estimate of Soviet impositions on Eastern Europe covering dismantlings, reparations and occupation costs is set at $15 to $20 billion in postwar prices. In contrast, the United States provided nine West European countries with nearly $19 billion from 1946 to 1964 (excluding UNRRA aid).[15]

In the post-Stalinist period, Soviet trade policy has been marked by a desire to minimize the effects of all foreign trade on the Soviet economy. This meant that Eastern Europe was no longer relied on to relieve crucial bottlenecks; instead, the Soviets ordered only standard industrial goods that they could readily produce for themselves, and in fact, at less cost than by exchanging raw materials for them at existing terms of trade. The Soviets have invariably developed their own sophisticated manufactures, bought them from the West, or done without rather than encourage East Europe to develop its own specialties for the Soviet market. This avoidance of dependence on Eastern Europe for sophisticated manufactures has been one major aspect of post-Stalin Soviet economic policy, accompanying a general support for Eastern European growth. Most recently, the Soviets have followed a policy of reducing the cost of trade with Eastern Europe by shifting the terms and composition of trade.

Looking at the entire period of economic development one may well ask who has benefited from this relationship. There are those who argue that in recent years trade has been one of mutual exploitation, i.e., each trades with the other at some sacrifice, which perhaps evens up.[16] But to this observer it appears that the net effect over the period 1945–1969 is clearly to the Soviet advantage. Even in the post-Stalin period, whenever debates on discriminatory pricing have arisen, the Soviet Union has been reluctant to allow itself to be discriminated against. To be sure it honored East Europe's grain requests in 1963 at some cost, and it has expanded iron ore and petroleum shipments, also at some cost. However, the Soviets appear to be torn between West European and East European markets for petroleum products. One is persuaded to agree with Robert Campbell that "for a given quantity of oil the hard currency receipts even at the lower prices will buy them a more advantageous bill of imports."[17] That is to say, the

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[14] Spulber, *Economics*, pp. 205–206.
[15] Ernst, *op. cit.*, pp. 900f.
[16] Franklyn D. Holzman, "Soviet Foreign Trade Pricing and the Question of Discrimination," *Review of Economics and Statistics*, vol. XLIV, no. 2, May 1962, pp. 134–147; Horst Mendershausen, "Terms of Trade Between the Soviet Union and Smaller Communist Countries," *Review of Economics and Statistics*, vol. XLI, no. 2, May 1959, pp. 106–118; Frederic L. Pryor, *The Communist Foreign Trade System*, Cambridge, M.I.T. Press, 1963, Chapter V.; Ernst, *op. cit.*, pp. 912–913.
[17] Robert W. Campbell, *The Economics of Soviet Oil and Gas*, Baltimore, Johns Hopkins, 1968, p. 235.

Soviets act as if the trade is a barter arrangement and as if prices and discussions of price discrimination are somewhat irrelevant. Nonetheless, since 1960, increasing East European reliance on Soviet raw materials and foodstuffs, and a felt need for more advanced machinery inputs from the West, have meant that the Soviets have been forced to put into Eastern Europe resources they could more profitably use elsewhere. In other words, Comecon trade has, in many instances, become a burden to the Soviet Union, a burden that it has been willing to bear as a tradeoff for maintaining strategic leverage in the area. For East Europe, the direct cost of Soviet impositions has thus ended, but the residual burden of Soviet-type institutions and Soviet involvement in economic policy has continued.

The long term implications of Soviet economic relations with Eastern Europe are cogently spelled out by Leon Herman in his appraisal of the specific current Czech problems:

> Two decades of preferential trading within the Socialist market have produced a host of repressed problems. The politically inspired system of bilateral commodity exchanges, oriented primarily to member of the Council of Mutual Economic Assistance (C.E.M.A. or Comecon), has resulted in the concentration of Czech commercial resources upon some six or seven trading partners. While the economic leaders may have been quite happy at first to acquire a loyal group of active trade partners, this arbitrary confinement to a closed commercial association in due time began to impose upon Czechoslovakia a variety of economic burdens.

Dependence on the Soviet Union

The manufacturing industries of Czechoslovakia, very soon came to depend rather heavily on the Soviet Union for mineral fuels and other raw materials. This dependence continued to grow with the steady expansion of the scale of production in industry. The Soviet Union became the predominant supplier to Czechoslovakia of such basic industrial inputs as iron ore, crude oil, coal, pig iron, non-ferrous metals, and cotton. In 1966, for example, the Soviet Union supplied Czechoslovakia with the following quantities of its basic import requirements: 7.0 million tons of petroleum; 7.7 million tons of iron ore; 2.1 million tons of coal; 60.5 thousand tons of cotton-fiber; and 1.1 million tons of wheat, along with large quantities of potash, copper, sulfur, and lead.

There had developed, at the same time, a high degree of Czech dependence on the U.S.S.R. as a market. The latter had to be supplied, on a growing scale, with heavy industrial machinery, designed and produced to Soviet specifications. Among these are: electric and diesel locomotives, presses, forges, rolling mills, diesel-generators, river boats, and chemical equipment. In 1967, 40 percent of all Czech machinery exports were destined for the Soviet market. An additional 45 percent went to other Socialist countries. Only 15 percent of Czech machinery exports were marketed outside the Socialist camp.

The uncensored press is now asserting publicly that Czech economic relations with the Soviet Union have always been "unequal" in character. They have reportedly become "deformed" over the decades as a result of the intrusion of "subjective" political pressures into the exchange of goods and technical data. "Socialist" trade was used largely as a means to achieve regional autarky. Czechoslovakia, in particular, was pressured into becoming a major supplier of a wide variety of machinery and equipment to the U.S.S.R. and other Comecon members, despite the fact that it often lacked the required skills and that the orders involved were often not large enough to employ large scale production methods. . . .

The non-convertibility of Czech currency has also been identified as an obstacle that tends to keep the domestic economy at a primitive economic level, largely isolated from the world market. This makes it impossible for the industrial executives to calculate comparative costs and, on that basis, to determine where their advantages lie in the international division of labor. . . .

Experienced officials in the field of foreign trade, like Minister Vales, are not asserting in public that the time has come to take some initial steps "to insure the required degree of convertibility of the *koruna*.". . .

. . . Heretofore, the heavy concentration of Czech trade on the largely non-competitive Socialist market, according to some Czech writers, has brought about a deterioration in the quality of their finished industrial products. Goods to be exported to Socialist trading partners are specified by the annual bilateral agreement, worked out at high level by officials of the Ministries of Foreign Trade. The end-users of the export product, for their part, generally, have no choice of supplier, and very little influence on the specifications and quality of the goods "purchased" for them. Prices are also determined by way of arrangements at a high administrative level, presumably with some reference to world prices; but they, in turn, have no bearing on decisions to buy.

This means, in practice, that the larger the share of Czech products sold in the "easy" Socialist market, the more difficult it became from year to year to sell the standard output of its factories under competitive conditions in the world market. . . . The outstanding indebtedness to Czechoslovakia on the part of its Comecon partners has been reported by the Bratislava Pravda (May 18, 1968) to amount to $250 million on the trade account and $1,600 million on the capital account.[18]

The East European countries able to shift their foreign economic relations, especially Rumania through export of petroleum and foodstuffs, to hard currency countries, have been shifting. Czechoslovakia and others (as noted above) may not have the same option through available markets.

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[18] Leon M. Herman, "The Economic Situation in Czechoslovakia," Appendix M to U.S. Senate Judiciary Committee, *Aspects of Intellectual Ferment and Dissent in Czechoslovakia*, Washington, GPO, 1969, pp. 162–164.

NATIONAL CHARACTERISTICS IN EAST EUROPEAN ECONOMIC DEVELOPMENT [19]

Size of national economies involved is the single most important indigenous factor conditioning external Soviet influence and differentiating East European from Soviet developments. Some of the summary points in a symposium of the International Economic Association [20] provides a frame of reference for evaluating the variations of small scale East European economies from large scale Soviet economic development:

(1) *National-ethnic characteristics* such as language, culture, educational background—"a feeling of common loyalty, being willing to make sacrifices together or be taxed together." [21]

(2) *Institutional characteristics* such as relate to a currency area and consequent existence of one banking system, a single national budget, a single tax system and, presumably, a single economic plan; similarly, characteristics contributing to a labor market and thereby an area within which obstacles to labor mobility can be controlled or reduced; finally, institutional and geographical obstacles to movement of goods.[22]

Both of these categories of characteristics influenced the application of the Stalinist approach to agriculture, labor-management control, and foreign trade. They may also have been a factor in the fluctuations in output that have characterized East European, but not Soviet, development to date. National-ethnic characteristics contributed to conflict environments in Eastern Europe in peasant/collective farm relations and in industrial worker/management relations that were disruptive and probably reduced worker productivity. Institutional characteristics of the East European countries made the bilateral trading machinery cumbersome in dealing with the Soviet Union and East European Comecon members, and even cruder as related to the world market.[23]

Later under Khrushchev, Soviet policy encouraged limited regional integration and specialization in Eastern Europe. But as noted by Michael Kaser:

> The hopes to transform Comecon went astray because domestic political similarities were no longer enough. When the organization was founded, such a supernational integration would have been feasible because there was general conformity not only to Soviet leadership but also to the Soviet economic system.[24]

Given the political and economic differences between Western and Eastern Europe—mainly the dominant role of the Soviet Union—it is unlikely that the successful integration of Western Europe could

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[19] Z. M. Fallenbuchl, "The Role of International Trade in the Czechoslovak Economy," *Canadian Slavonic Papers*, vol. X, no. 4, 1968, pp. 451–578; Andrew Gyorgy, "Competitive Patterns of Nationalism in Eastern Europe," *Canadian Slavonic Papers*, vol. X, no. 4, 1968, pp. 557–580; Pryor, *op. cit.*; Alan A. Brown and Egon Neuberger (ed.), *International Trade and Central Planning: An Analysis of Economic Interactions*, Berkeley, University of California Press. 1968.

[20] Edward A. G. Robinson (ed.), *Economic Consequences of the Size of Nations*, New York, St. Martin's Press, 1960.

[21] *Ibid.*, pp. 333–334.

[22] John M. Montias, "Economic Nationalism in Eastern Europe: Forty Years of Continuity and Change," *in* Kurt London (ed.), *Eastern Europe in Transition*, Baltimore, Johns Hopkins, 1966; Robinson, *op. cit.*, p. 335.

[23] *Supra*, pp. 12–13.

[24] Kaser, *op. cit.*, p. 222.

have been duplicated in Eastern Europe even if this had been Comecon's aim. But Western Europe's success points up by contrast the degree to which Soviet methods encouraged traditional nationalism. The introduction of joint partnership companies, Soviet state monopoly bilateral trading machinery, and the encouragement of individual country autarky—symbolized by the steel industry in each country approach—tended to strongly enforce traditional nationalistic tendencies. Moreover, consumer/peasant exploitation by forced collectivization set back possible later attempts to increase agricultural productivity by encouraging larger units and increased use of capital. The administration of reparations and Soviet-dominated trade agreements probably could have been accomplished with less economic autarky. That it was not can be traced mainly to Soviet post-war fear of a united East Europe which led it to follow the deliberate "divide and conquer" tactic which lay at the root of Stalin's economic policy.

In the French-German iron and steel community, traditional protectionist barriers were surmounted by a unique spirit of supernationalism and by the wider integration during the 1950's of the Common Market. Even under a comparatively favorable state policy the resistance of French peasants to changes designed to increase efficiency may suggest a common rural resistance to state economic involvement. This suggests that East European nationalistic resistance to economic integration and peasant reluctance to accept state programs for increased product were not just reactions to Soviet control. But the Soviets had it uniquely within their power to overcome this resistance to larger scale units during the Stalinist period of Soviet domination. After 1956, with reduced Soviet direct involvement and the revival of nationalism, the East European economic institutions became more resistant to supernationalism, specialization, and large scale modernized production. That the Soviets did not capitalize on their opportunity to overcome this resistance is the "missed opportunity" of their economic domination of the area. At the same time the concept of supernationalistic specialization and regional integration pressed later by Soviet leaders may not have been completely compatible with the Stalinist economic and political systems, e.g., there may have been a consistency between the Stalinist type party, central planning, autarkic policies, and a bilateral foreign trading machinery.

The national-ethnic characteristics of the peoples of East Europe have some similarity with but also marked differences from the character of the Soviet populace as it relates to economic development. Specifically, traditions of individualism, Western orientation, and a certain element of anti-Russian sentiment have been factors in economic development. Moreover, the independence of the Church from the State and, in some countries, the orientation of the Catholic Church to the West continue to encourage Western orientation and individualistic economic behavior. This was especially marked in the resistance to collectivized agriculture in the various countries.

Whereas Soviet Stalinist economic development could be somewhat isolated from Western influences, as had been traditional in the Slavophile or isolationist strain of old Russia, the natural orientation of East European countries has been to Europe and the West. Moreover,

the post-World War II period in Western Europe has been one of unprecedented economic recovery and expansion of a very visible nature. Limitations on travel and border barriers have not been sufficient to conceal from the East Europeans the fact that the West European economies were expanding their production and sharply improving the living conditions of their citizens. In contrast the more isolated Soviet Union, in rallying its workers, could point to mass unemployment and falling economic performance in Western Europe and the United States during the early thirties. It was visible too that the viability of the Stalinist system in the Soviet Union of the 1930's was coupled with the then credible promises that deferment of consumption would lead to greater output and eventual full Communism in later years. The external environment was thus far more conducive to the application of Stalinist economic development to the Soviet Union, in its time, than in the East European countries later. These considerations probably limited the extreme applications of coercion and control that underlay the depressing of living conditions in the U.S.S.R., i.e., the policy of "primitive accumulation," as applied to peasant and industrial wage payments and investment policy. The attraction of the West has even led to a substantial outflow of skilled labor from Germany, certainly influencing the building of the Berlin Wall. It has also limited the sharply differential and reduced wage payments. Whereas the exposure to booming West European economies might have beneficially encouraged the Comecon countries along the route of regional integration as well as increased trade and specialization, in fact, it probably did not. More likely, the invidious comparison served to aggravate further traditional East European distrust of state intervention, particularly when imposed from outside, in the economies—which ironically might have resulted in increased efficiency, had it been accepted.

Each of the countries of Eastern Europe fits in the category of small-scale economies in terms of complementarity and adequacy of resource endowment. In the sense of geographical size certainly the countries of Eastern Europe do not compare with the Soviet Union and cannot consider self-sufficiency with the same equanimity. More specifically, the meager resource supply of nonmineral derived energy and various metals in Eastern Europe indicated the absolute limitations for their development. The relative disadvantages in some countries were aggravated by Soviet trade policy, i.e., grain deficits and shortages in energy and metal resources had to be met from limited Soviet supplies. The urgency of relieving deficiencies in critical economic resources had to be even greater if Western sources were sought because of the obstacle created by inconvertibility of the East European currency and cumbersome bilateral trade machinery. The problem was less acute when Soviet supplies and East European technological needs could be met by "surplus" Soviet wheat, coal, and iron ore. But when Eastern Europe needed more sophisticated liquid fuels and modern investment goods, Soviet sources were less adequate and the demand for East-West trade came forcibly to the fore.

Moreover, the free mobility of labor, which was a major feature of the Common Market of Western Europe cushioning the impact of in-

dustrial development (and emulated by a reforming Yugoslavian economy), was not a characteristic of the East European economies.

The tradition of East European agriculture ran counter to the establishment of collectivized agriculture. As noted by Gregor Lazarcik, "As a result of historical development of rural life, the Czechoslovak farmer has a deep rooted sense of private property, individual freedom, religious feeling and family farming." [25] Even after decollectivization in Poland and Yugoslavia, the State, in each case, still opposed the concept of private farming and the peasant fought any residual form of collective state intervention. This was in each case counterproductive as the advantages of large-scale farming and mechanization were foregone, and there was only a modest offsetting gain from the removal of the negative features of collectivization. Even after decollectivization, the Polish peasants still distrusted the State-operated machinery groups, the "circles", and preferred to rely on their horses. This continual suspicion presumably derived from a feeling that any residual form of State administration was a vehicle for return to collectivization.[26] In Yugoslavia, the State made it difficult after decollectivization for the peasant to own over 10 hectares. Only in 1964 were the peasants allowed to buy tractors.[27] Assuming that the economies of scale from tilling larger plots with mechanical aid is a fundamental step toward increased productivity in agriculture, then the conflict between peasants and the State in Yugoslavia, Poland and elsewhere in Eastern Europe was counterproductive.

These East European deviations from Soviet characteristics brought into question the rigid Soviet-type development of collectivized agriculture, controlled labor and management, and bilateral foreign trade arrangements. Moreover, the ideological underpinning of these Stalinist institutions was challenged in Eastern Europe: the non-egalitarian "bourgeois right" nature of the Stalinist wage payment system, the coercive nature of the State as a contradiction of the concept of the "withering away of the state;" and the general abrogation of Marxian humanism characterized by the Stalinist/Leninist system.

Conflicts within the small East European economies also contributed to the development of cyclical patterns in output. According to Professor Staller, the fluctuations—i.e., the variations in total output, agriculture and construction—exceeded those for "free-market" economies whereas industrial variations did not.[28] He concluded that, "The explanation would presumably run in terms of such factors as rapid shifts in economic policies, changes in organization and planning techniques, political unrest, overambitious goals, and planning errors." The Economic Commission for Europe (ECE) credits the cyclical patterns to fluctuations in investment outlays. The Czech economist Josef Goldmann, writing in a Norwegian journal, suggests that three factors contributed to the cyclical patterns: (1) exhaustion of output capacity, manpower and labor productivity reserves, (2) economic

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[25] Gregor Lazarcik, "The Performance of Czechoslovak Agriculture Since World War II," *in* Karcz, *op. cit.* (385–406), p. 405.

[26] Andrzej Korbonski, "Peasant Agriculture in Socialist Poland Since 1956: An Alternative to Collectivization," *in* Karcz, *op. cit.* (411–435), pp. 425–430.

[27] *Ekonomska Politika*, Nov. 27, 1965.

[28] George J. Staller, "Fluctuations in Economic Activity: Planned and Free-Market Economics, 1950–60," *American Economic Review*, vol. LIV, no. 4, June 1964, pp. 393–394 (385–394).

maturity, e.g., industrial base—extensive to intensive, and (3) inflation.[29] The first factor may have been particularly important in the early Stalinist period; the second in the later post-Stalin period. Inflation has become more a factor in later periods.

Important as the factors noted by Professor Goldmann have been, we might conjecture that the variations in agriculture and construction—which accounted for much of the fluctuation in total output—may have been influenced by conflict environments in agriculture and construction coupled with strict requirements to adhere to delivery plans to the U.S.S.R. for military production and heavy industrial output; whereas other supplies for the U.S.S.R. raw materials and foodstuffs, may have been allowed to vary widely. The implication of these rigidities in demand for military and Soviet trade may have concentrated fluctuations in investment on nonmilitary construction. If these variations in investment outlays were coupled with interrupted supplies of Soviet raw materials and variations in labor supply due to political considerations, the recurrent fluctuation could be in part explained. In short, the East European economic fluctuations may have been, in large part, due to cycles in political decisions on resource commitments against a background of internal conflict and a position of residual claimant in Soviet plans. Furthermore, coupling these disruptive cyclical factors in planning with the small scale of the economies and the inflexibility of foreign trade, added to usual cyclical factors such as the harvest, has led to a very unstable East European economic process. The fact that economic fluctuations were pronounced in Yugoslavia and not in the Soviet economy suggests there is more weight to be given to the scale of the economy in dampening the level of fluctuation than to the disruptive factors in the Soviet type system of planning. The Yugoslav cycles suggest the constraining role of Soviet obligations may be less important than scale, foreign trade inflexibility and internal disruptions. The absence of significant fluctuations in the Soviet economy, in the same period, adds weight to the factor of scale, if it can be considered the major difference between the Soviet and East European economic developments.

The specific relationship of internal conflict to investment cycles is supported by J. M. Montias in the following:

> There has been a remarkable correlation ever since 1949 in the investment outlays of the Peoples' Democracies, which have been sensitive to political developments in the Soviet Union as well as to tensions within individual countries in the bloc. It can hardly be a coincidence that investments in industry rose at a rapid pace from 1949 to 1952 in Poland and in Bulgaria, Czechoslovakia, East Germany, Hungary, and Rumania, started declining within a year after the death of Stalin, rose in 1956, fell in 1957 in the aftermath of the Polish and Hungarian events of the previous year, picked up again in 1958, and rose sharply in 1959. The proportion of total industrial investments falling to heavy and light industry also varied in about the same manner in these various countries. Poland's long-range plans, it would appear, can no

[29] Josef Goldmann, "Fluctuations and Trend in the Rate of Economic Growth in Some Socialist Countries," *Economics of Planning*, vol. 4, no. 2, 1964, pp. 88–98 (reprinted in George R. Feiwel (ed.), *New Currents in Soviet-Type Economies: A Reader*, Scranton International Textbook Co., 1968, pp. 112–122).

more be insulated from events in the rest of the Soviet bloc than from the tribulations of her own political life.[30]

There is also an observable relationship of consumption trends to internal conflict. Similarly the egalitarian structure of income at times relatively favoring peasants and unskilled workers, e.g., in Poland, may have resulted from these unique factors influencing East European but not Soviet development.[31]

III. Changing Soviet and Party Sovereignty and East European Economic Reforms

The changing character of Soviet and party sovereignty in East Europe

Immediately after Stalin's death in March 1953, East Germany's Stalinist-type wage and control system was made more stringent. The result was the Berlin protest of June 1953—the first challenge to the Soviet control system in Eastern Europe. The full repercussions of this challenge to the Stalinist system were felt only after the Polish Poznań riots and the Hungarian uprising in 1956. Subsequent to those events there was substantial modification of Soviet control over the economic development process in Eastern Europe, and movement into what might be called the post Stalinist period.

No clear consistent Soviet guidelines on permissible destalinization of the political economy were enunciated. The framework of acceptable change has been established pragmatically, out of interaction between East European pressures for and Soviet constraints against change. What was not permitted in Poland in 1957–1958 was allowed in other countries after 1962. Similar approaches to economic change in Hungary were tolerated but opposed in Czechoslovakia. A sharp deviation on intra-bloc and East-West trade policy by the Rumanians was condoned, whereas a deviant internal Czechoslovak economic policy was not. The symbol of sharp Soviet dissent on East European policy divergences, including economic changes, has been the use of Soviet tanks: in East Berlin in 1953, in Budapest in 1956, and in Prague in 1968. Thus libertarian trends in the political economy have had to be appraised carefully by East European Party leaders in the context of the limits of change that their Soviet sovereign would tolerate. With the emergence of economic performance as a critical issue, the limits of sovereignty have become key parameters preconditioning economic change.

The changing character of Soviet sovereignty in Eastern Europe has been an active issue since Stalin's death. The concept of limited, direct sovereignty was developed as it related the Soviet Union to the European communist States in the Stalinist period, and continued in modified form thereafter, up to the restatement by the Soviet leadership of their right to intervene in the internal affairs of Eastern Europe in the Brezhnev doctrine.[32] Of relevance to economic development were the obligations imposed by the Soviet Union on former enemy states, i.e., (1) payment of reparations, (2) provision of sub-

[30] John M. Montias, *Central Planning in Poland,* New Haven, Yale, 1962, p. 68.
[31] Ernst, *op. cit.,* pp. 885 ff.
[32] *Pravda,* September 26, 1968.

sistence for Soviet armed forces and (3) acceptance of intensive bilateral economic exchanges including joint partnerships with the U.S.S.R. as an extra-territorial share-holder.[33] These relationships applied to East Germany, Hungary, Rumania and Bulgaria. As pointed out by Professor Spulber of Indiana University and some Polish analysts, the arrangement imposed by the Soviet Union for Polish coal was a highly unequal bilateral exchange approximating the relationships in the former enemy nations.[34] Only Czechoslovakia was outside this early Stalinist arrangement.

In addition to the direct economic control outlined above, Moscow also utilized control through the Parties in Eastern Europe. Certainly after the Prague Trials in 1952, it was clear that the Czech Party was responsive to Soviet "guidance" on trade and the course of economic development. Likewise the transmission belt from First Secretary in Moscow to Party First Secretaries in each of the East European countries, i.e., from Stalin to Bierut in Warsaw, Ulbricht in Pankow, Rakosi in Budapest, Gheorghiu-Dej in Bucharest, Novotný in Prague, and Chervenkov in Sofia, was effective in controlling the allocation of resources according to Stalinist priorities.

This form of sovereignty was also expressed through such formal interregional organizations as Comecon and the Warsaw Pact. These organizations were set up in 1949 and 1955, respectively, but took on a different character over time, especially after 1956, when the new Polish and Hungarian governments in September–October 1956 made sovereignty a central issue.

The Sino-Soviet split in 1958 indirectly affected the polycentric pressures in the Communist world. In Eastern Europe the evolution of the sovereignty issue was pushed by Rumania during 1961 to 1964 in its confrontation with the U.S.S.R. As noted by G. Ionescu, the issue—

> . . . in which the use of the word sovereignty becomes crucial, originated with the quarrel between Rumania and the Council of Mutual Economic Assistance on the question of whether a socialist country should submit to socialist supernational planning. The Rumanian party stated categorically in its crucial declaration of 23 April 1964, that: "the sovereignty of the socialist state presupposes that it alone should have full and effective control in directing the economy." It subsequently stretched this doctrine to all other fields and relations.[35]

These conflicts echoed themes from the earlier Yugoslav-Soviet confrontation. They were fed by explicit Polish-Hungarian-Rumanian challenges, which ultimately forced the Soviets to modify their special view on sovereignty. As again noted by Ionescu:

> There are two aspects to this change. This first is, as it were, the rehabilitation of the concept of nation, and its inclusion among the fundamental elements of a communist society. The second is the impact which this re-orientation has on the relations between the communist power-holders and society.[36]

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[33] Ghita Ionescu, *The Politics of the European Communist States*, London, Weidenfeld and Nicolson, 1967, pp. 32–37.
[34] Spulber, *Economics*, pp. 172–176.
[35] Ionescu, *op. cit.*, pp. 35–36.
[36] Ionescu, *op. cit.*, pp. 36–37.

It was the second aspect noted by Ionescu, the impact on the distribution of power between Party and society, that was involved in the Czech New Course, and appeared to the Soviets as a major threat. In the Soviet view, the relationship between the Czechoslovak Party and Czechoslovak society was changing too much. The Soviets felt the Leninist character of the Party was at stake. It was apparently not enough to argue that the change was still within the Marxian framework as Czech philosophers such as Professor Sviták were saying; it also had to adhere to the Leninist concept of democratic centralism. What apparently triggered the Soviet interruption of Czech reform was Soviet belief that Czech efforts to destalinize and democratize the politico-economic system were not compatible with retaining the party's leading role.[37] In the Soviet view, the institutions for continuing Party control of economic planning and management were at stake. This threat to Party primacy was seen as so basic and significant by the Soviet leaders that it was used as a partial pretext for the August invasion. It was rationalized post hoc by enunciation of the Brezhnev doctrine of limited sovereignty, meaning that the Soviet Union retained the right to intrevene in the internal affairs of a Communist country when fundamental changes were threatened in the character of the Party and the State, whether or not the local Communist Party requested that intervention.

The special relationship to date in Soviet-East European relations appears unique. Perhaps the relations of the Mongol rulers to the dukes of Muscovy provide some historical parallel, with the early occupation of East Germany in 1945–47 as its "Mongol Yoke" period equivalent.

LIMITS OF ECONOMIC REFORM IN EASTERN EUROPE

Modification of the Stalinist approach to economic development in the Soviet-type East European economies has been characterized by the term economic reform. A great deal has been written in Eastern Europe and the West about these changes. My interpretation of the key factors in economic change draws heavily on Michael Gamarnikow, J. Michael Montias, and others.[38] The central factors constraining change away from the Stalinist model have been the CPSU and

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[37] See H. Gordon Skilling, "Czechoslovakia's Interrupted Revolution," *Canadian Slavonic Papers*, vol. X, no. 4, 1968, pp. 409–429.

[38] J. F. Brown, "Rumania Today," *Problems of Communism*, vol. XVIII, no. 1, Jan.–Feb. 1969, pp. 8–17; no. 2, Mar.–Apr. 1969, pp. 32–38; Michael Gamarnikow, "Political Patterns and Economic Reform," *Problems of Communism*, vol. XVIII, no. 2, Mar.–Apr. 1969, pp. 11–23; Leon Smolinski, "Planning Reforms in Poland," *Kyklos*, vol. XXI, 1968, pp. 498–513.

The following sources appear among the reprints and original contributions included in George R. Feiwel (ed.), *New Currents in Soviet-Type Economies: A Reader*, Scranton, International Textbook Co., 1968. (In case of reprints, the place of original publication is added in parenthesis):

Alexander Erlich, "The Polish Economy After October, 1956: Background and Outlook," pp. 417–435 (*American Economic Review*, vol. XLIX, no. 2, May 1959, pp. 94–112); George R. Feiwel, "Proposals for Change: The Model Discussion and Afterthoughts," pp. 436–442; and "Poland's Lasting Predicaments and Search for Remedies: The Economics of Half-Measure Reforms," pp. 442–457 (*The Economics of a Socialist Enterprise*, New York, Praeger, 1965, pp. 17–25; 194–196, 266–283); Vaclav Holesovsky, "Problems of Transition to the 'New Model' in Czechoslovakia, pp. 476–485 (*ASTE Bulletin*, Fall 1966, pp. 2–9); Jan M. Michal, "Market Socialism: The Case of Czechoslovakia," pp. 486–499; John M. Montias, "The Czechoslovak Economic Reform in Perspective," pp. 499–519; Harry G. Shaffer, "Czechoslovakia's New Economic Model," pp. 465–476 (*Problems of Communism*, vol. XIV, no. 5, Sept.-Oct. 1965, pp. 31–40); Leon Smolinski, "Reforms in Poland," pp. 457–465 (*Problems of Communism*, vol. XV, no. 4, July–Aug. 1966, pp. 8–13).

strong traditional elements in the indigenous parties. These constraints have been relaxed with the process of destalinization in the CPSU and recognition of the need for economic change in the U.S.S.R.—a form of economic destalinization.

East European political/economic changes did not and probably could not precede changes in the Soviet Union influencing Eastern Europe, specifically the destalinization program introduced by Nikita Khrushchev and changes in the control system of Eastern Europe following the Hungarian and Polish uprisings of 1956. The resulting general relaxation of secret police control led to changes in institutions which had been used to enforce that control: collectivized agriculture, the highly differentiated wage system, the labor draft, and the highly directive economic system of planning and management. In Poland, where relaxation of control and egalitarism were pushed farthest, decollectivization was accompanied in 1957–1958 by payments which relatively favored the Polish peasants; moreover, a newly permissive environment and support of professionalism in economics and statistics encouraged professionals to surface once again and become involved in planning and management.[39]

It has been difficult to perceive precisely what limits the Soviet Party leaders have placed on East European change. The relaxation of constraints may be viewed in several steps each terminated by a Soviet injunction. The first brief reactions to Stalin's death were pressures to test the system in East Berlin in June 1953—a protest focusing on the wage payment system—and the changes in Soviet control and trade suggested by Imre Nagy in Hungary during 1953–1954. This early challenge surfaced again in 1956 when protests in Poznań, Poland and the Hungarian uprising led to the use of Soviet military force. The Soviets thereby dramatically underscored that the pressures of nationalism and economic change had exceeded the limits of permissible destalinization. Moreover, there was a trend toward equalization of wage payments; especially the differences between the average wage payments in industry and agriculture have narrowed markedly from 1955 to 1965 in each of the East European countries except Rumania.[40]

At the same time, change was permitted to continue in Poland, perhaps because the indigenous party was weak and Soviet force had not been directly intruded. Prophetically, however, J. Michael Montias, in June 1958, noted that measures implementing Polish reform went only halfway.[41] Michael Gamarnikow appears to argue, with support-

[39] Ernst, *op. cit.*, p. 888.

[40] V. P. Gruzinov, *Material'noe stimulirovanie truda v stranakh sotsializma* (*Material Stimulation of Labor in the Countries of Socialism*), Moscow, Mysl, Publishing House, 1968, pp. 237–256.

[41] John Michael Montias, "Producer Prices in a Centrally Planned Economy—The Polish Discussion," *in* Gregory Grossman (ed.), *Value and Plan*, Berkeley, Univ. of California, 1960 (47–75). "The Polish planners will have to make up their mind at some point whether they wish to overhaul their economic institutions (gear managerial incentives to profits, do away with central allocation, and vest decision making in the producing unit) or whether they wish to keep the reins of power in Warsaw, concentrating their controls on the technical progress and cost reductions of state-run enterprises by means of stable prices, immune to changes in resource scarcities. . . . Halfway measures toward efficient prices and decentralization are not necessarily an improvement over hidebound controls. A hybrid system may suffer from the disadvantages of centralization without reaping the benefits of decentralized operations. . . ." (pp. 64–65).

ing reference to the Polish reform architect Professor W. Brus, that the blueprint for reform was not halfway, but that political pressure from outside—presumably the U.S.S.R. and the other East European countries—kept it from full implementation.[42] The Polish reform also preceded the major deterioration in economic performance in Eastern Europe. Moreover, Khrushchev, by recognizing Yugoslavia's national road to communism appeared to encourage a degree of nationalism in Eastern Europe so long as membership in the Warsaw Pact and other expressions of orthodoxy were not endangered.

Soviet policy was let out another notch in 1959 when previously restricted trade on credit with the West was blessed by Khrushchev.[43] A challenge to Soviet Comecon policy by Rumania in 1961–62 was criticized but permitted. In 1962, by publication of the Liberman article in *Pravda*, the Soviet leaders appeared to signal that the fundamental challenges to Soviet directive planning and management by Academicians Nemchinov, Novozhilov, and Kantorovich were in line with Party policy.[44] Moreover, as these reformers were later to receive the Lenin prize, the East Europeans could have further interpreted the Soviet policy to be in support of reform.[45]

VARIETIES OF REFORM IN EUROPE

Meanwhile, deterioration of economic performance throughout Eastern Europe in the early 1960's provided a strong stimulus to reform. The measurable fall in performance represented not just a downward trend but a sharp deterioration approaching economic collapse in some countries, e.g., in Czechoslovakia where the national income produced was less in 1963 and 1964 than in 1962.[46] Performance in all the East European countries in the later post-Stalin (1960–1965) period was markedly less than in the Stalinist 1950–1955 period, with the exception of Rumania. One would hardly expect the same high growth rates in Eastern Europe in 1961–65 as in the early 1950's, when there was still unused labor and capacity and the Soviets were still too short of goods to fill Eastern European demand, and indeed performance fell markedly. But the retardation was more than might be expected from a later stage in the development process.

The fall in capital productivity was the main factor in the slowdown. Although fixed capital stock increased substantially, employment did not, and capital productivity fell in Czechoslovakia, Bulgaria, and Hungary, but not in Rumania. (See Table 4.) Labor productivity, even though increasing, was rising at a slower rate than in earlier years. Moreover, as calculated by Czech economists, potential growth of national income in the critical recession period was widely divergent from actual growth (potential in brackets): 1962—1.4(9.34); 1963—2.17(9.90); 1964—0.98(8.98).[47]

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[42] Gamarnikow, *Economic Reforms*, pp. 25–26.
[43] Herman, *op. cit.*, p. 232.
[44] *Pravda*, September 9, 1962.
[45] Vladimir Treml, "Politics of 'Libermanism,'" *Soviet Studies*, vol. XIX, no. 4, April 1968. pp. 567–572.
[46] As reported by the Czech government to the ECE (*Economic Survey of Europe*, 1967, p. 61).
[47] M. Hájek and M. Toms quoted by Ivo Moravcik, "The Czechoslovak Economic Reform", *Canadian Slavonic Papers*, vol. X, no. 4, 1968, p. 435.

TABLE 4.—CHANGES IN FACTOR INPUTS AND OUTPUT IN THE PRODUCTIVE SPHERE OF THE ECONOMY, 1960–64 [1]

Country	National income	Fixed capital stock	Capital productivity	Employment	Labor productivity	Capital intensity
Bulgaria:						
A	129	161	80	97	133	166
B	6.6	12.6	−5.3	−0.7	7.4	13.5
Czechoslovakia:						
A	107	131	82	102	105	129
B	1.7	7.0	−5.0	0.5	1.2	6.6
Hungary:						
A	123	130	95	99	125	132
B	5.3	6.8	−1.4	−0.4	5.7	7.2
Rumania:						
A	141	135	104	98	144	138
B	9.0	7.8	1.0	−0.5	9.5	8.4
Soviet Union:						
A	128	145	88	114	112	127
B	6.4	9.7	−3.0	3.3	2.9	6.2

[1] Economic Survey of Europe, 1967, p. 44.

Note: A. 1964 indices (1960 equals 100). B. Compound annual rates of change.

The strength of the indigenous parties appeared to benefit from the freedom to resume national, even anti-Russian identity, and to rehabilitate some of the victims of Stalinist excesses—Gomułka in Poland, Ceaușescu in Rumania and Dubček in Czechoslovakia all seemed to gain support in their party and among their populace by their nationalistic, post-Stalin postures. This strength may have freed them—within the limits of Soviet tolerance—to pursue different policy lines: as Gomułka gained strength he dampened the destalinization trend; Ceaușescu and his predecessor, Gheorghiu-Dej, followed a national, delayed-Stalinist form of economic development, e.g., in the early 1960's, they gave priority to heavy industry with the development of the iron and steel complex at Galați, and with development of a chemical industry, and completion of agricultural collectivization; Dubček, whose economy had different requirements, used his party power to press within Soviet guidelines to reform and destalinize it.

The different use to which the East European leaders put their freedom of action and power was related to their perception of economic performance and requirements. Rumania, experiencing the kind of growth Czechoslovakia had had in the 1950–1955 period, was less inclined to vary from Stalinist economic institutions. Poland, with moderate economic retardation and a Party comfortable with the Stalinist political system of control, was not pressed to change the economic institutions. Changes first discussed in Czechoslovakia in 1957–1958 began to be implemented after 1962.

After reform was adjudged acceptable by the Soviets, in Czechoslovakia a debate ensued in Prague and Bratislava involving Evžen Loebl, Ota Šik, and others, which led (in October 1964) to a blueprint for the new economic model.[48] By January 1965, the Party was said to be committed to the New Course. From commitment to implementa-

[48] Ota Šik, *Plan and Market Under Socialism,* Prague, Academia Publishing House, 1967 (International Arts and Sciences Press Translation); Ota Šik, "On the Economic Problems in Czechoslovakia," original article written before August 1968 and translated into English *in* U.S. Senate Judiciary Committee, Subcommittee on Antitrust and Monopoly, *Economic Concentrations; hearings,* Washington, GPO, 1969, pp. 4509–4530.

tion, the next major step was the issuance of detailed instructions for launching a new model of enterprise management in January 1967. From that move through development of the three-step price system, and of workers' councils, the New Course wended its way to the August invasion in 1968.

Formal East German changes came earlier than the Czechs'—the Ulbricht blueprint was published in July 1963—but "with an emphasis on organizational decentralization rather than on more incentives at the factory level." The decentralization consisted of a "minimum of directive indicators from central authorities" to semi-independent industrial associations.[49] Other reform measures followed: interest rates were reassessed; subsidies reduced; profits related to performance; individual contracts were taking the place of centrally determined allocations, financial accounting replaced physical terms, and a four stage, flexible price system was introduced.[50] The East German reform, apparently initially encouraged by the Soviets, was a technocratic rather than economic approach to reviving a lagging and overcommitted economy. With the apparent suicide of its architect, Erich Apel, in 1965, the drive for changes appeared to moderate in the GDR.

The Hungarians were late, perhaps made cautious by the premature economic thaw under Kádár's ill-fated predecessor, Imre Nagy in 1953–54. From 1965 on Kádár oversaw development of the Hungarian blueprint for reform:

> Apart from the usual verbiage and the obligatory set of new economic principles, the Hungarian blueprint contained four distinct features: first of all, the proposed new model was to be applied not only in industry and the distributive services but also in agriculture. Secondly, a new "three category" price system (not unlike that which was adopted in Czechoslovakia) was to be established. Thirdly, unlike Poland, Czechoslovakia, and East Germany, the Hungarian blueprint did not foresee the creation of a middle-level superstructure in the industrial sector in the form of trusts or industrial associations. Thus, the degree of independence granted to the enterprise directors appeared to be greater than elsewhere in the bloc. Finally, the Hungarians were the first to realize that in the changed conditions of the new economic model, the role of the trade union would have to undergo significant reassessment.[51]

Rumania ran somewhat ahead and counter to Soviet wisdom on development plans and foreign trade, but these differences appeared to be more counter to then current Comecon policy than to the Soviet's own development policy or example. Development of the Rumanian iron and steel plant at Galaţi and a Rumanian chemical industry would probably have been hailed by Stalin in the early 1950's; by the 1960's, however, it was at variance with Khrushchev's view on specialization within Comecon, which opposed the building of an industrial base in each country. Counter though Rumanian action was to Soviet plans the Soviets did no more than reprimand them. Either out of political weakness or unwillingness to channel resources from consumption to

[49] *Vereinigung Volkseigener Betriebe.*
[50] Gamarnikow, *op. cit.*, pp. 53–55.
[51] Gamarnikow, *Economic Reforms*, pp. 56–57.

investment, as well as because of export deficiencies in petroleum and raw materials, Rumania was the last to adopt a Stalin-style industrial investment program.[52] Likewise, Rumania's late collectivization of agriculture was a form of delayed Stalinism. With the option and perhaps necessity to turn to the West to complete their industrial expansion plans, the Rumanians were able to enjoy the advantages of short term Stalinist growth without incurring all of the longer term disadvantages of forced autarky within the bloc. Internal economic reform has thus perhaps been postponed for Rumania by its late resort to Stalinist growth prescriptions.

Economic retardation generated pressures for economic reform in Czechoslovakia, Hungary, and East Germany. The form taken by the reform in price policy and in incentives to workers and managers was similar, but the content was not. Each had a multiple price system with some prices free, other prices varied within ranges, and some prices fixed. Each made the enterprise manager in some sense responsive to profit criteria, with the power to cut labor costs through wage and employment decisions and to influence sales by price changes. Thus the formal approach to reform was similar: physical allocation of resources by centralized planners was to be replaced by a price system for allocation of a range of resources, probably exclusive of key items such as military procurement; the production-enginering criteria of total output at the enterprise were to be replaced by monetary and qualitative criteria such as sales, costs, and profit. As in the Soviet case, larger groupings of enterprises into associations or trusts were a companion development, at least in Czechoslovakia and East Germany. At the center, planning, competition, and economic institutions were established or expanded with an emphasis on professionalism in economics, statistical management science, and computer technology.

By adopting financial and monetary measures designed to improve factor efficiency at the enterprises, several of the East European countries appeared to approve in principle eventual transition to optimal planning through adoption of a price system and market simulating management. The central difference may have been whether they dismantled the old system, or tried for coexistence between old and new institutions. Czechoslovakia, and Yugoslavia since 1965, appeared to move to replace the old system. Hungary and East Germany appeared to proceed on the basis of coexistence with the old Stalinist economic institutions.

Still, with all this reform in Eastern Europe, even resumption of a moderate level of growth—4.5 percent—posed serious economic dilemmas in resource and planning/management policy. The resource allocation changes and planning/management restructuring which would accompany transition to optimal planning and market simulating management would inevitably pose short term problems. The East European Communist parties appeared to be faced with a necessity to change to improve economic performance, but with an uncertain expectation of favorable results, especially in the short run. Yet the Party leaders, perhaps conditioned by their past exhortations of the superior economic performance of their system, seem to be committed

[52] John Michael Montias, *Economic Development in Communist Rumania*, Cambridge, M.I.T. Press, 1968, p. 233 ff.

to improvement in performance. Likewise the populace seems to require improved performance by the Party.

The Party leaders in each of the countries, except Rumania, appear to have concluded that a new economic system must be set in place to provide required results. They appear to be divided on whether the cost of retaining all or part of the old Stalinist system would offset the benefits of the new system. There may be a mistaken impression that remnants of the old system may be neutral whereas, in fact, they may not only obfuscate the control system but may also negate the advantages of the new system. A manager may be told in effect to increase production with whatever labor and energy resources are necessary (by directives of the old system) while the new system is telling him to save scarce labor and energy, especially Soviet petroleum products. It is this kind of negative ambiguity which may become an evident factor in the formal steps toward reform in East Germany, Hungary, Bulgaria and Poland.

From this survey we may conclude that Soviet and East European party leaders have become increasingly conscious of the need for change in the internal planning and management system and external policy, including intrabloc (Comecon) trading and East-West trade. The ambiguity in the Soviet position may be explained by the unexpected East European inability to insulate potentialy beneficial economic changes from political side effects eroding political control and reliability.

IV. Economies in Crisis: The Dilemmas of Reform

Problems in dynamic efficiency

The economic problems, quantitatively expressed in the falling growth rate and decreasing factor efficiency, were politically characterized by official acceptance of the need for economic reform. We have assumed that the East European countries could and would continue to press against Soviet contraints in order to further economic destalinization and remedy their economic problems. The options open might be clearer if we ask the question: Why have the East European economies in 1960–1969 not returned to the Stalinist approach of 1950–1955? Several general reasons for precluding a return to the Stalinist model may be suggested:

1. The economies were mature and industrialized, and the option of channeling labor and investment to heavy industry and related ends (military and Soviet trade) was a short term option, e.g., transfer of 'surplus" labor from agriculture to industry had reached its limits as had deferment of broader investment requirements and consumption.[53] Only Poland, Bulgaria and Rumania had a percentage of the employed force in agriculture in excess of the Soviet Union in 1963.[54] These countries thus theoretically still had the limited option of transferring "surplus" agricultural labor to industry.[55]

2. The simplifying assumption of a constant state of the arts, deferring both modernization and replacement of capital, was especially

[53] Goldmann, *op. cit.*
[54] *Supra*, table 3.
[55] Cf. Smolinski, "Planning Reforms," *loc. cit.*

difficult for countries dependent on foreign trade, since technology in the Western industrial world was going through an unparalleled revolution. In Czechoslovakia, in particular, over-age industrial plant was a factor. But perhaps even more significant was the shift away from the technology of a coal-steel based industry. New industrial branches in petrochemicals and machine building were required, especially for Western markets, but even to meet Soviet requirements.

3. Without the control system of the Stalinist period the coercive institutions for controlling resource flows were not possible. A return to the Stalinist system would have required not only a Stalinist Party, but a Stalin-like leader in Moscow, and the other circumstances which had made the Stalin leadership possible.

The effectiveness of the Stalinist system could not be recaptured, but the costs of the system were very evident: in the requirements for deferred investment and consumption needs; in low productivity of capital and labor; and in the highly centralized, bureaucratized information and directive system of the planning and management process. The problem addressed by reform was simply to meet the requirements for allocation of resources differently than in the Stalinist period—particularly to meet underfulfilled or unfilled felt needs—and to use more efficient means of deciding among alternatives.

If a return to Stalinist control was precluded, and continuation of the modified Stalinist system provided unsatisfactory results, clearly changes in planning and management were required. Some form of optimal planning and market simulating management was generally felt to be needed. But what was meant by optimal planning and market simulating management and how resource allocation changes were to occur were subjects of considerable difference of view in degree and timing.[56] Besides, the speed and type of change had political as well as economic effects. The changes in East Germany and Hungary were thus different from the New Course in Czechoslovakia. There was also a commonly shared fear that changes might not produce the hoped for economic benefits.

THE RESOURCE ALLOCATION DILEMMA

Several factors contributed to the broadening of resource requirements. First, relaxation of the Stalinist control system meant economic incentives had to be substituted for coercion. Second, an increase in pluralism in the politics of the region meant increasing pressure for a broader distribution of resources to improve the lot of the populace, and to augment the power of the East European states. This pressure for wider distribution of resources was reinforced by economic pressure to deepen and improve the quality of capital and labor because of a number of factors: increasing complexity in the economy, reduced ability to transfer resources from non-priority sectors, and the cumulative requirements of deferment of investment. The short-term effect of meeting broader requirements, in consumer goods output turned out to be partially counterproductive, i.e., instead of the intended goal of increased satisfaction and incentive from the expansion in consumer goods supply, inventories increased. As the buyers became more selec-

[56] Gamarnikow, *Economic Reforms, passim.*

tive, and there was a shift from sellers' to buyers' markets, increments in consumer goods augmented *inventories* rather than increasing consumer consumption. Similarly, as capital was diverted to modernization and replacement of industrial plant and other economic facilities, and obsolescence and replacement became important, *underutilized capacity* became more characteristic. This underutilized capacity tended to reduce the overall output. Moreover, some of the modernization investments were new, and the cost of the learning process was evident. Other new investments required a long gestation period for showing results in improved productivity. All these factors, which were designed to improve economic performance in the long run, tended to dampen economic performance in the short run.

In the Stalinist system, there was a self-defined abundant supply of labor transferred to industry from agriculture, with negative incentives for insuring labor productivity through the Stalinist control system. This was coupled with a channelled supply of heavy industrial investment at a relatively constant state of arts to provide for substantial increases in industrial output. The post-Stalinist system had to rely on labor productivity and capital efficiency, rather than labor supply and volume of investment, and without the coercive Stalinist system of control. Therefore, resources had to be diverted to consumer goods output as incentives for increasing labor productivity, and to capital improvement for reducing the capital/output ratio. However, the rise of consumer goods inventories and unused capacity indicated that the reallocation of resources was not achieving its desired effects of stimulating labor productivity or or raising capital efficiency.

Moreover, the new power of the manager to hire and fire is intended to reduce production costs and raise efficiency. But as in the Yugoslav case, it can also lead to substantial unemployment. Unlike Yugoslavia, East European countries are not likely to permit temporary employment in the booming economies of Western Europe. As the Berlin Wall and to some extent the Yugoslav experience indicated, the wrong workers (i.e., the best) tend to migrate when East-West mobility of labor is permitted.

Consumer goods inventories and unused capacity, in turn, fueled concern with raising the quality of consumer and investment goods output. On quality grounds, West European sources of supply were clearly preferable to increased trade within Comecon, including the Soviet Union, since all Comecon countries shared the quality problem. The difficulty in obtaining Western European supplies was the balance of payment problem. How could hard currency be earned to pay for imports? About half the exports of the industrial East European countries were in machinery and equipment which was generally not competitive in the west. Rumania was a special case with an atypical export capability in petroleum and foodstuffs saleable in Western Europe. In this tight balance of payments situation tourism and credit from the West were most welcome. Tourism led indirectly to certain additional investments in facilities. Credits were available directly and through some joint venture channels.[57]

[57] Especially in tourism. V. L. Kona. *Uslugi i ikh sotsial'noekonomicheskaia rol'* (*Services and Their Social Economic Role*), Moscow, Progress, 1967.

In each East European economy, the pressures retarding economic performance could be partially relieved by the Soviet Union. More resources could be available for improving East European performance if substantial Soviet trade and aid were designed to assist. Likewise, greater changes in economic institutions would be likely if the Soviet environment were more permissive. Still, the Yugoslav reforms, beyond Soviet control, have not, in the short run, brought significant improvements in their economy. It must be assumed therefore that a favorable Soviet policy, while probably necessary, is not likely a sufficient condition for the attaining of dynamic economic efficiency in Eastern Europe in the near future.

Modern industrial investment capital on long-term credits or drafts could resolve the resource dilemma of East European countries. It is for this reason that both the East European countries and the Soviet Union became interested in East-West trade, especially on credit. Their particular problems were in obtaining goods needed for modernizing and expanding the capital base of their economies.[58] Similar needs led all these countries to seek ways other than credit for financing Western products of advanced technology. Tourism was perhaps close to credits in its mutual attraction. Increased exports of goods faced problems of quality as well as price. There was an additional problem for East Europe in its reliance on Soviet raw materials in the post-WWII period, e.g., grain, iron ore, petroleum, etc. Faced with the choice of denying themselves hard currency or using up hard currency or gold to continue to meet the raw material needs of Eastern Europe, the Soviets had a hard choice. In 1963–1964, they opted for Eastern Europe and imported grain from the West—using up gold and hard currency—to meet East Europe's needs. But that East Europe could not count on this support was indicated by the Soviets rapid increase of sales to Western Europe threatening a shift of their petroleum supply away from Eastern Europe, especially before August 1968.[59] Since the invasion, the Soviet commitments may be raised, but Soviet economic self-interest suggests a shift to hard currency markets in the West.

Changes in resource allocation to more consumption and broader investment outlays increased absolute and relative requirements, but failed to improve performance significantly. Barring either a major reduction in Warsaw Pact military outlays, or credit and aid from the West, the potential gains from changes in the resource allocation pattern appear limited. Without a reasonable prospect of substantial resource assistance from the Soviet Union or the West, the East European economies must turn to their own resources.

MANAGEMENT/PLANNING EFFICIENCY DILEMMA

If more resources cannot be released to raise factor efficiency (labor and capital) and overall performance, then perhaps resources could be allocated and utilized more efficiently? These are, of course, closely related matters. We merely choose to focus on the resource allocation

[58] Leon M. Herman, "The Promise of Economic Self-Sufficiency Under Soviet Socialism" *in* Treml (ed.), *Development*, p. 232.
[59] Campbell, *op. cit.*, p. 248.

pattern and system of planning and management separately. In each of the countries changes in planning and management were underway in the 1960's: a new price system, involving some variations of prices within ranges and some freely fluctuating prices (the three-step system in Czechoslovakia and Hungary, the four-stage system in East Germany, etc.), and more authority in the hands of the management with material incentive to stimulate performance.

The need to shift from a directive economy, with centralized day-to-day orders for managers to optimal planning and market simulating management was recognized. Less well recognized was that before results could be felt, a number of preconditions had to be met and time allowed for the transition to take effect.[60] For example, professionally trained economists and statisticians were needed to develop an optimal planning system; mechanisms for professional management likewise required training time for the professionals and a process of trial and error in application of new techniques. Moreover, a new information system involving a completely revamped statistical reporting system was necessary to provide the proper information for the kinds of systems such professionals might adopt. Mathematical-economic approaches, such as linear programming and input-output analysis, have become attractive to each of the East European countries, and are quite appropriately becoming significant in their planning discussions. Similarly, and perhaps least important, each of the East European countries has become oriented to the advantages and opportunities of the computer and rapid processing of large bodies of data.[61] In terms of the efficiency of planning and management, the necessary educational/investment period and development of expertise of optimal planners and market oriented managers takes time to develop capabilities and show results.

In the short run evidence from administrative and institutional changes suggests that performance may—contrary to some East European expectations—deteriorate before it improves. Indeed, there seems to be no assurance that it will be substantially improved in the long run. Moreover, the increasing evidence of cyclical patterns and performance in the East European countries may be related to approaches to either the resource or planning management dilemmas, or both. The short, sharp cyclical patterns now characteristic of all the East European countries and Yugoslavia are not precisely explainable by any of the familiar cyclical theories. However, inflation and instability in economic performance can be as troublesome as deteriorating performance itself. This may be particularly troublesome politically if it is felt to be associated with the adoption of changes in the economic system.

One approach to shortening the process of learning is selective borrowing from the West: through educational tours, attendance at meetings, and joint ventures with Western firms. The erudite presentations of Polish, Czech, Hungarian, and Yugoslav economists in Western

[60] For a detailed discussion of Soviet problems of change in management and planning, see John P. Hardt and Theodore Frankel. "The Managers" and Richard W. Judy, "The Economists," *in* H. Gordon Skilling and Franklyn Griffiths, *Group Conflict in the Soviet Union*, Princeton. Princeton University Press. 1970 (forthcoming).

[61] Cf. John P. Hardt et al., *Mathematics and Computers in Soviet Planning*, New Haven, Yale, 1967.

journals for Western audiences attest to their capability to learn from what they see. But it should be stressed that this approach is effective only if subsequently reflected in the planning/management process.

POLITICAL LIMITS ON REFORM

Introducing more professionalism and professionals at the planning/management process, if it shows results, is economically attractive. The desirability of the reforms alone, however, has not and will not determine the likelihood of their implementation. The decision to implement is a political decision which belongs to the Party, and, as the Czech experience showed, not only to the indigenous Party.

The Soviet Union's tolerance of reform in Eastern Europe will continue to follow its own posture on reform. At present that can be described at best as temporizing, and at worst, as balking the reform. The controlling factor is not that the nation's ailing economy does not require improvement; it clearly does, and there is no disagreement on that fact. The controlling factor is that the Party feels threatened by reform, which will inevitably transfer power from traditional Party power-holders into the hands of the economic professionals. The Party as the controlling institution in Communist society believes that control of the economy is crucial, and so long as those in power perceive reform as a threat to that control, the Party will not push reform with the vigor required to implement it. Can the Communist Party maintain its essential dominance and still permit more rational economic policies? That is the key question facing those in power; the prospects for reform hinge on their affirmative answer.

The institutional fear of the party stems from and is solidly supported by traditional, old-style Party regulars, jealous of their present positions and ill-equipped by experience and education to translate their skills into the complex and sophisticated techniques required by modernization. What will happen to the Party professionals' role in the economy under economic reform? Will the regional Party Secretary, for example, give up his power to appoint and supervise most enterprise directives as well as the responsibility for their performance? Lack of satisfactory answers makes these functionaries—not unjustifiably—fearful of losing their functions and positions to the new breed of professional economists, planners and managers, and hardens their support of the status quo.

There are those who argue reform is designed to save the Party in Eastern Europe.[62] As in the Soviet Union, however, there are also those in the Party who feel that, to paraphrase Marx, "they are digging their own graves." Those entrenched Party members who do see economic reforms as threats to their political security will continue to oppose them, taking their cue and their comfort from their mentors in Moscow. Another political problem for the reformers, in the Soviet Union and in Eastern Europe, is that changes in resource allocation and planning/management policy promise improved economic operation in the long run, but not in the short run. Reforms promise little sure, short-term gain in the near future. Why should the Party chance

[62] Skilling, *loc. cit.*

the significant, sure, immediate and perhaps irreversible costs of economic reform?

What is more, experience so far has shown that the opening of previously closed East European societies to tourists, western businessmen and western managers of joint ventures opens a Pandora's box of unwelcome—to the Party—side effects. It raises expectations of the indigenous population for better things and better living and introduces a full range of undesirable ideas which censorship at least gave the impression of keeping out.

Still another limit on change is the international political environment created by Soviet policy on the East and U.S./European policy on the West. Military neutralization of Eastern Europe *à la* Rapacki Plan and massive Western aid *à la* Marshall Plan would create a very favorable environment for improved economic performance. However, any heightening of cold war tensions would lead to economically injurious military costs and enforced autarky. Similarly, economic reform including expanded East-West trade in the U.S.S.R. would provide a permissive framework for East European political changes. In this context, it would be unduly pessimistic to assume that East European economic systems could not be revised to improve performance.

The critical factor is still the limits that the Soviets place on change. Given the fact that the Soviet Union's own experience with economic reform and its political consequences inform its handling of Eastern European reform (to the extent that Eastern Europe remains susceptible to Soviet control), Eastern European reform must await changes within the Soviet Union itself. The Czech invasion was the clearest recent statement of the present limits of the Party's tolerance for change.

If the constraint of Soviet policy is further released, the East European Communist nations may be more inclined than the Soviets to move away from the Stalinist-Leninist approaches of the past and to reduce their economic ties with U.S.S.R. This might involve a return to traditional association with Central European countries (Western Germany, for example, in the north and the non-Communist Balkan and Danubian countries in the south, i.e., Austria, Greece). It might also involve a return to a humanistic Marxian tradition of Central Europe—the democratic socialism of the pre-Leninist Second International.

A tendency toward Marxian-democratic socialism and reorientation of Eastern to Central Europe may be interwoven with the shift to new forms of planning and management. In this sense, Gregory Grossman's notion of a triangular interrelationship among economics, politics and ideas seems appropriate.[63] Here again the Soviet constraints loom large. If the repressive action of Soviet forces in Czechoslovakia in August 1968 was a last, Pyrrhic victory of Stalinist "interrupting the Czech revolution," then the East European communist nations may be permitted to move further on the lines of professional economic planning and management reform in a Marxian and nationalistic context. But we cannot be sure that August was this sort of a watershed.

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[63] Gregory Grossmann, "Economic Reform: The Interplay of Economics and Politics" *in* Richard V. Burks (ed), *The Future of Communism in Europe*, Detroit, Wayne University Press, 1968, p. 112. See also Benjamin Ward, "Political Power and Economic Change in Yugoslavia," *American Economic Review*, vol. LVIII, no. 2, May 1968, pp. 568–579.

The uncertainty of whether August 1968 was the last gasp of an old policy, or a renewed warning to Eastern Europe not to stray too far from the traditional relationship, will probably inhibit these tendencies in Eastern Europe until the limits of Soviet tolerance are clearly established.

THE IRRESOLVABLE ECONOMIC CRISIS?

It could be that the performance of the East European economies will stagnate and even regress farther. Even Rumania, which did not experience the long term retarding effect of Stalinist institutions, may exhaust its short-term advantages. Further the deterioration may be directly related to the level of development, i.e., worst in Czechoslovakia, the most highly industrialized. This situation will obtain if the following are true:

1. If Soviet policy precludes substantial Western assistance through aid—such as the U.S. Public Law 480 type which totalled a half billion dollars, primarily to Poland after 1956, or in the form of joint ventures, credits, tourism, etc.
2. If the Soviet Union chooses to reduce its trade with Eastern Europe by which it now supplies critically needed petroleum, metals, grain, etc., for otherwise unmarketable East European machinery.
3. If Soviet insistence on Party involvement in the economy leads to partial price reform and organizational proliferation rather than decentralization, and to retention of non-professionals in key positions.

If these conditions occur, then projections of the economic performance of Eastern Europe are discouraging.

At the same time, partial, but incomplete relaxation of the constraint on internal change might not show favorable results. Workers' councils and professionals unskilled in monetary policy might tend to frustrate cost reduction efforts and be permissive of inflationary pressures. Yugoslavia is a key laboratory for experimenting with transition from institutions keyed to selective dynamic centralism to more market-oriented institutions capable of providing dynamic economic efficiency. American economists benefited by the earlier exposure of Keynes and others in Britain to our economic problems; likewise, East European economists may benefit from relevant Yugoslav exposure.

Mainly, however, it is Moscow that holds the key to broader changes permitting external assistance and political-economic reform. If the pendulum of Soviet policy has swung as far as it is going toward the Stalinist past, then a swing toward Soviet pluralism and professionalism will provide wider limits in East Europe. Likewise, meaningful rapprochement between the Soviet Union and the United States will stimulate East-West economic relations. These changes may be viewed as credible and in the Soviet interest, and East Europe will benefit from them. A version of the Czechoslovak spring of 1968 may yet emerge again and with it movement toward the goal of a more western oriented, humanistic, efficient economic planning and management system.

To summarize, the major impediments to dynamic efficiency in Eastern Europe are the long-run costs of commission and omission of Stalinist Soviet-type development. Direct Soviet impositions have

ended, but the deferred costs of investment for refurbishing and modernizing economies not geared to economic efficiency, consumer choice, and export markets remain. Likewise, the institutions designed to channel labor and capital to Soviet and East European industrial and military needs change slowly to meet new broader requirements. Finally, the tradition of State and Party involvement in economic affairs creates a drag on the entire process of economic change.

The engine for change is failing performance, and rising population expectations and demands. The more advanced countries such as Czechoslovakia will be increasingly pushed by these factors. If permitted by the political leadership to pursue further economic destalinization, they will still have to face a learning period in order to master optimal planning, market mechanics and world trading practices. Economic stagnation at a low level of performance is not a necessary condition in Eastern Europe, but factors not within their control may make it their lot.

The root problem that will have to be faced by Soviet and East European leaders is the necessity to replace rather than modify the Stalinist system. There was a certain apparent stability, unity, and consistency in the Leninist Party, the Stalinist control system and the Stalinist economic system of planning and management. The need for economic reform and the expectation of improved performance have tended to bring each of these elements into question: political involvement in the economy of the Leninist-type parties, the channeling of resources through control mechanisms of the Stalinist system, and direct central planning and management. They may turn out to be inseparable and the likely result, given the impossibility of returning to the old system, will be pressure for a broader change throughout the system. Mere modification of the existing Leninist-Stalinist system may actually lead to further deterioration in the performance of the system. What appears to be required is replacement of the Stalinist planners and planning system by new, professional economists and statisticians, and replacement of the old production-engineering type managers and directive system with managers trained for market conditions and the functioning of a system simulating a market.

If change in the economic system requires political pluralism and reduction of party involvement, perhaps as expressed by workers' councils and trade union activity, then the change takes on larger dimensions. If economic change also affects the Leninist role of the Party as a central controlling agency and raises pressures for broadening the party to be more responsive and humanistic in the Marxian sense and permissive of factionalism, then the indirect effects of economic change may be more significant than the direct effort.

This possibility was implicit in the economic, political and ideological changes proposed by the Czech Reformers. Soviet recognition that this was so swept Dubček to his collision with Soviet power. My reading of the Czech experience is that the Czechs perceived that in the long run only replacement—not modification—of the Stalinist system in all its aspects could save the Communist Party.

ECONOMIC STRUCTURE AND GROWTH IN EASTERN EUROPE

By THAD P. ALTON

CONTENTS

LIST OF TABLES

I. INTRODUCTION*

This paper seeks to describe the composition of economic activity, to measure its growth, and to show trends in labor and capital productivity in Eastern Europe. The approach is statistical; use is made

*The statistical basis for the present paper is provided by monographs, *Occasional Papers*, and research manuscripts completed by the Research Project on National Income in East Central Europe at Columbia University. A partial listing is provided in the appendix to this paper. My appreciation is due to all my colleagues who participated in this work. I would like to thank particularly Mr. Wassyl Znayenko for help in consultations and research. My thanks are due also to Mrs. Elizabeth M. Bass for work on sectoral indexes that needed updating and to Dr. Gregor Lazarcik and Dr. Laszlo Czirjak for various consultations. Weights and indexes for the non-agricultural sectors of the Yugoslav economy were provided by Mr. Jerry Crawford; weights for the Rumanian and East German economies and the sectoral indexes, other than those for agriculture and industry, were provided by Mr. David Wigg. My thanks are due to them, but I must absolve them of responsibility for certain changes in the weight regimens that I introduced. Mr. Edwin Snell helped me in consultation on the structure of the East German economy, and I express my gratitude to him for valuable orientation.

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of both our independent estimates of gross national product and the official data on national income published in the countries under review. Seven countries are covered—Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, Rumania, and Yugoslavia, but the last is omitted from some of the tables and comparisons. Although the main reference in the paper is to comparisons within Eastern Europe, some comparisons are also made with Western Europe and other countries in order to provide perspective.**

The reader who wants a quick description of the economies can best proceed by reference to the list of tables. At this point we can mention only a few of the findings.

The rate of growth of GNP in Eastern Europe in 1965–1968 was in general somewhat higher than in the 1960–1965 period (Tables 1 and 15). The rate of growth in Eastern Europe since 1950 was about 5 percent per year (compound rate), roughly the same as in Western Europe.

Whether the measure be by changes in the composition of GNP (our findings), or by the composition of the official national income (net material product) aggregates, or by the composition of the labor force, it is clear that in the last two decades the area has strikingly changed from an agricultural-industrial character to a strongly industrial orientation (Tables 8 to 10). The share of agriculture in the economies is still very substantial, however, especially in regard to labor force.

The fruits of growth have been divided so as to favor future growth at the cost of slower growth of personal consumption (Tables 11 and 12). Investment has grown considerably faster than the aggregate product and from around 50 to more than 100 percent faster than personal consumption in the post-1950 period (Tables 6, 7, 11, and 12). Industry and construction are the fastest growing sectors, but their growth is offset in the aggregate performance by the slower growth of agriculture, services, and housing (Table 5).

The performance of Eastern Europe as measured by the rates of growth of labor productivity has been below that of such countries as Austria, West Germany, Italy, and Japan (Table 16). For the 1961–1967 period the rate of growth of capital productivity (GNP per unit of capital input) became negative, offsetting the positive rates of the 1948–1960 period. Economists in Eastern Europe and the USSR have noted the sharp decline in capital productivity in the Comecon countries and discussed its causes and remedies. The low rates of capital retirement, reflected in the continued use of obsolescent equipment, and lags in introducing technologically advanced equipment have been noted as contributing factors to the decline.

Eastern European official statistics in general have been improving in quality and extent of coverage, but their use to appraise the relative importance of sectors of production, of final uses of products, and of contributions to the economic effort can be seriously misleading unless the analyst keeps a close watch on the content of price and value categories and makes adjustments to bring the magnitudes into closer correspondence to resource costs.

**The reader will benefit by referring to an earlier Joint Economic Committee study prepared by Maurice Ernst, "Postwar Economic Growth in Eastern Europe (A Comparison with Western Europe)," in *New Directions in the Soviet Economy* (Part IV, The World Outside), Washington, U.S. Government Printing Office, 1966, pp. 873–916.

II. GNP by Sector of Origin

We shall use gross national product (GNP) as the main concept to estimate the dimensions of economic activity and its rate of growth and, by considering the composition of the GNP, to describe the character of the national economic effort. There are, of course, other ways of viewing this effort, some of them being derivatives of GNP and others related to it as means of generating the product or as indicative of uses of the final product. Thus one might study the total effort in terms of the allocation of factors of production—labor, fixed capital and working capital, and land—among industry, agriculture, and other sectors of production and in terms of the magnitude and trends of income generated by the employment of these factors and the eventual uses to which the income is put.

Production and consumption are obviously interrelated in the cycle of economic activity, and their various articulations are reflected through market prices in money terms. But the valuations in market prices often carry with them some obfuscation of perhaps more basic reality. Governments especially continue to influence prices through their policies of taxation and subsidization, ofttimes distorting the configuration of economic activity in very striking ways.

An interesting example of such distortion can be provided for Hungary where the separation of world market prices from Hungarian market prices in 1955 led to the phenomenon of 6.6 percent of GNP by sector of origin of product having no substantive counterpart in the final uses of GNP.[1] Considering the exactly balanced magnitudes of exports and imports in world prices, Hungary gave up in domestic prices a value of exports that was 7.9 billion forints greater than was received in the offsetting domestic value of imports. Comparable situations exist in the other Communist countries of Eastern Europe. In the case of Hungary and Poland the magnitudes find forthright expression in the official national income accounts and, in Poland, in the published state budget, but in some of the other countries the extent of distortion has to be approximated by various means.

The intervention of the governments in Eastern Europe on values expressed in market prices is no less striking in the case of the turnover tax, enterprise profits, and subsidies. The governments have depended on the turnover tax and levies on enterprise profits for the major part of their fiscal revenues, and these two sources are very directly reflected in the prices of products, predominantly those of the industrial sector. There is present also a distorting effect upon the relative sectoral contributions to the national income or GNP caused by purchases of industrial inputs from agriculture or other sectors at prices below their cost in terms of factor inputs or below their value in terms of prices that would reflect more uniform incidence of the fiscal levies upon a factor cost base.

An interesting anomaly that emerges in the official national income statistics of Eastern European countries may be worth noting at this point. In all of these countries the summary official measure of national economic activity is national income, defined more or less as value

[1] See Thad P. Alton and Associates, *Hungarian National Income and Product in 1955*, p. 59.

added in material production. The definition excludes as non-productive, or as non-material, the various service sectors not directly supporting material production. Thus, in most of the countries, passenger transportation and communication services for the population and the government were not considered as contributing to the national income. The same is true of government and various professional and personal services. Yet, though formally excluded, some part of the value of these services sneaks into the material product concept of national income by the way in which the latter is computed. Briefly, beginning with the market price of the material product of an enterprise, the national accountant subtracts purchases of material products from other enterprises and also subtracts depreciation on fixed assets to arrive at the contribution to national income. To the extent that the market prices reflect purchases of production inputs of non-material services, the national income still contains these services, only now they are attributed as value added in production of the purchasing sector and not the sector of origin. The extent of such transfer is not great,[2] but its distribution among the sectors of origin of product is not always indicated.

Although the GNP concept fails to cover some borderline productive activities because they do not find an evident market expression, still it is a relatively well-defined, more comprehensive concept than the net material product and convention recommends its use for international comparability, as well as for other reasons. In proceeding from an examination of the composition of the GNP by contributing industrial sectors and by final uses of product to a study of rates of growth, the shares of GNP by contributing sector or by end use become significant for weighting purposes. Both for an appreciation of the composition of economic activity and for the estimation of growth of GNP based on constant-price indexes of contributing sectors it is important that adjustments be made in East European market price magnitudes to put the elements that are being compared upon comparable footing. Thus the screen of turnover tax, administratively-set profits, and subsidies that obfuscate factor costs must be dealt with.

In an overly simplified way, our procedure consists of (1) estimating the GNP at market prices either by a fully articulated set of national income accounts [3] or by some approximation thereto, (2) determining within this total the returns to labor as a factor of production, and (3) attributing the balance of the GNP to returns to non-labor factors of production. The labor returns—wages, social security contributions, incomes of self-employed persons and other wage-like payments—were estimated sector by sector wherever possible on the basis of employment, average wages, income data, and other information. The non-labor residual in the market price GNP

[2] It is shown, e.g., in the Polish official national income accounts for various years. See Poland Główny urzad statystyczny *Dochód narodowy Polski. 1955–1960,* p. 15, where the entry for "other non-material costs" appears among the income elements of the "national income produced," along with wages, taxes, and profits. Its average share in the national income over the 1955–1960 period came to about 2.5 percent.

[3] See our monographs: Thad P. Alton and Associates, *Czechoslovak National Income and Product in 1947–1948 and 1955–1956; Hungarian National Income and Product in 1955;* and *Polish National Income and Product in 1954, 1955, and 1956;* all by Columbia University Press. A manuscript, Alexej Wynnyczuk, *Bulgarian National Income and Product in 1956,* awaits publication.

was next distributed to the sectors of origin of product on the basis of their shares in the total value of fixed and working capital. The sum of labor and non-labor returns represents the estimated contribution of each sector to GNP at factor cost.

In most of the countries of Eastern Europe, until recently, capital was for the most part regarded as a free good so far as enterprises were concerned; investment was financed largely from the "accumulation" caught up in turnover taxes and profits, and a net return to capital did not enter explicitly into price formation. Depreciation allowances did enter cost accounting and thus figured in price formation, but too often these allowances were close to nominal or were not calculated in a uniform way among the various production sectors. Our redistribution of non-labor returns to industry, agriculture, and other sectors of production attempts to cover explicitly depreciation and a net return to capital. Thus it should provide a better picture of the resource cost of production than the formal market price structure of GNP.

In most countries, where capital costs must be explicitly accounted for by enterprises, the market price structure of GNP is not so badly warped in relation to the factor cost structure as in Eastern Europe, but there the situation is improving. An explicit charge for capital was first introduced by Yugoslavia in the 1950's; by the mid-1960's Czechoslovakia and Hungary proceeded to rectify their costs and prices on this account, and Poland and other countries are progressively doing the same. The turnover tax has declined in importance, though still remaining a major source of budget revenue, and profits designed to cover capital charges and various funds under the new systems have gained a greater role. Attempts are being made as well to bring domestic prices into more direct articulation with world prices in an attempt to rediscover specializations in the international division of labor. Yet progress along these lines is very modest, and the use of national income statistics published in Eastern Europe will still require a diligent study of the price regimens in order to rectify distortion persisting from the past.

In Table 1 we present indexes of growth of GNP based predominantly on independently constructed sectoral indexes combined at lower levels by price weights and at higher levels and eventually into GNP by branch and sectoral weights approximating gross value added at factor cost in a base year. The appendix to this paper provides source indications and further methodological comments. Table 2 shows the official Eastern European indexes of the net material product version of national income, a concept that is narrower than GNP by the exclusion of service sectors not directly supporting material production (as noted above) and by the exclusion of depreciation on fixed capital. The national income figures are in constant market prices, and the GNP series are factor cost weighted. Because of the distortions of the Eastern European prices in relation to factor cost, the structure of economic activity as well as the trends shown in the official figures are not immediately comparable to our findings. Here we are concerned only with trends; in a later section structure will be discussed.

TABLE 1.—EASTERN EUROPE: GNP INDEXES, 1950–68

[1955=100]

	Bulgaria	Czechoslovakia	East Germany	Hungary	Poland	Rumania	Yugoslavia
1937	[1]65.8	81.0	...	[2]80.7	77.6	...	...
1950	74.3	84.5	73.3	76.8	79.9	70.5	81.0
1951	89.6	86.0	...	84.2	83.4	...	...
1952	85.5	88.9	...	87.0	85.3	...	...
1953	95.1	88.5	...	88.6	90.3	...	...
1954	93.3	92.1	...	91.7	95.4	...	...
1955	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1956	100.1	105.9	...	95.5	104.5	...	97.7
1957	110.7	112.4	...	103.4	110.0	...	114.0
1958	120.3	121.0	...	110.3	115.4	...	118.6
1959	129.9	126.3	...	114.8	118.7	...	133.2
1960	142.2	135.9	127.5	120.8	125.1	124.1	141.6
1961	151.5	141.3	128.4	126.9	135.1	132.5	148.0
1962	163.9	143.2	131.9	132.2	133.3	137.1	150.8
1963	171.4	140.5	136.2	139.4	141.3	147.0	166.5
1964	184.9	147.1	139.9	147.3	147.6	156.3	182.4
1965	196.0	152.5	145.6	148.4	155.7	166.0	187.3
1966	212.2	160.6	150.4	157.6	166.7	180.4	197.4
1967	225.8	168.4	155.6	164.8	173.5	191.3	200.8
1968[3]	242.0	175.0	160.0	173.0	184.0	202.0	205.0

[1] 1939.
[2] 1938.
[3] Provisional estimate.

Sources: See appendix.

We must note here that the various measures based on the aggregation of component indexes into GNP indexes are relative to the weights used for combining them, and that the component indexes are subject to the same kind of relativity. Our weights are generally drawn from the postwar period, but a significant exception is the index for gross value added in Bulgarian agriculture, where we used prewar prices. More recent prices were not available in sufficient detail. In brief, we expect that the prewar prices for current production inputs (fertilizers, etc.) purchased from other sectors are higher in relation to prices for farm output than those in the later, postwar years. With the steep rise in the quantities of fertilizers and other inputs during 1959–1967, the use of prewar prices implies sharply rising deductions from the values of output to arrive at gross value added by agriculture. The index thus derived would show a slower growth than one based on postwar prices where output is more favorably priced in relation to purchased inputs.

An alternative, faster growing index for Bulgarian agriculture would mean a GNP level higher by some points than that shown for 1967 in Table 1; the dollar values of GNP in Table 4 would be somewhat higher; and the shares of agriculture in the GNP for the more recent years higher (and concomitantly, the shares of industry and other sectors lower) than in Table 8. In due course we expect to recalculate the Bulgarian agricultural indexes using more recent prices and to derive for the various countries new sectoral weights based on cross sections of GNP for the late sixties. Meanwhile the relativity of economic performance to weighting regimens and to quality of economic information is worth keeping in mind, particularly where overly refined comparisons may be attempted. The years that are most affected for Bulgaria in our tables are in the 1959–1967 period.

TABLE 2.—NATIONAL INCOME (NET MATERIAL PRODUCT), OFFICIAL FIGURES, 1950–67 [1]

[1955=100; constant prices]

	1950	1955	1960	1965	1967
Bulgaria	[2] 79	100	159	219	266
Czechoslovakia	68	100	141	155	182
East Germany [3]	(4)	100	147	173	189
Hungary	76	100	134	167	195
Poland	66	100	137	185	210
Rumania	52	100	140	215	254
Yugoslavia	76	100	150	217	235

[1] National income produced (as distinct from consumed) is understood for most of the indexes.
[2] 1952.
[3] National income consumed. National statistics distinguish three varieties of national income: (1) Domestic national income is the sum of the net product originating in the material production sectors of the economy (industry, agriculture, construction, forestry, transport and communication, trade, and "other" material production). (2) National income produced is equal to concept (1) plus the balance in the foreign trade price equalization account, which is essentially the accounting gain or loss on bilaterally balanced trade that arises from differences between the relative prices in which the trade takes place (external prices) and the relative domestic prices paid for exports and realized upon imports. (3) National income distributed, or consumed, is equal to concept (2) adjusted for the net (external) foreign trade balance expressed in domestic prices and for losses of national income; it is equal to domestic net investment plus private and social consumption (see Poland, Główny urząd statystyczny, *Rocznik dochodu narodowego*, 1960–65, pp. XXXIII, XXXVII).
[4] Not available.

Source: See appendix.

Making allowances for the differences noted above, the rank orders attained by 1967 in Tables 1 and 2 agree fairly well. Bulgaria, Yugoslavia, and Rumania, the latecomers to industrialization, rank the highest in growth since 1955; Poland is in the middle, followed by Hungary, while East Germany and Czechoslovakia, the industrially more advanced countries, are at or near the bottom in the GNP and national income arrays. Somewhat different outcomes of course will follow if 1950 or prewar is taken as the starting point.

Table 3 presents the same information as Table 1 but on a per capita basis plus an indication of the average compound rate of growth in

TABLE 3.—INDEXES AND GROWTH RATES OF GNP PER CAPITA, 1950–67

	Indexes, 1955=100						Annual percentage increases				
	Prewar	1950	1955	1960	1965	1967	1950–55	1955–60	1960–67	1950–67	1965–67
Bulgaria	[1] 74.7	76.8	100.0	135.6	179.2	203.8	5.4	6.3	6.0	5.9	6.6
Czechoslovakia	[2] 73.5	89.3	100.0	130.3	141.1	154.1	2.3	5.4	2.4	3.3	4.5
East Germany	(3)	69.3	100.0	132.7	153.5	163.4	7.6	5.8	3.0	5.2	3.2
Hungary	[4] 86.5	80.8	100.0	118.9	143.7	158.5	4.4	3.5	4.2	4.0	5.0
Poland	[2] 62.4	87.8	100.0	115.4	134.9	148.2	2.6	2.9	3.6	3.1	4.8
Rumania	(3)	74.8	100.0	116.5	150.8	171.4	6.0	3.1	5.7	5.0	6.6
Yugoslavia	(3)	86.8	100.0	134.8	168.3	176.3	2.9	6.2	3.9	4.3	2.4

[1] 1939.
[2] 1937.
[3] Not available.
[4] 1938.

Sources: See appendix. Midyear population data were used

various postwar periods. This table may be compared with Table 15, showing the corresponding rates of growth of total GNP. The picture is a mixed one. One may see in it some reflections of (1) the new course policies adopted in the mid-fifties, (2) the more sustained rigor of Bulgaria over the entire period, (3) the lean early fifties for Yugo-

slavia confronted by economic hostility of the U.S.S.R., and (4) Czechoslovakia's economic problems of the early sixties. As one should expect, where the population is growing, the per capita increases are smaller than the total GNP rates. East Germany is the exception to the general East European experience because of her losses of population.

In the two-year period, 1966–1967, the unweighted average compound rate of growth of GNP for the seven Eastern European countries came to around 5.4 percent; for Western Europe, for the two-year period, 1965–1966, for the nine countries the corresponding rate was around 4 percent.[4] Over the longer 1950–1967 period, the unweighted average rate for the seven Eastern European countries was about 5.2 percent; for Western Europe the corresponding rate for the 1950–1968 period would be close to 5 percent.[5] The general conclusion would appear to be that the two regions have been growing over the longer period at about the same rate, but a weighted average would very likely show Western Europe slightly higher. (Using weights based on Table 4, the average for Eastern Europe came to 4.9 percent.)

The economies of Eastern Europe can be further described, albeit in a rough way, in a dollar setting. Table 4 provides an extension to 1967 of Maurice Ernst's dollar estimates of Eastern European GNP.[6] The two sets of estimates (A and B) refer to Ernst's alternative exchange rates for conversion of Western European countries' currencies to U.S. dollars. Estimate A is related to conversions at official exchange rates, and B is based on the geometric mean of two sets of dollar values in purchasing power equivalents for 1955 prepared for the OEEC by Milton Gilbert and Associates. Ernst first estimated the ratios of Eastern European GNPs to West German GNP by means of calculated exchange rates and quantity indexes, and then he applied the ratios to dollar values of West German GNP obtained by the two means of conversion mentioned above.

For a benchmark, the preliminary United States 1967 GNP figures are $785 billion total, and $3,842 per capita.[7] Thus, in 1967 the seven countries of Table 4 had a total GNP about 14 to 16 percent of that of the U.S. The indicated per capita levels range from about one-fourth to less than one-half that of the U.S. As one might expect, the levels of per capita income are highest in Czechoslovakia and East Germany and lowest in Rumania and Bulgaria, that is, inversely correlated with their rates of growth.

The indexes of Eastern European GNPs and of their component industrial sectors are shown in Table 5. Considering their heavy

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[4] Eastern Europe: rates were taken from Table 15 of the present article; Western Europe: rates were calculated from GNP figures at factor cost in 1958 prices as shown in OECD, *National Accounts of OECD Countries, 1957–1966*. Austria, Belgium, Denmark, France, West Germany, Greece, Italy, Netherlands, and Norway were represented. The figure for Greece is for a single year, 1965 over 1964.

[5] Eastern Europe: see Table 15, herein; Western Europe: the annual rates ofr 1951–64 shown by Maurice Ernst *in* U.S. Congress, Joint Economic Committee, *New Directions in the Soviet Economy*, Washington, U.S. Government Printing Office, 1966, Part IV, p. 880, were extended to 1966 by the growth rates indicated in the text above.

[6] Ernst, as cited above, p. 877. Ernst's estimates for 1964 were moved to 1955 by the indexes he shows for Eastern European countries (his p. 880) and then were carried forward by the indexes of the present article. Implicit U.S. GNP deflators given in the *Statistical Abstract of the United States, 1968*, and earlier volumes were used to convert Ernst's values to 1967 dollars.

[7] The revised figure for U.S. 1967 GNP is 789.7 billion current dollars (*Statistical Abstract, 1969*, p. 312). See also Frederic L. Pryor and George J. Staller, "The Dollar Values of the Gross National Products in Eastern Europe in 1955," *Economics of Planning*, vol. 6, no. 1, 1966, pp. 1–26, for comparative levels.

weights, industry and agriculture are decisive in determining the GNP trend, with rapidly growing industry lifting the rate of growth and slow moving agriculture retarding it. In all of the countries, from 1955 to 1967 industry ranked either first or second in the rate of growth. Other fast growing sectors were construction and transportation and communications. Trade generally ranked in a middle position, followed by housing and other sectors, while agriculture most often ranked last. This ranking reflects the planners' strategy: industry is the favored sector; the consumer goods-oriented sectors must proceed at a slower rate. What the differential rates of growth do to the sectoral composition of GNP will be examined below (Section IV).

We have noted above (in connection with Table 1) the probable depressive effect of prewar prices on the Bulgarian index for agriculture. Here we may add that the quality of our industrial production indexes depends to some degree on the extent of detailed production data that are available. In this respect the Bulgarian and Rumanian indexes were not as well supported as others that we calculated. Where detail is lacking, the possibility exists that the more favorable series were published, implying a possible upward bias in indexes based on them.

TABLE 4.—TOTAL AND PER CAPITA DOLLAR VALUES OF GNP, 1967

[1967 U.S. dollars]

	A[1]		B[1]	
	Total GNP (billion dollars)	Per capita (dollars)	Total GNP (billion dollars)	Per capita (dollars)
Bulgaria	7.2	870	8.2	990
Czechoslovakia	22.9	1,600	26.3	1,840
East Germany	25.4	1,480	29.1	1,700
Hungary	11.0	1,080	12.6	1,240
Poland	29.5	920	33.9	1,060
Rumania	16.3	840	18.8	970
Total	112.3	1,110	129.0	1,280

[1] See explanation in the text.

TABLE 5.—GROWTH OF GNP AND INDUSTRIAL SECTORS, PREWAR TO 1967

[Indexes, 1955=100]

	Prewar[1]	1950	1955	1960	1965	1966	1967
Bulgaria:							
GNP	66	74	100	142	196	212	226
Industry and handicraft	28	60	100	194	335	376	427
Agriculture and forestry	101	81	100	111	110	113	98
Construction	32	69	100	182	284	314	347
Transport and communications	26	68	100	180	290	322	368
Trade and catering[2]	81	65	100	166	227	247	272
Housing	78	93	100	117	136	140	144
Other services	49	72	100	107	134	137	142
Czechoslovakia:							
GNP	81	85	100	136	153	161	168
Industry and handicraft	69	82	100	156	187	198	210
Agriculture and forestry	117	101	100	107	89	98	105
Construction	76	71	100	148	147	155	163
Transport and communications	36	62	100	162	208	211	215
Trade and catering[2]	82	83	100	138	162	170	179
Housing	110	99	100	104	110	111	112
Other services	77	85	100	112	135	139	145

See footnotes at end of table.

TABLE 5—GROWTH OF GNP AND INDUSTRIAL SECTORS, PREWAR TO 1967

[Indexes, 1955=100]

	Prewar [1]	1950	1955	1960	1965	1966	1967
East Germany:							
GNP		71	100	128	146	150	156
Industry and handicraft		58	100	139	166	171	177
Agriculture and forestry		78	100	116	120	126	132
Construction		67	100	162	209	221	243
Transport and communications		72	100	119	134	138	139
Trade and catering		59	100	132	138	146	151
Housing		104	100	104	112	113	114
Other services		99	100	102	106	108	109
Hungary:							
GNP	81	77	100	121	148	158	165
Industry and handicraft	56	66	100	130	181	194	200
Agriculture and forestry	111	84	100	100	106	117	125
Construction	58	79	100	148	181	182	195
Transport and communications	35	64	100	142	176	182	190
Trade and catering	90	79	100	146	190	203	222
Housing	100	97	100	107	116	119	121
Other services	113	83	100	107	124	127	131
Poland:							
GNP	78	80	100	125	156	167	173
Industry and handicraft	53	63	100	145	202	213	227
Agriculture and forestry	91	94	100	114	124	135	134
Construction	51	59	100	130	155	164	178
Transport and communications	38	67	100	128	177	207	223
Trade and catering	166	86	100	144	186	199	214
Housing	82	92	100	116	131	136	140
Other services	90	88	100	102	127	131	134
Rumania:							
GNP		70	100	124	166	180	191
Industry and handicraft		69	100	155	259	290	322
Agriculture and forestry		61	100	109	111	119	116
Construction		82	100	264	475	515	599
Transport and communications		57	100	117	172	190	208
Trade and catering		67	100	104	125	129	132
Housing		96	100	114	128	131	134
Other services		85	100	108	148	160	166
Yugoslavia:							
GNP		81	100	142	184	197	201
Industry and handicraft		71	100	171	277	289	289
Agriculture and forestry		74	100	124	127	144	150
Construction		112	100	134	159	152	160
Transport and communication		90	100	164	236	255	263
Trade and catering		71	100	177	250	268	270
Housing		94	100	109	139	143	148
Other services		93	100	126	149	145	143

[1] Bulgaria: 1939; Czechoslovakia and Poland: 1937; Hungary: 1938.
[2] Includes banking and insurance.

Sources: See appendix.

III. Final Uses of GNP

Considerations similar to those that led us to make independent estimates of the composition and rates of growth of GNP and its sectors of origin of product have impelled us to estimate the structure and growth of the major final uses and their total as an expression of GNP. Briefly, the final uses at market prices are affected by the same market price abnormalities that cause deviations from factor cost in the gross value added by industrial sectors, tending to exaggerate the weight of sectors where the turnover tax is collected and where abnormal profits are generated and to reduce the weight where subsidies enter. On the production side of GNP it was mostly the weight of industry at market prices that was inflated relative to its share in GNP at factor cost; on the end-use side of GNP, it was personal consumption that was bloated by turnover taxes and gross investment that was trimmed by the incidence of subsidies. This of course is a vast over-

simplification, for even within the major industrial sectors and within the main final uses of GNP there are irregular deviations from factor cost caused by the distorting elements within market prices.[8]

Our procedure as regards the adjustment of end uses of GNP at market prices to values at factor cost was to subtract the incident turnover taxes and accounting profits and to add the subsidies to the various final use categories to arrive at an adjusted base, representing essentially labor cost plus depreciation. The total of the turnover tax plus accounting profits less subsidies, comprising roughly net returns to nonlabor factors of production, was then reallocated to those end uses where it was judged such returns ought to be reflected; uses representing purely labor services did not share in the reallocation. Thus the GNP total was reconstituted, and its new structure reflects the approximate factor costs of the uses. This new composition of the GNP provided weights for combining indexes of major end uses of GNP into the aggregate GNP index from the end-use side.

The indexes of major final uses—personal consumption, government consumption, and gross investment—are described in our publications.[9] In brief, our personal consumption indexes were constructed by a three-stage aggregation of representative sample series of consumer goods and services. In the first stage prices were used to aggregate related commodities into group indexes. Next these lowest level group indexes were aggregated into major categories of personal consumption by the use of weights based on household expenditures in the selected base year. Finally the major categories were combined into the overall personal consumption index by weights also drawn from household expenditures in the base year. Our gross investment indexes typically include as components construction (the same indexes by sector of origin), machinery and equipment, and agricultural investment in kind; these were combined by approximate factor cost weights. The government indexes for the most part are the same as for the sectors of origin (essentially, weighted employment series), but they were assigned end-use weights reflecting government purchases of goods and services.

Table 6 presents our summary results for GNP growth by end uses for Czechoslovakia, Hungary, and Poland. There are some differences between the rates of growth for GNP shown here and the GNP rates based on the aggregation of indexes of sectors of origin of product shown in Tables 1 and 5. Such differences could be expected, given the problems of weighting that are involved, and on the whole there is reasonable agreement between the tables. We consider our GNP indexes, based on the aggregation of indexes of sectors of origin of product, the more reliable of the two approaches; this is in accord with our opinion that the official production statistics are more reliable than the official summary measures of personal consumption and other uses of the national income.

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[8] See our monographs cited in note 3, p. 44, for more detailed discussion of our adjustments of market price GNP to factor cost.

[9] Thad P. Alton, ed., *Occasional Papers of the Research Project on National Income in East Central Europe;* authors and titles of individual numbers are listed at the end of this paper. Some supporting material for our indexes will appear in future *Occasional Papers;* they exist in manuscript now at the Project.

TABLE 6.—GNP BY END-USE CATEGORIES, INDEXES AND GROWTH RATES, SELECTED YEARS AND PERIODS 1950–67

	Indexes [1955 = 100]					Average annual percentage increase				
	1950	1955	1960	1965	1967	1950–55	1955–60	1960–67	1950–67	1965–67
Czechoslovakia:										
Personal consumption	94.9	100.0	118.6	128.1	135.7	1.1	3.5	1.9	2.1	2.9
Government consumption	85.2	100.0	102.4	116.0	121.7	3.3	.5	2.5	2.1	2.4
Gross investment	76.9	100.0	160.3	169.1	181.6	5.4	9.9	1.8	5.2	3.6
Total GNP	87.1	100.0	129.8	139.9	148.7	2.8	5.3	2.0	3.2	3.1
Hungary:										
Personal consumption	87.7	100.0	124.0	144.0	156.2	2.7	4.4	3.4	3.4	4.1
Government consumption	67.1	100.0	82.6	108.0	109.4	8.3	−3.9	4.1	2.9	.6
Gross investment	76.0	100.0	109.4	136.0	181.1	5.6	1.8	7.5	5.2	15.4
Total GNP	80.9	100.0	113.4	136.4	158.7	4.3	2.5	4.9	4.0	7.9
Poland:										
Personal consumption	80.0	100.0	123.9	146.9	159.5	4.6	4.4	3.7	4.1	4.2
Government consumption	82.5	100.0	95.0	108.0	113.7	3.9	−1.0	2.6	1.9	2.6
Gross investment	58.9	100.0	134.2	196.1	217.1	11.2	6.1	7.1	8.0	5.2
Total GNP	73.7	100.0	123.1	157.0	171.3	6.3	4.2	4.8	5.1	4.5

Source: See appendix.

For the entire period, 1950–1967, and for most subperiods shown in Table 6 gross investment exhibits the fastest rates of growth. Interestingly enough, the table shows a difference between Hungary and Poland on the one hand, and Czechoslovakia on the other. In the 1955–1960 period the repercussions of the 1956 revolt in Hungary and the 1956 demonstrations in Poland are manifested in a sharp drop in the rate of growth of gross investment (for Poland, from 11.2 percent in 1950–1955, to 6.1 percent in 1955–1960; for Hungary, correspondingly, from 5.7 to 1.8 percent), whereas the Czechoslovak rate nearly doubled (from 5.4 to 9.9 percent in these periods). In the next interval, 1960–1967, the Czechoslovak time of troubles finds reflection in the decline of the rate of growth of gross investment (a fall to 1.8 percent), while Hungary and Poland show substantial gains (to 7.5 and 7.1 percent, respectively).

For Czechoslovakia, personal consumption also dipped (to 1.9 percent), and indeed that country had the distinction in Eastern Europe of a forthright decline of the GNP in 1963. (See Table 1.)[10] The surge in the rate of gross investment in Hungary in 1965–1967 is striking.

In Table 7 are shown official indexes of national income consumed in selected countries of Eastern Europe. These indexes are not comparable with our measures on several counts, the foremost being the difference in boundaries of the aggregate concept: GNP includes services that are excluded in the net material product version of national income, and GNP is grosser also because depreciation is not excluded. One could expect that the slow growing services would mean slower growth of GNP and of personal and government consumption, and indeed Tables 6 and 7 bear this out. Still, despite reasons for noncomparability, there is enough overlap of the concepts for them to display similar trends. For example, the sharp increase in gross investment in Hungary in the period 1965–1967 (33 percent;

[10] The Czechoslovak official index of "national income produced" shows stagnation from 1960 to 1965, with a dip in 1963; see Czechoslovakia, Státní statistický úřad, *Statistická ročenka 1967*, p. 25.

Table 6) is paralleled by a corresponding increase in net investment (46 percent; see Table 7). The implications of the different growth rates of final uses for the structure of aggregate economic activity will be considered in Section IV. One can anticipate the rather obvious outcome, that faster rates of growth mean increasingly larger shares in the total for the corresponding sector.

TABLE 7.—OFFICIAL INDEXES OF NATIONAL INCOME (NET MATERIAL PRODUCT) BY FINAL USES, SELECTED YEARS 1950–67

[In comparable prices, 1955=100]

	1950 [1]	1955 [2]	1960	1965	1967
Bulgaria:					
National income	79	100	163	229	289
Personal consumption	71	100	137	187	217
Collective consumption	66	100	150	228	267
Net investment	132	100	312	464	701
Czechoslovakia:					
National income	69	100	140	156	180
Personal consumption	82	100	137	158	174
Collective consumption	56	100	117	150	177
Net investment	28	100	190	152	208
East Germany:					
National income		100	147	173	189
Personal consumption		100	139	156	169
Collective consumption		100	128	161	179
Net investment		100	215	299	339
Hungary:					
National income	76	100	134	167	195
Personal consumption	80	100	136	165	182
Collective consumption	78	100	131	160	177
Net investment	72	100	181	209	306
Poland:					
National income	66	100	139	185	208
Consumption from personal incomes	68	100	135	170	188
Collective consumption	61	100	150	225	269
Net investment:	61	100	148	221	252

[1] 1952 for Bulgaria.
[2] 1956 for Bulgaria.

Source: See appendix.

IV. Changes in Structure of Economic Activity

In Tables 8 through 12 we show the changing structure of aggregate economic activity in terms of the composition of GNP and the material product version of national income, by industrial sector of origin and by final uses of product, and also in terms of the distribution of employment. Let us first examine the industrial composition of the aggregate product.

Our figures in Table 8 are based on our independent estimates of the composition of GNP at factor cost in a selected base year for each of the countries. This structure was moved by indexes of gross value added by the contributing industrial sectors and summed for the benchmark years of Table 8. The percentage composition of GNP with respect to these sums is shown in Table 8. In Table 9 are shown the official country figures for the industrial composition of the national income (net material production). The differences in shares of industrial sectors as between Tables 8 and 9 reflect primarily the market price deformation (Table 9) of structure away from what it would be at factor cost (Table 8), but to a lesser degree they also reflect the different production boundaries of GNP and the net material product version of national income. Services omitted in the latter but included in the former lower the shares of all sectors of GNP from what they would be in some truncated version of GNP.

TABLE 8.—COMPOSITION OF GROSS NATIONAL PRODUCT BY INDUSTRIAL ORIGIN, SELECTED YEARS, PREWAR TO 1967 (AT FACTOR COST, CONSTANT PRICES)

	Prewar[1]	1950	1955	1960	1965	1967
Bulgaria:						
Industry and handicraft	9.5	18.1	22.6	30.8	38.7	42.7
Agriculture and forestry	55.1	39.4	35.9	28.1	20.2	15.6
Construction	3.0	5.6	6.1	7.8	8.8	9.3
Transport and communications	2.5	5.9	6.4	8.1	9.5	10.4
Trade	6.9	4.8	5.7	6.9	6.9	7.2
Housing	14.4	15.3	12.2	10.0	8.5	7.8
Government and other services	8.6	10.9	11.1	8.3	7.5	7.0
Total GNP	100.0	100.0	100.0	100.0	100.0	100.0
Czechoslovakia:						
Industry and handicraft	30.6	34.8	36.1	41.5	44.2	45.0
Agriculture and forestry	28.9	23.9	20.0	15.7	11.7	12.4
Construction	7.5	6.7	8.0	8.7	7.7	7.7
Transport and communications	4.4	7.3	10.0	11.9	13.6	12.8
Trade, banking and insurance	7.4	7.1	7.3	7.4	7.7	7.7
Housing	11.6	10.0	8.5	6.5	6.1	5.7
Government and other services	9.6	10.2	10.1	8.3	9.0	8.8
Total GNP	100.0	100.0	100.0	100.0	100.0	100.0
East Germany:						
Industry and handicraft		36.8	44.7	48.7	51.0	50.8
Agriculture and forestry		11.3	10.3	9.4	8.5	8.7
Construction		4.7	5.0	6.4	7.2	7.8
Transport and communications		10.4	10.4	9.7	9.5	9.2
Trade		7.3	8.8	9.0	8.3	8.5
Housing		9.8	6.7	5.5	5.2	4.9
Government and other services		19.7	14.1	11.3	10.3	9.9
Total GNP		100.0	100.0	100.0	100.0	100.0
Hungary:						
Industry and handicraft	20.7	25.3	29.6	32.0	36.2	36.0
Agriculture and forestry	37.3	29.7	27.2	22.5	19.5	20.6
Construction	4.3	6.2	6.0	7.4	7.3	7.1
Transport and communications	5.0	9.5	11.4	13.4	13.5	13.2
Trade	6.7	6.2	6.0	7.3	7.7	8.1
Housing	11.6	12.0	9.4	8.4	7.4	6.9
Government and other services	14.4	11.1	10.4	9.1	8.5	8.1
Total GNP	100.0	100.0	100.0	100.0	100.0	100.0
Poland:						
Industry and handicraft	18.9	22.0	27.6	32.0	35.7	36.0
Agriculture and forestry	36.6	36.9	31.2	28.4	24.9	24.2
Construction	4.0	4.5	6.1	6.3	6.1	6.2
Transport and communications	3.4	5.7	6.8	6.9	7.7	8.7
Trade	12.3	6.2	5.7	6.6	6.9	7.1
Housing	11.7	12.9	11.1	10.3	9.3	8.9
Government and other services	13.1	11.8	11.5	9.4	9.4	8.9
Total GNP	100.0	100.0	100.0	100.0	100.0	100.0
Rumania:						
Industry and handicraft		19.2	19.5	24.4	30.4	32.9
Agriculture and forestry		31.3	36.3	31.8	24.2	22.0
Construction		4.1	3.6	7.6	10.2	11.1
Transport and communications		6.6	8.1	7.6	8.4	8.8
Trade		7.4	7.8	6.5	5.9	5.4
Housing		13.8	10.1	9.2	7.8	7.0
Government and other services		17.7	14.7	12.9	13.2	12.8
Total GNP		100.0	100.0	100.0	100.0	100.0
Yugoslavia:						
Industry and handicraft		22.7	25.8	31.2	38.2	37.2
Agriculture and forestry		27.6	30.3	26.5	20.5	22.6
Construction		5.9	4.3	4.0	3.6	3.4
Transport and communications		8.6	7.7	9.0	9.8	10.2
Trade		5.2	5.9	7.3	7.8	7.9
Housing		12.2	10.4	8.1	7.7	7.7
Government and other services		17.8	15.6	13.9	12.4	11.0
Total GNP		100.0	100.0	100.0	100.0	100.0

[1] Czechoslovakia and Poland: 1937; Hungary: 1938; Bulgaria: 1939.

Sources: See appendix.

TABLE 9.—COMPOSITION OF NATIONAL INCOME (NET MATERIAL PRODUCT) BY INDUSTRIAL ORIGIN, SELECTED YEARS, 1950–67

	Total	Industry	Agriculture and forestry	Construction	Transport and communication	Trade	Other
Bulgaria:							
1955 [1]	100	34	30	8	5	20	3
1960 [1]	100	46	32	7	4	9	2
1965 [1]	100	45	34	7	4	8	2
1967 [1]	100	46	31	8	5	8	2
Czechoslovakia:							
1950 [1]	100	61	17	9	3	9	1
1960 [1]	100	62	16	11	4	7	1
1960 [2 3]	100	63	14	11	4	8	1
1965 [1]	100	65	13	9	3	8	1
1965 [2 3]	100	69	10	10	4	6	1
1966 [2 3]	100	68	10	11	4	6	1
1966 [4]	100	62	13	12	4	8	1
1967 [4]	100	61	12	12	5	9	1
East Germany:							
1950 [1]	100	56	12	5	6	19	1
1955 [1]	100	61	10	6	6	17	1
1965 [1]	100	64	12	5	5	13	1
1967 [1]	100	60	13	8	5	13	1
Hungary: [5]							
1960 [2]	100	58	22	12	4	8	−3
1965 [2]	100	67	16	11	5	7	−6
1967 [2]	100	68	15	11	4	7	−6
1967 [1]	100	57	21	11	5	9	−1
Poland: [6]							
1950 [2]	100	38	[7] 41	8	([8])	([8])	([8])
1955 [2]	100	45	[7] 29	9	([8])	([8])	([8])
1960 [2]	100	48	26	9	6	9	2
1965 [2]	100	53	21	9	6	9	2
1967 [2]	100	54	19	10	6	8	2
Rumania: [9]							
1938 [1]	100	31	39	4	6	15	5
1950 [1]	100	44	28	6	4	12	6
1955 [1]	100	40	38	6	4	9	4
1960 [1]	100	44	33	9	4	6	4
1965 [1]	100	49	29	8	4	7	3
1967 [1]	100	52	29	8	4	5	2
Yugoslavia: [10]							
1950 [2]	100	34	32	11	7	10	6
1955 [2]	100	36	34	7	6	10	7
1960 [2]	100	43	27	6	7	11	6
1964 [2]	100	48	22	7	6	12	5
1966 [2]	100	49	21	7	6	12	5

[1] Current prices.
[2] Constant or comparable prices.
[3] Prices of Apr. 24, 1960.
[4] Prices of Jan. 1, 1967.
[5] The Hungarian national accounts show a large loss of foreign trade price equalization. I have shown this under "Other" as a negative percentage of national income. The entry that normally would have appeared there has been lumped with domestic trade, and their sum appears under "Trade." Actually the foreign trade "value added" figure under "Other" comprises value added in the conventional sense as well as the accounting outcome of price equalization. The differences between the breakdown in 1967 current and constant prices appear to be due in part to the exclusion of turnover tax from industry and "Other" in the current price shares (see Statisztikai évkönyv, 1965, p. 38).
[6] "Domestic national income" in 1961 prices.
[7] Excludes forestry.
[8] Not available.
[9] Forestry comprises only silviculture, i.e., it excludes timber cutting.
[10] 1960 prices; "Other" includes handicraft.

Sources: See appendix.

In Table 8 all of the countries appear much less industrialized than Table 9 might suggest. Indeed, except for the trends it suggests, Table 9 conveys a misleading impression, and very substantial adjustments would be necessary to restore the picture to some approximation of relative sizes at resource cost. Perhaps one further caution with respect to Table 9 is in order: various price vintages are represented there, and the composition of the aggregate is not invariant under different price regimens. An illustration of this is provided in the

tabulation for Czechoslovakia. In 1965, in 1965 current prices the share of industry was 65 percent, but at 1960 prices it was 69. Another single year comparison for Czechoslovakia appears in Table 9 for 1966: The shift from 1960 to 1967 prices dropped the share of industry from 68 to 62 percent. Given the turnover-tax inflated nature of the percentages for industry in Table 9 and also the different price regimens that intervene, further discussion of the composition of economic activity based on that table would require detailed analysis and adjustments of the given data.

Table 8 is much closer to the reality of resource costs, but index number problems creep into all temporal and international comparisons, and allowance should be made for them here as well. According to Table 8, East Germany and Czechoslovakia in 1967 rank at the top as regards the share of industry in the GNP, both having around one-half of the aggregate product arising in that sector. Rumania is at the bottom with about one-third of the product originating in industry, and the other countries come in between.

Agriculture has the lowest share in 1967 in East Germany (less than 10 percent); in Poland it has the highest share (about one-fourth); for the rest of the countries it falls in between. Bulgaria has a surprisingly low figure (15.6 percent), which no doubt reflects the use of prewar prices for the valuation of total production, output, and, particularly, production expenses (fertilizers, fuel, spare parts, etc., i.e., purchases from other sectors). Prices paid by farmers for inputs purchased in the prewar period were relatively high in comparison with prices received by farmers. In the postwar period the steep rise in the use of fertilizers and the rising expenses connected with the mechanization of agriculture would be augmented by the price factor and would accordingly affect the value added residual in output.

We have indicated above that the Bulgarian index of value added in agriculture was calculated in prewar prices, which would imply a slower growth for this index and a lower share for agriculture in GNP, particularly for the 1959–1967 period, than would follow from a calculation in postwar prices where output is more favorably valued in relation to purchased inputs. Here we can only speculate on the possible outcome of such a recalculation, having in mind results for other countries in both prewar and postwar prices and taking into account the ratios of indexes of agricultural output to those of gross value added in five other countries. These considerations suggest that use of more recent prices might result in a percentage share in GNP for Bulgarian agriculture and forestry in 1967 around the low twenties, with the consequence that the percentage share for industry and handicraft would be around the upper thirties (*cf.* Table 8).

Table 8 shows also the changing composition of GNP over time. The striking rise of the share of industry in the postwar period should be read in connection with the fall in that of agriculture. Construction and transportation also have risen in most of the countries. Government and other services generally have declined, while trade shows relative stability.

The shares of housing are worth a special remark. They depend on its

weight and on the index (housing space). The weight reflects primarily the heavy capitalization of the sector vis-à-vis other sectors; labor costs were relatively insignificant in housing's total weight. In determining the returns to capital, I allowed a uniform rate to all sectors (see above, section II). Although this may raise some questions in the light of different sectoral rates of return to capital in various countries, housing often having a lower rate, for a largely socialized economy a uniform rate may have merit. At the outset of the postwar period the share of housing may possibly suggest some affront to plausibility, but by 1967 the sector's share seems to have become unexceptional.

One may note also in Table 8 a leveling off of the share of industry in the most recent period. This is to be expected eventually as the service sectors begin to reassert themselves. Agriculture still has in most of the countries a large pool of labor that awaits other employment opportunities, and its share no doubt will continue to fall.

One further aspect of the structure of production should be examined here; namely, the distribution of the total labor force or employment. Table 10 showing the industrial composition of employment does not pretend to precision as regards comparability among sectors or among countries, but rather seeks to convey an impression of the major shifts in employment within a given country. Nonetheless, as among countries the figures should be broadly comparable, with one significant exception, that of agriculture in Poland. Here the basic data are in terms of full-man equivalents engaged in agriculture, whereas in other countries the data on agriculture refer to the "economically active population" without an attempt to put them on a commensurate, full man-equivalent basis. The Czechoslovak data on agricultural employment exclude women who are mostly housewives and children who are students; for other countries the data may be somewhat grosser.

The changes in the industrial composition of employment in the national economies in the postwar period, as shown in Table 10, in general confirm the impressions of growth and structural changes given in Tables 8 and 5. In the case of Bulgarian industry, the 2.4-fold increase in the GNP share from 1950 to 1967 is reflected in the corresponding 3.6-fold increase, 1948–1967, of the employment share. For Rumania the respective shares grow at roughly an equal rate, an increase of about two thirds from 1950 to 1967. For Yugoslavia the employment share increase (111 percent) exceeds the GNP share increase (64 percent). For Czechoslovakia the corresponding ratios for industry's shares, 1950–1967, in GNP and in total employment are 29 and 36 percent, respectively; and so on. Similar comparisons of GNP shares versus shares in total employment can be made for agriculture and other sectors. The differences of ratios of shares in GNP to shares in total employment have a bearing on comparisons of labor productivity as between sectors, but this will be approached directly on the basis of our data on GNP in constant prices and data on employment, keeping in mind the context of prices in which various measures were constructed and which would have implications for the values that emerge.

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TABLE 10.—STRUCTURE OF EMPLOYMENT BY INDUSTRIAL SECTOR, SELECTED YEARS, 1948–67

[In percentages of total]

	1948	1956	1960	1965	1967
Bulgaria:					
Industry	7.9	12.9	21.9	26.3	28.2
Agriculture and forestry	82.1	70.5	55.5	45.3	41.8
Construction	2.0	3.3	5.2	7.0	7.5
Transport and communications	1.5	3.0	4.1	5.1	5.3
Trade	2.2	3.0	4.0	5.2	5.4
Other	4.3	7.3	9.3	11.1	11.8
Total	100.0	100.0	100.0	100.0	100.0

	1950	1955	1960	1965	1967
Czechoslovakia:					
Industry	27.9	31.0	36.1	37.8	38.0
Agriculture and forestry	36.9	32.2	24.8	20.2	19.1
Construction	6.0	6.4	7.9	7.7	8.0
Transport and communications	4.9	5.4	5.8	6.2	6.2
Trade	8.0	7.6	7.6	8.2	8.0
Other	16.3	17.2	17.8	19.9	20.7
Total	100.0	100.0	100.0	100.0	100.0

	1952	1955	1960	1965	1967
East Germany:					
Industry and handicraft	39.7	40.0	41.6	40.9	41.1
Agriculture and forestry	22.9	22.6	17.6	16.3	15.6
Construction	5.8	5.5	5.9	5.8	5.8
Transport and communications	7.0	6.9	6.7	7.2	7.1
Trade	10.7	11.0	11.5	11.6	11.5
Other	13.8	14.0	16.6	18.3	18.9
Total	100.0	100.0	100.0	100.0	100.0

	1950	1955	1960	1965	1967
Hungary:					
Industry and handicarft	19.7	26.2	29.4	32.8	33.6
Agriculture and forestry	49.8	42.9	38.8	31.2	30.0
Construction	5.3	4.9	5.6	6.0	6.3
Transport and communications	4.2	5.1	6.0	6.4	6.3
Trade	4.8	5.7	6.2	7.1	7.2
Other	16.2	15.2	14.0	16.5	16.6
Total	100.0	100.0	100.0	100.0	100.0
Poland:					
Industry and handicraft	20.7	24.0	25.4	26.6	27.3
Agriculture and forestry	53.5	47.4	44.4	41.6	39.9
Construction	5.1	6.4	6.6	6.6	6.9
Transport and communications	4.7	5.0	5.8	6.0	6.1
Trade and catering	6.0	5.9	6.1	6.0	5.9
Other	10.0	11.2	11.7	13.2	14.0
Total	100.0	100.0	100.0	100.0	100.0
Rumania:					
Industry	12.0	13.1	15.1	19.2	20.0
Agriculture and forestry	74.3	69.7	65.6	56.7	53.8
Construction	2.2	4.3	4.9	6.3	7.1
Transport and communications	2.2	2.7	2.8	3.7	4.0
Trade	2.5	3.3	3.4	4.0	4.2
Other	6.8	6.9	8.2	10.1	10.9
Total	100.0	100.0	100.0	100.0	100.0

TABLE 10.—STRUCTURE OF EMPLOYMENT BY INDUSTRIAL SECTOR, SELECTED YEARS, 1948–67—Continued

[In percentages of total]

	1952	1955	1960	1965	1967
Yugoslavia:					
Industry and industrial handicrafts	9.3	12.1	15.8	19.3	19.6
Agriculture and forestry	78.3	73.0	65.0	57.7	56.7
Construction and crafts	3.2	4.4	5.1	5.5	5.4
Transport and communications	2.0	2.1	2.6	3.3	3.3
Trade and catering	2.3	2.7	3.3	4.5	4.9
Other	4.9	5.7	8.1	9.7	10.0
Total	100.0	100.0	100.0	100.0	100.0

Sources: See appendix.

Some insight into the distribution of the GNP among final uses is provided in Table 11; Table 12 similarly allocates the material product version of national income to final uses. The declining trend in the share of personal and government consumption shares is particularly noteworthy; the share of investment of course rose *pari passu*. In GNP shares, gross investment in constant prices rose over the 1950–1967 period from a low of 25 percent (Poland) to around 40 percent for the three countries shown in Table 11. In material product national income terms the share of net investment in "comparable prices" rose from 24 to 34 percent in Bulgaria, the highest level for the five countries shown in Table 12, while for East Germany the percentages were much smaller. Personal consumption shares in this table are very considerably inflated by the turnover tax, and thus they are faulty guides to the "true" shares in the national income, at least in the sense of resource costs. The trends in constant prices do have some significance, while the values in assorted prices for Czechoslovakia afford an interesting example of what prices can do to the shares of major categories. The data for Hungary shown in Table 11 under personal and collective consumption apparently reflect an abrupt shift for 1960 and later years of the material product component in services for the population from collective to personal consumption.

TABLE 11.—STRUCTURE OF GNP BY END USES, 1950–67

[Percent of total in constant prices]

	Personal consumption	Government consumption	Gross investment	Total GNP
Czechoslovakia:				
1950	52.7	17.4	29.9	100
1955	48.4	17.8	33.9	100
1960	44.2	14.0	41.8	100
1965	44.3	14.8	40.9	100
1967	44.1	14.6	41.3	100
Hungary:				
1950	55.8	11.1	33.1	100
1955	51.4	13.4	35.2	100
1960	56.3	9.7	34.0	100
1965	54.3	10.6	35.1	100
1967	50.6	9.2	40.2	100
Poland:				
1950	59.6	15.3	25.1	100
1955	55.0	13.6	31.4	100
1960	55.3	10.5	34.2	100
1965	51.4	9.4	39.2	100
1967	51.2	9.1	39.7	100

Sources: See appendix.

TABLE 12.—COMPOSITION OF NATIONAL INCOME (MATERIAL PRODUCT) BY FINAL USES, OFFICIAL DATA, SELECTED YEARS, 1950–67

[Percentage shares]

	Net investment	Personal consumption	Collective consumption	National income
Bulgaria (in "comparable" prices):				
1952	23.8	70.3	5.9	100
1956	14.3	78.6	7.1	100
1960	27.5	66.0	6.5	100
1965	28.3	65.0	6.7	100
1967	33.9	59.9	6.2	100
Czechoslovakia (A: current prices; B: April 1960 prices; C: Jan. 1, 1967, prices):				
1950 A	16.9	67.6	15.5	100
1955 A	19.5	61.7	18.8	100
1960 A	17.6	64.6	17.8	100
1965 A	9.1	70.2	20.7	100
1965 B	13.5	66.4	20.1	100
1966 B	15.8	64.7	19.5	100
1966 C	21.1	60.3	18.5	100
1967 C	21.5	59.0	19.5	100
East Germany (in "comparable" prices):				
1955	11.7	80.5	7.8	100
1960	17.1	76.1	6.8	100
1965	20.2	72.5	7.3	100
1867 preliminary	21.0	71.7	7.3	100
Hungary (1950 at 1949 constant prices; 1955 at 1954 constant prices; 1960–67 at "comparable" prices) [1]:				
1950	26.8	58.1	13.0	100
1955	19.5	68.9	9.6	100
1960	25.6	73.4	3.5	100
1965	23.7	71.6	3.7	100
1967	29.7	67.7	3.3	100
Poland (in 1961 prices):				
1950	21	72	7	100
1955	23	70	7	100
1960	24	68	8	100
1965	27	64	9	100
1967	27	63	10	100

[1] In order to add up to 100, the indicated components must be augmented by small positive or negative percentages representing foreign "transfers, war reparation payments, and surplus or deficit in foreign trade" (see Hungary, Központi statisztikai hivatal, *Statisztikai évkönyv, 1949–55*, p. 39, and *ibid.*, 1967, p. 38). The surplus or deficit in this context refers to the equivalent in domestic forints of only that part of foreign trade that was not balanced in foreign exchange forints; it does not include the result in domestic forints of foreign trade price equalization on the part of trade that was balanced in foreign exchange forints. See Thad P. Alton and Associates, *Hungarian National Income and Product in 1955*, New York, Columbia University Press, 1963, pp. 53–54, 58, 61–62, 184–186 for some detail on foreign trade accounting in 1955.

Sources: See appendix.

V. Labor and Capital Productivity

Estimates of trends in labor productivity on the level of the entire economy, by the simple fact of aggregation, tend to hide the more interesting details on productivity by industrial sectors and by lower, more homogeneous groupings of activity. Estimates have been made by my associates [11] separately for agriculture and industry and the inquiry will be broadened.

In the present discussion the term "employment" and "labor force" are used rather loosely and interchangeably. For many of the countries the distinction simply was not made in the official statistics, and the prevailing ideology held that there was no unemployment. The

[11] Gregor Lazarcik and Laszlo Czirjak in their contributions to the present volume (pp. 463 and 434, respectively).

official data supporting Table 13 are described poorly or not at all in the summary official sources, and we did not pursue more refinement in view of the rough measures we had in mind for the present. For Czechoslovakia and Hungary the indexes are based on employment data by industrial sectors combined by estimated returns to labor as weights.

TABLE 13.—INDEXES OF LABOR INPUTS, SELECTED YEARS, 1950–1967 (1955=100)

	Bulgaria	Czecho-slovakia	East Germany	Hungary	Poland	Rumania	Yugoslavia
1950		91.9	[2] 89.2	89.2	89.4	89.3	101.9
1955	[1] 100.0	100.0	100.0	100.0	100.0	100.0	100.0
1960		106.4	100.2	105.8	106.5	101.8	103.4
1965	102.8	115.9	99.4	109.9	118.2	103.6	106.5
1967		120.3	99.9	112.6	124.7	105.4	102.8

[1] 1956.
[2] Estimated.

Sources: See appendix.

The data in Table 13 show practically no change in total employment in East Germany since 1955, modest increases for Bulgaria, Rumania, and Yugoslavia, and more substantial growth for the remaining countries. East Germany had been losing manpower through escapes from the country up until recently, but the relatively static labor force in Bulgaria, Rumania, and Yugoslavia at first sight appears surprising. The trend in the totals of course should not obscure the massive shifts from agriculture to other sectors in the postwar period (See Table 10.). In the countries that still have relatively high shares of the total labor force in agriculture the pressure to force women and others into employment should not be so compelling as in a country, like Czechoslovakia, where the surplus labor in agriculture had been greatly reduced. We may also have in our data for the countries where the labor force has not increased substantially some reflection of increased years of schooling. We have not pursued the matter, however, and the data as given in the official statistical sources were used without significant adjustment to derive our rough indexes of labor productivity. (We have already noted above that the employment in Polish agriculture in our data is in full man-equivalents, and that for the other countries agricultural employment corresponds to the definition of "economically active population.") Ideally one would want to explore labor productivity in terms of man-hours or full-year equivalents of labor across all sectors, but we shall have to settle for less at this time.

The indexes of labor productivity shown in Table 14 are the outcome of dividing the GNP indexes by the labor input indexes. As such they reflect the entire configuration of growth of various components of the labor force by assorted levels of training, the shifts of employment among industrial sectors, the increased amount and sectoral distribution of capital, and such intangibles as organization, management, and levels of technology.

TABLE 14.—INDEXES OF LABOR PRODUCTIVITY,[1] SELECTED YEARS, 1950–67

[1955=100]

	Bulgaria	Czecho-slovakia	East Germany	Hungary	Poland	Rumania	Yugo-slavia
1950		91.9	79.6	86.1	89.4	78.9	79.5
1955	[2] 100.0	100.0	100.0	100.0	100.0	100.0	100.0
1960		127.7	127.2	114.2	117.5	121.9	136.9
1965	190.5	131.6	146.5	135.0	131.7	160.2	175.9
1967		140.0	155.8	146.4	139.1	181.5	195.3

[1] GNP indexes divided by labor input indexes.
[2] 1956.

Sources: See appendix.

Table 15 presents the rates of growth of GNP, employment, and labor productivity for the 1950–1967 period. In comparison with the rates experienced for the entire period, the growth of labor productivity in the 1950–1955 subperiod was lower for all countries except East Germany. This was a period of rapid growth, and the lower rates may possibly reflect the quality of the new additions to the industrial labor force. In the 1955–1960 subperiod the results for the rates of increase of labor productivity were above the longer period average, except for Hungary and Rumania. There was some slowing down in the 1960–1967 period, with an upturn in the last two years, but the picture is a mixed one. On the whole there was considerable stability in the rate of growth of labor productivity in each country for which this rate was calculated, except Czechoslovakia. For the latter there were below average results in 1950–1955 and 1960–1967.

TABLE 15.—RATES OF GROWTH OF OUTPUT, EMPLOYMENT, AND LABOR PRODUCTIVITY, SELECTED PERIODS, 1950–67

[Compound annual rates in percent]

	Bulgaria	Czecho-slovakia	East Germany	Hungary	Poland	Rumania	Yugo-slavia
1950–55:							
GNP	6.1	3.4	7.0	5.4	4.6	7.2	4.3
Employment		1.7	2.3	2.3	2.3	2.3	−.4
Labor productivity		1.7	4.7	3.0	2.3	4.8	4.7
1955–60:							
GNP	7.3	6.3	5.0	3.9	4.6	4.4	7.2
Employment		1.2	.0	1.1	1.3	.4	.7
Labor productivity		5.0	4.9	2.7	3.3	4.0	6.5
1960–67:							
GNP	6.8	3.1	2.9	4.5	4.8	6.4	5.1
Employment	[1] .3	1.8	.0	.9	2.3	.5	−.1
Labor productivity	[1] 7.4	1.3	2.9	3.6	2.4	5.9	5.2
1950–67:							
GNP	6.8	4.1	4.7	4.6	4.7	6.0	5.5
Employment		1.6	.7	1.4	2.0	1.0	.1
Labor productivity		2.5	4.0	3.2	2.6	5.0	5.4
1965–67:							
GNP	7.3	5.1	3.4	5.4	5.5	7.3	3.5
Employment		1.9	.2	1.2	2.7	.8	−1.8
Labor productivity		3.2	3.1	4.1	2.8	6.4	5.4

[1] 1956–65.

Sources: See appendix.

Our results on the rates of growth of labor productivity can be shown in relation to rates realized in countries outside Eastern Europe (see Table 16). The data shown in the table can be readily supple-

mented for subperiods from Table 15 for Eastern Europe, and from other sources for the other countries in order to cover the more recent years. The performance of Eastern Europe on the score of labor productivity rates of increase has on the whole been below that of the indicated non-communist countries, considering the level of development; only Rumania and Yugoslavia have rates in the 5 percent range, and the others fall below 4.1 percent.

TABLE 16.—*GNP per unit of labor, 1950–67 (compound annual rates in percent)*

Eastern Europe:	
Czechoslovakia	2.5
East Germany	4.0
Hungary	3.2
Poland	2.6
Rumania	5.0
Yugoslavia	5.4
Other countries:	
Japan	6.6
West Germany	4.4
Italy	5.2
Austria	4.1
Finland	4.4

Sources: For Eastern Europe, see Table 15. For other countries, the rates were calculated as weighted averages for the 1950–58 and 1958–67 subperiods, except for Austria. For 1950–58, for Italy, Japan, and West Germany, see Frank O'Brien, *Crisis in World Communism: Marxism in Search of Efficiency,* New York, Committee for Economic Development, 1965, p. 69, and for Finland, see Bernard Mueller, *A Statistical Handbook of the North Atlantic Area,* New York, The Twentieth Century Fund, 1965, p. 75. For 1958–67, for Finland, Italy, Japan, and West Germany, and for 1950–67 for Austria, calculated from GNP in constant 1967 dollars (see U.S. Agency for International Development, Statistics and Reports Division, *Gross National Product, Growth Rates and Trend Data by Region and Country,* Washington, April 1969, pp. 11, 13) and from indexes of employment (see U.N. International Labor Office, *Bulletin of Labor Statistics,* Geneva, 1956–57, p. 69; *ibid.,* 1965, p. 7; and *ibid.,* 1969, p. 7).

Our results for the rates of growth of GNP per unit of capital and per unit of combined labor and capital input are in the process of being completed. Provisional figures for Czechoslovakia show negative annual rates of change of capital productivity on the order of one percent over the 1948–1967 period, and for combined input productivity, a positive annual rate of growth of about 1 percent. For Hungary, the results are similar: around minus 0.5 percent for GNP per unit of capital and a little over plus 1 percent for GNP per unit of combined labor and capital inputs.[12]

For the 1961–1967 period the capital productivity rates of growth became negative, but the significance of this measure should not be judged in isolation from other indicators of efficiency.

Concern over the declining productivity of capital has become increasingly evident in the countries of Eastern Europe. Soviet writers surveying the Comecon countries have also noted the rather sharp declines in recent years and have pointed to the variability of the output-capital ratio in other economies as well, including the United

[12] See Gregor Lazarcik, *Czechoslovak National Income and Product by Sector of Origin and by Final Use, 1937 and 1948–1965,* Occasional Paper No. 26, Research Project on National Income in East Central Europe, and a manuscript on the same topic for Hungary, prepared by Laszlo Czirjak. The average annual rates are calculated by the least squares fit to the formula $I_N = I_0(1+R)^t$. Weights for combining labor and capital inputs are based on our cross-section studies (Alton and associates, *Czechoslovak National Income and Product* . . . and *id., Hungarian National Income and Product.* . . . (See appendix.)

States.[13] Beliaev and Semenova provide ratios of indexes of national income produced to indexes of growth of basic productive capital for the 1961–1965 period, indicating the following decreases in capital productivity: USSR—15 percent, Bulgaria (1961–1964)—24 percent, Hungary—6 percent, and Czechoslovakia—17 percent.[14] Usievich and Shabunina provide similar figures for these countries as well as data for East Germany that show for the latter an increase in the capital productivity index (*koeffitsient fondootdachi*) of about one-third during 1951–1965, but with a decline of 10 percent during 1961–1965.[15] Beliaev and Semenova cite figures for East Germany given at the 11th Plenum of the German Socialist Unity (Communist) Party showing the declining productivity of capital stock over three successive periods (increment in national income in marks per 1000 marks increment in capital stock in each period): 1951–1955, 656; 1956–1960, 333; and 1961–1964, 162.[16] For Hungary they noted that in 1958–1960 a 1 percent increment in national income required a 2.12 percent increment of basic productive capital, but that in 1961–1965, a 1 percent increment in national income necessitated a 3.9 percent increment in capital.

Usievich and Shabunina called attention to the relatively low rates of retirement of capital equipment in the Comecon area—currently some 2 to 3 percent per year in the USSR, 1 to 1½ percent in Hungary (1958–1963), and 2 percent in Czechoslovakia (1958–1963). These rates do not assure timely replacement of old, inefficient equipment, which requires excessive outlays on capital repairs. Similarly Beliaev and Semenova compared the "period of turnover" of productive fixed capital in the USSR and Hungary (25 to 30 years) with that in the United States (12 to 15 years), England (10 to 12 years), West Germany (8 to 10 years). In short, the cost of keeping obsolete equipment in production is being recognized.

The factors affecting economic growth are diverse. Besides the evident role of direct labor and capital inputs, there are questions of the contributions of economies of scale, technology, sectoral shifts of employment, education, specialization in branches of production, and the milieu of the economic system as it affects rationality and efficiency in the use of resources. These, and other factors that could be mentioned, are interrelated in a complex way, and their separate contributions are difficult to disentangle reliably. Some progress through further research can be expected on the role of such factors as returns to increasing scale of production, and education, for example, thus reducing the residual in the rate of growth that is unexplained by the simple consideration of the unrefined inputs of labor and capital. However, given the familiar index number problems and the quality of economic data that are available, detailed refinement of the contributions of the many involved factors would have to be understood within ranges of probable reliability.

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[13] See T. Khachaturov, "Povyshenie effektivnosti kapital'nykh vlozhenii i nauchnye osnovy ee opredeleniia," *Voprosy ekonomiki*, v. 19, no. 2, Feb. 1966, pp. 3–16; M. Usievich and V. Shabunina, "Puti povyshenila effektivnosti obshchestvennogo proizvodstva v stranakh-chlenakh SEV," *Voprosy ekonomiki*, v. 20, no. 11, Nov. 1967, pp. 98–108; Iurii Nikolaevich Beliaev and Liubov' Stefanovna Semenova, *Strany SEV v mirovoi ekonomike*, Moscow, Mezhdunarodnye otnoshenila, 1967, pp. 43–35.

[14] Beliaev-Semenova, *op. cit.*, p. 44.

[15] Usievich-Shabunina, *op. cit.*, p. 101.

[16] Beliaev-Semenova, *loc. cit.*

APPENDIX

NOTES ON SOURCES AND METHODS

The tables that are as based directly on official sources (Tables 2, 7, 9, 10, 12, and 13) generally are drawn from the statistical yearbooks of the respective countries. Sometimes these were augmented by special yearbooks for national income, agriculture, and employment. The principal yearbooks used were as follows:

Bulgaria. Tsentralno statistichesko upravlenie. *Statisticheski godishnik na Narodna Republika Bŭlgariia.* Annual.

Czechoslovakia. Státni statistický úřad. *Statistická ročenka Československé socialistické republiky.* Annual.

Germany (Democratic Republic). Staatliche Zentralverwaltung für Statistik. *Statistisches Jahrbuch der Deutschen Demokratischen Republik.* Annual.

Hungary. Központi statisztikai hivatal. *Statisztikai évkönyv.* Annual.

Poland. Główny urząd statystyezny. *Rocznik statystyczny.* Annual.

———. *Rocznik dochodu narodowego, 1960–1965.* 1966.

———. *Rocznik statystyczny inwestycji i środków trwałych, 1946–1966.*

———. *Rolniczy rocznik statystyczny, 1945–1965.* 1966.

Rumania. Directia centrală de statistică. *Anuarul statistic al Republicii Socialiste România.* Annual.

Yugoslavia. Savezni zavod za statistiku. *Statistički godišnjak SFRJ.*

Tables 1, 3, 5, 6, 8, 11, 14, and 15 are based on work done at the Research Project on National Income in East Central Europe, at Columbia University. Beyond that, Mr. Jerry Crawford provided the indexes for the non-agricultural sectors and weights for the Yugoslav GNP; Mr. David Wiggs provided indexes for all sectors except industry and agriculture for Rumania and East Germany, as well as weights for combining these indexes into the GNP's; the indexes for agriculture in Yugoslavia were provided initially by Dr. Joseph Bombelles and were updated for the two most recent years at the Project; the indexes for Rumanian agriculture and East German agriculture and industry were provided by the Project. Authors' credits will appear on the forthcoming publications of the corresponding *Occasional Papers.* The Yugoslav official index was used for industry. The weights provided by Messrs. Crawford and Wiggs in general followed the methodology we used at the Project. M. C. Kaser's estimates (see *Soviet Studies*, v. 18, no. 1, July 1966, pp. 86–90) were used with some adjustments for Rumania by Wiggs. The weights for housing in Yugoslavia and East Germany are very rough estimates that take into account the shares of housing in the GNP that we used for other countries of Eastern Europe.

The methodology for deriving the weights for aggregation of sectors of origin of product and final uses of product into the GNP's is outlined in the text of the present article and detailed in monographs published by the Columbia University Press and in manuscripts on file at the Project. These manuscripts will be published as *Occasional Papers* in due course. The monographs (with date of publication) and the longer manuscript on Bulgaria are as follows:

Thad P. Alton and Associates, *Czechoslovak National Income and Product in 1947–1948 and 1955–1956* (1962).

——— *Hungarian National Income and Product in 1955* (1963).

——— *Polish National Income and Product in 1954, 1955, and 1956* (1965).

Alexej Wynnyczuk, *Bulgarian National Income and Product in 1956* (MS).

Indexes for sectors of origin of product and for final uses of GNP are published in the *Occasional Papers* (*OP's*) of the Research Project on National Income in East Central Europe or they are awaiting publication as future *OP's.*

A brief indication of the methodology of the sectoral indexes is provided in the text of the article; a complete statement is available in the *OP's.*

The list of *OP's* already published (except Nos. 10 and 21, which have been delayed in publication) is as follows:

OCCASIONAL PAPERS OF THE RESEARCH PROJECT ON NATIONAL INCOME IN EAST CENTRAL EUROPE, COLUMBIA UNIVERSITY

1. Gregor Lazarcik. *Growth of Czechoslovak Trade, Banking and Insurance, 1937–1962.*
2. Vaclav Holesovsky and Gregor Lazarcik. *Trends in Czechoslovak Housing, Government, and Other Services, 1937–1962.*
3. George J. Staller. *Czechoslovak Index of Investment, 1937–1962: Machinery and Equipment.*
4. George J. Staller. *Czechoslovak Index of Construction, 1937–1962.*
5. Maurice C. Ernst. *Indexes of Polish Industrial Production, 1937–1960.*
6. Gregor Lazarcik. *Output of Czechoslovak Forestry, Fishery, and Hunting, Trapping and Game at Constant 1948 Prices, 1936 and 1946–1962.*
7. Gregor Lazarcik. *Czechoslovak Agricultural Output, Expenses, Gross and Net Product and Productivity, 1934–38 and 1946–1962.*
8. Laszlo Czirjak. *Hungary: Index of Transport and Communication Services, 1938–1962.*
9. Gregor Lazarcik. *Output and Value Added in Czechoslovak Transportation and Communications, 1937 and 1946–1962.*
10. Paul Marer and Alexej Wynnyczuk. *Indexes of Rumanian Industrial Production, 1938, 1948, and 1950–1963.*
11. Laszlo Czirjak. *Growth of Hungarian Domestic and Foreign Trade, 1938 and 1946–1965.*
12. Laszlo Czirjak. *Output of Hungarian Forestry, Fishing and Hunting, 1934–38 and 1946–1965.*
13. Laszlo Czirjak. *An Index of Hungarian Construction, 1938 and 1946–65.*
14. Laszlo Czirjak. *Hungarian Agricultural Production and Value Added, 1934–38 and 1946–1965.*
15. George Pall and Leon Smolinski. *Indexes of Hungarian Service Sectors and Financial Institutions, 1938 and 1947–1965.*
16. Laszlo Czirjak. *Indexes of Hungarian Industrial Production, 1938 and 1956–1965.*
17. Laszlo Czirjak. *Hungarian Investment, 1938 and 1949–1965: Trends in Fixed Capital, Inventories, and Net Foreign Investment.*
18. Vaclav Holesovsky and George Pall. *Personal Consumption in Hungary, 1938 and 1947–1965.*
19. Andrzej Korbonski and Claus Wittich. *Index of Polish Transport and Communications, 1937 and 1946–1965.*
20. Gregor Lazarcik. *Comparison of Czechoslovak Agricultural and Non-Agricultural Incomes in Current and Real Terms, 1937 and 1948–1965.*
21. Paul Marer. *Comparison of Hungarian Agricultural and Non-Agricultural Incomes, 1938 and 1949–1962.*
22. Andrzej Korbonski and Claus Wittich. *Index of Polish Construction Materials Consumption, 1937 and 1946–1965.*
23. Andrzej Korbonski and Claus Wittich. *An Index of Polish Trade and Catering, 1937 and 1946–1965.*
24. Gregor Lazarcik and George J. Staller. *A New Index of Czechoslovak Industrial Output, 1937 and 1947–1965.*
25. Vaclav Holesovsky and Gregor Lazarcik. *Czechoslovakia: I. Extension of Growth Indexes to 1965; II. Personal Consumption Index, 1937 and 1948–1965.*
26. Gregor Lazarcik. *Czechoslovak Gross National Product by Sector of Origin and by Final Use, 1937 and 1948–1965.*
27. Gregor Lazarcik and Alexej Wynnyczuk. *Bulgaria: Growth of Industrial Output, 1939 and 1948–1965.*
28. Gregor Lazarcik and Alexej Wynnyczuk. *Bulgaria: Index of Government Services, Trade, Banking and Insurance, and Communal Services, 1939 and 1948–1965.*
29. Andrzej Korbonski and Claus Wittich. *Indexes of Polish Housing, Service, and Government Sectors, 1937 and 1946–1965.*
30. Gregor Lazarcik and Alexej Wynnyczuk. *Bulgaria: Indexes of Construction, Investment, Housing, and Transportation and Communications, 1939 and 1948–1965.*

Weights for the aggregation of sectoral indexes have been described briefly in the text. Here I may add that the year from which they were taken is as follows:

Bulgaria	1956	Poland	1956
Czechoslovakia	1956	Rumania	1960
East Germany	1955	Yugoslavia	1962
Hungary	1955		

Other sources that were consulted include the *Statistical Abstract of the United States*, various years; OECD, *National Accounts of OECD Countries, 1957–1966;* and U.N., *Yearbook of National Accounts Statistics, 1967.*

DEMOGRAPHIC TRENDS IN EASTERN EUROPE

By PAUL F. MYERS*

CONTENTS

I. INTRODUCTION

At the beginning of 1968, the six countries of Eastern Europe discussed here—Bulgaria, Czechoslovakia, East Germany,[1] Hungary, Poland, and Rumania—had an estimated population of 101,699,000, or approximately 22 percent of the total population of Europe. With 266 persons per square mile, population density in this region was 8 percent higher than it was in Southern Europe and 16 percent higher than it was in Northern and Western Europe.

These countries are treated here as a unit, but they are very different from one another in their population history and status, as well as in many other aspects of their society and culture. For example, there is a great diversity among the six countries in the degree of economic development and in the levels of educational attainment among their peoples. The ethnic pattern among the countries is no less diverse, and there are representatives of at least four major linguistic groups—Slavic, Finno-Ugric, Germanic, and Romance. In terms of religion, the Czechoslovak, Hungarian, and Polish populations are basically

*The assistance of Gloria Campbell, Frances Manning, Ozie Jamison, Jr., Arthur Saul, and Godfrey Baldwin of the Foreign Demographic Analysis Division, U.S. Bureau of the Census, in the preparation of this paper is deeply appreciated. This paper was completed in June 1969 and does not take account of information available after that date.

[1] The term "East Germany" will be used in this report to refer to the Soviet Zone of Germany plus the Soviet sector of Berlin.

Roman Catholic, the Bulgars and Rumanians are Eastern Orthodox, and the East Germans are Protestant. The extremes of diversity are exemplified by Bulgaria and East Germay. Bulgaria has had a separate identity for hundreds of years, a historical orientation to the East, and a predominantly backward peasantry; it also retains vestiges of centuries of Turkish occupation. East Germany did not exist as a separate entity until 20 years ago, but the area nonetheless has been historically part of the western world.

The boundaries of the six states have changed appreciably since the onset of World War II. East Germany was carved entirely from the former German Reich. Poland's borders were shifted to the west as a consequence of gaining territory from Germany, while its total area was reduced by some 30,000 square miles through loss of territory to the U.S.S.R. Czechoslovakia lost the 4,900 square miles of the Sub-Carpathian Ruthenia to the U.S.S.R., and Rumania lost not only Northern Bukovina and Bessarabia (19,000 square miles) to the U.S.S.R. but also Southern Dobrudja to Bulgaria. Thus, considering East Germany as a constant unit, the total area of the six countries is now smaller by about 54,000 square miles in which there were some 7.3 million people in 1938.[2]

Changes in these countries did not result only from the transfer of territories and peoples. The population of the region was reduced by 6 million persons as a result of war losses and migratory flights and transfers during World War II. In addition, since the end of the war, social, political, economic, and demographic changes have been extreme. The advent of Communist control in each country has meant the adoption of a Soviet-type economic system, with significant changes in the nation's economic life—the establishment of a planned economy, land reform and collectivization of agriculture, nationalization of industry and commerce, and rapidly increasing industrialization. The populations have been more mobile than ever before, and there has been a tremendous increase in urbanization. Illiteracy has been reduced and educational achievement has been raised. Women are participating in economic activities in unprecedented numbers. Mortality has been reduced sharply and fertility even more.

In short, demographic events in Eastern Europe during the past 30 years have been dramatic. The impact of World War II and the transfers and migrations of peoples throughout the postwar period, as well as the effects that these events have had on the size and composition of the present-day population, will be surveyed. Also, attention will be paid to the distribution of population and the process of urbanization, to the reduction in mortality, and to total population change. The principal emphasis of the report, however, will be on two topics: first, the fall of the birth rate in these countries and the concomitant rise in the abortion rate; and second, population projections for each country and for the region as a whole. The latter topic will touch on the implications for the size of the preschool, primary, and secondary school populations, of the male population of military ages, of the population of working ages, and of the older population.

[2] Czechoslovakia's loss amounted to some 0.7 million persons and Poland's net loss was about 2.8 million persons. Rumania was the heaviest loser with about a half million persons living in the territory ceded to Bulgaria and 3.7 million in territory ceded to the U.S.S.R.

Such demographic factors as marital status, family and household size, literacy, educational attainment, and participation in economic activity will not be treated.

The following data are presented in the appendix tables for each country and for Eastern Europe as a whole: (1) the January 1 and midyear populations, absolute numbers of births, deaths, and natural increase, and the rates per 1,000 population that correspond to these vital events, for the period 1950–90; (2) the distribution of the population by sex and 5-year age groups for 1969 and each fifth year of the period 1970–90; and (3) the numbers in the kindergarten, primary school, secondary school, and working ages, and the numbers of males in the military ages for 1969 and each fifth year of the period 1970–90. No source citations are given in the tables or the text for those figures taken directly or derived from the various official publications of the governments concerned. Also, no methodological statements are given in the tables presenting the projections, which were prepared in April 1969 by the Foreign Demographic Analysis Division, U.S. Bureau of the Census, on the basis of officially reported data and various assumptions which are described in the text. Questions concerning the details of these projections or any other aspect of the report should be directed to the Chief, Foreign Demographic Analysis Division, Bureau of the Census, 24M Annex, U.S. Department of Commerce, Washington, D.C. 20230.

II. Population Change to 1950

Before World War II, the six countries of Eastern Europe were at different stages of demographic development. Czechoslovakia, East Germany, and Hungary were more advanced demographically and resembled the countries to the west more than they resembled their eastern or southern neighbors, Bulgaria, Poland, and Rumania. To the extent that the six countries can be regarded as a demographic region, the transition from high to low birth and death rates occurred later than in northern and western Europe.

Birth rates above 40 per 1,000 population were recorded in both Bulgaria and Rumania up to the beginning of World War I. Birth rates higher than 30 per 1,000 were characteristic of the early years of this century in the other four countries, and rates were still very high in most of the countries until the early 1920's. Data are not available to trace the course of the death rates in all of these countries, but clearly the rates had begun to fall in the late 19th century in some and by World War I in the others. In Germany (data are not available for East Germany), the death rate dropped below 20 per 1,000 in the first years of this century, but it was apparently above 20 elsewhere. In Hungary, for which data are available since 1876, the death rate was relatively constant at above 35 per 1,000 until 1892, and then fell slowly but persistently to below 20 per 1,000 in 1923. In Poland, the rate was 25 in the 1896–1900 period and fell below 20 by 1925.

By 1938, death rates were below 15 per 1,000 in all countries except Rumania (Table 1). Birth rates, although still very high in most of the countries in the early 1920's, fell even more rapidly than the death rate during the years preceding World War II. Thus, between 1920–

24 and 1938, the rate of natural increase had declined by about 20 percent in Poland and Rumania, about 40 percent in Germany and Hungary, 54 percent in Bulgaria, and 66 percent in Czechoslovakia. Natural increase, however, was still almost double that in northern and western Europe.

TABLE 1.—VITAL RATES—REGIONS AND SELECTED COUNTRIES OF EUROPE, 1938 TO 1967
[Births, deaths, and natural increase per 1,000 population; infant mortality per 1,000 live births]

Rate and year	Eastern Europe							Southern Europe [1]	Northern and Western Europe [2]
	Total	Bulgaria	Czecho-slovakia	East Germany	Hungary	Poland	Rumania		
Birth:									
1938	22.5	22.8	16.7	18.0	19.9	24.5	29.5	23.9	16.9
1950	24.4	25.2	23.3	16.5	20.9	30.7	26.2	21.8	17.9
1955	23.2	20.1	20.3	16.4	21.4	29.1	25.6	20.7	16.9
1960	18.8	17.8	15.9	17.2	14.7	22.6	19.1	20.6	17.7
1965	16.0	15.3	16.4	16.5	13.1	17.4	14.6	20.2	17.9
1967	17.7	15.0	15.1	14.8	14.6	16.3	27.4	19.4	17.1
Death:									
1938	14.3	13.7	13.2	11.9	14.2	13.8	19.1	15.9	12.6
1950	11.7	10.2	11.5	11.9	11.4	11.6	12.4	10.5	11.3
1955	10.1	9.0	9.6	12.0	10.0	9.6	9.7	9.6	11.2
1960	9.4	8.1	9.2	13.7	10.2	7.6	8.7	9.4	11.2
1965	9.4	8.2	10.0	13.5	10.7	7.4	8.6	9.3	11.1
1967	9.7	9.0	10.1	13.2	10.7	7.8	9.3	9.2	10.9
Natural increase:									
1938	8.2	9.1	3.5	6.1	5.7	10.7	10.4	8.0	4.3
1950	12.7	15.0	11.8	4.6	9.5	19.1	13.8	11.3	6.6
1955	13.1	11.1	10.7	4.4	11.4	19.5	15.9	11.1	5.7
1960	9.4	9.7	6.7	3.5	4.5	15.0	10.4	11.2	6.5
1965	6.6	7.1	6.4	3.0	2.4	10.0	6.0	10.9	6.8
1967	8.0	6.0	5.0	1.6	3.9	8.5	18.1	10.2	6.2
Infant mortality:									
1938	133	144	110	55	131	140	179	119	59
1950	98	95	78	72	86	111	117	78	44
1955	68	82	34	49	60	82	78	68	34
1960	52	45	24	39	48	55	75	54	27
1965	36	31	25	25	39	41	44	45	21
1967	36	33	23	21	37	.38	47	41	19

[1] Includes Greece, Italy, Malta, Portugal, Spain, and Yugoslavia. Excludes Albania, Andorra, Gibraltar, and San Marino.
[2] Includes all countries west of the U.S.S.R. not included in Southern or Eastern Europe; excludes the Channel Islands the Faeroe Islands, Iceland, Isle of Man, Liechtenstein, Monaco, and Turkey.

The orderly demographic development in Eastern Europe during the 1920's and 1930's was completely disrupted by World War II. The impact of the war on most of the countries was severe. In the area as a whole, the number of deaths was two-and-one-half times as great per capita as in the other European countries involved in the war (not including the U.S.S.R.).[3] Military losses per capita were slightly higher than those for the rest of Europe, but civilian losses, exclusive of Jews, were four times as high, and deaths of Jews were 20 times as high. Frumkin has estimated that within the present boundaries of the six countries there were 1.6 million military deaths, 3.8 million Jews killed, and 2.8 million other civilian deaths directly related to the war. These losses constituted 29 percent of all European military

[3] War losses are from Gregory Frumkin, *Population Changes in Europe Since 1939*, New York, Augustus M. Kelley, 1951. Since data are not given in this source for the present entity of East Germany, it was assumed here that war losses cited for all of Germany were proportional to the population of its various parts. Other materials relating to the war period are from official sources of the countries concerned or are estimates made by the Foreign Demographic Analysis Division, U.S. Bureau of the Census. Some of these have been published in Jerry W. Combs, Jr., "Recent Demographic Changes in Eastern Europe," *in* U.S. Congress. House. Committee on the Judiciary. *Study of Population and Immigration Problems*. (Special series, No. 8). Washington, U.S., G.P.O., 1963.

deaths, 87 percent of all Jewish deaths, and 56 percent of civilian deaths other than of Jews. With 23 percent of the population, Eastern Europe suffered 55 percent of the losses directly attributable to the war.

The estimated 8.2 million deaths which would not have occurred under normal conditions were not the only population losses to the region as a result of the war. Many ethnic minorities, of which Germans constituted the great majority, were forcibly removed. Although millions of expelled Germans settled in East Germany, and thus would be migrants within the region, most of them settled in the Federal Republic of Germany. In 1950, there were 7.4 million German expellees (*Heimatvertriebene*) living in the Federal Republic and West Berlin who, in 1939, lived in what is now Eastern Europe. In addition, there were 1.1 million who lived within the boundaries of present-day East Germany in 1939. Thus, the number of war-related deaths was more than matched by the number of Germans who fled or were expelled from within the present boundaries of the region.

Offsetting these losses were a positive balance of births and normal deaths and gains from movement into the area of millions of persons, particularly from territories ceded to the Soviet Union. Birth rates in Bulgaria, Czechoslovakia, and Hungary were not appreciably affected by the war. The Bulgarian rate hovered around the 1938 level of 22.8 per 1,000 throughout the war—the average rate during the 1940–45 period was 22.4. Average rates for Czechoslovakia (20.6) and Hungary (20.8) were, in fact, considerably higher than they were in the immediate prewar period. The average rate in Rumania was 22.1, or 7 per 1,000 lower than the rate in 1938, and undoubtedly the rates in East Germany and Poland were severely affected. At the same time, the rate reflecting "normal" deaths went up somewhat in each of the four countries for which information is available. The net result was that the average rate of natural increase actually rose in Czechoslovakia, from 3.5 per 1,000 in 1938 to 5.8 during the 1940–45 period, remained at the same level in Bulgaria, dropped slightly, from 5.7 to 3.5 per 1,000 in Hungary, and decreased sharply, from 10.4 to 3.3 in Rumania. Estimates by Frumkin for Germany and Poland, combined with official data for the other four countries, indicate that natural increase within the six countries amounted to about 2.5 million for the 1938–45 period and 3.6 million for the 1946–49 period.

The total populations for the region as a whole and for each of the individual countries, which reflect all of the above components of change, are given in Table 2. The impact of the war varied considerably from one country to another, as is exemplified by the net increases or decreases in population. In *Poland*, the impact was of exceptional magnitude, and the total population decreased by 22 percent during the 1938–50 period. War-related deaths amounted to 18 percent of the prewar population, the highest loss rate of any country involved in the war. This figure may be compared with a 10 percent loss rate experienced by the U.S.S.R. and Yugoslavia, and a 6 percent loss rate for Germany—the other countries which suffered most heavily. According to Frumkin, about 3.2 million Jews were executed and some

2.5 million other civilians died in prison camps and various other war-related actions.[4]

TABLE 2.—ESTIMATED POPULATION—SIX EASTERN EUROPEAN COUNTRIES: 1938, 1945, AND 1950

[In millions as of July 1]

Country	1938	1945	1950
Eastern Europe	94.5	89.0	88.5
Bulgaria	6.7	6.9	7.3
Czechoslovakia	14.5	14.2	12.4
East Germany	16.6	17.9	18.4
Hungary	9.2	9.3	9.3
Poland	31.9	25.0	24.8
Rumania	15.6	15.7	16.3

Population losses by migration were due essentially to the exodus of some 7–8 million Germans from Central Poland or from the former German territories placed under Polish administration in 1945. At the Potsdam Conference, Poland's borders were redrawn and shifted westward by about 125 miles, so that she gained approximately 39,000 square miles of former German territory and lost some 69,000 square miles to the U.S.S.R. The agreements at Potsdam also sanctioned the transfer of the German minority out of the new Poland. Meanwhile, however, the arrival of the Russian army in Poland early in 1945 had resulted in the flight of millions of Germans from areas east of the Oder and Neisse Rivers. This movement continued until February 1946, when organized transfers began. The German population in these territories dropped from an estimated 11.9 million at the end of 1944 to 5.6 million in the summer of 1945—a net loss of over 6 million persons. Large numbers of Germans died during this period in defending strongholds against the Russian army, and in reprisals, but probably 5 million or more had fled by the time Polish authorities assumed control in July 1945. An additional one-half million had moved out by the time the transfer of Germans began on a large scale in February 1946. From then until the end of 1949, when the transfers were terminated, 2,275,000 Germans left present-day Poland.

Agreements made in 1944 and 1945 between the Polish and Soviet Governments also resulted in an exchange of millions of persons, which on balance added substantially to Poland's population. All ethnic Poles and Jews in the U.S.S.R. who had been Polish citizens in September 1939 could opt for Polish citizenship and be transferred to Poland; all ethnic Russians, Ukrainians, Belorussians, and Lithuanians living within the new Polish borders could opt for Soviet citizenship and be transferred to the U.S.S.R. Some 518,000 of the latter group were repatriated to the Soviet Union and 1,950,000 Poles and Jews returned to Poland by the end of 1947. Of this latter number, about 170,000 were Jews, most of whom subsequently emigrated to Israel. In addition, some 1.5 million persons were repatriated to Poland from other European countries by the end of 1949. Most were war refugees or deportees and most came from Germany. A very small

[4] Frumkin, *op. cit.*, p. 122.

minority were persons who had settled outside Poland before the war.

Czechoslovakia also lost population during the 1938–50 period, but most of the net loss of 2.1 million occurred after the war as a result of the mass expulsion of some 3 million Germans. Losses during the war totaled about 405,000 for all war-related deaths, or 3 percent of the 1938 population. Military losses are put at 200,000, Jewish losses at 140,000, and other civilian losses at 65,000.

The Munich Agreement of 1938 which granted the Sudetenland to Germany marked the beginning of a period of territorial change, political upheaval, and large and generally unrecorded population movements which lasted until the late 1940's. The German occupation of the Sudetenland and, in 1939, of the rest of Bohemia and Moravia brought an estimated 800,000 Germans to Czechoslovakia while about one-half million Czechoslovaks, some voluntarily and some under force, went to Germany to work. The reverse movement began in early 1945 when the collapse of Germany was imminent. Many Germans fled before the approaching Russian army and others were expelled. Germans continued to leave, either voluntarily or by force, on a rather small scale until their organized transfer began in January 1946 under the provisions of the Potsdam Agreement. About 2.4 million had been expelled by October 1947 when the transfer was declared complete, although some small flow continued even after that time. The net result of the movement was that of the 3,344,000 Germans resident in the country in 1937, only 165,000 remained in 1950.[5] Other population movements, aside from the repatriation of some 300,000–400,000 Czech nationals, were relatively insignificant in size.

Hungary's population remained almost stationary during the period 1938–50. Losses due to the war amounted to an estimated 378,000 persons, of whom 220,000 were Jews and 134,000 were military personnel. The country also lost 385,000 emigrants, most of whom were Germans, and gained about 232,000 immigrants, mainly from Rumania and Czechoslovakia. These net losses were almost exactly compensated by natural increase during the period.

Bulgaria's population gain from 6.7 million in 1938 to 7.3 million in 1950 was due mainly to natural increase. The country was outside the main theater of operations and, as a consequence, suffered far less from the war than the other five countries. Approximately 20,000 persons died as a direct result of the war; this was a loss rate only one-tenth that for Czechoslovakia or Rumania, which had the next lowest rates among the six countries of Eastern Europe. There were also net migratory losses of about 100,000 persons to Turkey, Israel, and Rumania.

Despite 460,000 war-related deaths and a net loss of about 350,000 persons resulting from population exchanges and other movements, *Rumania's* population registered a slight gain between 1938 and 1950 as a result of natural increase. Deaths due to the war consisted of 300,000 military losses and 160,000 Jews executed. The migratory picture is extremely cloudy, but it appears that the major outward movements were to Hungary, Israel, and the Federal Republic of Germany.

[5] Vladimír Srb, *Demografická Příručka (Demographic Manual)*, Prague, Nakladatelství Svoboda, 1967, p. 44.

These flows were counterbalanced to a small extent by the net gain of population in an exchange with Bulgaria, and as the result of the flight to Rumania of some persons living in areas ceded to the U.S.S.R.

The large gain of 1.8 million to the population of *East Germany* resulted from the influx of ethnic Germans who were expelled from the Oder-Neisse territories and other countries. A balance of the components of population change during these 12 years must be considered highly tenuous, but accepting the premise that Germany's war-related deaths were distributed proportionately to the former Reich's population, a very rough calculation shows that East Germany lost about 1.1 million persons as a direct result of the war—over 80 percent of whom were in the armed forces. Natural increase during the 1938–45 period amounted to about 0.4 million; therefore, since the total population increase in these years was 1.3 million, net immigration by mid-1945 must have approximated 2 million persons. During the 1945–49 period, the population increased by 0.5 million, but since deaths exceeded births by about 0.4 million, the implied net immigration was 0.9 million.[6]

III. Population Change Since 1950

Demographic developments in Eastern Europe since 1950 have been radically different from those of the previous decade and more in keeping with normal expectations. Migration has been a significant factor in only one country; population change in the other countries has occurred largely as a result of the balance between births and deaths.

The total population of these countries has been growing at a slightly slower rate than that of the rest of Europe, excluding the U.S.S.R. Between 1950 and 1968, the population of Eastern Europe increased from 88 to 102 million, or by 15.5 percent, while the population of all the rest of Europe increased by 16.3 percent. The Eastern European population of 95 million in 1958 was only slightly higher, after 20 years, than the number residing in the same territory in 1938. The rate of population growth in these countries as a group has been declining since 1950. During the period 1950–55, the population increased at the rate of slightly less than 1.0 percent per year, but the rate went down to 0.8 and then to 0.7 percent during the next two 5-year periods, and finally, to 0.6 percent per year during the 1965–68 period. This decline resulted from the heavy emigration from East Germany, but more directly from the dramatic drop in the birth rate.

Poland and East Germany offer the extreme contrast in population change during these 18 years. Poland had the most rapid population growth, 30.7 percent, and, with a far larger population than the other five countries, accounted for 55 percent of the population increase in the entire region. East Germany, however, actually had 1.3 million fewer people in 1968 than in 1950—a 7.1 percent decline. The populations of the other four countries increased moderately, with rates ranging between 10 and 21 percent for the period (Table 3).

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[6] These two immigration figures agree quite closely with Reichling's estimates of 4.0 and 3.9 million expellees in East Germany at the end of 1949 and 1950, respectively, and with the West German census results of 1950 which showed 1,037,000 residents who had lived in East Germany in 1939. Gerhard Reichling, *Die Heimatvertriebenen im Spiegel der Statistik (The Expellees, a Statistical Survey)*, Berlin, Duncker and Humblot, 1968, p. 15.

TABLE 3.—TOTAL POPULATION AND POPULATION CHANGE—SIX EASTERN EUROPEAN COUNTRIES: 1950 TO 1968

[Absolute figures in thousands]

Item	Eastern Europe	Bulgaria	Czecho-slovakia	East Germany	Hungary	Poland	Rumania
Population (Jan. 1):							
1950	88,060	7,228	12,340	[1] 18,388	9,293	24,613	16,198
1955	92,375	7,461	13,024	[2] 17,928	9,767	27,012	17,183
1960	96,307	7,829	13,608	[2] 17,114	9,961	29,480	18,315
1965	99,740	8,178	14,107	17,004	10,135	31,339	18,977
1968	101,699	8,335	14,333	17,090	10,236	32,163	19,542
Percent change:							
1950–55	4.9	3.2	5.5	−2.5	5.1	9.7	6.1
1955–60	4.3	4.9	4.5	−4.5	2.0	9.1	6.6
1960–65	3.6	4.5	3.7	−0.6	1.7	6.3	3.6
1965–68	2.0	1.9	1.6	0.5	1.0	2.6	3.0
1950–68	15.5	15.3	16.2	−7.1	10.1	30.7	20.6
Components of population change, 1950–68:							
Total change	13,639	1,107	1,993	[3] −1,298	943	7,550	3,344
Natural increase	16,942	1,308	2,006	[3] 1,149	1,107	7,787	3,585
Births	34,090	2,556	4,426	[3] 5,009	2,984	12,362	6,753
Deaths	17,148	1,248	2,420	[3] 3,860	1,877	4,575	3,168
Implied net migration [4]	−3,303	−201	−13	[3] −2,447	−164	−237	−241

[1] Census of Aug. 31, 1950.

[2] The Dec. 31, 1964, census total of 17,003,664 was 212,000 lower than the estimated population for that date based on the population register. Although this difference could be due to an undercount in the census, or to errors in birth and death registration, it is more likely due to the underregistration of emigration since the 1950 census. Accordingly, the published population totals for 1955 and 1960 were adjusted to account for this difference. See text.

[3] From Aug. 31, 1950.

[4] In addition to net migration, this difference between total population change and natural increase is no doubt due to errors in the registration systems of the individual countries. For some countries, errors probably account for most of this difference; for others, migration was undoubtedly the main factor.

MIGRATION

By 1950, nearly all displaced persons had been repatriated, most Germans had been expelled, the migration of Jews to Israel was largely completed, and various other small exchanges of population had been accomplished. Since that time, migration has played only a very minor role in demographic change in Czechoslovakia. It was significant only in 1950 and 1951 for Bulgaria and in 1956 for Hungary; it has had notable influence in Poland and Rumania during many of the past 18 years; and it has been the crucial factor in demographic change in East Germany, especially until 1961.

For the *region as a whole*, migration was still an important factor in population change during the 18 years between 1950 and 1968, as is indicated by the fact that there was a net balance of 3.3 million emigrants—a figure equal to 19 percent of the number added by natural increase. Some 2.5 million of this loss is attributable to the movement out of East Germany. This flow was reduced drastically after the Berlin Wall was erected in August 1961, and in the following 5 years the average yearly loss to Eastern Europe was cut from the previous level of 255,000 to 33,000. As Table 3 shows, all the countries experienced net losses from migration after 1950, but the losses in the other five countries were relatively minor as compared with East Germany's.

A large share of the migration from *Bulgaria* occurred during 1950 and 1951 when there was an exodus of 154,000 Turks to Turkey. This particular emigration, part of a flow that dates back to 1878 when Bul-

garia attained its independence of Turkey, was the direct result of a policy announced in August 1950 to expel the large Turkish minority. In spite of Turkey's protests, the hapless Turks were transported to the border by the Bulgarians and the Turks of necessity accepted them. This expulsion caused much bitter feeling between the two countries. Turkey especially accused the Bulgars of inhuman treatment of the expellees as well as the confiscation of their property. Only a few persons have moved from Bulgaria to Turkey since the beginning of 1952, but in February 1967 a Turkish delegation was reported to be negotiating the emigration of more Turks of Bulgarian origin.

Migration to and from *Czechoslovakia* since 1950 has been small. Immigrants predominated at first, but since 1954 emigrants have exceeded immigrants, and there has been a net loss for the period. Data on the country of destination for the 1955–66 period show that the great bulk of persons who left went to the Federal Republic of Germany. There have been reports that many persons fled the country when the Soviet army invaded Czechoslovakia in August 1968 and that most of the 30,000 persons on vacation outside the country at that time have not returned, but instead have settled in Switzerland, France, Canada, and Australia. These reports cannot be verified by the information at hand; if they are true, it would mean that Czechoslovakia lost more than twice as many persons by emigration in this single episode as during the previous 18 years.

Most of *Hungary's* net migratory loss of about 164,000 persons occurred in 1956 and 1957 as an aftermath of the revolt in late 1956. During 1956, 143,000 persons left the country and in 1957 another 43,000 left. During the other years of the period there was a net immigration of about 22,000 persons.

The implied emigration of 241,000 persons from *Rumania* during the years 1950–67 was no doubt largely accounted for by the movement of Jews to Israel. Data from an Israeli source[7] show that 46,000 Rumanian Jews arrived in 1950, 39,000 in 1951, 3,700 in 1952, and another 300 in 1953–55, before the Israelis adopted a policy of not showing the specific country of origin of settlers. A restrictive emigration policy was evidently in effect during the 1953–58 period, but the policy was changed in late 1958. A reported 6,000 Jews were permitted to leave in December of that year and another 7,000 in January 1959.[8] How long this emigration rate continued is not known, but population estimates which take account of births and deaths imply a net emigration of from 10,000 to 25,000 for each year between 1958 and 1965.

A total implied net emigration of 237,000 persons from *Poland* during the period 1950–67 was at the same level as that for Rumania. Poland, however, had a recorded immigration of 266,000 persons and an emigration of 542,000 persons during the 1955–67 period, and therefore the volume of movement to and from Poland was much greater than the movement to and from Rumania. All but 9,000 of the 266,000 immigrants came during the 5 years 1955–59 as repatriates from the Soviet Union under a 1955 agreement between the Soviet and Polish Governments whereby ethnic Poles and Jews who had been Polish

[7] Moshe Sicron, *Immigration to Israel 1948–1953 Statistical Supplement*, Jerusalem, Falk Project for Economic Research in Israel, 1957.
[8] *The Washington Post and Times Herald*, January 29, 1959.

citizens in September 1939 could be transferred back to Poland. The peak years were 1957 and 1958 when 95,000 and 87,000, respectively, moved to Poland. The larger part of the emigration from Poland also took place in 1957 and 1958 when 281,000 persons moved to the Federal Republic of Germany in implementation of an agreement between the Red Cross Societies of Poland and of the Federal Republic to reunite families.[9]

Since 1958, emigration has been quite steady, varying between 20,000 and 32,000 per year.

Although the destinations of emigrants from Poland cannot be determined precisely, scattered data indicate that in the main they settled in the two Germanies, Canada, the United States, and Israel. West Germany data show that 363,000 persons came into the Federal Republic between 1955 and 1966 from present-day Poland.[10] Canadian and United States data indicate that Poland was the country of last permanent residence of 54,000 immigrants to Canada and 51,000 to the United States during the period 1951–66. The numbers moving to East Germany and Israel are unknown but probably were substantial. The only direct data on these movements are official Polish figures relating to the 117,000 emigrants during the first 9 months of 1957. Of these, 17,000 moved to East Germany and 29,000 to Israel. Certainly the movement to East Germany was substantially larger since 1950; one Polish source notes that it amounted to 48,000 between 1951 and 1959.[11] There have been various estimates of the number of Jews in Poland; for example, the Polish Sejm internal affairs committee estimated that there were 50,000 in 1957 and the American Jewish Committee estimated that there were 40,000 in 1961 and 25,000 in 1967. These estimates, if accurate, imply that emigration to Israel continued after 1957 but at a relative low level.

There is little doubt, however, that most of the Jews who still remain in Poland have wanted to leave since the anti-Semitic campaign began after the student disturbances in March 1968 and the Jews were told that they must leave the country. About 14,000, or a little more than half the remaining Jewish community, had registered to leave by November 1968, and despite the high cost of emigration papers and other extreme difficulties placed in the way, it has been reported that an estimated 5,000 to 7,000 had left by January 1969.[12] A recent newspaper story indicates that Władysław Gomułka, First Secretary of the Central Committee of the Workers' Party, had announced that the emigration process would come to an end on September 1, 1969, and that refugee agency officials were deeply concerned about the 5,000 Jews involved in the lengthy process and about the other 10,000 to 20,000 Jews who had not started the process but who were clearly unwelcome in Poland.[13]

The population movements for the five countries just discussed, although relatively large in some cases, pale in significance when East Germany is considered. During the period between the August 31,

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[9] G. C. Paikert, *The German Exodus*, The Hague, Martinus Nijhoff, 1962, p. 3.

[10] Federal Republic of Germany, Statistisches Bundesamt, *Bevölkerung und Kultur (Population and Culture)*, Reihe 3, *Wanderungen (Migration)*, 1960, 1962, and 1966.

[11] Andrzej Kwilecki, "Mniejszości narodowe w Polsce ludowej (National Minorities in People's Poland)," *Kultura i Społeczeństwo (Culture and Society)*, vol. VII, no. 4, December 1963, p. 87.

[12] *The Economist*, January 18, 1969, p. 16.

[13] *The Washington Post and Times Herald*, July 22, 1969.

1950, census and the end of 1967, East Germany's migratory loss of 2.45 million persons constituted three-quarters of the loss for the region as a whole. Until the Berlin Wall was erected in August 1961, East Germany suffered the loss of three persons by emigration for each one gained by natural increase, and as a result, was one of the two countries in Europe to have had a declining population.

Migration to East Germany was also massive for the 3 years before migration out of the country became dominant in 1948. The 1946 population of East Germany included almost 4 million persons who had lived elsewhere in 1939, including children born to them since 1939. Most of these migrants were persons whose 1939 residence was east of the Oder-Neisse border with postwar Poland or outside the 1939 boundaries of the German Reich. Known in East Germany as the *Umsiedler* (resettled persons), they were a part of the influx of 12 million expellees of German ethnic origin into the four occupation zones. In East Germany they numbered 3.6 million and comprised one-fifth of the total population. The size of the *Umsiedler* group in East Germany continued to increase after 1946, reaching a high point of 4.2 million at the end of 1948. After that date, their number declined as a result of the flow of migrants to West Germany.

The total amount of migration to and from East Germany before the census of August 31, 1950, cannot be determined. A balance of the available estimates of total population, births, and deaths for the years of this hectic period indicates, however, that between the 1946 and the 1950 censuses, East Germany had a net immigration of 151,000 persons. Year-to-year changes in migration were dramatic. During the last 2 months of 1946 there was an estimated net immigration of 311,000. The level of immigration fell sharply to 584,000 in 1947, after which the balance shifted to net emigration. There was a *net* loss between January 1, 1948, and August 31, 1950, of 744,000 persons; thus the actual number leaving East Germany was much higher. An official West German source places the number at 816,000 for the 1946–50 intercensal period; [14] an unofficial West German source estimated that at least 1 million left during this period.[15] Whatever the actual number, the flight of refugees had already begun by 1946 and apparently gathered momentum when the extent of Communist domination became clear.

The flow of refugees from East Germany after 1950 can be measured more directly, although there is disagreement between official East German and West German sources as to the exact size of the movement. During the period 1951–66, East German data indicate a net emigration of 2.2 million persons, whereas data published by the Federal Republic set the figure for net immigration from East Germany at 2.9 million. The East Germans have not published data on the migration flow as such, but they have published annual figures, obtained from their population registration system, on the end-of-year population, births, and deaths from which implied migration figures can be derived. These implied net figures, it must be noted, include migration to and from areas other than the Federal Republic, although such movements are believed to have been relatively small. Data from the

[14] Federal Republic of Germany, Ministerium für Gesamtdeutsche Fragen, "The Population Balance of the Soviet Zone of Occupation," *Bonner Berichte aus Mittel- und Ostdeutschland*) (*Bonn Reports from Middle and East Germany*), Bonn, 1954, pp. 19, 46.

[15] Gunter Ipsen, "The Population of Central and Western Germany up to 1955," *in* Institut für Raumforschung, *Informationen*, no. 27–29, July 2, 1954, pp. 413–414.

Federal Republic, also based on population registers, overstate the net number of migrants from East Germany due to double counting of immigrants as a result of the registration procedures and the failure to count all persons who returned to East Germany. A majority of the refugees arrived first in West Berlin, where they registered their place of departure as East Germany, and many continued to do this as they moved from one West German community to another.

The West German Statistical Office derived a formula for eliminating the double counting which involves West Berlin, but it has been unable to correct the other double counting. The extent of the undercount in the East German data and of the overcount in the West German data was a matter of conjecture until the results of the 1964 East German census were released. The census total turned out to be 212,000 lower than the population register total for the same date. Although the difference could be due to an undercount in the census or to errors in the registration of births and deaths in the 1950–64 intercensal period, it is more likely due to an underregistration of emigrants. The earlier implied migration figure for the intercensal period therefore can be increased by 212,000 and distributed year by year in proportion to the original figures. The East German figures given in Table 4, which have been adjusted in this manner, must be considered as much closer to the actual net loss than the Federal Republic figures. The difference of 571,000 between the two sets of data would be somewhat reduced if proper allowance could be made of movements into and out of East Germany involving other countries. For example, the difference would be smaller by the number of persons moving from Poland as part of the agreement to reunite families. As was indicated above, the number is conjectural, but could have been substantial. Also, other countries may have lost population to East Germany. Czechoslovakia, for example, has lost a net of 1,200 migrants to East Germany since 1956.

TABLE 4.—MIGRATION BETWEEN EAST GERMANY AND THE FEDERAL REPUBLIC OF GERMANY: 1951 TO 1966

[In thousands]

Year	East German data	West German data [2]		
	Estimated net emigration [1]	Migration from East Germany	Migration to East Germany	Net immigration to the Federal Republic
1951	122.6	287.8	45.3	242.5
1952	147.3	232.1	30.9	201.2
1953	300.7	408.1	28.1	380.0
1954	202.2	295.4	49.0	246.4
1955	272.5	381.8	48.7	333.1
1956	325.9	396.3	46.7	349.6
1957	264.3	384.7	52.6	332.1
1958	163.6	226.3	38.7	187.6
1959	96.3	173.8	38.7	135.1
1960	171.7	225.4	28.5	196.9
1961	205.3	233.5	23.1	210.4
1962	8.1	21.5	8.8	12.7
1963	37.6	47.1	4.7	42.4
1964	34.1	39.3	4.9	34.4
1965	14.8	29.5	5.6	23.9
1966	10.6	24.3	4.2	20.1
Total	2,377.6	3,406.9	458.5	2,948.4

[1] Emigration to all countries, but presumably almost all emigrants go to the Federal Republic. These estimates were calculated as the difference between natural increase during the year and population estimates at the beginning and end of the year after adjustment to account for the difference of 212,000 between the 1964 census total and the estimated population total for the same date based on the population register.

[2] Data are from Federal Republic of Germany, Statisttisch Bundesamt, "Bevölkerung und Kultur (Population and Culture)," Reihe 3, "Wanderungen, (Migration)" 1964, 1965, and 1966.

Both sets of data reveal a wide fluctuation in the annual number of migrants. According to East German data, until 1962 the yearly net emigration from East Germany averaged 207,000, ranging from a low of 96,000 in 1959 to a high of 326,000 in 1956. The level of emigration was also very high in 1953, 1955, and 1957. Although emigration must be viewed largely in terms of relative economic opportunities existing in the two areas, some of the fluctuations are obviously related to variations in pressures within East Germany. The large number of persons leaving in 1953 undoubtedly reflects the collectivization drive in the winter of 1952 and spring of 1953 as well as the other events which culminated in the revolt of June 1953. Similarly, the large numbers who fled in 1956 and 1957 reflect the intensification of economic and political pressures after a period of relative relaxation during the period of the New Course. Conversely, during the "thaw" of 1959 fewer people left than during any other year of the period.

The erection of the Berlin Wall in August 1961 brought to an end the massive emigration from East Germany, but did not stop it completely. During the 5 years after 1961, net emigration averaged 21,000 per year. Newspaper accounts have told of dramatic escapes and tragic attempts by families and young people, but the greatest part of the movement during these years has been of old people permitted to join their relatives in the west. For example, according to West German data, 63 percent of the net number of migrants were over age 65 and 81 percent were over age 50.[16] Seen in retrospect, the Wall appears to have precipitated a number of changes as profound as the ending of a massive population movement. There seems to be a growing consensus among western observers that the Wall has served as a stabilizing factor in East Germany. A quickening in economic performance, a relaxation of police state practices, and a willingness to permit somewhat more latitude in intellectual life have been displayed by the regime and welcomed by the people.

There has also been a fairly large amount of return migration from West to East Germany. According to West German data, 458,000 people either returned to East Germany or migrated there from West Germany during the years 1951–66. This figure is 13.5 percent of the number of persons recorded in West German statistics as moving from east to west, and is probably considerably understated. Except in 1962, when west to east migrants were 40 percent as high as east to west migrants, the yearly proportion has varied between the rather narrow limits of 7 and 22 percent. Why these people returned is the subject of a relatively recent propaganda battle between East and West Germany. The East Germans claim that many of them are escaping conscription, and that more and more have moved under the pressure of rising living costs, social insecurity, and concern over the future. The West Germans claim that crimes and debts have almost always been the cause for flight to East Germany.

MORTALITY

The crude death rate in five of the six countries of Eastern Europe has dropped sharply since 1938, but in one country, East Germany, it

[16] Federal Republic of Germany, Statistisches Bundesamt, *Bevölkerung und Kultur (Population and Culture)*, Reihe 3, *Wanderungen (Migration)*, 1966.

has increased by more than 10 percent (Table 5). In the region as a whole, the rate dropped by 25 percent from 1938 to 1950; since "normal" mortality rose during the last years of the war and was higher in 1946 than in 1938, all of the drop—and more—occurred in the 4 years 1947–50. The pace of the decrease, although slower, was still swift during the next 5 years when the rate fell another 14 percent. After that the drop was quite slow, and in fact since 1960 the trend has been reversed in all countries except East Germany. As the data for Southern Europe in Table 5 show, the sharp reductions in the death rate from the end of the war to 1955 were not unique to Eastern Europe but were part of a postwar decline in relatively high mortality countries throughout the world. The reduction in mortality in Eastern Europe, as elsewhere, has resulted from the introduction of antibiotics and insecticides, improved sanitation practices and nutrition, and the extension of public health facilities.

TABLE 5.—PERCENTAGE CHANGES IN VITAL RATES—REGIONS AND SELECTED COUNTRIES OF EUROPE: 1938 TO 1967

Rate and year	Eastern Europe							Southern Europe [1]	Northern and Western Europe [1]
	Total	Bulgaria	Czecho-slovakia	East Germany	Hungary	Poland	Rumania		
Birth:									
1938–50	8	11	40	−8	5	25	−11	−9	6
1950–55	−5	−20	−13	−1	2	−5	−2	−5	−6
1955–60	−19	−11	−22	5	−31	−22	−25	0	5
1960–67	−6	−16	−5	−14	−1	−28	43	−6	−3
1950–67	−27	−40	−35	−10	−30	−47	5	−11	−4
1938–67	−21	−34	−10	−18	−27	−33	−7	−19	1
Death:									
1938–50	−25	−26	−13	0	−20	−16	−35	−34	−10
1950–55	−14	−12	−17	1	−12	−17	−22	−9	−1
1955–60	−7	−10	−4	14	2	−21	−10	−2	0
1960–67	3	11	10	−4	5	3	7	−2	−3
1950–67	−17	−12	−12	11	−6	−33	−25	−12	−4
1938–67	−32	−34	−23	11	−25	−43	−51	−42	−13
Natural increase:									
1938–50	55	65	237	−25	67	79	33	41	53
1950–55	3	−26	−9	−4	20	2	15	−2	−14
1955–60	−28	−13	−37	−20	−61	−23	−35	1	14
1960–67	−15	−38	−25	−54	−13	−43	74	−9	−5
1950–67	−37	−60	−58	−65	−59	−55	31	−10	−6
1938–67	−2	−34	43	−74	−32	−21	74	28	44
Infant mortality:									
1938–50	−26	−34	−29	31	−34	−21	−35	−34	−25
1950–55	−31	−13	−56	−32	−30	−26	−33	−13	−23
1955–60	−24	−45	−29	−20	−20	−33	−4	−21	−21
1960–67	−31	−27	−4	−46	−23	−31	−37	−24	−30
1950–67	−63	−65	−71	−71	−57	−66	−60	−47	−57
1938–67	−73	−77	−79	−62	−72	−73	−74	−66	−68

[1] For the countries included, see Table 1, footnotes 1 and 2.

Within the region, Rumania and Poland have had the most dramatic reductions in the crude death rate over the last 30 years. Rumania's death rate was cut in half and Poland's rate declined by over 40 percent. During the same period, the rate in Bulgaria was reduced by one-third and in both Czechoslovakia and Hungary it was cut by one-fourth. In East Germany, as noted above, the death rate is now somewhat higher than it was before the war.

The significant improvement in infant mortality has been a major factor in reducing the overall death rate. The trend in this improvement is graphically shown for each country in Figure 1. In 1950, infant mortality ranged from 72 deaths per 1,000 live births in East Ger-

many to 117 in Rumania; by 1967, the range had been considerably narrowed to 21–47, again with the same two countries representing the extremes. Decreases during the period varied from a low of 57 percent for Hungary to the high of 71 percent for Czechoslovakia and East Germany. As is the case with the crude death rate, these improvements were not confined to Eastern Europe, although they were somewhat more significant there than in the rest of Europe. In 1967, the infant mortality rates of 21 for East Germany and 23 for Czechoslovakia were at the same level as the U.S. rate, but were much higher than the rates of 13–14 in Iceland, Finland, the Netherlands, and Sweden, which are the lowest in the world. Bulgaria, Hungary, and Poland had rates somewhat below the average for Southern Europe, but the rate in Rumania was higher than in all other European countries except Portugal. In October 1968, the Rumanian Ministry of Health stated that the high rate was due to the unequal distribution

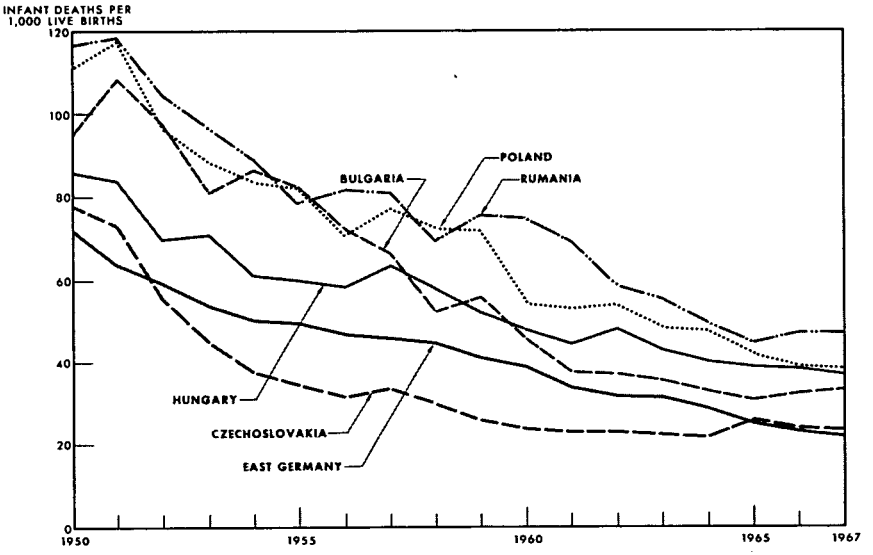

Figure 1.--Infant mortality rates--six Eastern European countries: 1950 to 1967

of doctors and insufficient numbers of intermediate medical personnel. Also, according to the Ministry, there is a lack of training and conscientiousness on the part of some medical and health personnel, and a low level of knowledge about health and hygiene among certain groups of the population.

As in most other countries of the world, mortality of females in Eastern Europe has declined more rapidly than that of males, and mortality at the younger ages has decreased more rapidly than at the older ages for both sexes—as noted above in the discussion of infant

deaths. The general improvement in death rates at all but the very oldest ages has added substantially to the average length of life. A child born in Bulgaria in 1961, for example, could expect to live about 70 years; had he been born in 1937 he could expect to live only 52 years. There has been a 14-year gain in life expectancy in Czechoslovakia since 1937, a 4-year gain in East Germany since 1952, a 12-year gain in Hungary since 1941, a 19-year gain in Poland since 1932, and a 26-year gain in Rumania since 1932. On an annual average basis, these increases have amounted to about a third of a year for East Germany, about half a year for Czechoslovakia, Hungary, and Poland, and about three-quarters of a year for Bulgaria and Rumania.

Because events in the past have generated a variety of age structures in the area, crude death rates are poor indicators of the current levels of mortality in the various countries. In 1960, for example, East Germany had the highest crude death rate, but this was because it had a long history of low birth and death rates giving it an older age structure. In addition, war casualties and the loss of young persons in the flight to the West have created additional deficits among young adults whose death rates are low. On an age-specific basis, however, East Germany had lower mortality rates than Hungary or Rumania. The standardized death rates given in Table 6, which are based on officially reported age-sex specific death rates and eliminate the effects of differences in age structures among the countries, therefore are more valid comparative indices of the level of mortality. During the 6 years 1960–66, mortality improved in all countries but Czechoslovakia, and Bulgaria maintained its position as the country with the lowest mortality rate.

TABLE 6.—CRUDE AND STANDARDIZED DEATH RATES—SIX EASTERN EUROPEAN COUNTRIES: 1960 AND 1966
(PER 1,000 POPULATION)

Country	1960		1966	
	Crude death rate	Standardized death rate [1]	Crude death rate	Standardized death rate [1]
Bulgaria	8.1	9.4	8.3	8.6
Czechoslovakia	9.2	9.5	10.0	9.7
East Germany	13.7	10.5	13.3	9.6
Hungary	10.2	11.0	10.0	9.6
Poland	7.6	10.0	7.3	9.4
Rumania	8.7	11.3	8.2	9.5

[1] Based on the age-sex distribution of the U.S. population in 1960.

FERTILITY

In common with countries of Northern and Western Europe and the United States, after the end of World War II there was an upsurge of the birth rate in Czechoslovakia and Poland. However, Bulgaria and Hungary had only very moderate increases, and as of 1950 the birth rates in East Germany and Rumania were still below the prewar level. For the region as a whole, the birth rate was 8 percent above

the prewar level. After 1950 or 1951, the birth rate in each of the countries began to fall and, except for short-term rises in four of the countries, continued to fall until 1966. During 1967 and 1968 there was a slight rise in the Bulgarian and Hungarian rates, and an enormous rise in the Rumanian rate as a result of governmental action restricting abortions and contraceptives. For the six countries combined, the birth rate declined only slightly until 1955, then at a very fast pace of 19 percent during the next 5 years and at a slightly lower pace of 15 percent during the 5 years 1960–65. Between 1950 and 1967, the birth rate of all the countries declined by 27 percent, despite the large increase in Rumania during 1967. The largest decreases were registered by Poland, Bulgaria, Czechoslovakia, and Hungary. The birth rate decreased by only 10 percent in East Germany during this period, while it actually rose in Rumania (Tables 1 and 5).

The rate of natural increase for the region jumped by 55 percent between 1938 and 1950, and rose by another 3 percent during the next 5 years. During each half of the next decade, however, it declined by about 30 percent. Again largely due to the drastic rise in the Rumanian birth rate, natural increase rose to 8.0 per 1,000 in 1967, or just 2 percent below the level experienced by the region 29 years earlier. In sharp contrast, natural increase rose by 28 percent in Southern Europe and by 44 percent in Northern and Western Europe during the same time period.

Figure 2 shows the changes in the birth, death, and natural increase rates between 1950 and 1968 for each of the six countries of Eastern Europe. As may be seen at a glance, each of the countries has a different configuration of change in the rates, but overall the birth rate has been much more volatile and has decreased more rapidly than the death rate, with the result that natural increase has narrowed considerably. In fact, the balance between births and deaths has been reduced in each country except Rumania by 50 to 60 percent since 1950. The most striking drop was that in East Germany, where the balance was nearly zero in 1968. Needless to say, the East German rate of natural increase is among the lowest in the world, as are the rates of 3.9 per 1,000 for Hungary and 4.2 for Czechoslovakia.

A question arises as to what influence changes in the age structure of women in their fertile years had on these declines in the crude birth rate. This question can be answered for the period since 1955 by determining what the birth rate would have been in 1966–67 if the population then had the same age-sex structure that it had in 1955. These standardized birth rates, given in Table 7, show that declines of the crude birth rates of these countries between 1955 and 1966–67 have been due essentially to decreases in age-specific fertility rates and not to changes in age structure. All of the drop in the crude birth rate in East Germany between 1955 and 1966 was due to a decrease in fertility; at the other extreme, two-thirds of the drop in Bulgaria was due to this factor and the other third to a less favorable age structure of women.

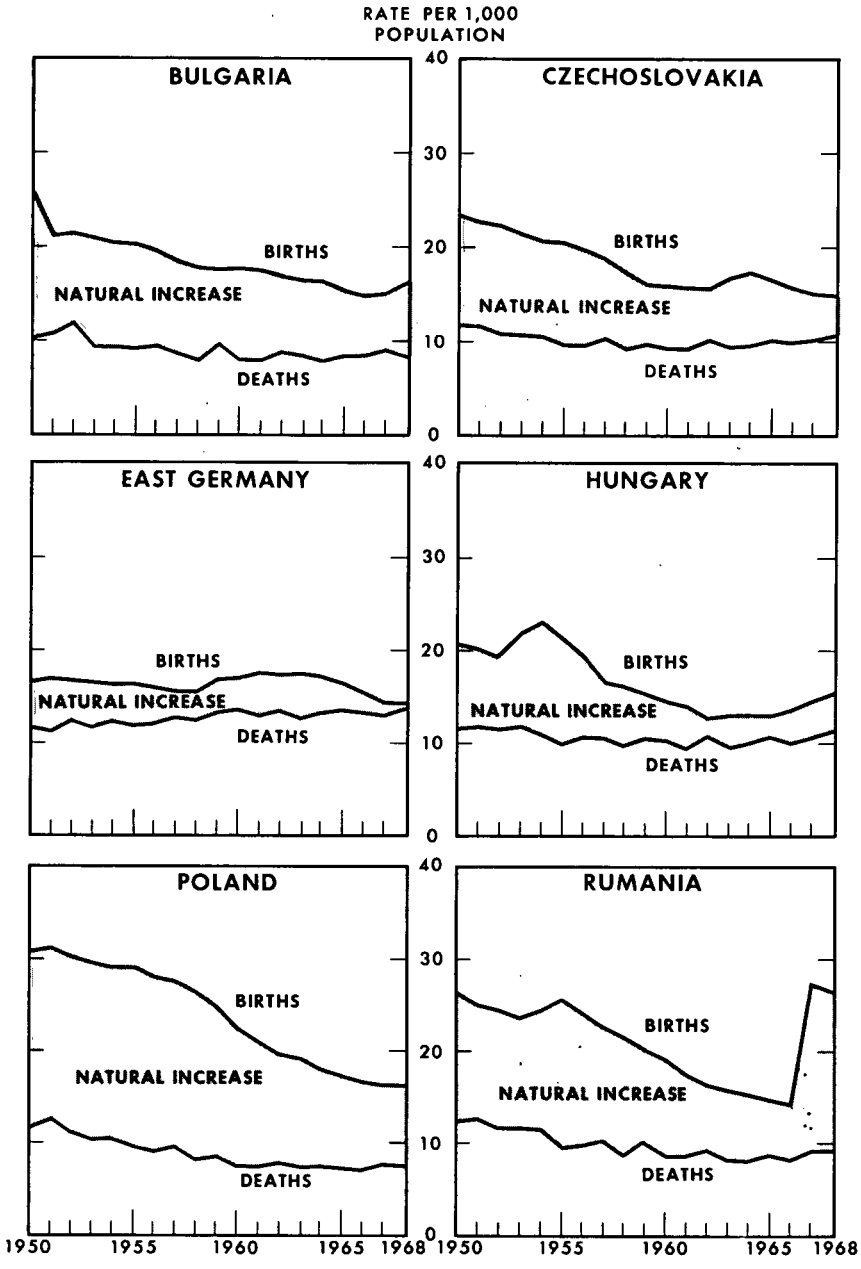

Figure 2.--Vital rates—six Eastern European countries: 1950 to 1968

TABLE 7.—CRUDE AND STANDARDIZED BIRTH RATES—SIX EASTERN EUROPEAN COUNTRIES: 1966–67

Line	Item	Bulgaria	Czecho-slovakia	East Germany	Hungary	Poland	Rumania
	Crude birth rate:						
1	1955	20.1	20.3	16.3	21.4	29.1	25.6
2	1966 or 1967 [1]	15.0	15.6	15.7	14.6	16.3	14.3
3	Change [2]	−5.1	−4.7	−0.6	−6.8	−12.8	−11.3
4	Standardized birth rate, 1966 or 1967 [3]	16.7	15.8	16.6	15.3	19.0	16.3
	Change in birth rate since 1955 due to fertility decline:						
5	Per 1,000 population [4]	−3.4	−4.5	+0.3	−6.1	−10.1	−9.3
6	Percent of total change [5]	67.0	96.0	[6] 100.0	90.0	79.0	82.0

[1] 1966—Czechoslovakia, East Germany, and Rumania; 1967—Bulgaria, Hungary, and Poland.
[2] Line 2 minus line 1.
[3] Derived by applying 1966 or 1967 age-specific fertility rates to the 1955 population of women, by 5-year group within ages 15–49. The results are rates that would have occurred if the population in 1966 or 1967 had had the same age-sex structure as in 1955.
[4] Line 4 minus line 1.
[5] Line 5 divided by line 3 times 100.
[6] If the population in 1966 had had the same age-sex structure as in 1955, the birth rate would have been higher in 1966 than it was in 1955. The fact that it was lower indicates that the total decline was due to fertility rather than to change in age-sex structure.

A question also arises as to whether the drop in the birth rate is attributable to changes in the marriage rate, and thus to the proportion of women married in their 20's and 30's when fertility is highest. In 1967 there were 83,000 fewer marriages than in 1955. Since the population in 1967 was larger than in 1955, there has been a reduction in the marriage rate for the region as a whole—a reduction that is no doubt related to the fact that smaller birth cohorts of the war period were entering the marriageable ages. But the trend in the marriage rate is not related to that of the birth rate in three of the six countries. In Bulgaria and Czechoslovakia, the marriage rate was stable throughout the period whereas the birth rate declined. In Rumania, the marriage rate was stable until 1958, and then it dropped sharply including a drop from 1966 to 1967 when the birth rate doubled. There appears to be a close relationship between the trends in the rates for Hungary and East Germany. In Poland, both rates declined throughout the period, although there were only 21,000 fewer marriages in 1967 than in 1955 whereas there were 274,000 fewer births.

Data on marital status, available for all countries except Rumania, show that the proportion of women married in the age group 20–39 is higher now than it was 10 to 20 years ago. There was a slight rise in the proportion married in each 5-year age group of this high-fertility age span in Bulgaria between 1956 and 1965, in Czechoslovakia between 1950 and 1958 and also between 1958 and 1965, in East Germany between 1950 and 1964, and in Poland between 1950 and 1960. Only in Hungary was the proportion married at ages 20–29 smaller in 1968 than it was in 1960. And even there the decrease was quite small—from 67.1 to 65.6 percent married at ages 20 to 24 and from 85.6 to 85.0 percent at ages 25 to 29. From all the above evidence, it appears that the decline in fertility in Eastern Europe has been due far less to structural factors than to a decrease in marital fertility.

Declines in fertility have been greatest among older women and among those who have already had more than two children, as may be noted in Table 8. The greater decline for each older age group was consistent for every country except for the two oldest age groups in Rumania. In Bulgaria, for example, there has been practically no change in the number of babies born to women 20–24 years old, but there has been a one-third reduction in the number born to women 30–34 years old and a two-thirds reduction in the number born to women 10 years older. In Hungary, the 20–24 year old women had 16 percent fewer babies in 1967 than they had in 1955, but the 40–44 year old women had 72 percent fewer. Such decreases are reflected in the relatively consistent decreases in the higher birth orders, since at any one point in time, older women generally already have had more babies than younger women. In Czechoslovakia, there was a 16 percent rise in first births and only a small decline in second births, but a 48 percent decline in fourth and higher order births. East Germany was the exception to the common pattern exhibited by the other five countries. The anomalous situation of a rise in fourth and higher orders was probably due to the fact that the proportion of pregnancies of older women terminated by abortion in East Germany was very small as compared with that in the other five countries. This in turn reflected the much more restrictive policy on abortion in effect in East Germany.

TABLE 8.—CHANGES IN FERTILITY PATTERNS SINCE 1955—SIX EASTERN EUROPEAN COUNTRIES

Item	Bulgaria	Czecho-slovakia	East Germany	Hungary	Poland	Rumania
Percent change in selected age-specific fertility rates:[1]						
20 to 24 years	−1	−8	+12	−16	−12	−20
25 to 29 years	−22	−22	−1	−26	−36	−28
30 to 34 years	−36	−38	−8	−46	−51	−36
35 to 39 years	−57	−53	−11	−62	−60	−49
40 to 44 years	−63	−66	−21	−72	−68	−37
Percent change in the number of children born:[2]						
First births	−14	+16	−17	−8	−20	−14
Second births	−13	−7	−7	−22	−32	−10
Third births	−50	−33	−3	−56	−48	−20
Fourth and higher orders	−58	−48	+6	−62	−46	−27

[1] Figures for Bulgaria, Hungary, and Poland refer to 1955–67, Czechoslovakia to 1955–66, East Germany to 1955–63, and Rumania to 1958–66.

[2] Figures for Bulgaria, Hungary, and Poland refer to 1955–67, Czechoslovakia and East Germany to 1955–66, and Rumania to 1961–66.

One measure of the overall fertility of a population, which eliminates the effect of differences in age structure, is the gross reproduction rate.[17] These rates for each of the six Eastern European countries during the years 1950–68 are given in Table 9. Since it has been demonstrated that the age structure of women in the childbearing years has accounted for only a small part of the decline in the crude birth

[17] The gross reproduction rate may be defined as the number of females that will be born to 100 women during their reproductive lifetimes if a given set of age-specific fertility rates prevailed throughout the period. For example, a rate of 150 signifies that 100 women would give birth to 150 daughters, etc. A gross reproduction rate of 100 or less for a prolonged period means that ultimately deaths will exceed births.

rates between 1955 and 1966–67, the trends of the gross reproduction rates are essentially the same as those for the crude birth rates. Thus, in Czechoslovakia, the crude birth rate declined by 36 percent between 1950 and 1968 and the gross reproduction rate declined by 34 percent. Whether measured by crude birth rates or gross reproduction rates, however, fertility in all countries of Eastern Europe was very low in 1968, except in Rumania. In Czechoslovakia and Hungary, the gross reproduction rate was below unity, standing at 98 and 99, respectively. Bulgaria's rate was below 100 in 1967 and just above it in 1968. East Germany and Poland had rates somewhat higher, but the trend for each was downward. In point of fact, only Rumania, with a gross reproduction rate of 174 in 1968, was well above replacement level. The other five are among the lowest fertility countries in the world. During the period 1955–64, only Japan with a rate of 96 in 1963, Greece and Luxembourg with a rate of 109 in 1964 and 1960, respectively, and Sweden, with a rate of 112 in 1963, were as low.

TABLE 9.—ESTIMATED GROSS REPRODUCTION RATES—S'X EASTERN EUROPEAN COUNTRIES: 1950 TO 1968

Year	Bulgaria	Czecho-slovakia	East Germany	Hungary	Poland	Rumania
1950	(1)	148	115	124	179	(1)
1951	119	147	120	121	181	149
1952	119	144	118	120	177	150
1953	117	139	117	133	175	144
1954	114	137	116	143	173	150
1955	115	138	115	135	174	154
1956	115	138	111	126	170	136
1957	110	134	109	110	169	129
1958	109	125	108	104	162	125
1959	109	116	116	100	154	118
1960	112	116	115	98	144	113
1961	110	115	118	94	136	105
1962	108	114	119	87	130	99
1963	106	121	122	88	130	97
1964	105	122	123	87	124	95
1965	100	115	122	88	122	93
1966	98	108	119	91	117	91
1967	98	102	113	97	113	175
1968	105	98	110	99	112	174

[1] Not available.

FACTORS IN THE DECLINE OF FERTILITY

For decades, demographers and sociologists have focused attention on the decline in fertility in various countries. Explanations as to the reasons for these declines have varied from time to time but a list of the factors involved includes: (1) lower infant mortality; (2) industrialization and the division of labor which generates a much more complex social structure with greater opportunities for social mobility; (3) growing urbanization with increasing facilities for communication and exchange and penalties for large families; (4) shift of functions from the family unit to other institutions; (5) increasing participation of women in economic activities outside the home; and (6) development of secular, rational attitudes. Certainly these factors have all been operating in Eastern Europe as have others, such as a continuing

housing shortage, particularly in the cities, and significant increases in literacy and educational attainment. The list could be long, but little is known of the relative importance of each factor and a suitable way of measuring the quantitative impact of a given factor is lacking.[18]

Disregarding the doubling of the birth rate in Rumania in 1967, the fertility levels of all six Eastern European countries have closely converged. Although there must be convergence at the lower end of the spectrum of fertility limits in a viable society, the degree of convergence in Eastern Europe is surprising in view of the differences that still exist between the countries with respect to those factors that presumably are related to fertility behavior. Religious affiliation and practices vary widely, as do levels of living and levels of education, urbanization, and industrialization, and the extent to which women are employed outside the home. There are considerable differences also in the shortages of housing, in the availability of child-care facilities, in the stability of marriage, in the extent to which the various family allowance systems cover the costs of bearing and caring for children, and in past cultural patterns and current adaptations to the changing social and economic systems. A question arises as to whether this convergence to a pattern of very low fertility behavior is related to a common political-ideological belief. As Freedman has indicated, however, this factor seems to be much less important than the socioeconomic situation in which families find themselves.[19] Families in Eastern Europe, as elsewhere, probably react to the problem of reproduction according to their individual circumstances. Although these are different for each family, as well as for each nation as a whole, it has been both implied and stated by Eastern European demographers and other observers that the underlying reason for the convergence of fertility levels is the incorporation of the small-family ideal among a large proportion of the population and the availability of legal abortion and contraceptive devices so that families are able to attain that ideal.

The desired family size in Eastern Europe is exceptionally small. In Hungary, for example, the average number of children desired by a couple was 2.4 in 1958–60 and 2.1 in 1965–66, as determined by survey of 0.5 percent of all Hungarian women aged 15–49.[20] In Czechoslovakia, research on engaged couples during the early 1960's by the State Population Commission revealed that only 2.1 children were planned on the average.[21] Also, families already in being plan to have an average of only 2.3 children. The average Rumanian family in Bucharest wants only 1.3 children, and among the professional classes the number falls to 0.7—figures without parallel elsewhere in the

[18] Bernardo Colombo, Moderator's statement in *World Population Conference, 1965, Volume I: Summary Report*, New York, United Nations, 1966, p. 74.
[19] Ronald Freedman, Moderator's statement in *World Population Conference, 1965, Volume I: Summary Report*, New York, United Nations, 1966, p. 42.
[20] Malcolm Potts, "Legal Abortion in Eastern Europe," *The Eugenics Review*, vol. 59, no. 4, December 1967, p. 235.
[21] Milan Kučera, "Population Reproduction in 1961–1966," *Demografie (Demography)*, vol. 9, no. 3, August 1967, p. 195.

world.[22] Perhaps the present situation in these countries, possibly excluding Rumania, is summed up by a Polish writer as follows:[23]

> Women work. But they can barely manage both professional and household duties. . . . Therefore, they can scarcely imagine taking on so time-consuming a task as raising a child. A child is a ball and chain in professional and social life. Give up work? Bah! It's easier not to begin a family. One gets used to a larger family budget. Someone making a decent living (100 leva, 1,000 lei, 1,600 forints, 1,500 korunas, 500 marks average per capita wages) would have trouble raising even one child—in spite of the development of nursery schools, playgrounds, and summer camps and in spite of the family allowances. They would have real difficulty in raising two. After all, they have no intention of giving up amenities which have become elementary in all five countries, like the radio, the cinema, or a different pair of shoes in winter and summer.
>
> People earning above-average incomes can live decently even with two children, but to them "decently" means something more. They do not want to lower their standards and would rather buy an automobile or take a trip abroad than have children. And this is what they do. People in those countries which had a hard time during the war, after the war, and during the ascetic stalinist period, give full rein to their appetities now that there is stability. . . .
>
> A Hungarian satirical paper printed a cartoon showing a young couple looking at a car and a baby buggy. The caption was "Which?" As we know, many families choose the car. . . .

Abortions

The relaxation of laws governing abortions was the crucial governmental action enabling the population of Eastern Europe to attain its desired number of children. Following the example of the U.S.S.R., which in 1955 repealed its restrictive decree of 1936 regarding abortions, five of the six Eastern European countries enacted legislation liberally extending the circumstances under which legal abortions for other than medical reasons would be permitted. Bulgaria became the first to follow the Soviet policy in early 1956, followed by Poland, Hungary, and Rumania later that year, and finally by Czechoslovakia in December 1957.

Within the overall pattern of steps taken to legalize abortions, there was considerable variation in the new laws passed by the five countries. Abortion at the request of the pregnant woman was legalized in Bulgaria, Hungary, and Rumania. In Czechoslovakia, the law permitted abortions for reasons "which deserve special consideration" among which the Ministry of Health listed in 1957: advanced age; numerous children; loss or disability of the husband; predominant economic responsibility of the woman for the maintenance of the family or the

[22] Potts, *op. cit.*, p. 236.
[23] Andrzej K. Wroblewski, *Polityka (Policy)*, Warsaw, September 4, 1965, excerpted in *East Europe*, vol. 15, no. 1, January 1966, pp. 27, 28.

child; and difficult circumstances of an unmarried woman resulting from her pregnancy. A new regulation in late 1961 restricted voluntary abortion on the ground of "numerous children" to three or more living children and required a threat to the level of living in cases of predominant economic responsibility of the woman. In Poland, the 1956 law stipulated a "difficult social situation" as an acceptable reason for the termination of pregnancy and made the physician responsible for determining the validity of the claim. Since early 1960, however, an oral declaration by the pregnant woman suffices to establish her "difficult social situation." [24]

East Germany did not participate in this liberalization. After World War II, the Draconic regulations of the Third Reich were replaced by a series of laws under which legal abortion could be performed on medical, eugenic, and humanitarian grounds, and to some extent on social and economic grounds. These statutes were in turn superseded in 1950 by the Law for the Protection of the Mother and Child, which permits abortion on medical and eugenic indications only, as established by regional commissions. In March 1965, these commissions were administratively authorized to extend the scope of the medical indication, taking into account the woman's social environment. Abortion was to be permitted when there was a serious danger that the physical or mental health of the woman would be impaired. Women considered to be especially endangered are those under age 16 or over 40, and those who have five or more living children or who have had a rapid succession of pregnancies. As a result of this change, the number of legal abortions increased from less than 1,000 per year in the years 1956–62 to 16,000 in 1966 and 20,000 in 1967. Coincidentally, the birth rate dropped from 16.5 per 1,000 in 1965 to 14.8 in 1967.

The liberalization of abortion laws resulted in much more substantial increases in the numbers of abortions in the other five countries. Systematic data are available only for Bulgaria, Czechoslovakia, Hungary, and Poland, as shown in Table 10 and Figure 3, essentially for the period 1953 to 1967. For these four countries, 7.1 million abortions were reported during the various periods of time covered, and this total and the component numbers are very probably too low, especially those for Poland.[25] According to these data, Hungary has the highest abortion rate, in terms of total population, number of pregnancies, and number of women of childbearing ages. Its abortion rate of 22 per 1,000 population in 1967 exceeded the birth rate by 7 points; 60 percent of the total number of pregnancies that year were terminated by abortion. Hungary was followed in all of these measures by Bulgaria, then Czechoslovakia, and finally Poland, which has the lowest rates among the four countries.

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[24] Christopher Tietze, "Abortion Laws and Abortion Practices in Europe," paper presented at the meeting of the American Association of Planned Parenthood Physicians, April 1969.

[25] In Poland, private medical practice persists and many women seek out private doctors. Although these doctors are required by law to register all abortions, nonregistration is thought to be common. Potts, *op. cit.*, p. 239.

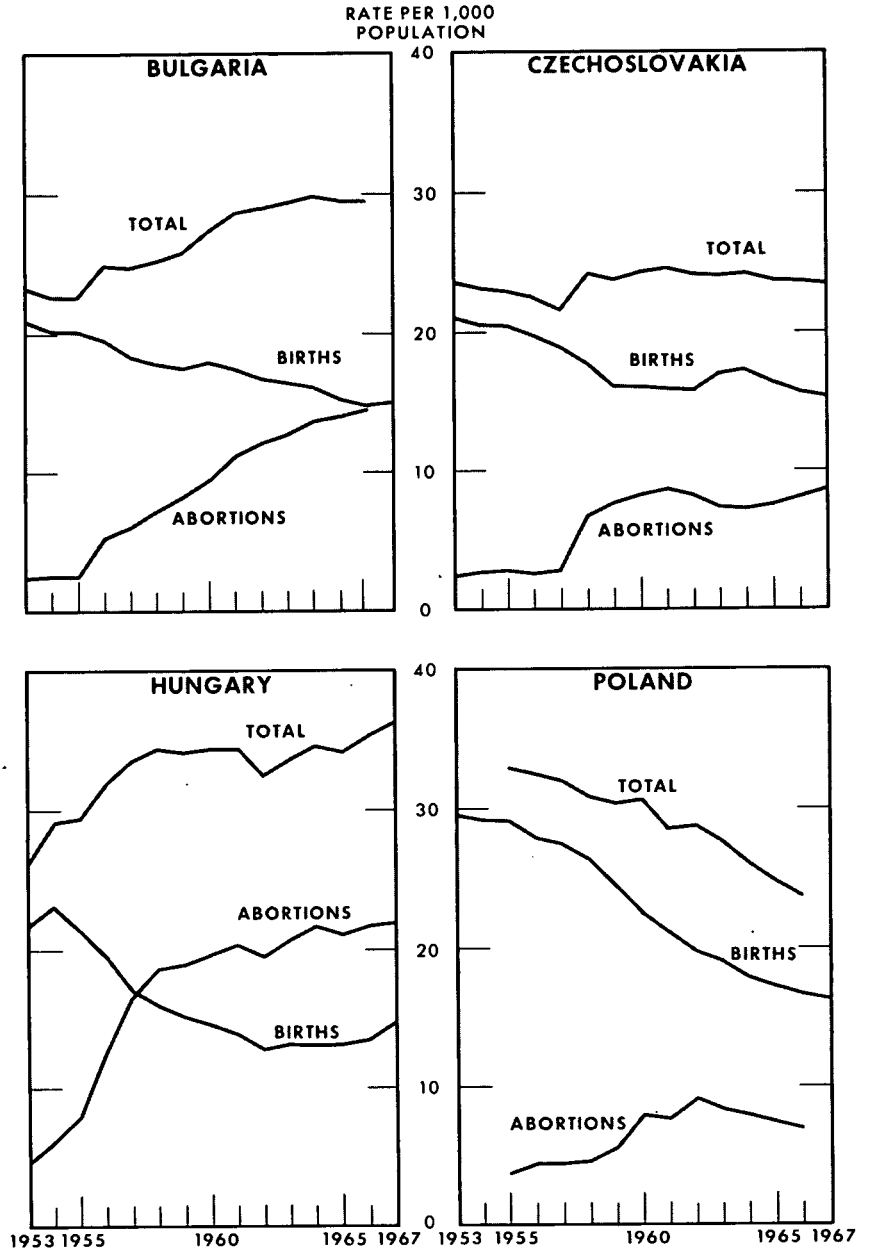

Figure 3.--Abortion and birth rates—four Eastern European countries: 1953 to 1967

TABLE 10.—ABORTIONS AND LIVE BIRTHS,—FOUR EASTERN EUROPEAN COUNTRIES, 1953 TO 1967

[Absolute figures are in thousands. Total abortions and live births per 1,000 population may not add to totals because of independent rounding]

Country and year	Number of abortions [1]			Rate per 1,000 population			Total abortions	
	Total	Legal	Other	Total abortions and live births	Total abortions	Live births	Per 100 pregnancies [2]	Per 1,000 women, 15 to 49 years old
Bulgaria:								
1953	17.4	1.1	16.3	23.2	2.4	20.9	10.2	8.9
1954	18.6	1.1	17.5	22.7	2.5	20.2	11.0	9.5
1955	19.1	(3)	(3)	22.7	2.5	20.1	11.2	9.7
1956	40.0	18.4	21.6	24.8	5.3	19.5	21.3	20.2
1957	46.2	31.7	14.5	24.5	6.0	18.4	24.7	23.3
1958	55.5	38.1	17.4	25.1	7.2	17.9	28.6	27.8
1959	63.8	45.6	18.2	25.7	8.2	17.6	31.8	31.9
1960	74.1	54.8	19.3	27.2	9.4	17.8	34.6	36.9
1961	88.7	68.8	19.9	28.5	11.2	17.4	39.1	43.9
1962	97.8	76.7	21.1	28.9	12.2	16.7	42.2	48.0
1963	103.8	83.3	20.5	29.2	12.8	16.4	44.0	50.5
1964	112.3	91.5	20.8	29.9	13.8	16.1	46.2	54.1
1965	116.0	96.5	19.5	29.5	14.1	15.3	48.0	55.5
1966	119.5	101.4	18.1	29.4	14.5	14.9	49.3	56.8
Czechoslovakia:								
1953	30.6	1.5	29.1	23.6	2.4	21.2	10.1	9.6
1954	33.4	2.8	30.6	23.2	2.6	20.6	11.1	10.5
1955	35.1	2.1	33.0	22.9	2.7	20.3	11.7	11.0
1956	34.1	3.1	31.0	22.4	2.6	19.8	11.5	10.7
1957	37.5	7.3	30.2	21.7	2.8	18.9	12.9	11.8
1958	89.1	61.4	27.7	24.1	6.6	17.4	27.5	28.0
1959	105.5	79.1	26.4	23.8	7.8	16.0	32.7	33.1
1960	114.6	88.3	26.3	24.3	8.4	15.9	34.5	35.9
1961	120.3	94.3	26.0	24.6	8.7	15.8	35.5	37.5
1962	115.9	89.8	26.1	24.1	8.4	15.7	34.8	35.8
1963	99.9	70.5	29.4	24.1	7.2	16.9	29.7	30.6
1964	99.2	70.7	28.5	24.2	7.1	17.2	29.1	30.2
1965	105.8	79.6	26.2	23.8	7.5	16.4	31.3	31.8
1966	115.8	90.3	25.5	23.8	8.1	15.6	34.2	34.1
1967	121.2	96.4	24.8	23.6	8.5	15.1	36.0	35.1
Hungary:								
1953	42.7	2.8	39.9	26.0	4.5	21.6	17.1	16.9
1954	58.3	16.3	42.0	29.0	6.0	23.0	20.7	23.0
1955	78.5	35.4	43.1	29.4	8.0	21.4	27.2	31.0
1956	123.6	82.5	41.1	31.9	12.5	19.5	39.1	49.0
1957	162.9	123.4	39.5	33.6	16.6	17.0	49.3	65.1
1958	183.0	145.6	37.4	34.5	18.5	16.0	53.6	73.4
1959	187.7	152.4	35.3	34.1	18.9	15.2	55.4	75.2
1960	196.0	162.2	33.8	34.3	19.6	14.7	57.2	78.7
1961	203.7	170.0	33.7	34.3	20.3	14.0	59.2	82.1
1962	197.6	163.7	33.9	32.6	19.6	12.9	60.3	79.7
1963	207.9	173.8	34.1	33.7	20.6	13.1	61.1	83.8
1964	218.7	184.4	34.3	34.7	21.6	13.1	62.3	88.0
1965	214.0	180.3	33.7	34.2	21.1	13.1	61.7	85.1
1966	220.4	186.8	33.6	35.3	21.7	13.6	61.4	86.2
1967	222.4	187.5	34.9	36.3	21.8	14.6	59.9	85.5
Poland:								
1955	103.0	1.4	101.6	32.9	3.8	29.1	11.5	14.3
1956	120.8	18.9	101.9	32.4	4.3	28.0	13.4	16.7
1957	121.8	36.4	85.4	31.9	4.3	27.6	13.5	16.9
1958	126.4	44.2	82.2	30.7	4.4	26.3	14.3	17.6
1959	161.5	79.0	82.5	30.2	5.5	24.7	18.3	22.6
1960	233.3	158.0	75.3	30.5	7.9	22.6	25.8	32.7
1961	229.5	155.3	74.2	28.6	7.7	20.9	26.8	32.1
1962	271.8	199.4	72.4	28.7	9.0	19.8	31.2	37.6
1963	260.3	190.0	70.3	27.6	8.5	19.2	30.7	35.5
1964	246.8	177.5	69.3	26.0	7.9	18.1	30.5	33.1
1965	234.6	168.1	66.5	24.8	7.4	17.3	30.0	30.8
1966	222.2	156.7	65.5	23.7	7.0	16.7	29.5	28.5

[1] Legal abortions are those induced in accordance with the provisions of the various laws. Other abortions are those treated in a hospital which are spontaneous (miscarriages) or illegal (i.e., performed without legal authorization).
[2] All abortions and live births.
[3] Not available.

Source of data on number of abortions—Bulgaria: Total, 1953–63—Chantal Blayo, "The Population of the European Socialist Countries: Other Aspects of the Demographic Evolution," *Population*, no. 5, September–October 1966, pp. 992–993. 1964–66: K. H. Mehlan, "Changing Patterns of Abortions in the Socialist Countries of Europe," paper presented at the International Conference on Abortion, Hot Springs, Virginia, November 17–20, 1968. Legal, 1953–54, 1957–63—Blayo *op. cit.*, pp. 992–993. 1956, 1964–66—Mehlan, *op. cit.* Other, total minus legal. Czechoslovakia: Total, legal, other, 1953–57—Blayo, *op. cit.*, pp. 992–993. 1958–67—Tomáš Frejka and Josef Koubek, "Abortions in Czechoslovakia," *Bevolkning en Gezin* (*Population and Family*), no. 16, December 1968, p. 25. Hungary: All data—Központi Statisztikai Hivatal, *Demográfiai Évkönyv 1967: Magyarország Népesedése* (*Demographic Yearbook 1967: The Population of Hungary*), p. 110. Poland: Total and legal, 1955–58—Blayo, *op. cit.*, pp. 992–993. 1959–66—Mehlan, *op. cit.* Other, total minus legal.

In *Bulgaria*, the annual number of spontaneous and illegal abortions has varied between 14,500 and 21,600 since 1953, but the number of legal abortions has risen each year to reach 101,000 in 1966. The drop in the birth rate caused the Government to revise its abortion law in December 1967. In the words of the decree, the change was made "in order to create favorable conditions for promoting the birth rate and increasing the population." [26] According to provisions of the decree, abortion on demand is permitted only when the woman is over 45 years of age or when she has three or more children. Interruption of pregnancy is prohibited in the case of a woman without a living child, except for a serious medical or social indication as established by a women's health center. A woman with one child or two children must apply to a commission of three physicians which is to make every effort to dissuade her from having her pregnancy interrupted, but which nonetheless must grant its approval if the woman persists.[27]

In *Czechoslovakia*, legislation legalizing abortion for nonmedical reasons was preceded by 2 years of public discussion. Moderate increases in the number of legal abortions in 1956 and 1957 reflect the changing attitude of the medical profession. Promulgation of the new law in December 1957 was followed in 1958 by a steep rise in the number of legal abortions which continued at a decelerating pace until 1961. The trend was then reversed for the next 2 years when concern with the declining birth rate resulted in tightening the regulations of the 1957 law. Since then, the number of abortions has continued to increase, and in 1967 some 36 percent of all pregnancies were terminated by abortion.

In *Hungary*, rigorous efforts to enforce existing laws against criminal abortion in 1952 and 1953 were followed by an increase in the birth rate in 1953 and 1954. At about that time, medical boards for the authorization of therapeutic abortions were established, and the growing number of legal abortions after 1953 indicates the progressive liberalization of the policies of these boards. After the decree of June 3, 1956, had introduced termination of pregnancy on request, the number of abortions increased rapidly to reach 222,000 in 1967, exceeding the number of births by 74,000.

The 1956 law in *Poland* was obscurely announced, certain of its provisions were subject to various interpretations, the Catholic Church carried on a campaign against it, and numerous doctors boycotted it

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[26] Decree No. 61, *in* Bulgaria. Narodno sŭbranie. *Dŭrzhaven vestnik* (*State Gazette*), Sofia, January 9, 1968, pp. 1, 2.
[27] Christopher Tietze and Sarah Lewit, "Abortion," *Scientific American*, vol. 220, no. 1, January 1969, pp. 25, 26.

by continuously demanding new documents certifying poor living conditions.[28] For these reasons, the number of legal abortions, although increasing from 19,000 in 1956 to 79,000 in 1959, did not jump as radically as it did in the other three countries. It was only after the law was modified in 1960 that the number increased sharply, to reach a peak of 199,000 in 1962. Since then, the reported numbers of both legal and other abortions have decreased. The birth rate has declined during this period as well, and it therefore could be surmised that contraception, which has been promoted vigorously, has to some extent supplanted abortion as the principal device for implementing family planning. This can be no more than a surmise, however, because of the acknowledged underreporting of abortions by physicians.

Statistics on abortions in *Rumania* are fragmentary. There have been reports in the literature that 112,000 abortions were performed in 1958, the first full year after abortions were legalized, and 219,000 in 1959.[29] After that, no data appeared until the startling figure of 1,115,000 was announced for 1965—a total of four abortions for each live birth, the highest incidence of abortion ever reported. Although this truly extraordinary figure cannot be evaluated, it certainly was accepted by the Rumanian Government because a set of severe measures were adopted in October 1966 "to regulate abortions and promote the birth rate," [30] which had fallen to 14.3 per 1,000 population in 1966. These new measures included restrictions on divorce, increased taxes on persons over age 25 without children, subsidies to families with three or more children, housing priorities to families with the largest number of children, and the prohibition of abortions in all but exceptional circumstances. Aside from the usual medical, eugenic, and humanitarian indications, interruption of pregnancy was to be allowed only if the woman was 45 years of age or older or if she already had four children.[31] As a result of these measures, the number of abortions reportedly dropped in 1967 to one-fifth of its 1965 level. The birth rate jumped from 12.1 per 1,000 in December 1966 to 17.8 in April 1967, to 29.9 in June, and to 39.9 in September. Since that time, as may be seen in Figure 4, it has been declining, presumably because of increasing recourse to contraception and/or illegal abortion. The rate stood at 25.0 per 1,000 in February 1969, the latest date for which figures are available.

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[28] M. C. Miklasz, "The Polish Population: Political Doctrines and the Religious Conflict," *Population*, vol. 15, no. 2, pp. 322–324.
[29] Tietze, *op. cit.*
[30] General Report by the Ministry of Health, "Analysis of the Health of the Population and Measures to Perfect the Organization of the Health Network," *Muncă* (*Labor*), Bucharest, October 29, 1968.
[31] *Scînteia* (*Spark*), Bucharest, October 2, 1966.

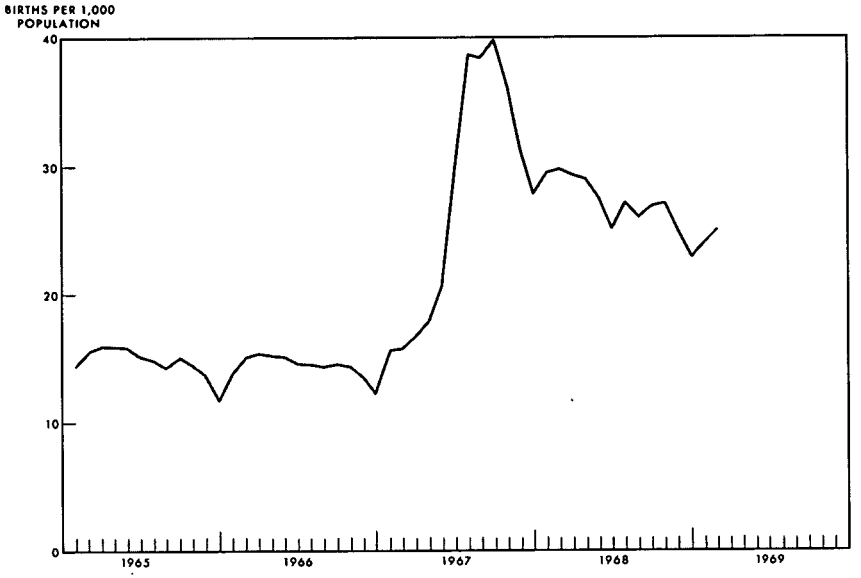

Figure 4.--Birth rate, by month--Rumania: 1965 to 1969

The Rumanian situation, as described above, is a clear-cut case of a population having been almost completely dependent on abortion as its means of birth control. The pregnancy rate at least doubled between 1959 and 1965, if the number of abortions reported in 1959 is close to actuality, and probably declined to about the 1959 level in 1967. There is evidence from the data given for Bulgaria, Czechoslovakia, and Hungary in Figure 3 and Table 10 that the pregnancy rates in these countries have also increased since their abortion policies were liberalized. We cannot be sure, however, that the increases in these countries are not more apparent than real, being due at least partially to the decline of illegal abortions.[32] Nonetheless, it is probable that there have been substantial rises in the pregnancy rates for Bulgarian and Hungarian women, due to an increased reliance on abortion as the means of birth control.

[32] The estimated number of illegal abortions in Hungary before liberalization has been put at 100,000 per year. Károly Milténvi and Egon Szabady, "The Problem of Abortions in Hungary; Demographic and Health Aspects," *Demográfia* (*Demography*), vol. VII, no. 2, 1964, p. 309. It was estimated before the law was passed in Czechoslovakia that 100,000 to 140,000 abortions would have to be performed each year to substitute legal for illegal abortions. Potts, *op. cit.*, p. 241.

It seems clear that the legalization of abortion has had a depressant effect on the birth rate of the six countries considered here. Although data are not available for East Germany to test adequately the relationship between the levels of abortions and births, and the relationship is a very ambiguous one for Poland, it is equally unambiguous for Rumania. For the other three countries, the mirror-images of the birth rate and the abortion rate, although distorted to some degree, are striking. Tietze came to the same conclusion based on differences in the trend of the birth rates in these countries and those in countries of Western Europe which had not legalized abortion.[33] The most positive statement concerning this relationship has recently come from a Bulgarian source:[34]

> We have no grounds for seeking the reasons for the progressive drop in the absolute number of births in the level of marriages or in the decline of women in childbearing ages nor in any restriction of their reproductive capacity. The mass artificial interruption of pregnancy, voluntarily or criminally achieved, is the mechanism which today has a powerful regulating effect on the birth rate and which to a great extent determines the level of the birth rate.

This is not to say that abortion is the cause for the declining birth rate, but rather that it constitutes an important means of effecting family planning today in Bulgaria, Czechoslovakia, Hungary, and Rumania. There is much concern in these four countries regarding the low level of natural increase, and indeed Bulgaria and Rumania have acted to depress their abortion rates and raise their birth rates. It is too early to say whether this will be effective for Bulgaria. Certainly the step has been effective in the short run for Rumania, but again it is too early to determine whether it will be so over the long run. Czechoslovakia and Hungary probably are watching the trend of the Rumanian birth rate with great interest as a possible criterion of the effectiveness of a change in abortion policy in their countries, although a recent observer on the scene in these countries reports that a change in abortion policies is not expected. Certainly their abortion rates are increasing quite slowly, and they must balance off the need for an adequate birth rate with the need for women to participate in the labor force. Also, they know that the levels of contraceptive knowledge and use in their countries are far above those of Rumania and that modern contraceptives, available anywhere in the two countries, would be in much greater demand and used much more effectively if new legislation were to curtail or prevent abortions. No policy change in Poland is anticipated because the level of abortions is relatively low, and there is no manpower shortage. In fact, the natural increase rate of 8.7 per 1,000 attained in 1968 may be considered by the Poles as nearly optimum. The secretary of the Polish Academy of Sciences committee on demographic sciences has recently written that demographic relationships should be

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[33] Christopher Tietze, "The Demographic Significance of Legal Abortion in Eastern Europe," paper presented at the meeting of the Population Association of America, July 1963.

[34] Khr. Petkov, "Features of the Demographic Situation in Bulgaria," *Khigiena i zdraveopazvane (Hygiene and Public Health)*, vol. XI, no. 2, 1968, p. 92.

such as to guarantee a natural increase rate of 0.5 to 1.0 percent per year by the end of this century.[35]

In the meantime, despite their sanction of abortions, the governments of the six countries pursue a pronatalist policy in the sense that each has a family allowance system, each makes awards to help defray the cost of having a baby, and each has special provisions for working mothers, including paid maternity leave. Also, each has actively pursued a policy of providing child-care facilities and of improving its poor and inadequate housing. There is a general recognition in these countries that as much as possible needs to be done in all areas to ease the burden of having children, and all of the countries but Poland have moved ahead in this direction. In Rumania, as was indicated above, the measures introduced in late 1966 are strongly pronatalist. At the time Bulgaria revised its abortion law in December 1967, it also increased maternity benefits, family allowances, taxes on those without children, and the leave of absence from work for pregnancy and childbirth, and gave preferential treatment to families with three or more children in housing, loans, hiring help, placement of children in child-care facilities, and scholarships.[36] Czechoslovakia strengthened its pronatalist programs in 1968, and family allowances were increased in East Germany and Hungary in 1967. Whether or not these recent measures will significantly alter the course and level of the various birth rates is impossible to say. It is clear, however, that those measures in effect in earlier years did not deter the birth rates from falling to very low levels.

IV. Distribution of the Population

DENSITY

The countries of Eastern Europe occupy 382,000 square miles of territory, an area comprising approximately 20 percent of Europe west of the U.S.S.R., and equivalent in size to the three states of Louisiana, Oklahoma, and Texas combined. Poland, the largest of the six countries, has 121,000 square miles and is the sixth largest country in Europe, but is still less than half the size of Texas. Hungary, the smallest of the six, has 36,000 square miles and is just half the size of Oklahoma.

An estimated population of 101.7 million lived in Eastern Europe at the beginning of 1968, giving the region an average density of 266 persons per square mile (Table 11). More than 10 times as densely settled as the U.S.S.R., the region as a whole is 10 percent more densely settled than Europe as a whole. The six countries constituting Eastern Europe hold a central position on the density scale for all European countries, ranking substantially below the densities in Belgium, the Netherlands, the Federal Republic of Germany, and the United Kingdom, and well above those in Norway, Finland, and Sweden. Densities within the bloc range from a low of 195 persons per square mile in Bulgaria to a high of 409 persons per square mile in East Germany.

[35] Jerzy Z. Holzer, *Polityka (Policy)*, Warsaw, May 31, 1969.
[36] Decree No. 61, *op. cit.*, pp. 1, 2.

Poland, the most populous of the six countries, had the same density as the average for the region. Czechoslovakia and Hungary, in addition to East Germany, had densities well above the regional average, whereas Rumania and Bulgaria had densities significantly below the regional average.

TABLE 11.—AREA, POPULATION, AND POPULATION DENSITY—REGIONS AND SELECTED COUNTRIES OF EUROPE 1950 AND 1968

Country and region	Area (square miles)	Population (in thousands)		Population per square mile	
		Jan. 1, 1950	Jan. 1, 1968	1950	1968
Europe total	1,877,730	389,920	452,887	208	241
Eastern Europe	382,102	88,060	101,699	230	266
Bulgaria	42,683	7,228	8,335	169	195
Czechoslovakia	49,371	12,340	14,333	250	290
East Germany	41,766	[1] 18,388	17,090	440	409
Hungary	35,919	9,293	10,236	259	285
Poland	120,664	24,613	32,163	204	267
Rumania	91,699	16,198	19,542	177	213
Southern Europe [2]	507,628	107,981	125,405	213	247
Northern and Western Europe [2]	988,000	193,879	225,783	196	229

[1] Census of Aug. 31, 1950.
[2] For the countries included, see Table 1, footnotes 1 and 2.

Except in Hungary, where 15 to 20 percent of the population live in scattered dwellings and settlements removed from commune centers, almost all the population of Eastern Europe live in villages, towns, or cities. Both isolated farmsteads and extensive suburban development around towns and cities are uncommon. The location of these populated places and therefore the density patterns within each country are dependent on topography, climate, soil fertility, and the relative level of economic and commercial development. In all cases, the highest population densities are in and around cities and other industrialized areas, and the lowest in the mountainous and swampy areas and in other places where the soil is poor.

In *Bulgaria*, the areas of highest density, aside from cities, are in the Danubian Tableland and the Maritsa Basin, which constitute parallel zones north and south of the Balkan Mountains that stretch across the middle of the country. The areas of lowest density are in the Rila and Pirin Mountains, which form the Western Rhodopes in the southwestern part of the country; in the Balkan Mountains; and in the Strandzha Mountains in the southeastern corner.

Czechoslovakia has three distinct geographic regions which correspond roughly with Bohemia and Moravia, which together constitute the Czech Lands, and Slovakia. Bohemia, in the west, consists primarily of a plateau, and is characterized by abrupt contrasts in relief. Slovakia, in the east, is almost entirely mountainous except for a small section of the Danube Plain lying behind Bratislava in the extreme south. Between Bohemia and Slovakia lies the Moravian depression, consisting of a central plain which gives way to hills in the east and west. With 324 persons per square mile in 1968, density in the Czech Lands was 37 percent higher than the 236 persons per square mile in Slovakia. The highest densities outside of cities were along the border with East Germany, in the Moravian depression at the center of the

country, and in the Danube Basin. The areas of lowest density were in southwestern Bohemia and eastern Slovakia.

The northern two-thirds of *East Germany*, which is predominantly agricultural, is the least densely settled part of the country. With the exception of East Berlin and its surrounding counties and the concentrations of population in Rostock, Schwerin, Stralsund, and Wismar in the north, the most densely settled areas are the industrial districts of the south. Here, in a triangle bounded by the Czechoslovak border and by the Elbe River Basin, densities are extremely high. The district of Karl-Marx-Stadt, in the extreme south, has more than 900 persons per square mile.

Aside from the concentration in and around Budapest, the population of *Hungary* is rather evenly distributed throughout the country. The areas of highest density are located in the north, and those of lowest density are in the Transdanubian region southwest of Budapest. Densities in the Great Hungarian Plain south and east of Budapest are quite even and approximate those of the country as a whole.

Population density patterns in *Poland* in general follow those in East Germany—low in the north and increasingly high toward the south. A belt of low density stretches across the entire northern third of the country, and just south of this belt is a large area of moderate density. Concentrations of population are highest along the southern border which contains the Upper Silesian industrial complex and the country's most productive agricultural land.

The population of *Rumania* is divided into two major aggregations by the Carpathian Mountain range, which extends from the north-central border southward into the heart of the country, then turns westward and crosses the border into Yugoslavia. Heaviest population settlement is in the arc of plains along the southern and eastern borders in the traditional regions of Walachia and Moldavia. The second area of dense settlement is north and west of the Carpathians in the Someş Plateau of Transylvania, along the Someş River to the Hungarian Plain, and in the westernmost part of the Banat. The most sparsely settled parts of the country are in and along the curve of the Carpathians and in the lowlands of Dobrudja.

URBANIZATION

The process of urbanization has proceeded steadily and rapidly in postwar Eastern Europe. Since 1946, the urban population of the entire region has increased by 16.8 million, and the proportion of the total population that is urban has increased from about 41 percent to nearly 52 percent. During the same period, the rural population has declined by 2.6 million. The magnitude of this change in composition is particularly impressive when viewed against the background of the destruction of cities during the war, chronic housing shortages, and, in some of the countries, stringent controls on population movements.

These regional figures are based on a summation of those for all six countries as given in Table 12. The figures for each country refer to different dates and to the definition used in that country as to what constitutes an urban or rural place. It is not possible to adjust the data to make them comparable in terms of definition or of time period, and these shortcomings must be held in mind in the discussion to follow.

Of the two, the differences in definition is the more serious. In two of the countries, Czechoslovakia and East Germany, an urban place is determined by the criterion of size—communes of 2,000 or more inhabitants are counted as urban. In the other four countries, a legal concept, rather than the criterion of size, is the factor used to distinguish urban and rural populations, and this concept differs from one country to another. Although size is one of the bases for classifying inhabited places as urban, a legal or administrative act determines the classification, and function is the paramount consideration. It should also be noted that the series of urban data for Poland and Rumania are not based on the same concept throughout the period. In 1954, Poland added 103 workers' settlements near industrial plants, health resorts, and fishing settlements to its list of urban places. Between the 1948 and 1956 censuses, Rumania added to its list 183 "city-like villages" which had a combined population of 728,000. A further change in definition occurred at the time of the 1966 census when an additional 900,000 persons were shifted to the urban population by fiat.[37]

TABLE 12.—TOTAL, URBAN, AND RURAL POPULATION—SIX EASTERN EUROPEAN COUNTRIES: POSTWAR PERIOD

[Absolute figures in thousands. Urban and rural populations may not add to totals because of independent rounding]

Country and date	Total	Urban				Rural		
		Number	Percent of total	Net change since preceding date		Number	Net change since preceding date	
				Number	Percent		Number	Percent
Bulgaria:								
Dec. 31, 1946	7,029	1,735	25	(1)	(1)	5,294	(1)	(1)
Dec. 1, 1956	7,614	2,556	34	821	47	5,058	−237	−4
Dec. 1, 1965	8,228	3,823	−46	1,267	50	4,405	−653	−13
Czechoslovakia:								
July 1, 1950	12,389	6,363	51	(1)	(1)	6,026	(1)	(1)
July 1, 1955	13,093	6,978	53	615	10	6,115	89	2
July 1, 1965	14,159	8,602	61	1,624	23	5,557	−558	−9
East Germany:								
Oct. 29, 1946	18,355	12,415	68	(1)	(1)	5,940	(1)	(1)
Dec. 31, 1955	17,832	12,772	72	357	3	5,060	−880	−15
Dec. 31, 1967	17,090	12,508	73	−265	−2	4,582	−478	−9
Hungary:								
Jan. 31, 1949	9,205	3,341	36	(1)	(1)	5,864	(1)	(1)
Jan. 1, 1960	9,961	3,958	40	618	18	6,003	139	2
Jan. 1, 1963	10,072	4,208	42	249	6	5,864	−139	−2
Poland:								
Feb. 14, 1946 [2]	23,626	7,517	32	(1)	(1)	16,109	(1)	(1)
Dec. 31, 1954	27,012	11,316	42	3,799	50	15,696	−413	−3
Dec. 31, 1967	32,163	16,367	51	5,051	45	15,796	100	1
Rumania:								
Jan. 25, 1948	15,873	3,713	23	(1)	(1)	12,159	(1)	(1)
Feb. 21, 1956	17,489	5,474	31	1,761	47	12,015	−144	−1
July 1, 1965	19,027	6,418	34	943	17	12,610	595	5

[1] Not applicable.
[2] Excludes 304,000 persons not classified by residence.

About 1930, the average proportion of the population that was urban in the six countries was between 30 and 35 percent. That part of Germany now identified as East Germany was by far the most urbanized, as about 68 percent of its population lived in places of 2,000 or more inhabitants. In all the other countries, however, less than half the population was urban, and in three of them the proportion was less than 30 percent. The 1930's were not marked by significant urban gains because there were few job opportunities in the

[37] This latter change does not affect the data presented here because the series in Table 12 stops at midyear 1965.

cities in this depression decade. This situation, combined with little opportunity to migrate to foreign countries, led to increasingly chronic under-employment in the countryside—especially in Poland. During World War II, urban growth was still restricted, and in certain cases there actually was some decline; in these localities, the growth immediately following the war resulted essentially from the return of people dispersed during hostilities.

Since the return to normalcy, however, the increase in the urban population of three of these countries—Bulgaria, Poland, and Rumania—has been striking. Starting from the three lowest positions on the urban-rural scale, Rumania, with 23 percent urban in 1948, has increased its urban population by 73 percent; Bulgaria, with 25 percent urban in 1946, has increased its urban population by 120 percent; and Poland, with 32 percent urban in 1946, has increased its urban population by 118 percent. Czechoslovakia, Hungary, and East Germany, with higher proportions urban to start with, had much smaller gains—35, 26, and 1 percent, respectively. Of the total urban increase of 16.8 million, the 8.8 million growth in Poland represented 52 percent. Four of the countries lost rural population during the postwar period; the most notable was East Germany, which had 53 percent of the total loss of 2.6 million. Hungary had the same rural population in 1963 as in 1949, and Rumania had a net gain of 451,000 in its rural population.

As indicated by the data in Table 12, gains in the urban population in each of these countries were relatively even throughout the postwar period. For the region as a whole, the urban population increased by 8.0 million, or 23 percent during the first half of the period, and by 8.8 million, or 21 percent during the last half. Conversely, the rural population decreased by approximately 1.5 million and 1.1 million in each half, respectively.

The capital city of each of the six countries of Eastern Europe has by far the largest population of all cities in its respective country (Table 13). Sofia had a population of 801,000 in 1965 and each of the other five capitals had over 1 million. Sofia has more than three and one-half times the population of any other city in Bulgaria, and one-fourth more people than all other cities of more than 100,000 population combined. Prague has three times the population of Brno, the second largest city in Czechoslovakia, and is larger than the next three cities combined. Budapest has 11 times the population of Miskolc, the next largest city in Hungary and more than 3 times the combined population of all other cities of 100,000 or more. Bucharest has more than six times the population of the next largest city in Rumania and almost as many people as the next eight cities combined. In East Germany and Poland, the capitals are relatively smaller. Leipzig and Dresden together have as many people as East Berlin, and there are 10 cities of 100,000 to 600,000 population. Warsaw is less than twice as large as Łódź, and Kraków and Łódź, together have as many people as Warsaw. The relative standing of four of the capitals today is not significantly different from what it was in the 1930's, although Sofia, Budapest, and Bucharest have grown somewhat faster and Prague somewhat slower than the other cities which now have 100,000 or more. Warsaw, however, is now only 9 percent larger than it was in 1931, whereas Poland's other cities of 100,000 or more in 1967 have grown by 54 percent overall. East Berlin has declined by 32 percent since 1939, but the other cities of East Germany have declined by only 6 percent.

TABLE 13.—POPULATION OF CITIES OF 100,000—SIX EASTERN EUROPEAN COUNTRIES: SELECTED YEARS

[Absolute figures in thousands]

Country and city	Number			Percent change		
	Pre-World War II	Early postwar	Present	Prewar to early postwar	Early postwar to present	Prewar to present
Bulgaria (1934, 1946, 1965):						
Sofia	287	367	801	28	118	179
Plovdiv	100	127	223	27	76	123
Varna	70	77	180	10	134	158
Ruse	49	54	129	8	141	161
Burgas	36	44	106	23	139	193
Czechoslovakia (1930, 1950, 1967): [1]						
Prague	849	933	1,035	10	11	22
Brno	272	285	335	5	18	23
Bratislava	156	193	281	24	46	80
Ostrava	187	184	272	−2	48	45
Plzeň	131	124	144	−5	16	10
Košice	70	63	118	−10	87	69
East Germany (1939, 1946, 1967):						
East Berlin	1,588	1,175	1,082	−26	−8	−32
Leipzig	707	608	592	−14	−3	−16
Dresden	630	468	500	−26	7	−21
Karl-Marx-Stadt	338	250	295	−26	18	−13
Magdeburg	337	236	268	−30	14	−20
Halle/Saale	220	223	266	1	19	21
Erfurt	166	175	193	5	10	16
Rostock	121	115	189	−5	64	56
Zwickau	85	123	128	45	4	51
Potsdam	136	114	111	−16	−3	−18
Gera	83	89	109	7	22	31
Hungary (1930, 1949, 1968):						
Budapest	1,006	1,590	1,990	58	25	98
Miskolc	62	109	180	77	65	192
Debrecen	117	111	150	−5	35	28
Pécs	62	88	140	43	58	127
Szeged	135	87	120	−36	38	−11
Poland (1931, 1946, 1967):						
Warsaw	1,172	479	1,283	−59	168	9
Łódź	605	497	750	−18	51	24
Kraków	219	299	540	36	80	146
Wrocław	625	171	487	−73	185	−22
Poznań	246	268	447	9	67	81
Gdańsk	[2] 235	118	334	−50	183	42
Szczecin	271	73	322	−73	341	19
Katowice	126	128	292	2	128	132
Bydgoszcz	117	135	264	15	96	125
Lublin	112	99	212	−11	113	89
Zabrze	130	104	198	−20	90	52
Bytom	101	93	191	−7	105	90
Częstochowa	117	101	179	−14	77	53
Gdynia	33	78	172	134	121	418
Gliwice	111	96	165	−14	72	49
Chorzów	102	111	153	8	38	50
Białystok	91	57	149	−38	162	64
Radom	78	69	148	−11	113	90
Sosnowiec	109	78	143	−28	84	31
Ruda Śląska	[3]	[3]	143	[3]	[3]	[3]
Wałbrzych	47	73	127	55	74	170
Toruń	54	68	118	26	73	118
Kielce	58	50	113	−14	126	94
Rumania (1930, 1948, 1966): [1]						
Bucharest	639	1,042	1,511	63	45	136
Braşov	59	83	240	40	190	306
Cluj	101	118	223	17	89	121
Constanţa	59	79	199	33	154	237
Iaşi	103	94	195	−9	107	89
Timişoara	92	112	193	22	72	111
Ploieşti	79	96	191	21	99	141
Craiova	63	85	173	34	105	174
Galaţi	101	80	151	−20	88	50
Brăila	68	96	144	40	51	111
Arad	77	87	137	13	57	77
Oradea	83	82	135	0	64	63
Sibiu	49	61	110	23	81	122
Tîrgu-Mureş	39	47	105	22	123	172

[1] Data include population of suburbs under the administration of the cities.
[2] Figure refers to 1929.
[3] Not available.

The middle-sized cities have in general been growing more rapidly than the large or small places during the postwar period, although the pattern of population growth or decline by size class varies greatly between the five countries (i.e., excluding Poland) for which data are available. In each instance, the number living in places of less than 2,000 population has either remained stationary or declined, and the number living in places of 20,000 to 100,000 has increased more rapidly than that in any other size class. In Bulgaria, the population declined in places of under 5,000 but increased by about one-third in those of 5,000 to 20,000 and by 160 percent in those above 20,000. In Czechoslovakia, the population in places from 2,000 to 50,000 grew by 20 to 30 percent, but growth was much higher in places of 50,000 to 100,000. East Germany lost population in places with less than 10,000 population but gained in larger places, especially in those of 20,000 to 50,000. Hungary's population grew at the national rate in places of 2,000 to 5,000 and 10,000 to 20,000, declined slightly or remained stationary in others of less than 50,000, and showed the fastest growth in those above that size, especially in the 50,000 to 100,000 category. Finally, Rumania's population declined in places of under 5,000 and of 50,000 and 100,000, but grew fastest in places of 20,000 to 50,000.

Unlike the data on the growth of cities having a present population of 100,000 or more, these figures on smaller-sized places do not pertain to constant universes, and many of the vagaries of growth or decline by size class are due to the transfer of places from one size class to another. Despite this, however, the broad picture of population declines in the smallest places, and of gains in the middle-sized places, accompanied by lesser gains in the largest places, is valid. Some of the most rapidly growing middle-sized towns and cities are centers of mining or intense industrial activity which have played a major role in the industrialization of these countries. Pernik (formerly Dimitrovo), Kŭrdzhali, Dimitrovgrad, Madan, and Rudozem in Bulgaria, Havířov in Czechoslovakia, Eisenhüttenstadt, Hoyerswerda, and Lübbenau in East Germany, Nowa Huta in Poland, and Hunedoara, Medgidia, and Baia-Mare in Rumania are examples of such places which have developed from nothing or from small villages during the past 20 years. Among the largest cities, the most rapid growth during the postwar period occurred in Varna, Ruse, and Burgas in Bulgaria, Košice in Czechoslovakia, Rostock in East Germany, Miskolc in Hungary, Szczecin, Wrocław, Gdańsk, and Białystok in Poland, and Braşov and Constanţa in Rumania.

Government policy is evident not only in the establishment and development of new towns but also in the pattern of change in the population of places of all sizes. Bulgaria and Rumania, for example, have been pursuing a policy of locating industrial activities throughout the country rather than in the large established cities, and Czechoslovakia has acted in various ways to regulate the growth of its largest cities. More generally, however, government policies respecting socialization and collectivization of agriculture, industrialization, and the location and amount of new housing have been decisive in determining the direction and intensity of internal migration—the principal factor in the growth or decline of most places.

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Only rough estimates can be made of the three components of change in the urban population during the postwar period—natural increase, in-migration, and reclassification. Data on the last component must be derived as a residual because less is reported and known about it than about the other two. Natural increase can be calculated on the basis of the assumption, which is not unreasonable, that it was the same for the urban as for the rural population. On this basis, natural increase would have amounted to 4.0 million persons, or 24 percent of the total urban increase of 16.8 million. Net in-migration can be very roughly calculated at about 7.3 million, or 43 percent of the total urban increase, by extrapolating data reported for various parts of the total time period for each country.[38] Summing these estimates leaves a total of 5.5 million persons, or one-third of the total increase in urban population, as a residual estimate of the amount of increase due to reclassification.

Net in-migration of the order of magnitude shown above does not indicate the sizable volume of migration between communes that actually took place during these years. The innumerable flows of population within each country are undocumented for the most part, and therefore few figures have been published; those that have been released show clearly that the bulk of the movement consisted of persons who changed their residence from one rural area to another or from one urban area to another, and therefore did not count in the numbers who moved from rural to urban areas and vice versa. A good series of data for Hungary shows, for example, that in the 8 years 1960–67, some 2.6 million persons made a permanent change in their commune of residence, with a resultant net increase of 349,000 in the urban population.

As a result of the destruction of urban places during World War II, the rapid urban growth since that time, and the relatively low priority given to the construction of new housing, a persistent problem of the last two decades in all Eastern European countries has been a shortage of urban housing. This shortage imparts a distinctive quality to the general process of urban development in Eastern Europe. No other shortage, among the whole constellation of shortages stemming from the priority given to industrial growth, has effects on the social fabric so far-reaching or creates problems so deep-seated.[39]

The acuteness of the housing shortage need not be documented here, but the amount of attention given to the problem by officials, social investigators, and the residents themselves attests to the impact which

[38] Except for Rumania, all sources given below are papers presented at the World Population Conference, Belgrade, 1965. Net migration to urban areas in Bulgaria averaged 57,000 annually during the 1947–56 intercensal period and 80,000 between 1960 and 1964 (Ivan Stefanov, "Characterization of the Main Migration Flows in the People's Republic of Bulgaria"). For Czechoslovakia, the annual average net migration to places of 2,000 inhabitants or more was 42.000 for the 1955–59 period and 69,000 for the 1960–62 period (Vladimír Srb and Milan Kučera, "Urbanization and Population in Czechoslovakia"). Data for East Germany are available only for 1962 and 1963. In 1962, there was a net in-migration of 24,000 to places of 2,000 inhabitants or more (Louis L. Thirring, "Internal Migration in Hungary and Some Central European Countries"), and in 1963, a net in-migration of 51,000 (Kurt Lungwitz, "On the Influence Exerted by Inland Migration on the Changes in the Age Structure of the Urban and Rural Population and on the Consequences Resulting Therefrom for the Labour Situation in the Country"). For Hungary, 342.000 were added to the urban population through migration between 1955 and 1963 (Thirring, *op. cit.*). For Poland, net in-migration rates per 1,000 of the urban population are given for the 11 years, 1952–62 (Stanislaus Borowski, "New Forms and Factors Affecting Rural-Urban Migration in Poland"). And finally, it has been reported that Rumania's urban population increased by one-half million through migration during the 1958–64 period (C. Grigorescu, "The Role of Labor Force Utilization in the Geographic Distribution of Industry," *Probleme Economice* (*Economic Problems*), no. 10, October 1966, p. 52).

[39] Jerry W. Combs, Jr., "Urbanization in Eastern Europe," paper presented at the meeting of the American Sociological Association, August 1965.

it is having. The National Population Commission of Czechoslovakia conducted a study in 1968 of 1,886 couples throughout Czechoslovakia who had been married 3 years. It was found that only 51 percent of the couples had their own apartment, and one-fourth of these consisted of but a single room. Four out of every 10 couples living with others had no idea of how their plans for a private residence could materialize. These findings are consistent with those of the 1961 census, which showed that 58 percent of families in which the wife was less than 30 years old shared a dwelling with others.[40] An account of the housing situation in Budapest in 1966 indicated that housing officials there tried to balance 110,000 fully certified apartment applications against 4–5,000 units available. Contradictory rules and decisions have left many residents feeling that the entire housing situation "is a hotbed of corruption, injustice, patronage, etc." [41]

Although the extent to which the housing shortage has slowed the growth of the urban population cannot be judged, it has undoubtedly reduced the number of persons who would normally live in cities. There are frequent references in the literature to worker-peasant households—i.e., those households still located in the villages and oriented to agriculture which have members, usually the head of the household, who commute to urban jobs. Czechoslovak data from the 1961 census revealed that 49.6 percent of all male workers and employees and 31.5 percent of all female workers and employees commuted to work in another community.[42] In Poland, 24.5 percent of all farm families in 1960 had some family member employed full-time outside of agricuture.[43]

Many of the social effects which may be attributed to the housing shortage belong to a complex in which other social influences also play an important role. Nevertheless, crowding in cities is acknowledged as being an important factor both in keeping the marriage rate low and in the increase of divorce and abortion rates. Divorce rates calculated on the basic of 1,000 marriages during the previous 10 years indicate that the rates for Poland, Bulgaria, Czechoslovakia, and Hungary have increase by 70 to 80 percent in the recent past. Poland's rate rose from 5.6 (per 1,000 marriages during the previous 10 years) in 1960 to 10.1 in 1966. Between 1950 and 1967, the rate in Bulgaria increased from 8.3 to 14.4, in Czechoslovakia from 10.5 to 18.7, and in Hungary from 13.3 to 23.7. East Germany's rate increased at a somewhat slower pace, from 14.7 in 1960 to 18.8 in 1967, as did Rumania's, which increased from 16.1 in 1956 to 19.2 in 1965—before stringent regulations went into effect which caused the number of divorces to decline from 37,000 in 1965 to 48 in 1967. Only Czechoslovakia and Hungary have published data on the reasons women give for seeking an abortion. In Czechoslovakia, poor housing was cited by 7.5 percent of the women in 1960 and by 12.0 percent in 1965. In Hungary, this reason was given by 15.2 percent of the women in 1960 and by 16.1 percent in 1964.[44] Data reported by the Central Statistical Office of Hungary for 1964 indicate that 17 percent of the women with

[40] Zdeněk Jurečcek, "Dwelling Standard in Czechoslovakia," *Demografie (Demography)*, vol. 6, no. 4, 1964, p. 297.
[41] *East Europe*, vol. 15, no. 12, December 1966, p. 49.
[42] Zdeněk Jurečcek, "Commuting to Work," *Demografie (Demography)*, vol. 9. no. 2, 1967, p. 115.
[43] M. Pohorille, "Development and Rural Overpopulation: Some Lessons From Polish Experience," *International Labour Review*, vol. 89, no. 3, March 1964, p. 234.
[44] Potts, *op. cit.*, p. 238.

their own apartment refused to have a child; this figure rose to 36 percent among couples living with their parents or as co-tenants, and to 51 percent among those living in a furnished room.[45]

There are signs that the housing shortage is slowly being ameliorated in some countries, but it will not disappear in the near future. Meanwhile, the shortage remains a condition of urban living, and a factor that must be given weight in evaluating developments in these countries.

V. Ethnic Composition

Each of the countries of Eastern Europe is more ethnically homogeneous today than it was before the war. Table 14 shows that, as a result of the war and the subsequent population migration and transfers, there has been a great reduction in the size of minority groups in Eastern Europe. No information on the ethnic composition of the population of *East Germany* is available for periods before or since 1946, but at that time it had only 83,000 persons whose mother-tongue was other than German. The country then was probably more homogenous than before the war, and today is by far the most homogenous country in the region.

TABLE 14.—COMPOSITION OF THE POPULATION, BY MAJORITY AND MINORITY GROUP—FIVE EASTERN EUROPEAN COUNTRIES: PREWAR AND POSTWAR

[Absolute figures in thousands]

Country and year	Total	Majority group		Minority group	
		Number	Percent	Number	Percent
Bulgaria:					
1934	6,078	5,204	85.6	874	14.4
1965	8,227	7,260	88.2	967	11.8
Czechoslovakia:					
1937	14,429	10,061	69.7	4,368	30.3
1965	14,159	13,302	93.9	857	6.1
Hungary:					
1941	9,317	8,656	92.9	661	7.1
1960	9,961	9,786	98.2	175	1.8
Poland:					
1931	31,916	21,993	68.9	9,923	31.1
1964	30,940	30,487	98.5	453	1.5
Rumania:					
1930	14,281	11,118	77.9	3,163	22.1
1956	17,489	14,996	85.7	2,493	14.3

Note: Data for Bulgaria, Czechoslovakia, and Rumania are based on the classification of the population by nationality; those for Hungary and Poland on the classification by mother tongue. Prewar data for Bulgaria and Poland relate to the territory of the country in the year indicated; those for Czechoslovakia, Hungary, and Rumania relate to the present territory.

Source: Poland, 1964: S. H. Steinberg, editor, "The Statesman's Year Book, 1967–68," New York, St. Martin's Press, 1967, p. 1359. All other: From official sources.

Bulgaria is the only one of the five countries listed in Table 14 which has a minority population larger today than it was 30 years ago. Even so, the minority groups now form a slightly lower proportion of the total population. The data in the table are derived from the published results of the 3 percent sample tabulations of the December 1, 1965, census, which give data for three minority groups—Macedonians, Turks, and other. The inconsistency of Bulgarian data on nationality is exemplified by the number of Macedonians shown in

[45] Zsuzsa Ortutay, "The Birth Rate and the Family." *Társadalmi Szemle (Social Survey)*, October 1966, translated in Radio Free Europe, *Hungarian Press Survey*, no. 1753, October 20, 1966, p. 9.

this publication for the various censuses dating back to 1900. Macedonians were evidently considered to be Bulgars in every census up to 1956 since they are not shown separately. In 1956, however, they are shown as numbering 187,789, and in 1965 as numbering 8,750. The minority groups totaling 874,000 in 1934 therefore consisted of two categories—591,000 Turks and 283,000 persons of the other nationalities. In 1965, the minority population of 967,000 consisted of 747,000 Turks, 8,750 Macedonians, and 211,000 persons of other nationalities. A more explicit tabulation of the "other" nationality groups available for the 1956 census shows that they consisted largely of Gypsies—198,000 of the 264,000 "others" at that time. Smaller groups included Armenians (22,000), Russians (11,000), Greeks (7,000), and Jews (6,000). The Turkish minority grew by 26 percent during the 31 years between 1934 and 1965, despite the exodus of 154,000 in 1950 and 1951. Between 1956 and 1965, the Bulgars increased by 12 percent but the Turks increased by 14 percent as the result of their higher fertility.

Before World War II, the binational state of *Czechoslovakia* had not two major ethnic groups but three, since Germans outnumbered Slovaks by 0.9 million. In 1937, the population consisted of 7.6 million Czechs, 3.3 million Germans, 2.4 million Slovaks, and 1.1 million persons of other nationalities. Since that time, population transfers, expulsions, and more normal migration have changed the ethnic composition of the country drastically. Each of the various minority groups has been reduced in size, and the Germans have been eliminated almost entirely. There were only 165,000 remaining in 1950, and this number declined to 131,000 in 1965 as a result of natural decrease and a low level of emigration, especially to the Federal Republic of Germany. Although the number of Hungarians has been cut from 634,000 in 1937 to 553,000 in 1965, they have emerged as the largest minority group in the country. Other groups identified in 1965 are the Poles (70,000) and the Ukrainians and Russians (56,000). The number of Czechs increased to 9,223,000 and the Slovaks to 4,079,000 in 1965; these groups comprised 65 and 29 percent of the total population respectively. These data on nationality do not include the Jews or the Gypsies. The Jews are estimated to have numbered 18,000 in 1967,[46] and a special census of the Gypsies showed 218,000 at the end of 1966.[47] This census was one of the first acts taken by a Government Committee for Questions of Gypsy Population, which is to deal with the Gypsy's resistance to assimiliation into the larger society.

In *Hungary*, as in Czechoslovakia, the decline in the number of Germans has been the significant factor in increasing ethnic homogeneity. Thus, the number of Hungarians in the total population increased from 92.9 percent in 1941 to 98.2 percent in 1960. The 175,000 members of ethnic minorities remaining in 1960, according to a census question on mother-tongue, consisted of 51,000 Germans (as contrasted to 475,000 in 1941), 31,000 Czechs and Slovaks, 26,000 Gypsies (Romany), 16,000 Rumanians, and smaller numbers of other groups. These data do not identify Jews, whose numbers were estimated at 80,000 as of 1967.[48] Nor do they include all of the Gypsies in the country.

[46] American Jewish Committee, *American Jewish Yearbook*, 1968 edition, Philadelphia, The Jewish Publication Society of America, p. 510.
[47] "Gypsy Population in Czechoslovakia," *Demografie* (*Demography*), vol. 9, no. 3, 1967, pp. 276–279.
[48] American Jewish Committee, *op. cit.*, p. 514.

Various estimates have placed their numbers at about 2 percent of the population, or about 200,000.[49]

Poland has had the most drastic reduction in minority population of any of the six countries. Although the data shown in Table 14 for 1931 pertain to Poland as it existed at that time, and those for 1964 are estimates from an unofficial source, there can be no doubt that ethnic minorities have been nearly completely eliminated and that the present population is almost entirely Polish. According to *The Statesman's Year Book*, cited as the source for 1964 Polish data in Table 14, the 364,000 Ukrainians and Russians constituted 80 percent of the 453,000 minority population remaining at that time. Other relatively large minority groups included Jews (31,000),[50] Czechs and Slovaks (23,000), Gypsies (12,000), and Lithuanians (10,000). The number of Germans was given as 3,000.

Whether the estimated number of Germans is valid is not known at this time. In fact, the size of the German population in Poland has been a matter of considerable contention between Poland and the Federal Republic of Germany over the past 20 years. Much of the controversy probably can be traced to the classification by the Polish Government in 1945 of 1.3 million residents of the German territories placed under its administration as "autochthonous" Poles. The term means aboriginal, as though sprung from the soil, and its use implies that it was sufficient for a resident to have had a Polish ancestor to be classified as Polish stock. Since no more than 500,000 of the "autochthonous" Poles could have been persons, or their children, reported as Polish in the German census of 1933, the other 800,000 presumably were Germans reclassified as Poles.[51] It may be presumed that the continuous stream of emigrants from Poland to the Federal Republic of Germany consists almost entirely of these "autochthonous" Poles.

Although *Rumania* is somewhat more ethnically homogeneous today than it was in 1930, within its present boundaries, the minority population reported in the 1956 census was as large as that in the other five countries in the region combined. The principal reductions between 1930 and 1956 were those of the Germans (from 634,000 to 385,000), the Jews (from 452,000 to 146,000) and the Gypsies (from 243,000 to 104,000). The large Hungarian minority, which numbered 1,423,000 in 1930 and 1,588,000 in 1956, still constitutes the largest non-Rumanian group in the country. Other minorities in 1956 included 99,000 Ukrainians and Russians, 14,000 Turks, and 12,000 Bulgars.

In summary, since the beginning of World War II, the ethnic composition has changed only slightly in Bulgaria, moderately in Rumania, and probably moderately in East Germany. On the other hand, it has changed significantly and ethnic homogeneity substantially increased in the other three countries of the region—principally as a result of the exodus of Germans and the execution and migration of Jews. The largest minority groups present in the region today are the Turks in Bulgaria, the Hungarians in Czechoslovakia and Rumania, and the Ukrainians and Russians in Poland.

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[49] István Hoóz, "Birth Characteristics of the Gypsies in the Sellye District," *Demográfia (Demography)*, vol. VII, no. 2, p. 242.

[50] This figure is consistent with the estimate of 25,000 Jews in 1967, given in American Jewish Committee, *op. cit.*, p. 505.

[51] W. Parker Mauldin and Donald S. Akers, *The Population of Poland*, U.S. Bureau of the Census, International Population Statistics Reports, Series P–90, no. 4, Washington, D.C., 1954, p. 78.

VI. Future Growth of the Population

METHODS AND ASSUMPTIONS

The population projections presented here[52] were prepared by the cohort-component method, which involves carrying forward recently reported or estimated distributions of the population, by age and sex, to future years on the basis of various assumptions concerning fertility, mortality, and migration. For each of the countries, the most recent official age-sex distribution available was used as the base population—1965 for Rumania and Bulgaria, and 1967 for the other four countries. In each instance, the base population was updated to January 1, 1969, by using reported and estimated age-specific birth and death rates and population totals for the intervening time period.

Migration to and from Bulgaria, Czechoslovakia, Hungary, and Rumania has been negligible over the recent past, but there has been a small but persistent net emigration from East Germany and Poland. In 1967, for example, there was a reported net loss of 21,000 from Poland and an implied net loss of 8,000 from East Germany. However, since the extent of migration into and out of the six countries cannot be foreseen, migration was assumed to be negligible for each country during the projection period.

Only one assumption was made concerning the future course of mortality, namely that it will decrease at a modest rate. For each country, mortality was reduced by using life tables, selected from the various families of life tables prepared by Coale and Demeny,[53] to accord with an increase in life expectancy at birth of approximately 2.5 years between 1968 and 1990. The levels of mortality at the terminal year were represented by survival rates computed from the life tables chosen. Survival rates for the intervening years were derived by interpolation, and the rates for each year were used to calculate the numbers of deaths by age and sex for that year.

The four series of projections prepared for each country differ only as a result of varying assumptions about future fertility in that country. Series A projections assume an increase in the level of fertility; series B projections assume constant fertility at the current level; and series C and D projections assume declining fertility. The assumptions for each series were represented by an assumed maternal gross reproduction rate for each year of the projection period. These rates were used to adjust recently reported or estimated female age-specific fertility rates, which, in turn, were applied to the female population in the reproductive ages to give the projected numbers of births.

The fertility assumptions for each of the six countries are given in Table 15, both as ratios of the 1968 gross reproduction rate (which is the way the assumptions were formulated) and in terms of the gross reproduction rates those ratios imply. These assumptions can be stated as follows:

Assumption A. That the gross reproduction rate will rise from its 1968 level to that shown for 1969 and continue to increase by a constant annual amount until 1979, after which it will stabilize at the level shown until 1990.

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[52] These projections have been published in Godfrey S. Baldwin, *Projections of the Population of the Communist Countries of Eastern Europe, by Age and Sex: 1969 to 1990*, U.S. Bureau of the Census, International Population Reports, Series P–91, no. 18, Washington, D.C., December 1969.

[53] Ansley J. Coale and Paul Demeny, *Regional Model Life Tables and Stable Populations*, Princeton, N.J., Princeton University Press, 1966.

Assumption B. That the gross reproduction rate will remain constant at the 1968 level throughout the projection period.

Assumptions C and D. That the gross reproduction rate will decline from its 1968 level to that shown for 1969 and continue to decline by a constant annual amount until 1979, after which it will stabilize at the level shown until 1990.

TABLE 15.—ASSUMED GROSS REPRODUCTION RATES—SIX EASTERN EUROPEAN COUNTRIES: 1969 AND 1979–90

Country and series	Ratio of the assumed gross reproduction rate to that for 1968		Gross reproduction rate	
	1969	1979–90	1969	1979–90
Bulgaria:				
A	1.10	1.30	115	136
B	1.00	1.00	105	105
C	0.95	0.90	99	94
D	0.90	0.85	94	89
Czechoslovakia:				
A	1.10	1.30	108	127
B	1.00	1.00	98	98
C	0.95	0.90	93	88
D	0.90	0.85	88	83
East Germany:				
A	1.10	1.20	121	132
B	1.00	1.00	110	110
C	0.95	0.90	104	99
D	0.90	0.80	99	88
Hungary:				
A	1.10	1.30	109	129
B	1.00	1.00	99	99
C	0.95	0.90	94	90
D	0.90	0.85	90	85
Poland:				
A	1.10	1.20	123	135
B	1.00	1.00	112	112
C	0.95	0.90	107	101
D	0.90	0.80	101	90
Rumania:				
A	1.10	1.20	191	209
B	1.00	1.00	174	174
C	0.90	0.80	157	139
D	0.80	0.60	139	104

In formulating these assumptions, the projected changes in the gross reproduction rate for a particular country were related to the current rate for that country. For example, the 1968 rate for Czechoslovakia is very low; therefore, series A provides for a sizable 30 percent increase by 1979, and series D allows for only a 15 percent decrease. On the other hand, the current rate for Rumania is high, and the assumed changes for series A and D provide for a 20 percent increase and a 40 percent decrease, respectively, by 1979.

TOTAL POPULATION

The future population of the six Eastern European countries will be determined primarily by future levels of fertility. If fertility remains at the 1968 level, as assumed by projection series B, the total population of the six countries will increase from 102.4 million in 1969 to 112.4 million by 1980 and 120.9 million by 1990. If fertility declines, as assumed by series D, the projections show a population of 108.4 million by 1980 and 112.0 million by 1990. Projection series A, which provides for a possible rise in fertility, postulates a population as large as 129.0 million by 1990 (Table 16). The rate of population growth during each 5-year period from 1970 to 1990 is relatively constant for the first two periods but declines during the last two. For example, in the series B projection, the rates of 4.3–4.4 percent growth during the first two periods decline to 4.0 and then to 3.5 percent during the last two periods.

TABLE 16.—PROJECTED TOTAL POPULATION—SIX EASTERN EUROPEAN COUNTRIES: 1969 TO 1990

[Population figures are in thousands and relate to Jan. 1. They have been independently rounded without adjustment to group totals. See text for an explanation of the series]

Country and series	1969	1970	1975	1980	1985	1990	Percent change 1969–70	1970–75	1975–80	1980–85	1985–90	1969–90
Eastern Europe:												
A	102,382	103,377	109,099	115,849	122,567	128,961	1.0	5.5	6.2	5.8	5.2	26.0
B		103,200	107,623	112,350	116,801	120,883	0.8	4.3	4.4	4.0	3.5	18.1
C		103,086	106,729	110,305	113,476	116,244	0.7	3.5	3.4	2.9	2.4	13.5
D		102,972	105,875	108,405	110,423	112,015	0.6	2.8	2.4	1.9	1.4	9.4
Bulgaria:												
A	8,401	8,481	8,920	9,389	9,827	10,223	1.0	5.2	5.3	4.7	4.0	21.7
B		8,468	8,796	9,087	9,322	9,511	0.8	3.9	3.3	2.6	2.0	13.2
C		8,461	8,745	8,973	9,142	9,262	0.7	3.4	2.6	1.9	1.3	10.2
D		8,454	8,704	8,898	9,033	9,117	0.6	3.0	2.2	1.5	0.9	8.5
Czechoslovakia:												
A	14,403	14,486	15,008	15,634	16,200	16,716	0.6	3.6	4.2	3.6	3.2	16.1
B		14,465	14,806	15,130	15,364	15,550	0.4	2.4	2.2	1.5	1.2	8.0
C		14,454	14,722	14,942	15,065	15,141	0.4	1.9	1.5	0.8	0.5	5.1
D		14,444	14,656	14,817	14,885	14,905	0.3	1.5	1.1	0.5	0.1	3.5
East Germany:												
A	17,093	17,133	17,393	17,776	18,300	18,910	0.2	1.5	2.2	2.9	3.3	10.6
B		17,109	17,208	17,355	17,601	17,915	0.1	0.6	0.9	1.4	1.8	4.8
C		17,097	17,116	17,145	17,251	17,419	0.0	0.1	0.2	0.6	1.0	1.9
D		17,085	17,023	16,935	16,902	16,925	0.0	−0.4	−0.5	−0.2	0.1	−1.0
Hungary:												
A	10,275	10,329	10,660	11,069	11,401	11,651	0.5	3.2	3.8	3.0	2.2	13.4
B		10,314	10,519	10,717	10,826	10,862	0.4	2.0	1.9	1.0	0.3	5.7
C		10,306	10,460	10,586	10,620	10,586	0.3	1.5	1.2	0.3	−0.3	3.0
D		10,298	10,413	10,498	10,496	10,425	0.2	1.1	0.8	−0.0	−0.7	1.5
Poland:												
A	32,330	32,676	34,738	37,285	39,872	42,142	1.1	6.3	7.3	6.9	5.7	30.3
B		32,623	34,304	36,249	38,148	39,754	0.9	5.2	5.7	5.2	4.2	23.0
C		32,597	34,088	35,731	37,286	38,562	0.8	4.6	4.8	4.4	3.4	19.3
D		32,571	33,871	35,213	36,425	37,372	0.7	4.0	4.0	3.4	2.6	15.6
Rumania:												
A	19,880	20,272	22,380	24,697	26,968	29,319	2.0	10.4	10.4	9.2	8.7	47.5
B		20,222	21,990	23,812	25,539	27,290	1.7	8.7	8.3	7.3	6.9	37.3
C		20,171	21,599	22,928	24,111	25,274	1.5	7.1	6.2	5.2	4.8	27.1
D		20,120	21,208	22,044	22,683	23,270	1.2	5.4	3.9	2.9	2.6	17.1

Among the individual countries, the largest relative increase in total population is expected to be in Rumania, for which projection series B shows the population as increasing by 37 percent over the next 21 years. Poland's population is shown as increasing by 23 percent and Bulgaria's by 13 percent. The smallest increases are expected in Czechoslovakia (8 percent), Hungary (6 percent), and East Germany (5 percent).

If fertility drops as postulated for series D, the population of East Germany can be expected to decline by 1 percent during the next 21 years, that of Hungary to increase by only 1 percent, and that of Czechoslovakia to increase by about 3 percent. Despite the declining levels of fertility postulated, by 1990 series D yields an increase of 17 percent in Rumania's population and 16 percent in Poland's population.

Since the six countries are expected to grow at different rates, the proportionate distribution of population within the region will shift by 1990. According to series B, Poland and Rumania will grow much faster than the other four countries, and each will make up a larger share of the total population in 1990. Each of the other four countries, on the other hand, will make up a smaller share. Poland's population constituted 31.6 percent of the total for the region in 1969, and by 1990 it can be expected to comprise about 33 percent. Because of the preponderance of the Polish population in Eastern Europe, the demographic characteristics of the region as a whole are heavily weighted by those of Poland.

The components of change for the populations of the six countries and the region as a whole are given in Appendix Table A. All projection series, except D, show the birth rate for the region as increasing during the next 5 to 10 years and declining thereafter. Series D shows the birth rate remaining stable until 1976, then declining. Despite the assumption of constant fertility, the series B projections show Rumania's birth rate as declining from 26.8 per 1,000 population in 1968 to 22.1 in 1986, then rising to 23.7 in 1990. For the other five countries, the birth rate in the series B projections rises in the early part of the period and then declines—Bulgaria after 1972, Czechoslovakia and Hungary after 1975, Poland after 1979, and East Germany after 1984. These changes in the birth rate, under the assumption of constant fertility levels, result primarily from changes in the proportion of the female population in the prime reproductive ages of 20 to 29. This is illustrated by the rise in Rumania's birth rate beginning in 1987 when the large cohorts of women born in 1967 and later reach age 20, replacing the smaller cohorts in the prime reproductive ages born during earlier years.

AGE-SEX STRUCTURE

The broad changes in the age-sex structure of each of the six countries can be foreseen fairly clearly for those already alive in 1968 but not for those born after 1968 (persons aged 20 and under as of January 1, 1990). The greater predictability of the older part of the population is due to the fact that its size and structure are dependent solely on the future trend of mortality, assuming that the influence of migration is negligible, and this trend can be ascertained with some confidence

for a relatively short period. The size and structure of the younger population, however, depend not only on future changes in mortality but also on future trends in fertility, which are much less predictable. In order to simplify the discussion that follows, the total population and the age-sex structure in the future as calculated from the series B projections have been used. This choice was made for convenience and not because the assumption of constant fertility at the current level is considered to be more probable than other assumptions for any or all of the countries.

War and the changing patterns of births and deaths are dramatically reflected in the age-sex pyramids of these countries (Figure 5). The most significant distortions in these structures have resulted from reductions in the numbers of births. Indentations in the 1969 pyramids centered around ages 50–53 and, to a lesser extent, ages 23–26, stem from depressed birth rates during World Wars I and II. East Germany's population structure also reflects her very substantial military losses from the two wars—the male side of the pyramid for 1969, beginning at about age 42, is markedly shorter than the female side. The extremely severe war losses suffered by Poland in World War II are not readily discernible because the great bulk of the losses were suffered by civilians of all ages, both Polish and Jewish. The pyramid for Poland does show vividly, however, the greatly increased and high birth rates during the early postwar years and the early 1950's, as well as the drop in the rate since then.

The pattern of indentations and bulges usually follows through from one generation to the next as the small or the large birth cohorts reach the prime reproductive ages. Such a cyclical pattern may continue to affect the age-sex structure over long time spans, finally being dampened by the interaction of changing fertility with fluctuations in the size of the cohorts. This "ripple" effect and its dampening may be seen readily in the two pyramids for Bulgaria. In the 1969 pyramid, the bulge in the size of the cohorts in the ages around 20 reflects the bulge around age 45, a generation earlier. In the 1990 pyramid, the recurrent pattern of indentations and bulges is not nearly so apparent.

Special note must be made of the 1990 pyramid for Rumania which has a tremendous bulge in the cohorts below age 23. This pattern shows dramatically the effect of the increase in the birth rate in 1967, as well as the effect of the assumption of constant fertility at the 1968 level. Should the fertility assumption on which the projection is based hold true, one can see that the whole age structure of the Rumanian population will be changed drastically. And even if the assumption does not hold true over the long run, the very large cohorts already born will affect the society for years to come through increased demands for school accommodations, housing, and jobs, and the ripple effect will cause further reverberations in the next generation as well.

The sex composition of these countries has also been significantly affected by the events of the last half century. At the beginning of 1969, there were 3.3 million more females than males in the region. During the projection period, the relative difference between the numbers of each sex will decline to 1.8 million, and the sex ratio (males per 100 females), according to series B, will increase from 93.8 to 97.1 in 1990. In 1969, the sex ratio was lowest in East Germany (84.7) and highest

Figure 5.--Population, by age and sex—six Eastern European countries: January 1, 1969 and 1990

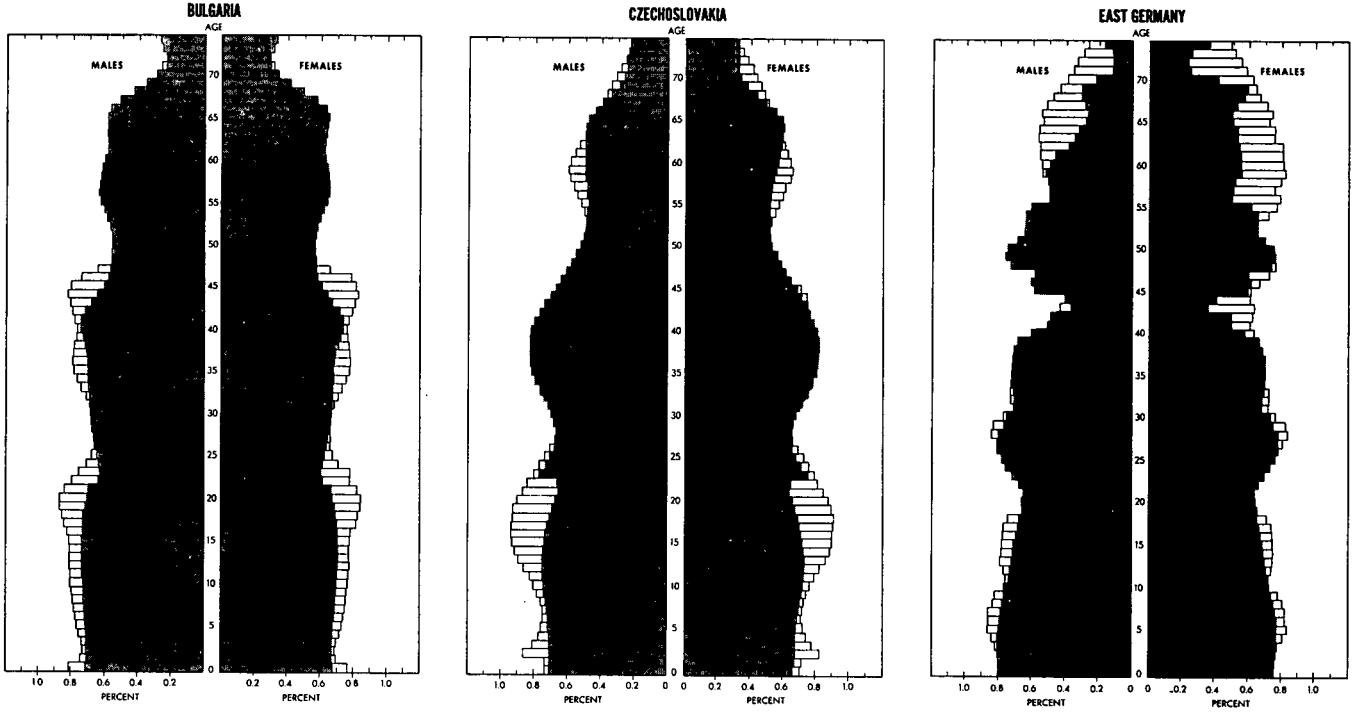
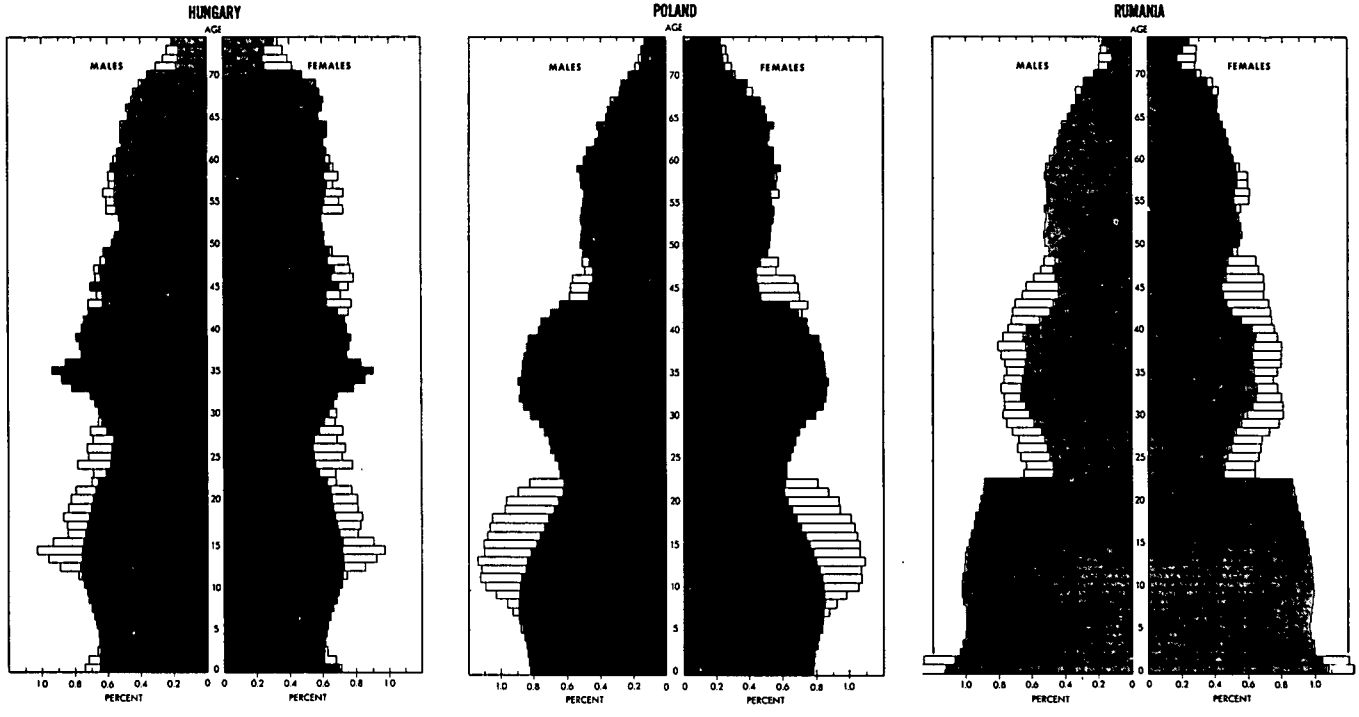


Figure 5.--Population, by age and sex—six Eastern European countries: January 1, 1969 and 1990



in Bulgaria (100.0). Although the projections show a sex ratio for East Germany of 91.8 by 1990, it would still be considerably lower than that for any of the other countries, all of which are expected to have between 96 and 101 males per 100 females at that time. The wide disparity between the size of the male and female populations in East Germany results from greater losses to the male population during the two wars.

Figure 6 presents sex ratios by age for the total region in 1969 and 1990 (series B). The lines in the figure show that the sex ratios for ages under 25 will remain relatively stable around 104, while those for ages 25 to 39 will rise to the 103–104 level by 1990. The most significant changes will occur in the sex ratios for ages 40 to 59 where a substantial rise is expected as cohorts from which military personnel were drawn during World War II are supplanted by cohorts too young for wartime military service. Sex ratios at ages 60 and over, however, will continue to be low because the cohorts suffering the highest war losses will be in this age group by 1990. Also, differential mortality favoring women in the older ages will continue to depress the sex ratio.

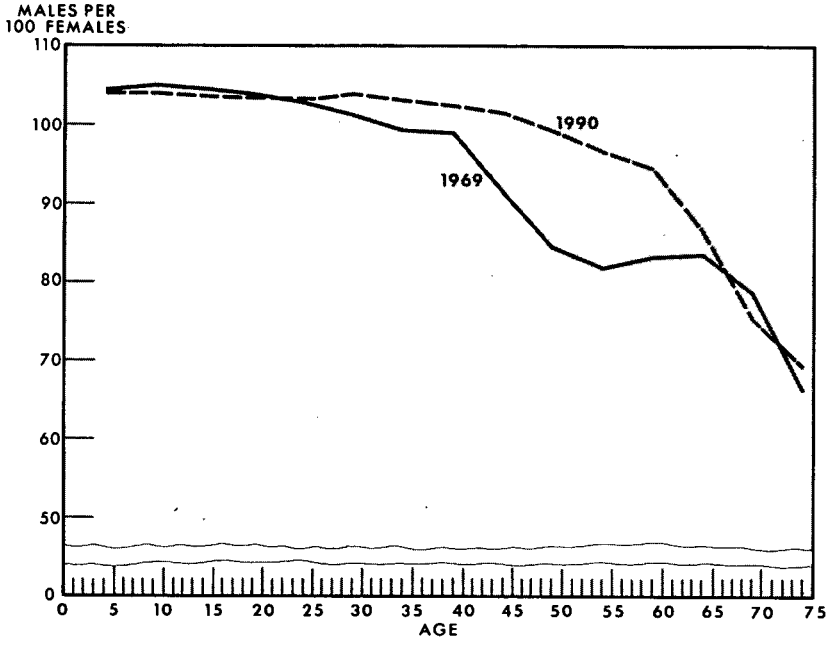


Figure 6.--Sex ratios, by age–six Eastern European countries combined: January 1, 1969 and 1990

Table 17 presents data on the distribution of the population within each of the six countries, by broad age group, for various postwar years, 1969, and 1990 (series B projections). Median ages, sex ratios, and dependency ratios for each of these years are also shown as summary measures of changes in the age-sex structures during the period.

Table 18 shows percent changes in broad age groups and in some functional age groups between 1969 and 1990 for each of the countries and for the region as a whole. Detailed population figures for each fifth year during the projection period, as well as the percent changes during the 5-year periods, are given in the appendix tables for the four functional age groups shown in Table 18 and for the 15–64 year group. Totals for other age groups of possible interest, such as 0–14, 15–39, 40–64, and 65 and older, can be derived from Appendix Table B.

TABLE 17.—SELECTED AGE-SEX CHARACTERISTICS OF THE POPULATION—SIX EASTERN EUROPEAN COUNTRIES: VARIOUS YEARS, 1946 TO 1990

[Percentages may not add to totals due to rounding. Figures shown for 1990 are based on projection series B]

Country and year	Percent distribution by age group					Median age (in years)	Males per 100 females	Dependency ratio[1]
	All ages	0 to 14	15 to 39	40 to 64	65 and over			
Bulgaria:								
1946	100.0	27.9	42.3	24.0	5.8	26.3	100.1	509
1956	100.0	26.6	39.5	26.7	7.2	29.3	99.6	510
1969	100.0	22.9	37.8	30.1	9.3	33.0	100.0	474
1990	100.0	21.2	34.3	31.4	13.1	36.1	99.8	522
Czechoslovakia:								
1950	100.0	25.4	36.8	29.9	7.8	30.6	94.6	498
1961	100.0	27.3	35.2	28.8	8.8	31.5	95.2	563
1969	100.0	23.6	36.4	29.2	10.8	31.9	95.4	524
1990	100.0	21.5	36.5	29.7	12.3	35.1	96.0	509
East Germany:								
1950	100.0	22.8	31.0	35.6	10.6	37.3	79.8	511
1964	100.0	23.8	32.0	29.7	14.5	35.0	83.7	622
1969	100.0	23.5	33.3	27.7	15.5	34.4	84.7	631
1990	100.0	23.0	35.9	28.3	12.9	33.8	91.8	559
Hungary:								
1949	100.0	24.9	38.8	28.8	7.5	29.9	92.5	479
1960	100.0	25.4	36.8	28.9	8.9	32.0	93.2	523
1969	100.0	21.7	36.6	30.4	11.3	34.0	93.8	491
1990	100.0	20.7	35.0	31.2	13.2	36.6	96.7	513
Poland:								
1950	100.0	29.7	39.2	25.6	5.4	26.2	88.4	542
1960	100.0	33.8	35.8	24.4	5.9	26.9	93.7	660
1969	100.0	28.0	38.4	25.8	7.8	28.2	94.6	557
1990	100.0	25.2	37.8	27.0	9.9	32.4	97.0	542
Rumania:								
1956	100.0	27.5	39.9	26.3	6.4	27.4	94.6	513
1965	100.0	26.3	39.5	26.3	7.9	30.2	95.9	521
1969	100.0	25.7	38.7	26.9	8.6	30.8	96.7	524
1960	100.0	30.4	34.8	25.4	9.4	27.8	100.7	660

[1] Number of persons under age 15 and 65 and over per 1,000 persons of age 15 to 64.

TABLE 18.—PERCENT CHANGE IN THE POPULATION, BY AGE GROUPS—SIX EASTERN EUROPEAN COUNTRIES: 1969 TO 1990

[Figures are based on projection series B]

Age group	Eastern Europe	Bulgaria	Czechoslovakia	East Germany	Hungary	Poland	Rumania
All ages	18.1	13.2	8.0	4.8	5.7	23.0	37.3
Under 15 years	16.8	5.0	−1.4	2.5	0.9	10.8	62.2
Kindergarten, ages 3 to 6	27.3	6.8	−0.2	0.3	12.7	24.6	98.4
Primary school, ages 7 to 14	11.1	3.8	−1.8	−0.3	−2.6	0.6	58.2
15 to 64 years	17.2	9.6	8.9	10.2	4.2	24.2	26.0
15 to 39 years	15.1	2.8	8.2	12.8	0.9	21.1	23.6
Secondary school (ages 15 to 18)	−0.3	−0.4	15.0	−4.5	−11.3	−13.8	44.8
Males of military age:							
17 to 19 years	−1.5	−3.2	−18.3	−1.3	−10.6	−14.8	39.9
17 to 34 years	14.6	4.2	3.5	12.7	−1.1	21.5	24.8
40 to 64 years	19.2	18.2	9.7	7.1	8.3	28.8	29.4
65 years and over	29.1	59.8	23.0	−12.8	23.9	56.5	48.9

Before discussing the highlights of the changes indicated by projection series B, it should be noted that the changes in age groups under age 20 in 1990 result mainly from the application of a constant set of age-specific fertility rates to a constantly changing number of women in the reproductive ages. Changes in the older age groups result mainly from the differences in numbers of persons entering and leaving those age groups. Some changes in the various age groupings are sharp and in different directions from one 5-year period to another because of the very distorted age structures in 1969.

Population Under Age 15

Except in Rumania, the child population in each country is not expected to grow as rapidly as that 15 years and older; therefore, the younger group will decline as a proportion of the total population. In Rumania, the number of children is expected to increase by 62 percent over the projection period and to comprise 30.4 percent of the total population in 1990. This large increase is in sharp contrast to the gain of less than 1 percent in the size of the child population in Hungary and to its decline of 1.4 percent in Czechoslovakia.

Changes in the child population are, of course, reflected in the number of children of kindergarten and primary school age. Detailed data on these groups for all four projection series and for each fifth year of the projection period are given in Appendix Tables C and D. The size of the kindergarten age population is expected to grow very rapidly in all countries except East Germany during the 1970's and then to decline in the 1980's. The number of children of primary school age is expected to decrease between 1970 and 1975, increase at a moderate rate during the following 10 years, and then increase more slowly between 1985 and 1990. These changes, which foretell later patterns in the population of secondary school age, military age, college age, etc., reflect the compounding of demographic trends from the late 1930's to the present.

Special note should again be made of the effects of the sharp rise in the Rumanian birth rate in 1967, the small decline in 1968, and the assumption of a continuation of fertility at this level in the future. This set of circumstances results in a doubling of the number of children of kindergarten age between 1970 and 1975, and in a 44 percent rise in the number of children of primary school age between 1975 and 1980. These increases would be reduced by half if fertility should fall in accordance with the series D assumptions, but even so it is likely that the educational system of that country will be severely affected during the 1970's.

Population 15 to 64 Years Old

This population group encompasses persons of secondary school age, college age, military age, and working age. Changes anticipated in the populations of secondary school and college age will not be discussed here; details of the former are given in Appendix Table E, and those of the latter can be derived from Appendix Table B.

The conscription age, the length of military service, and the rigidity of the requirement for military service differ among the Eastern

European countries. The age ranges presented here for the military age group therefore are intended to show potential military manpower for the region and the individual countries rather than the actual population legally subject to conscription. Ages 17 to 19 have been selected to represent potential conscription ages, and ages 17 to 34 to represent the potential reserve of prime military manpower.

Projected figures given in Table 18 and Appendix Table F show the number of conscription-age males in five of the six countries as declining between 1969 and 1990. Despite the fact that Rumania shows a 52 percent rise between 1985 and 1990, and a 40 percent rise over the projection period, the number of males in ages 17 to 19 is expected to decrease very slightly in the region as a whole, and the decline could be as high as 15 percent for Poland and 18 percent for Czechoslovakia. The population in the broader military ages, 17 to 34 years, is expected to rise during the next 20 years. The projections show that their numbers will increase in every country except Hungary and that there will be 15 percent more men of these ages in Eastern Europe in 1990 than there were in 1969.

At the beginning of 1969, the population of working age (taken here as 15 to 64 years) in Eastern Europe was estimated at 66.3 million, or 64.7 percent of the total population. By 1990, the projections yield a working-age population of 77.4 million, and because the rate of growth of this group is just under that of the total population, its proportion of the total will drop slightly—to 64.1 percent. Among the individual countries, the largest increases are expected in Rumania (26 percent) and Poland (24 percent) and the smallest increase in Hungary (4 percent).

The labor force probably will be somewhat older in 1990, since persons 40 to 64 years old in five of the six countries are expected to increase at a faster rate than the younger segment. It is only in East Germany that the opposite situation can be expected. Certain of the differences in the growth of these two segments of the working ages are striking. In Bulgaria, for example, persons 15 to 39 are expected to increase by 3 percent, but those 40 to 64 are expected to grow by 18 percent. In Hungary, the increases are 0.9 and 8.2 percent, respectively.

Perhaps of equal significance are the differences between the projected changes in the male and female components of the working ages. (See Appendix Table G.) For example, during the 21-year projection period the number of working-age men in East Germany is shown as increasing by 20 percent in contrast to a 2 percent increase in the number of women. Although East Germany represents the extreme case, similar differences are shown for the other five countries in the region. The disparity in numbers of males and females, resulting from a paucity of males at the upper end of the working ages, becomes smaller and smaller throughout the projection period as younger men replace the older men in the working ages. The normalization of the sex ratio in the working-age population is illustrated by the fact that in 1969 there were 2.0 million more women than men in this age group in Eastern Europe whereas in 1990 there are expected to be slightly more men than women.

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Population 65 Years and Older

Elderly persons constitute the most rapidly growing element of Eastern Europe's population—a 29 percent increase is projected between 1969 and 1990. Their numbers are shown as rising from 10.4 million in 1969 to 13.3 million in 1980, then declining to 12.5 million in 1985—as persons born during World War I enter the age group—and then rising again to 13.4 million in 1990. East Germany is the only country among the six whose elderly population will be smaller in 1990 than in 1969. Czechoslovakia and Hungary show 23–24 percent increases, and Bulgaria, Poland, and Rumania show 49 to 60 percent increases over the projection period. The elderly population in Eastern Europe is presently dominated by the abnormally large elderly population in East Germany. If the changes noted above should occur, the population 65 years and over in East Germany would amount to 12.9 percent of the total population of that country, or a lower proportion than the anticipated 13.2 percent in Bulgaria and Hungary.

As a result of the projected changes in the age structures of the various populations, the dependency ratio (the number of persons under age 15 and 65 and over per 1,000 persons of age 15 to 64 is expected to increase between 1969 and 1990 in Bulgaria, Hungary, and Rumania, and to decrease in the other three countries. The population of four of the six countries should be considerably older, with the median age increasing in each. In East Germany and Rumania, however, the population should be somewhat younger than it is at present. Should events bear out the assumptions implied in series B, the median ages in 1990 would range from 28 years in Rumania to 32 years in Poland, and to 34 or 37 years in the other four countries.

APPENDIX TABLES

TABLE A-1.—ESTIMATED AND PROJECTED TOTAL POPULATION, COMPONENTS OF POPULATION CHANGE, AND VITAL RATES—SIX EASTERN EUROPEAN COUNTRIES COMBINED: 1950 TO 1990

[Absolute numbers in thousands, rates per 1,000 population. Differences between natural increase and year-to-year changes in the population estimates are due, in varying degrees, to migration and discrepancies in the reporting systems. See text on p. 111 ff. for an explanation of the series]

Year	Population		Natural increase		Births		Deaths	
	Jan. 1	July 1	Number	Rate	Number	Rate	Number	Rate
ESTIMATES								
1950	88,060	88,501	1,126	12.7	2,161	24.4	1,035	11.7
1951	88,898	89,292	1,077	12.0	2,138	23.9	1,061	11.9
1952	89,701	90,147	1,089	12.1	2,119	23.5	1,030	11.4
1953	90,615	91,027	1,123	12.3	2,112	23.2	989	10.9
1954	91,435	91,874	1,133	12.3	2,134	23.2	1,001	10.9
1955	92,375	92,855	1,220	13.1	2,156	23.2	936	10.1
1956	93,322	93,720	1,151	12.3	2,090	22.3	939	10.0
1957	94,003	94,357	1,044	11.1	2,024	21.5	980	10.4
1958	94,697	95,115	1,044	11.0	1,948	20.5	904	9.5
1959	35,491	95,897	910	9.5	1,888	19.7	978	10.2
1960	96,307	96,527	907	9.4	1,817	18.8	910	9.4
1961	96,892	97,221	852	8.8	1,750	18.0	898	9.2
1962	97,486	97,841	719	7.4	1,681	17.2	962	9.8
1963	98,180	98,573	777	7.9	1,684	17.1	907	9.2
1964	99,001	99,398	732	7.4	1,646	16.6	914	9.2
1965	99,740	100,059	655	6.6	1,596	16.0	941	9.4
1966	100,260	100,582	628	6.3	1,556	15.5	928	9.2
1967	100,830	101,143	809	8.0	1,791	17.7	982	9.7
1968	101,699	102,105	788	7.7	1,800	17.6	1,012	9.9
PROJECTIONS								
Series A:								
1969	102,464	102,880	995	9.7	2,005	19.5	1,010	9.8
1970	103,377	103,898	1,042	10.0	2,072	19.9	1,030	9.9
1971	104,419	104,966	1,093	10.4	2,142	20.4	1,048	10.0
1972	105,512	106,085	1,146	10.8	2,212	20.9	1,067	10.1
1973	106,658	107,256	1,197	11.2	2,282	21.3	1,085	10.1
1974	107,855	108,477	1,244	11.5	2,348	21.6	1,104	10.2
1975	109,099	109,741	1,285	11.7	2,409	22.0	1,124	10.2
1976	110,383	111,045	1,323	11.9	2,464	22.2	1,141	10.3
1977	111,706	112,384	1,355	12.1	2,513	22.4	1,158	10.3
1978	113,062	113,753	1,383	12.2	2,556	22.5	1,172	10.3
1979	114,445	115,147	1,404	12.2	2,590	22.5	1,186	10.3
1980	115,849	116,544	1,391	11.9	2,589	22.2	1,198	10.3
1981	117,240	117,925	1,370	11.6	2,580	21.9	1,209	10.3
1982	118,610	119,282	1,345	11.3	2,565	21.5	1,220	10.2
1983	119,955	120,614	1,319	10.9	2,547	21.1	1,228	10.2
1984	121,274	121,921	1,294	10.6	2,530	20.7	1,236	10.1
1985	122,567	123,204	1,274	10.3	2,516	20.4	1,242	10.1
1986	123,841	124,473	1,264	10.2	2,509	20.2	1,246	10.0
1987	125,105	125,737	1,264	10.1	2,514	20.0	1,250	9.9
1988	126,369	127,009	1,280	10.1	2,531	19.9	1,251	9.9
1989	127,649	128,305	1,312	10.2	2,563	20.0	1,251	9.8
1990	128,961	129,642	1,363	10.5	2,608	20.1	1,245	9.6

TABLE A-1.—ESTIMATED AND PROJECTED TOTAL POPULATION, COMPONENTS OF POPULATION CHANGE, AND VITAL RATES—SIX EASTERN EUROPEAN COUNTRIES COMBINED: 1950 TO 1990—Continued

[Absolute numbers in thousands, rates per 1,000 population. Differences between natural increase and year-to-year changes in the population estimates are due, in varying degrees, to migration and discrepancies in the reporting systems. See text on p. 111 ff. for an explanation of the series]—Continued

Year	Population		Natural increase		Births		Deaths	
	Jan. 1	July 1	Number	Rate	Number	Rate	Number	Rate
Series B:								
1969	102,464	102,791	818	8.0	1,823	17.7	1,005	9.8
1970	103,200	103,620	839	8.1	1,862	18.0	1,022	9.9
1971	104,039	104,471	863	8.3	1,903	18.2	1,040	10.0
1972	104,902	105,345	887	8.4	1,944	18.5	1,057	10.0
1973	105,789	106,243	908	8.5	1,983	18.7	1,074	10.1
1974	106,697	107,160	926	8.6	2,018	18.8	1,092	10.2
1975	107,623	108,092	937	8.7	2,048	18.9	1,111	10.3
1976	108,560	109,033	946	8.7	2,073	19.0	1,127	10.3
1977	109,506	109,981	950	8.6	2,093	19.0	1,143	10.4
1978	110,456	110,931	950	8.6	2,106	19.0	1,156	10.4
1979	111,406	111,878	944	8.4	2,113	18.9	1,169	10.4
1980	112,350	112,816	932	8.3	2,113	18.7	1,181	10.5
1981	113,282	113,739	913	8.0	2,106	18.5	1,192	10.5
1982	114,196	114,641	891	7.8	2,094	18.3	1,203	10.5
1983	115,087	115,521	868	7.5	2,080	18.0	1,211	10.5
1984	115,955	116,378	846	7.3	2,065	17.7	1,219	10.5
1985	116,801	117,214	826	7.1	2,052	17.5	1,226	10.5
1986	117,627	118,034	814	6.9	2,043	17.3	1,229	10.4
1987	118,441	118,845	808	6.8	2,041	17.2	1,233	10.4
1988	119,249	119,654	811	6.8	2,045	17.1	1,234	10.3
1989	120,060	120,471	823	6.8	2,056	17.1	1,234	10.2
1990	120,883	121,306	847	7.0	2,074	17.1	1,226	10.1
Series C:								
1969	102,464	102,734	704	6.9	1,705	16.6	1,002	9.7
1970	103,086	103,442	712	6.9	1,730	16.7	1,017	9.8
1971	103,798	104,159	722	6.9	1,756	16.9	1,034	9.9
1972	104,520	104,886	731	7.0	1,782	17.0	1,050	10.0
1973	105,251	105,620	738	7.0	1,805	17.1	1,067	10.1
1974	105,989	106,359	740	7.0	1,824	17.2	1,084	10.2
1975	106,729	107,097	736	6.9	1,839	17.2	1,103	10.3
1976	107,466	107,831	730	6.8	1,848	17.1	1,118	10.4
1977	108,196	108,555	719	6.6	1,852	17.1	1,133	10.4
1978	108,915	109,267	705	6.5	1,851	16.9	1,146	10.5
1979	109,620	109,962	685	6.2	1,843	16.8	1,158	10.5
1980	110,305	110,641	673	6.1	1,843	16.7	1,170	10.6
1981	110,978	111,306	656	5.9	1,837	16.5	1,181	10.6
1982	111,634	111,951	635	5.7	1,827	16.3	1,192	10.6
1983	112,269	112,576	614	5.5	1,815	16.1	1,201	10.7
1984	112,883	113,179	593	5.2	1,801	15.9	1,209	10.7
1985	113,476	113,762	573	5.0	1,788	15.7	1,215	10.7
1986	114,049	114,328	559	4.9	1,778	15.5	1,219	10.7
1987	114,608	114,882	548	4.8	1,770	15.4	1,222	10.6
1988	115,156	115,427	544	4.7	1,767	15.3	1,223	10.6
1989	115,699	115,971	544	4.7	1,767	15.2	1,223	10.5
1990	116,244	116,520	555	4.8	1,769	15.2	1,215	10.4
Series D:								
1969	102,464	102,677	590	5.7	1,588	15.5	998	9.7
1970	102,972	103,266	588	5.7	1,601	15.5	1,012	9.8
1971	103,560	103,853	586	5.6	1,615	15.5	1,028	9.9
1972	104,146	104,438	583	5.6	1,627	15.6	1,044	10.0
1973	104,730	105,019	578	5.5	1,638	15.6	1,060	10.1
1974	105,307	105,591	568	5.4	1,644	15.6	1,076	10.2
1975	105,875	106,151	551	5.2	1,646	15.5	1,095	10.3
1976	106,426	106,693	533	5.0	1,642	15.4	1,109	10.4
1977	106,959	107,214	510	4.8	1,633	15.2	1,124	10.5
1978	107,469	107,711	484	4.5	1,620	15.0	1,136	10.5
1979	107,952	108,179	453	4.2	1,601	14.8	1,148	10.6
1980	108,405	108,625	441	4.1	1,601	14.7	1,160	10.7
1981	108,846	109,058	424	3.9	1,595	14.6	1,171	10.7
1982	109,270	109,472	404	3.7	1,586	14.5	1,182	10.8
1983	109,674	109,866	385	3.5	1,575	14.3	1,191	10.8
1984	110,059	110,241	364	3.3	1,563	14.2	1,199	10.9
1985	110,423	110,595	345	3.1	1,550	14.0	1,206	10.9
1986	110,767	110,932	329	3.0	1,538	13.9	1,209	10.9
1987	111,097	111,254	315	2.8	1,528	13.7	1,213	10.9
1988	111,412	111,565	305	2.7	1,519	13.6	1,213	10.9
1989	111,717	111,866	298	2.7	1,510	13.5	1,212	10.7
1990	112,015	112,163	297	2.6	1,501	13.4	1,204	10.8

TABLE A-2.—ESTIMATED AND PROJECTED TOTAL POPULATION, COMPONENTS OF POPULATION CHANGE, AND VITAL RATES—BULGARIA: 1950 TO 1990

[Absolute numbers in thousands; rates per 1,000 population. Differences between natural increase and year-to-year changes in the population estimates are due, in varying degrees, to migration and discrepancies in the reporting systems. See text on p. 111 ff. for an explanation of the series]

Year	Population		Natural increase		Births		Deaths	
	Jan. 1	July 1	Number	Rate	Number	Rate	Number	Rate
ESTIMATES								
1950	7,228	7,251	108	15.0	183	25.2	74	10.2
1951	7,273	7,258	75	10.4	153	21.0	77	10.6
1952	7,243	7,275	70	9.6	154	21.2	84	11.6
1953	7,307	7,346	85	11.6	153	20.9	68	9.3
1954	7,386	7,423	82	11.0	150	20.2	68	9.2
1955	7,461	7,499	83	11.1	151	20.1	68	9.0
1956	7,538	7,576	77	10.1	148	19.5	71	9.4
1957	7,614	7,651	75	9.8	141	18.4	66	8.6
1958	7,689	7,728	78	10.0	138	17.9	61	7.9
1959	7,766	7,798	63	8.1	137	17.6	74	9.5
1960	7,829	7,867	76	9.7	140	17.8	64	8.1
1961	7,906	7,943	75	9.5	138	17.4	63	7.9
1962	7,981	8,013	65	8.0	134	16.7	70	8.7
1963	8,045	8,078	66	8.2	132	16.4	66	8.2
1964	8,111	8,144	66	8.2	131	16.1	64	7.9
1965	8,178	8,201	59	7.1	126	15.3	67	8.2
1966	8,231	8,258	55	6.6	123	14.9	68	8.3
1967	8,285	8,310	50	6.0	125	15.0	75	9.0
1968	8,335	8,370	66	7.9	135	16.1	69	8.2
PROJECTIONS								
Series A:								
1969	8,401	8,441	80	9.5	150	17.8	70	8.3
1970	8,481	8,523	83	9.8	155	18.2	72	8.4
1971	8,564	8,607	86	10.0	159	18.5	73	8.5
1972	8,650	8,694	88	10.1	163	18.8	75	8.6
1973	8,739	8,784	90	10.2	167	19.0	77	8.7
1974	8,829	8,874	91	10.3	170	19.1	78	8.8
1975	8,920	8,966	92	10.3	172	19.2	80	8.9
1976	9,012	9,059	93	10.3	175	19.3	82	9.0
1977	9,105	9,152	94	10.3	177	19.4	83	9.1
1978	9,199	9,246	95	10.2	179	19.4	85	9.2
1979	9,294	9,341	95	10.2	182	19.4	86	9.3
1980	9,389	9,435	93	9.8	181	19.2	88	9.3
1981	9,482	9,527	90	9.5	180	18.9	90	9.4
1982	9,572	9,615	88	9.1	179	18.6	91	9.5
1983	9,659	9,702	85	8.7	177	18.3	92	9.5
1984	9,744	9,785	82	8.4	176	18.0	94	9.6
1985	9,827	9,867	80	8.2	175	17.8	95	9.6
1986	9,907	9,947	79	7.9	175	17.6	96	9.7
1987	9,986	10,025	78	7.8	175	17.5	97	9.7
1988	10,064	10,104	79	7.8	177	17.5	98	9.7
1989	10,143	10,183	80	7.9	179	17.5	98	9.7
1990	10,223	10,265	83	8.1	182	17.7	99	9.6
Series B:								
1969	8,401	8,434	66	7.9	137	16.2	70	8.3
1970	8,468	8,501	67	7.9	138	16.3	72	8.4
1971	8,535	8,568	67	7.8	140	16.3	73	8.5
1972	8,601	8,635	66	7.7	141	16.3	75	8.6
1973	8,668	8,700	65	7.5	141	16.2	76	8.7
1974	8,733	8,765	64	7.3	141	16.1	78	8.9
1975	8,796	8,827	62	7.0	141	16.0	79	9.0
1976	8,858	8,888	60	6.8	141	15.9	81	9.1
1977	8,918	8,947	58	6.5	141	15.7	82	9.2
1978	8,976	9,004	56	6.2	140	15.6	84	9.3
1979	9,033	9,060	54	6.0	140	15.4	86	9.4
1980	9,087	9,113	52	5.7	139	15.3	87	9.6
1981	9,138	9,163	50	5.4	138	15.1	89	9.7
1982	9,188	9,212	47	5.1	137	14.9	90	9.8
1983	9,235	9,258	45	4.8	136	14.7	92	9.9
1984	9,280	9,301	43	4.6	135	14.6	93	10.0
1985	9,322	9,343	41	4.3	135	14.4	94	10.1
1986	9,363	9,382	39	4.1	134	14.3	95	10.1
1987	9,402	9,420	37	4.0	134	12.2	96	10.2
1988	9,439	9,457	36	3.8	133	14.1	97	10.3
1989	9,475	9,493	36	3.8	134	14.1	98	10.3
1990	9,511	9,530	37	3.9	135	14.1	98	10.3

TABLE A-2.—ESTIMATED AND PROJECTED TOTAL POPULATION, COMPONENTS OF POPULATION CHANGE, AND VITAL RATES—BULGARIA: 1950 TO 1990—Continued

[Absolute numbers in thousands; rates per 1,000 population. Differences between natural increase and year-to-year changes in the population estimates are due, in varying degrees, to migration and discrepancies in the reporting systems. See text on p. 111 ff. for an explanation of the series]—Continued

Year	Population		Natural increase		Births		Deaths	
	Jan. 1	July 1	Number	Rate	Number	Rate	Number	Rate
Series C:								
1969	8,401	8,431	60	7.1	130	15.4	70	8.3
1970	8,461	8,491	59	7.0	131	15.4	71	8.4
1971	8,520	8,550	59	6.9	131	15.4	73	8.5
1972	8,579	8,608	57	6.6	132	15.3	74	8.6
1973	8,636	8,664	55	6.4	131	15.2	76	8.8
1974	8,692	8,718	53	6.1	131	15.0	77	8.9
1975	8,745	8,770	51	5.8	130	14.8	79	9.0
1976	8,796	8,820	48	5.5	129	14.6	81	9.1
1977	8,844	8,867	46	5.2	128	14.4	82	9.3
1978	8,890	8,911	43	4.8	127	14.2	84	9.4
1979	8,933	8,953	40	4.5	126	14.0	85	9.5
1980	8,973	8,992	38	4.3	125	13.9	87	9.7
1981	9,012	9,030	36	4.0	124	13.8	88	9.8
1982	9,048	9,064	34	3.7	124	13.6	90	9.9
1983	9,081	9,097	31	3.5	123	13.5	91	10.0
1984	9,113	9,127	29	3.2	122	13.4	93	10.2
1985	9,142	9,156	27	3.0	121	13.2	94	10.3
1986	9,169	9,182	25	2.8	120	13.1	95	10.3
1987	9,194	9,206	24	2.6	120	13.0	96	10.4
1988	9,218	9,229	22	2.4	119	12.9	97	10.5
1989	9,240	9,251	22	2.3	119	12.9	97	10.5
1990	9,262	9,273	21	2.3	119	12.8	98	10.5
Series D:								
1969	8,401	8,428	53	6.3	123	14.6	70	8.3
1970	8,454	8,481	53	6.2	124	14.6	71	8.4
1971	8,507	8,533	52	6.1	124	14.6	73	8.5
1972	8,559	8,584	50	5.9	125	14.5	74	8.6
1973	8,609	8,633	49	5.6	124	14.4	76	8.8
1974	8,658	8,681	46	5.3	124	14.2	77	8.9
1975	8,704	8,726	44	5.0	123	14.1	79	9.0
1976	8,748	8,769	41	4.7	122	13.9	80	9.2
1977	8,789	8,809	39	4.4	121	13.7	82	9.3
1978	8,828	8,846	36	4.1	120	13.5	84	9.4
1979	8,864	8,881	34	3.8	119	13.4	85	9.6
1980	8,898	8,914	31	3.5	118	13.3	87	9.7
1981	8,929	8,944	29	3.3	118	13.1	88	9.9
1982	8,959	8,972	27	3.0	117	13.0	90	10.0
1983	8,986	8,998	25	2.7	116	12.9	91	10.1
1984	9,010	9,022	23	2.5	115	12.8	93	10.3
1985	9,033	9,043	20	2.3	114	12.6	94	10.4
1986	9,053	9,063	18	2.0	113	12.5	95	10.5
1987	9,072	9,080	17	1.8	112	12.4	96	10.6
1988	9,088	9,096	15	1.7	112	12.3	97	10.6
1989	9,104	9,111	14	1.5	111	12.2	97	10.7
1990	9,117	9,124	13	1.5	111	12.1	97	10.7

TABLE A-3.—ESTIMATED AND PROJECTED TOTAL POPULATION, COMPONENTS OF POPULATION CHANGE, AND VITAL RATES—CZECHOSLOVAKIA: 1950 TO 1990

[Absolute numbers in thousands; rates per 1,000 population. Differences between natural increase and year-to-year changes in the population estimates are due, in varying degrees, to migration and discrepancies in the reporting systems. See text on p. 111 ff. for an explanation of the series]

Year	Population		Natural increase		Births		Deaths	
	Jan. 1	July 1	Number	Rate	Number	Rate	Number	Rate
ESTIMATES								
1950	12,340	12,389	145	11.8	288	23.3	143	11.5
1951	12,464	12,532	143	11.4	286	22.8	143	11.4
1952	12,607	12,683	146	11.6	281	22.2	135	10.6
1953	12,754	12,820	137	10.7	272	21.2	134	10.5
1954	12,892	12,952	132	10.2	267	20.6	135	10.4
1955	13,024	13,093	139	10.7	265	20.3	126	9.6
1956	13,162	13,229	136	10.2	262	19.8	126	9.6
1957	13,296	13,358	118	8.8	253	18.9	134	10.1
1958	13,414	13,474	109	8.1	235	17.4	126	9.3
1959	13,523	13,565	86	6.3	217	16.0	131	9.7
1960	13,608	13,654	92	6.7	217	15.9	125	9.2
1961	13,698	13,780	92	6.6	218	15.8	126	9.2
1962	13,824	13,860	79	5.7	217	15.7	139	10.0
1963	13,902	13,952	103	7.4	236	16.9	133	9.5
1964	14,004	14,058	106	7.6	241	17.2	135	9.6
1965	14,107	14,159	91	6.4	232	16.4	141	10.0
1966	14,194	14,240	80	5.6	223	15.6	142	10.0
1967	14,271	14,305	71	5.0	216	15.1	144	10.1
1968	14,333	14,362	61	4.2	214	14.9	153	10.7
PROJECTIONS								
Seris A:								
1969	[1] 14,389	14,445	83	5.8	241	16.7	157	10.9
1970	14,486	14,532	91	6.3	251	17.3	160	11.0
1971	14,577	14,626	98	6.7	261	17.9	163	11.1
1972	14,676	14,728	105	7.1	271	18.4	166	11.3
1973	14,781	14,836	111	7.5	280	18.9	169	11.4
1974	14,892	14,950	116	7.8	288	19.2	171	11.5
1975	15,008	15,069	121	8.0	294	19.5	174	11.5
1976	15,129	15,191	124	8.2	300	19.7	176	11.6
1977	15,253	15,316	126	8.2	304	19.9	178	11.6
1978	15,379	15,442	127	8.2	307	19.9	180	11.7
1979	15,506	15,570	127	8.2	309	19.9	182	11.7
1980	15,634	15,695	123	7.8	306	19.5	183	11.7
1981	15,756	15,815	118	7.4	302	19.1	184	11.7
1982	15,874	15,930	113	7.1	298	18.7	186	11.6
1983	15,987	16,041	109	6.8	295	18.4	187	11.6
1984	16,095	16,148	105	6.5	292	18.1	187	11.6
1985	16,200	16,252	103	6.3	291	17.9	188	11.5
1986	16,304	16,355	102	6.3	290	17.7	187	11.5
1987	16,406	16,457	103	6.2	289	17.6	187	11.4
1988	16,509	16,560	103	6.2	289	17.5	186	11.2
1989	16,612	16,664	105	6.3	290	17.4	185	11.1
1990	16,716	16,770	107	6.4	291	17.4	184	11.0
Series B:								
1969	[1] 14,389	14,434	62	4.3	219	15.1	157	10.8
1970	14,465	14,497	65	4.5	224	15.5	159	11.0
1971	14,530	14,564	67	4.6	229	15.7	162	11.1
1972	14,597	14,632	69	4.7	234	16.0	165	11.2
1973	14,666	14,701	70	4.8	237	16.1	167	11.4
1974	14,736	14,771	70	4.7	240	16.2	170	11.5
1975	14,806	14,841	69	4.7	241	16.3	172	11.6
1976	14,876	14,910	68	4.6	242	16.2	174	11.7
1977	14,944	14,976	65	4.4	241	16.1	176	11.8
1978	15,009	15,040	62	4.1	240	16.0	178	11.8
1979	15,071	15,101	59	3.9	238	15.7	179	11.9
1980	15,130	15,157	55	3.6	235	15.5	181	11.9
1981	15,184	15,210	50	3.3	232	15.3	182	12.0
1982	15,235	15,258	46	3.0	230	15.0	183	12.0
1983	15,281	15,303	43	2.8	227	14.8	184	12.0
1984	15,324	15,344	40	2.6	225	14.7	185	12.1
1985	15,364	15,383	38	2.5	223	14.5	185	12.0
1986	15,402	15,421	37	2.4	222	14.4	185	12.0
1987	15,440	15,458	37	2.4	221	14.3	184	11.9
1988	15,477	15,495	37	2.4	220	14.2	184	11.9
1989	15,513	15,532	37	2.4	219	14.1	183	11.8
1990	15,550	15,568	37	2.4	218	14.0	182	11.7

TABLE A-3.—ESTIMATED AND PROJECTED TOTAL POPULATION, COMPONENTS OF POPULATION CHANGE, AND VITAL RATES—CZECHOSLOVAKIA: 1950 TO 1990—Continued

[Absolute numbers in thousands; rates per 1,000 population. Differences between natural increase and year-to-year changes in the population estimates are due, in varying degrees, to migration and discrepancies in the reporting systems. See text on p. 111 ff. for an explanation of the series]—Continued

Year	Population		Natural increase		Births		Deaths	
	Jan. 1	July 1	Number	Rate	Number	Rate	Number	Rate
Series C:								
1969	[1] 14,389	14,429	51	3.6	208	14.4	156	10.8
1970	14,454	14,481	53	3.7	212	14.6	159	11.0
1971	14,507	14,534	54	3.7	215	14.8	161	11.1
1972	14,561	14,588	54	3.7	218	15.0	164	11.2
1973	14,616	14,643	54	3.7	220	15.1	167	11.4
1974	14,670	14,696	53	3.6	222	15.1	169	11.5
1975	14,722	14,748	51	3.4	222	15.1	171	11.6
1976	14,773	14,797	48	3.2	221	15.0	173	11.7
1977	14,821	14,843	44	3.0	220	14.8	175	11.8
1978	14,866	14,886	40	2.7	217	14.6	177	11.9
1979	14,906	14,924	36	2.4	214	14.3	178	12.0
1980	14,942	14,957	32	2.1	212	14.1	180	12.0
1981	14,973	14,987	28	1.9	209	14.0	181	12.1
1982	15,001	15,014	24	1.6	207	13.8	182	12.1
1983	15,026	15,036	21	1.4	204	13.6	183	12.2
1984	15,047	15,056	18	1.2	202	13.4	184	12.2
1985	15,065	15,073	17	1.1	201	13.3	184	12.2
1986	15,082	15,089	16	1.0	200	13.2	184	12.2
1987	15,097	15,105	15	1.0	199	13.2	184	12.2
1988	15,112	15,120	15	1.0	197	13.1	183	12.1
1989	15,127	15,134	14	0.9	196	12.9	182	12.0
1990	15,141	15,148	13	0.9	194	12.8	181	11.9
Series D:								
1969	[1] 14,389	14,423	41	2.8	197	13.6	156	10.8
1970	14,444	14,465	42	2.9	201	13.9	158	11.0
1971	14,486	14,507	43	3.0	204	14.1	161	11.1
1972	14,529	14,550	43	3.0	207	14.2	164	11.2
1973	14,572	14,593	43	2.9	209	14.3	166	11.4
1974	14,614	14,635	41	2.8	210	14.3	169	11.5
1975	14,656	14,675	39	2.7	210	14.3	171	11.6
1976	14,695	14,713	36	2.5	209	14.2	173	11.7
1977	14,731	14,748	33	2.2	208	14.1	175	11.9
1978	14,764	14,778	29	1.9	205	13.9	176	11.9
1979	14,793	14,805	24	1.6	202	13.7	178	12.0
1980	14,817	14,827	21	1.4	200	13.5	179	12.1
1981	14,837	14,846	17	1.1	198	13.3	181	12.2
1982	14,854	14,861	13	0.9	195	13.1	182	12.2
1983	14,868	14,873	10	0.7	193	13.0	183	12.3
1984	14,878	14,881	7	0.5	191	12.8	184	12.3
1985	14,885	14,888	6	0.4	190	12.7	184	12.4
1986	14,891	14,893	5	0.3	189	12.7	184	12.3
1987	14,895	14,898	4	0.3	187	12.6	183	12.3
1988	14,900	14,901	3	0.2	186	12.5	182	12.2
1989	14,903	14,904	2	0.2	184	12.3	181	12.2
1990	14,905	14,906	1	0.1	181	12.2	180	12.1

[1] This total, published after the projections were prepared, is 14,000 less than the estimated total for this date.

TABLE A–4.—ESTIMATED AND PROJECTED TOTAL POPULATION, COMPONENTS OF POPULATION CHANGE, AND VITAL RATES—EAST GERMANY: 1950 TO 1990

[Absolute numbers in thousands; rates per 1,000 population. Differences between natural increase and year-to-year changes in the population estimates are due, in varying degrees, to migration and discrepancies in the reporting system. See text on p. 111 ff. for an explanation of the series.]

Year	Population [1]		Natural increase		Births		Deaths	
	Jan. 1	July 1	Number	Rate [2]	Number	Rate [2]	Number	Rate [2]
ESTIMATES								
1950	[3] 18,388	[3] 18,388	84	4.6	304	16.5	220	11.9
1951	18,355	18,344	102	5.5	311	16.9	209	11.4
1952	18,334	18,302	84	4.6	306	16.7	222	12.1
1953	18,271	18,164	86	4.8	299	16.5	213	11.7
1954	18,057	17,992	74	4.1	294	16.3	220	12.2
1955	17,928	17,832	79	4.4	293	16.4	214	12.0
1956	17 735	17,606	69	3.9	281	16.0	213	12.1
1957	17,478	17,370	48	2.7	273	15.7	225	13.0
1958	17,262	17,205	50	2.9	271	15.8	221	12.9
1959	17,148	17,131	62	3.6	292	17.0	230	13.4
1960	17,114	17,058	59	3.5	293	17.2	234	13.7
1961	17,002	16,938	78	4.6	301	17.8	223	13.2
1962	16,874	16,902	64	3.8	298	17.6	234	13.8
1963	16,930	16,951	79	4.7	301	17.8	222	13.1
1964	16,972	16,988	66	3.9	292	17.2	226	13.3
1965	17,004	17,028	51	3.0	281	16.5	230	13.5
1966	17,040	17,066	42	2.5	268	15.7	226	13.2
1967	17,071	17,082	27	1.6	253	14.8	226	13.2
1968	17,090	17,092	3	0.2	244	14.3	241	14.1
PROJECTIONS								
Series A:								
1969	17,093	17,113	40	2.3	270	15.8	231	13.5
1970	17,133	17,154	43	2.5	275	16.0	232	13.5
1971	17,176	17,200	47	2.7	281	16.3	234	13.6
1972	17,223	17,249	52	3.0	287	16.6	235	13.6
1973	17,275	17,303	57	3.3	293	16.9	237	13.7
1974	17,332	17,362	61	3.5	299	17.2	238	13.7
1975	17,393	17,426	66	3.8	305	17.5	239	13.7
1976	17,459	17,494	70	4.0	311	17.8	240	13.7
1977	17,529	17,567	75	4.3	317	18.0	241	13.7
1978	17,604	17,645	82	4.7	324	18.3	241	13.7
1979	17,686	17,731	89	5.0	331	18.7	242	13.6
1980	17,776	17,823	95	5.3	336	18.8	241	13.5
1981	17,871	17,921	100	5.6	341	19.0	240	13.4
1982	17,971	18,024	106	5.9	345	19.1	239	13.3
1983	18,076	18,131	110	6.1	348	19.2	238	13.1
1984	18,186	18,243	114	6.2	350	19.2	236	12.9
1985	18,300	18,358	116	6.3	350	19.1	234	12.7
1986	18,416	18,476	119	6.4	350	18.9	231	12.5
1987	18,535	18,596	121	6.5	350	18.8	228	12.3
1988	18,657	18,719	125	6.7	350	18.7	225	12.0
1989	18,781	18,846	129	6.8	351	18.6	222	11.8
1990	18,910	18,978	135	7.1	352	18.6	217	11.4
Series B:								
1969	17,093	17,101	15	0.9	245	14.4	230	13.5
1970	17,109	17,117	17	1.0	248	14.5	231	13.5
1971	17,125	17,134	18	1.0	251	14.6	233	13.6
1972	17,143	17,153	20	1.2	254	14.8	234	13.6
1973	17,163	17,174	22	1.3	257	15.0	236	13.7
1974	17,185	17,196	23	1.4	260	15.1	237	13.8
1975	17,208	17,220	25	1.4	263	15.3	238	13.8
1976	17,233	17,246	26	1.5	265	15.4	239	13.9
1977	17,259	17,274	28	1.6	268	15.5	240	13.9
1978	17,288	17,304	32	1.8	272	15.7	240	13.9
1979	17,320	17,337	36	2.1	276	15.9	240	13.8
1980	17,355	17,376	40	2.3	280	16.1	240	13.8
1981	17,396	17,418	45	2.6	284	16.3	239	13.7
1982	17,441	17,466	50	2.8	287	16.5	238	13.6
1983	17,490	17,517	54	3.1	290	16.5	236	13.5
1984	17,544	17,572	57	3.2	291	16.6	234	13.3
1985	17,601	17,631	59	3.4	292	16.5	232	13.2
1986	17,660	17,691	62	3.5	291	16.4	229	13.0
1987	17,722	17,753	63	3.5	289	16.3	227	12.8
1988	17,785	17,817	64	3.6	288	16.2	224	12.6
1989	17,849	17,882	66	3.7	286	16.0	220	12.3
1990	17,915	17,950	69	3.9	285	15.9	215	12.0

TABLE A–4.—ESTIMATED AND PROJECTED TOTAL POPULATION, COMPONENTS OF POPULATION CHANGE, AND VITAL RATES—EAST GERMANY: 1950 TO 1990—Continued

[Absolute numbers in thousands; rates per 1,000 population. Differences between natural increase and year-to-year changes in the population estimates are due, in varying degrees, to migration and discrepancies in the reporting system. See text on p. 111 ff. for an explanation of the series.]—Continued

Year	Population [1]		Natural increase		Births		Deaths	
	Jan. 1	July 1	Number	Rate [2]	Number	Rate [2]	Number	Rate
Series C:								
1969	17,093	17,095	3	0.2	233	13.6	230	13.4
1970	17,097	17,098	3	0.2	234	13.7	231	13.5
1971	17,100	17,102	3	0.2	236	13.8	232	13.6
1972	17,103	17,105	4	0.2	237	13.9	234	13.7
1973	17,107	17,109	4	0.2	239	14.0	235	13.7
1974	17,111	17,113	4	0.3	241	14.1	236	13.8
1975	17,116	17,118	4	0.3	242	14.1	237	13.9
1976	17,120	17,122	5	0.3	243	14.2	238	13.9
1977	17,125	17,127	5	0.3	244	14.3	239	14.0
1978	17,129	17,133	7	0.4	246	14.4	239	14.0
1979	17,136	17,141	9	0.5	248	14.5	239	14.0
1980	17,145	17,152	13	0.8	252	14.7	239	13.9
1981	17,158	17,167	17	1.0	255	14.9	238	13.9
1982	17,176	17,187	22	1.3	259	15.0	237	13.8
1983	17,197	17,210	25	1.5	261	15.2	235	13.7
1984	17,223	17,237	28	1.7	262	15.2	234	13.6
1985	17,251	17,267	31	1.8	262	15.2	231	13.4
1986	17,282	17,299	33	1.9	261	15.1	228	13.2
1987	17,315	17,332	34	2.0	260	15.0	226	13.0
1988	17,349	17,367	34	2.0	257	14.8	223	12.8
1989	17,384	17,401	35	2.0	255	14.6	219	12.6
1990	17,419	17,438	38	2.2	252	14.5	214	12.3
Series D:								
1969	17,093	17,089	−9	−0.5	221	12.9	230	13.4
1970	17,085	17,080	−10	−0.6	221	12.9	231	13.3
1971	17,075	17,069	−11	−0.7	221	12.9	232	13.6
1972	17,063	17,057	−12	−0.7	221	12.9	233	13.7
1973	17,051	17,044	−13	−0.8	221	13.0	235	13.8
1974	17,038	17,030	−15	−0.9	221	13.0	236	13.8
1975	17,023	17,015	−16	−0.9	221	13.0	237	13.9
1976	17,007	16,998	−17	−1.0	220	13.0	238	14.0
1977	16,990	16,980	−19	−1.1	220	13.0	239	14.1
1978	16,971	16,962	−18	−1.1	220	13.0	239	14.1
1979	16,953	16,944	−18	−1.1	221	13.0	239	14.1
1980	16,935	16,928	−14	−0.8	224	13.2	238	14.1
1981	16,921	16,916	−10	−0.6	227	13.4	237	14.0
1982	16,911	16,908	−6	−0.4	230	13.6	236	14.0
1983	16,904	16,903	−3	−0.2	232	13.7	235	19.9
1984	16,902	16,902	0	0.0	233	13.8	233	13.8
1985	16,902	16,903	3	0.2	233	13.8	231	13.6
1986	16,904	16,907	5	0.3	232	13.7	228	13.5
1987	16,909	16,912	5	0.3	230	13.6	225	13 3
1988	16,914	16,917	5	0.3	227	13.4	222	13.1
1989	16,919	16,922	5	0.3	224	13.2	219	12.9
1990	16,925	16,928	7	0.4	221	13.0	214	12.6

[1] All published population totals for 1951 through midyear 1964 have been corrected to account for the difference of 212,000 between the results of the December 31, 1964, census and the estimated population for that date based on the population register.

[2] Rates for 1950 were based on the published number of births and deaths and the August 31, 1950, census total; those for 1951 through 1964 were based on the published numbers of births and deaths and revised midyear populations. See note 1 above.

[3] Census of August 31, 1950.

TABLE A-5.—ESTIMATED AND PROJECTED TOTAL POPULATION, COMPONENTS OF POPULATION CHANGE, AND VITAL RATES—HUNGARY: 1950 TO 1990

[Absolute numbers in thousands; rates per 1,000 population. Differences between natural increase and year-to-year changes in the population estimates are due, in varying degrees, to migration and discrepancies in the reporting systems. See text on p. 111 ff. for an explanation of the series]

Year	Population		Natural increase		Births		Deaths	
	Jan. 1	July 1	Number	Rate	Number	Rate	Number	Rate
ESTIMATES								
1950	9,293	9,338	89	9.5	196	20.9	107	11.4
1951	9,383	9,423	81	8.5	191	20.2	110	11.7
1952	9,463	9,504	78	8.3	186	19.6	107	11.3
1953	9,545	9,595	95	9.9	207	21.6	112	11.7
1954	9,645	9,706	117	12.0	223	23.0	107	11.0
1955	9,767	9,825	113	11.4	210	21.4	98	10.0
1956	9,883	9,911	89	9.0	193	19.5	104	10.5
1957	9,829	9,839	64	6.5	167	17.0	104	10.5
1958	9,850	9,882	61	6.1	158	16.0	98	9.9
1959	9,913	9,937	47	4.7	151	15.2	104	10.5
1960	9,961	9,984	45	4.5	146	14.7	102	10.2
1961	10,006	10,028	44	4.4	140	14.0	96	9.6
1962	10,050	10,061	22	2.1	130	12.9	108	10.8
1963	10,072	10,088	32	3.2	132	13.1	100	9.9
1964	10,104	10,120	31	3.1	132	13.1	101	10.0
1965	10,135	10,148	25	2.4	133	13.1	108	10.7
1966	10,160	10,179	37	3.6	138	13.6	102	10.0
1967	10,197	10,217	39	3.9	149	14.6	110	10.7
1968	10,236	10,255	39	3.9	154	15.1	115	11.2
PROJECTIONS								
Series A:								
1969	10,275	10,302	54	5.2	171	16.6	118	11.4
1970	10,329	10,357	57	5.5	177	17.1	120	11.6
1971	10,386	10,417	61	5.9	183	17.6	122	11.7
1972	10,447	10,480	66	6.3	189	18.1	123	11.8
1973	10,513	10,549	71	6.7	196	18.6	125	11.9
1974	10,584	10,622	76	7.1	202	19.0	127	11.9
1975	10,660	10,699	79	7.4	208	19.4	129	12.0
1976	10,739	10,780	82	7.6	212	19.7	130	12.1
1977	10,821	10,862	83	7.6	214	19.7	131	12.1
1978	10,904	10,945	83	7.6	215	19.7	132	12.1
1979	10,987	11,028	82	7.4	215	19.5	133	12.1
1980	11,069	11,107	77	6.9	211	19.0	134	12.1
1981	11,146	11,182	72	6.4	206	18.5	135	12.0
1982	11,218	11,251	66	5.9	201	17.9	135	12.0
1983	11,284	11,314	61	5.4	197	17.4	136	12.0
1984	11,345	11,373	56	4.9	193	16.9	137	12.0
1985	11,401	11,427	52	4.6	189	16.6	137	12.0
1986	11,453	11,478	50	4.3	187	16.3	137	12.0
1987	11,503	11,527	48	4.2	186	16.1	138	11.9
1988	11,551	11,575	49	4.2	187	16.1	138	11.9
1989	11,600	11,625	51	4.4	188	16.2	138	11.9
1990	11,651	11,678	55	4.7	191	16.4	136	11.7
Series B:								
1969	10,275	10,294	38	3.7	156	15.1	117	11.4
1970	10,314	10,333	39	3.8	158	15.3	119	11.5
1971	10,353	10,372	40	3.8	160	15.5	121	11.6
1972	10,392	10,413	41	3.9	163	15.7	122	11.7
1973	10,433	10,454	42	4.0	166	15.9	124	11.9
1974	10,475	10,497	43	4.1	169	16.1	125	12.0
1975	10,519	10,540	43	4.1	170	16.2	127	12.1
1976	10,562	10,583	43	4.0	171	16.1	128	12.1
1977	10,604	10,625	41	3.8	170	16.0	130	12.2
1978	10,645	10,664	38	3.5	168	15.8	131	12.2
1979	10,683	10,700	34	3.2	166	15.5	131	12.3
1980	10,717	10,732	30	2.8	162	15.1	132	12.3
1981	10,748	10,761	26	2.4	159	14.7	133	12.3
1982	10,774	10,784	22	2.0	155	14.4	133	12.4
1983	10,795	10,804	17	1.6	151	14.0	134	12.4
1984	10,812	10,819	13	1.2	148	13.7	135	12.5
1985	10,826	10,831	10	0.9	145	13.4	135	12.5
1986	10,836	10,840	8	0.7	144	13.2	135	12.5
1987	10,844	10,847	6	0.6	142	13.1	136	12.5
1988	10,851	10,853	6	0.5	142	13.1	136	12.5
1989	10,856	10,859	6	0.6	142	13.1	136	12.5
1990	10,862	10,866	8	0.7	143	13.1	135	12.4

TABLE A-5.—ESTIMATED AND PROJECTED TOTAL POPULATION, COMPONENTS OF POPULATION CHANGE, AND VITAL RATES—HUNGARY: 1950 TO 1990—Continued

[Absolute numbers in thousands; rates per 1,000 population. Differences between natural increase and year-to-year changes in the population estimates are due, in varying degrees, to migration and discrepancies in the reporting systems. See text on p. 111 ff. for an explanation of the series]—Continued

Year	Population		Natural increase		Births		Deaths	
	Jan. 1	July 1	Number	Rate	Number	Rate	Number	Rate
Series C:								
1969	10,275	10,291	31	3.0	148	14.4	117	11.4
1970	10,306	10,321	31	3.0	149	14.5	119	11.5
1971	10,337	10,352	31	3.0	151	14.6	120	11.6
1972	10,367	10,383	31	3.0	153	14.7	122	11.7
1973	10,398	10,414	31	3.0	154	14.8	123	11.9
1974	10,429	10,445	31	3.0	156	14.9	125	12.0
1975	10,460	10,475	30	2.9	157	15.0	127	12.1
1976	10,490	10,505	29	2.7	156	14.9	128	12.2
1977	10,519	10,532	26	2.5	155	14.7	129	12.2
1978	10,545	10,556	22	2.1	152	14.4	130	12.3
1979	10,567	10,576	18	1.7	149	14.1	131	12.3
1980	10,586	10,593	15	1.4	146	13.8	131	12.4
1981	10,600	10,606	11	1.0	143	13.5	132	12.4
1982	10,611	10,615	7	0.6	140	13.1	133	12.5
1983	10,618	10,619	3	0.3	136	12.8	133	12.6
1984	10,621	10,620	−1	−0.1	133	12.5	134	12.6
1985	10,620	10,618	−4	−0.4	131	12.3	135	12.7
1986	10,616	10,613	−6	−0.6	129	12.2	135	12.7
1987	10,610	10,607	−7	−0.7	128	12.1	135	12.8
1988	10,603	10,599	−8	−0.8	127	12.0	135	12.8
1989	10,595	10,590	−9	−0.8	127	12.0	135	12.8
1990	10,586	10,582	−8	−0.7	126	11.9	134	12.7
Series D:								
1969	10,275	10,287	23	2.3	140	13.6	117	11.4
1970	10,298	10,310	23	2.2	141	13.7	118	11.5
1971	10,322	10,333	23	2.2	143	13.8	120	11.6
1972	10,344	10,356	23	2.2	144	13.9	122	11.7
1973	10,367	10,379	23	2.2	146	14.1	123	11.9
1974	10,390	10,402	23	2.2	148	14.2	125	12.0
1975	10,413	10,424	22	2.1	148	14.2	126	12.1
1976	10,435	10,446	20	2.0	148	14.2	127	12.2
1977	10,456	10,465	18	1.7	146	14.0	129	12.3
1978	10,474	10,481	14	1.4	144	13.7	130	12.4
1979	10,488	10,493	11	1.0	141	13.4	130	12.4
1980	10,498	10,502	7	0.7	138	13.1	131	12.5
1981	10,506	10,507	3	0.3	135	12.8	132	12.5
1982	10,509	10,509	−1	−0.1	132	12.5	132	12.6
1983	10,508	10,506	−5	−0.4	129	12.2	133	12.7
1984	10,504	10,500	−8	−0.8	126	12.0	134	12.7
1985	10,496	10,490	−11	−1.0	124	11.8	134	12.8
1986	10,485	10,479	−13	−1.2	122	11.6	135	12.8
1987	10,472	10,465	−15	−1.4	120	11.5	135	12.9
1988	10,458	10,450	−16	−1.5	119	11.4	135	12.9
1989	10,442	10,434	−17	−1.6	119	11.4	135	12.9
1990	10,425	10,417	−16	−1.5	118	11.3	134	12.8

TABLE A-6.—ESTIMATED AND PROJECTED TOTAL POPULATION, COMPONENTS OF POPULATION CHANGE, AND VITAL RATES—POLAND: 1950 TO 1990

Absolute numbers in thousands; rates per 1,000 population. Differences between natural increase and year-to-year changes in the population estimates are due, in varying degrees, to migration and discrepancies in the reporting system. See text on p. 111 ff. for an explanation of the series]

Year	Population		Natural increase		Births		Deaths	
	January 1	July 1	Number	Rate	Number	Rate	Number	Rate
ESTIMATES								
1950	24,613	24,824	474	19.1	763	30.7	289	11.6
1951	25,035	25,271	471	18.6	784	31.0	312	12.4
1952	25,507	25,753	492	19.1	779	30.2	287	11.1
1953	25,999	26,255	512	19.5	779	29.7	267	10.2
1954	26,511	26,761	502	18.8	778	29.1	276	10.3
1955	27,012	27,281	532	19.5	794	29.1	262	9.6
1956	27,550	27,815	530	19.1	780	28.1	250	9.0
1957	28,080	28,310	513	18.1	782	27.6	269	9.5
1958	28,540	28,770	514	17.9	755	26.3	241	8.4
1959	29,000	29,240	471	16.1	723	24.7	252	8.6
1960	29,480	29,561	445	15.0	669	22.6	224	7.6
1961	29,795	29,965	400	13.3	628	20.9	228	7.6
1962	30,133	30,324	360	11.9	600	19.8	239	7.9
1963	30,484	30,691	358	11.7	588	19.2	230	7.5
1964	30,940	31,161	327	10.5	563	18.1	236	7.6
1965	31,339	31,496	314	10.0	546	17.4	232	7.4
1966	31,551	31,698	297	9.4	530	16.7	233	7.3
1967	31,811	31,944	272	8.5	520	16.3	248	7.8
1968	[1] 32,163	[1] 32,305	281	8.7	525	16.3	244	7.6
PROJECTIONS								
Series A:								
1969	[1] 32,426	32,503	346	10.6	592	18.2	246	7.6
1970	32,676	32,860	367	11.2	620	18.9	254	7.7
1971	33,043	33,238	390	11.7	650	19.6	261	7.8
1972	33,432	33,639	413	12.3	680	20.2	268	8.0
1973	33,845	34,063	435	12.8	710	20.8	275	8.1
1974	34,280	34,509	458	13.3	739	21.4	281	8.2
1975	34,738	34,976	477	13.6	767	21.9	290	8.3
1976	35,215	35,463	496	14.0	793	22.3	297	8.4
1977	35,711	35,967	512	14.2	816	22.7	304	8.4
1978	36,223	36,486	526	14.4	836	22.9	310	8.5
1979	36,749	37,017	536	14.5	853	23.0	317	8.6
1980	37,285	37,553	535	14.3	858	22.8	322	8.6
1981	37,820	38,085	530	13.9	858	22.5	328	8.6
1982	38,350	38,610	520	13.5	853	22.1	333	8.6
1983	38,870	39,124	508	13.0	846	21.6	338	8.6
1984	39,378	39,625	494	12.5	836	21.1	342	8.6
1985	39,872	40,111	479	11.9	825	20.6	346	8.6
1986	40,351	40,584	466	11.5	813	20.0	348	8.6
1987	40,817	41,042	452	11.0	803	19.6	351	8.5
1988	41,268	41,489	441	10.6	793	19.1	352	8.5
1989	41,709	41,926	433	10.3	787	18.8	354	8.4
1990	42,142	42,358	432	10.2	785	18.5	353	8.3
Series B:								
1969	[1] 32,426	32,477	294	9.0	539	16.6	245	7.5
1970	32,624	32,777	307	9.4	559	17.1	252	7.7
1971	32,931	33,092	322	9.7	580	17.5	258	7.8
1972	33,253	33,421	337	10.1	602	18.0	265	7.9
1973	33,589	33,765	351	10.4	623	18.4	272	8.1
1974	33,940	34,122	364	10.7	643	18.8	278	8.2
1975	34,304	34,491	374	10.9	661	19.2	287	8.3
1976	34,679	34,871	384	11.0	677	19.4	293	8.4
1977	35,063	35,258	391	11.1	691	19.6	300	8.5
1978	35,454	35,652	397	11.1	703	19.7	306	8.6
1979	35,851	36,050	398	11.1	711	19.7	312	8.7
1980	36,249	36,447	397	10.9	715	19.6	318	8.7
1981	36,646	36,841	391	10.6	715	19.4	324	8.8
1982	37,037	37,228	382	10.3	711	19.1	329	8.8
1983	37,419	37,604	371	9.9	705	18.7	334	8.9
1984	37,790	37,969	359	9.4	696	18.3	338	8.9
1985	38,148	38,321	345	9.0	687	17.9	342	8.9
1986	38,494	38,660	333	8.6	677	17.5	344	8.9
1987	38,826	38,986	320	8.2	667	17.1	347	8.9
1988	39,146	39,301	309	7.9	658	16.7	349	8.9
1989	39,455	39,605	299	7.5	649	16.4	350	8.8
1990	39,754	39,901	294	7.4	643	16.1	349	8.7

TABLE A–6.—ESTIMATED AND PROJECTED TOTAL POPULATION, COMPONENTS OF POPULATION CHANGE, AND VITAL RATES—POLAND: 1950 TO 1990—CONTINUED

[Absolute numbers in thousands; rates per 1,000 population. Differences between natural increase and year-to-year changes in the population estimates are due, in varying degrees, to migration and discrepancies in the reporting system. See text on p. 111 ff. for an explanation of the series]—Continued

Year	Population		Natural increase		Births		Deaths	
	January 1	July 1	Number	Rate	Number	Rate	Number	Rate
Series C:								
1969	[1] 32,426	32,464	267	8.2	512	15.8	244	7.5
1970	32,597	32,736	277	8.5	528	16.1	251	7.7
1971	32,875	33,019	288	8.7	546	16.5	257	7.8
1972	33,163	33,312	299	9.0	563	16.9	264	7.9
1973	33,462	33,616	309	9.2	579	17.2	271	8.1
1974	33,770	33,929	317	9.4	594	17.5	277	8.2
1975	34,088	34,249	323	9.4	608	17.8	285	8.3
1976	34,411	34,575	328	9.5	620	17.9	291	8.4
1977	34,739	34,904	331	9.5	629	18.0	298	8.5
1978	35,070	35,236	332	9.4	636	18.1	304	8.6
1979	35,402	35,566	329	9.3	640	18.0	310	8.7
1980	35,731	35,895	327	9.1	643	17.9	316	8.8
1981	36,058	36,219	322	8.9	643	17.8	322	8.9
1982	36,380	36,536	313	8.6	640	17.5	327	9.0
1983	36,693	36,844	303	8.2	634	17.2	332	9.0
1984	36,995	37,141	291	7.8	627	16.9	336	9.0
1985	37,286	37,426	278	7.4	618	16.5	340	9.1
1986	37,565	37,698	267	7.1	609	16.2	342	9.1
1987	37,832	37,959	254	6.7	599	15.8	345	9.1
1988	38,086	38,208	243	6.4	590	15.4	347	9.1
1989	38,329	38,446	233	6.1	581	15.1	348	9.1
1990	38,562	38,676	227	5.9	574	14.8	347	9.0
Series D:								
1969	[1] 32,426	32,450	241	7.4	485	14.9	244	7.5
1970	32,571	32,695	247	7.6	497	15.2	250	7.6
1971	32,818	32,946	254	7.7	511	15.5	256	7.8
1972	33,073	33,203	261	7.9	524	15.8	263	7.9
1973	33,334	33,467	266	8.0	536	16.0	269	8.0
1974	33,600	33,735	271	8.0	546	16.2	275	8.2
1975	33,871	34,007	272	8.0	555	16.3	283	8.3
1976	34,143	34,279	273	8.0	562	16.4	290	8.5
1977	34,415	34,550	271	7.8	567	16.4	296	8.6
1978	34,686	34,819	267	7.7	569	16.4	302	8.7
1979	34,953	35,083	260	7.4	569	16.2	308	8.8
1980	35,213	35,342	258	7.3	572	16.2	314	8.9
1981	35,471	35,597	252	7.1	572	16.1	319	9.0
1982	35,723	35,845	244	6.8	569	15.9	325	9.1
1983	35,967	36,084	234	6.5	564	15.6	330	9.1
1984	36,201	36,313	223	6.1	557	15.3	334	9.2
1985	36,425	36,530	212	5.8	549	15.0	338	9.2
1986	36,636	36,737	201	5.5	541	14.7	340	9.3
1987	36,837	36,931	189	5.1	532	14.4	343	9.3
1988	37,026	37,115	178	4.8	523	14.1	345	9.3
1989	37,204	37,288	168	4.5	514	13.8	347	9.3
1990	37,372	37,452	160	4.3	506	13.5	345	9.2

[1] The projections were based on a published January 1, 1968, population total of 32,065,000. Subsequently, a "corrected" total of 32,163,000 was published, as were the figures given here for July 1, 1968, and January 1, 1969. The figures which are consistent with the projections are 32,198,000 for July 1, 1968, and 32,330,000 for January 1, 1969.

TABLE A–7.—ESTIMATED AND PROJECTED TOTAL POPULATION, COMPONENTS OF POPULATION CHANGE, AND VITAL RATES—RUMANIA: 1950 TO 1990

[Absolute numbers in thousands; rates per 1,000 population. Differences between natural increase and year-to-year changes in the population estimates are due, in varying degrees, to migration and discrepancies in the reporting systems. See text on p. 111 ff. for an explanation of the series]

Year	Population		Natural increase		Births		Deaths	
	Jan. 1	July 1	Number	Rate	Number	Rate	Number	Rate
ESTIMATES								
1950	16,198	16,311	225	13.8	427	26.2	202	12.4
1951	16,388	16,464	203	12.3	413	25.1	210	12.8
1952	16,547	16,630	218	13.1	413	24.8	195	11.7
1953	16,739	16,847	207	12.2	402	23.8	195	11.6
1954	16,944	17,040	227	13.3	422	24.8	195	11.5
1955	17,183	17,325	275	15.9	443	25.6	168	9.7
1956	17,454	17,583	251	14.3	426	24.2	175	9.9
1957	17,706	17,829	226	12.7	408	22.9	182	10.2
1958	17,942	18,056	234	12.9	391	21.6	157	8.7
1959	18,141	18,226	181	10.0	368	20.2	187	10.2
1960	18,315	18,403	192	10.4	352	19.1	161	8.7
1961	18,485	18,567	163	8.8	325	17.5	162	8.7
1962	18,624	18,681	130	7.0	302	16.2	172	9.2
1963	18,747	18,813	139	7.4	295	15.7	156	8.3
1964	18,870	18,927	135	7.1	287	15.2	152	8.1
1965	18,977	19,027	115	6.0	278	14.6	163	8.6
1966	19,084	19,141	116	6.1	274	14.3	157	8.2
1967	19,195	19,285	349	18.1	528	27.4	179	9.3
1968	19,542	19,721	338	17.2	528	26.8	190	9.6
PROJECTIONS								
Series A:								
1969	19,880	20,076	393	19.6	580	28.9	188	9.3
1970	20,272	20,473	401	19.6	593	29.0	192	9.4
1971	20,673	20,878	411	19.7	607	29.1	196	9.4
1972	21,084	21,294	422	19.8	622	29.2	200	9.4
1973	21,505	21,722	433	19.9	636	29.3	204	9.4
1974	21,938	22,159	442	19.9	650	29.3	208	9.4
1975	22,380	22,605	450	19.9	663	29.3	213	9.4
1976	22,830	23,059	458	19.9	675	29.3	217	9.4
1977	23,288	23,521	465	19.8	685	29.1	220	9.4
1978	23,753	23,988	470	19.6	694	28.9	223	9.3
1979	24,223	24,460	473	19.4	700	28.6	227	9.3
1980	24,697	24,931	468	18.8	698	28.0	230	9.2
1981	25,165	25,395	461	18.1	693	27.3	233	9.2
1982	25,626	25,852	453	17.5	688	26.6	235	9.1
1983	26,079	26,302	447	17.0	684	26.0	238	9.0
1984	26,525	26,747	443	16.5	683	25.5	240	9.0
1985	26,968	27,189	442	16.3	686	25.2	244	9.0
1986	27,410	27,634	448	16.2	694	25.1	246	8.9
1987	27,858	28,089	462	16.4	711	25.3	249	8.9
1988	28,320	28,562	484	17.0	736	25.8	252	8.8
1989	28,804	29,061	514	17.7	768	26.4	254	8.7
1990	29,319	29,594	551	18.6	806	27.2	255	8.6
Series B:								
1969	19,880	20,051	342	17.1	528	26.3	186	9.3
1970	20,222	20,394	345	16.9	534	26.2	190	9.3
1971	20,566	20,741	349	16.8	542	26.1	193	9.3
1972	20,915	21,092	354	16.8	550	26.1	196	9.3
1973	21,269	21,449	359	16.7	558	26.0	200	9.3
1974	21,628	21,809	362	16.6	565	25.9	204	9.3
1975	21,990	22,171	363	16.4	572	25.8	208	9.4
1976	22,353	22,536	365	16.2	577	25.6	212	9.4
1977	22,718	22,901	366	16.0	581	25.4	215	9.4
1978	23,084	23,267	365	15.7	583	25.1	218	9.4
1979	23,449	23,631	363	15.4	583	24.7	221	9.3
1980	23,812	23,991	358	14.9	582	24.2	224	9.3
1981	24,170	24,346	351	14.4	578	23.7	227	9.3
1982	24,522	24,694	344	13.9	573	23.2	229	9.3
1983	24,866	25,035	339	13.5	570	22.8	232	9.2
1984	25,205	25,372	334	13.2	569	22.4	234	9.2
1985	25,539	25,706	333	12.9	570	22.2	238	9.2
1986	25,872	26,040	336	12.9	576	22.1	240	9.2
1987	26,208	26,380	344	13.0	587	22.2	243	9.2
1988	26,552	26,731	359	13.4	604	22.6	245	9.2
1989	26,911	27,100	379	14.0	626	23.1	247	9.1
1990	27,290	27,491	403	14.7	651	23.7	248	9.0

TABLE A–7.—ESTIMATED AND PROJECTED TOTAL POPULATION, COMPONENTS OF POPULATION CHANGE, AND VITAL RATES—RUMANIA: 1950 TO 1990 —Continued

[Absolute numbers in thousands, rates per 1,000 population. Differences between natural increase and year-to-year changes in the population estimates are due, in varying degrees, to migration and discrepancies in the reporting systems. See text on p. 111 ff. for an explanation of the series]—Continued

Year	Population		Natural increase		Births		Deaths	
	Jan. 1	July 1	Number	Rate	Number	Rate	Number	Rate
Series C:								
1969	19,880	20,025	291	14.5	475	23.7	184	9.2
1970	20,171	20,315	289	14.2	475	23.4	187	9.2
1971	20,459	20,603	287	13.9	477	23.2	190	9.2
1972	20,747	20,890	286	13.7	479	22.9	192	9.2
1973	21,033	21,175	285	13.4	480	22.7	195	9.2
1974	21,318	21,458	281	13.1	481	22.4	199	9.3
1975	21,599	21,737	277	12.7	480	22.1	203	9.4
1976	21,876	22,012	272	12.4	479	21.7	206	9.4
1977	22,148	22,282	267	12.0	476	21.4	209	9.4
1978	22,415	22,545	260	11.6	472	20.9	212	9.4
1979	22,676	22,802	252	11.1	467	20.5	214	9.4
1980	22,928	23,052	248	10.8	465	20.2	217	9.4
1981	23,176	23,297	242	10.4	462	19.8	220	9.5
1982	23,418	23,536	236	10.0	459	19.5	223	9.5
1983	23,654	23,769	231	9.7	456	19.2	225	9.5
1984	23,884	23,998	226	9.4	455	19.0	228	9.5
1985	24,111	24,223	224	9.2	455	18.8	231	9.6
1986	24,335	24,447	224	9.2	458	18.7	234	9.6
1987	24,559	24,673	229	9.3	465	18.9	237	9.6
1988	24,787	24,906	237	9.5	476	19.1	239	9.6
1989	25,024	25,149	249	9.9	489	19.5	240	9.5
1990	25,274	25,405	263	10.3	504	19.8	241	9.5
Series D:								
1969	19,880	20,000	240	12.0	422	21.1	182	9.1
1970	20,120	20,236	233	11.5	417	20.6	184	9.1
1971	20,353	20,465	225	11.0	412	20.1	187	9.1
1972	20,578	20,687	219	10.6	407	19.7	189	9.1
1973	20,797	20,902	211	10.1	402	19.2	191	9.2
1974	21,007	21,108	201	9.5	396	18.8	195	9.2
1975	21,208	21,304	190	8.9	389	18.2	198	9.3
1976	21,399	21,488	180	8.4	381	17.7	201	9.4
1977	21,578	21,662	168	7.8	372	17.2	203	9.4
1978	21,746	21,824	156	7.1	361	16.6	206	9.4
1979	21,902	21,973	142	6.5	350	15.9	208	9.5
1980	22,044	22,113	138	6.2	349	15.8	211	9.6
1981	22,181	22,248	133	6.0	347	15.6	214	9.6
1982	22,314	22,378	127	5.7	344	15.4	217	9.7
1983	22,441	22,503	123	5.5	342	15.2	219	9.7
1984	22,564	22,623	119	5.2	341	15.1	222	9.8
1985	22,683	22,740	115	5.1	341	15.0	225	9.9
1986	22,798	22,855	114	5.0	342	15.0	228	10.0
1987	22,912	22,969	115	5.0	346	15.0	230	10.0
1988	23,027	23,086	119	5.2	351	15.2	232	10.1
1989	23,146	23,208	125	5.4	358	15.4	234	10.1
1990	23,270	23,336	131	5.6	365	15.6	234	10.0

TABLE B-1.—PROJECTED POPULATION, BY 5-YEAR AGE GROUPS AND SEX—SIX EASTERN EUROPEAN COUNTRIES COMBINED: 1969 TO 1990

[January 1 figures in thousands. Figures were independently rounded without adjustment to group totals. See text on p. 111 ff. for an explanation of the series]

Age and series	Both sexes						Male						Female					
	1969	1970	1975	1980	1985	1990	1969	1970	1975	1980	1985	1990	1969	1970	1975	1980	1985	1990
All ages:																		
A	102,382	103,377	109,099	115,849	122,567	128,961	49,537	50,068	53,105	56,674	60,239	63,651	52,845	53,310	55,993	59,174	62,329	65,310
B		103,200	107,623	112,350	116,801	120,883		49,977	52,352	54,889	57,296	59,530		53,223	55,271	57,462	59,505	61,352
C		103,086	106,729	110,305	113,476	116,244		49,918	51,896	53,846	55,602	57,167		53,167	54,833	56,459	57,874	59,077
D		102,972	105,875	108,405	110,423	112,015		49,860	51,460	52,878	54,047	55,014		53,112	54,415	55,527	56,376	57,001
Under 5 years:																		
A	8,057	8,428	10,668	12,122	12,420	12,277	4,125	4,310	5,447	6,192	6,345	6,273	3,932	4,117	5,221	5,931	6,075	6,003
B		8,250	9,367	10,090	10,138	9,947		4,219	4,783	5,153	5,179	5,083		4,031	4,584	4,937	4,959	4,865
C		8,136	8,585	8,932	8,849	8,623		4,161	4,384	4,562	4,521	4,407		3,975	4,201	4,370	4,328	4,216
D		8,022	7,843	7,881	7,688	7,437		4,102	4,005	4,026	3,929	3,802		3,919	3,838	3,855	3,759	3,636
5 to 9 years:																		
A	8,269	8,064	8,368	10,601	12,054	12,359	4,236	4,132	4,270	5,402	6,146	6,304	4,033	3,933	4,098	5,198	5,908	6,055
B			8,193	9,309	10,034	10,088			4,181	4,744	5,116	5,145			4,012	4,565	4,919	4,943
C			8,081	8,533	8,884	8,807			4,124	4,349	4,530	4,492			3,957	4,184	4,354	4,314
D			7,969	7,796	7,840	7,652			4,067	3,974	3,998	3,904			3,902	3,822	3,841	3,748
10 to 14 years:																		
A	9,405	9,236	8,049	8,353	10,583	12,037	4,808	4,722	4,121	4,260	5,391	6,134	4,598	4,514	3,928	4,093	5,193	5,903
B				8,179	9,293	10,019				4,171	4,733	5,106				4,007	4,560	4,914
C				8,067	8,519	8,871				4,115	4,339	4,521				3,952	4,179	4,350
D				7,955	7,783	7,828				4,058	3,965	3,990				3,897	3,818	3,838
15 to 19 years:																		
A	9,294	9,434	9,210	8,028	8,333	10,560	4,738	4,811	4,704	4,106	4,246	5,374	4,556	4,623	4,506	3,922	4,087	5,186
B					8,159	9,273					4,158	4,719					4,001	4,554
C					8,047	8,500					4,101	4,326					3,946	4,174
D					7,936	7,766					4,044	3,953					3,892	3,813
20 to 24 years:																		
A	7,370	7,778	9,392	9,172	7,997	8,304	3,732	3,945	4,781	4,677	4,084	4,225	3,637	3,832	4,611	4,496	3,913	4,079
B						8,131						4,137						3,994
C						8,019						4,080						3,939
D						7,908						4,024						3,884
25 to 29 years	6,942	6,842	7,736	9,345	9,130	7,963	3,492	3,444	3,916	4,748	4,647	4,059	3,451	3,398	3,819	4,597	4,483	3,904
30 to 34 years	7,150	7,167	6,800	7,693	9,297	9,087	3,564	3,572	3,417	3,888	4,716	4,617	3,585	3,595	3,383	3,805	4,581	4,469
35 to 39 years	7,223	7,177	7,114	6,752	7,643	9,241	3,593	3,576	3,539	3,386	3,856	4,679	3,629	3,601	3,575	3,366	3,787	4,562
40 to 44 years	6,984	7,080	7,103	7,045	6,690	7,579	3,335	3,421	3,531	3,496	3,347	3,816	3,649	3,659	3,572	3,548	3,342	3,764
45 to 49 years	5,977	6,317	6,968	6,996	6,944	6,599	2,737	2,898	3,354	3,465	3,434	3,290	3,240	3,419	3,615	3,531	3,510	3,309
50 to 54 years	4,216	4,068	6,160	6,800	6,832	6,790	1,896	1,840	2,806	3,251	3,363	3,337	2,320	2,228	3,353	3,549	3,470	3,453
55 to 59 years	5,828	5,705	3,906	5,926	6,548	6,587	2,647	2,570	1,744	2,666	3,094	3,205	3,181	3,135	2,163	3,260	3,454	3,382
60 to 64 years	5,291	5,395	5,348	3,671	5,585	6,179	2,409	2,448	2,360	1,606	2,464	2,866	2,882	2,947	2,988	2,066	3,121	3,314
65 to 69 years	4,297	4,408	4,858	4,832	3,330	5,087	1,892	1,954	2,144	2,074	1,416	2,184	2,405	2,455	2,714	2,758	1,914	2,903
70 to 74 years	2,969	3,094	3,693	4,092	4,086	2,833	1,184	1,251	1,579	1,741	1,690	1,161	1,785	1,843	2,114	2,351	2,396	1,672
75 years and over	3,110	3,185	3,726	4,422	5,093	5,479	1,150	1,174	1,392	1,716	2,000	2,127	1,960	2,010	2,334	2,706	3,094	3,353

TABLE B-2.—PROJECTED POPULATION, BY 5-YEAR AGE GROUPS AND SEX—BULGARIA: 1969 TO 1990

[Jan. 1 figures in thousands. Figures were independently rounded without adjustment to group totals. See text on p. 111 ff. for an explanation of the series]

Age and series	Both sexes						Male						Female					
	1969	1970	1975	1980	1985	1990	1969	1970	1975	1980	1985	1990	1969	1970	1975	1980	1985	1990
All ages:																		
A	8,401	8,481	8,920	9,389	9,827	10,223	4,201	4,241	4,461	4,696	4,917	5,117	4,201	4,240	4,459	4,693	4,910	5,106
B		8,468	8,796	9,087	9,322	9,511		4,234	4,397	4,541	4,657	4,751		4,234	4,399	4,546	4,665	4,760
C		8,461	8,745	8,973	9,142	9,262		4,230	4,371	4,483	4,565	4,623		4,231	4,374	4,491	4,577	4,639
D		8,454	8,704	8,898	9,033	9,117		4,227	4,350	4,444	4,506	4,549		4,227	4,354	4,454	4,524	4,569
Under 5 years:																		
A	617	640	797	868	877	868	318	330	410	447	452	447	300	311	387	421	426	421
B		627	687	689	675	659		323	354	355	347	339		304	333	335	327	320
C		620	642	627	607	590		319	331	323	313	304		301	312	304	295	286
D		613	608	593	574	554		316	313	305	295	285		298	295	288	278	269
5 to 9 years:																		
A	641	634	638	795	866	875	328	325	328	409	445	450	313	309	310	386	421	425
B			625	685	687	673			321	352	354	346			303	333	334	327
C			618	640	625	606			318	329	322	312			300	311	304	294
D			611	606	591	572			314	312	304	294			297	294	287	278
10 to 14 years:																		
A	664	661	633	637	794	865	339	338	324	328	408	445	325	323	309	309	386	420
B				624	684	687				321	352	353				303	332	334
C				617	640	625				317	329	321				300	311	304
D				610	605	591				314	311	304				297	294	287
15 to 19 years:																		
A	695	684	660	632	636	793	354	349	337	323	327	407	341	335	323	309	309	385
B					623	683					320	351					303	332
C					616	639					317	328					299	311
D					610	605					313	311					296	294
20 to 24 years:																		
A	662	687	682	658	630	635	335	348	347	336	322	326	327	339	334	322	306	309
B						621						319						302
C						615						316						299
D						608						312						296
25 to 29 years	561	568	684	679	656	629	282	286	346	346	334	321	279	283	338	334	322	308
30 to 34 years	600	582	566	682	677	654	301	292	234	345	344	333	298	290	282	337	333	321
35 to 39 years	656	654	579	563	679	675	331	330	291	282	343	343	325	324	289	281	336	332
40 to 44 years	667	657	649	575	560	675	335	330	327	288	280	340	332	327	322	287	280	335
45 to 49 years	543	602	649	642	569	554	270	300	325	322	284	277	273	302	323	320	285	278
50 to 54 years	401	382	590	636	630	559	201	190	292	317	315	278	200	191	297	319	315	281
55 to 59 years	492	489	369	571	616	612	246	245	182	280	305	303	246	244	187	291	312	309
60 to 64 years	423	435	462	349	543	587	207	212	227	169	262	286	216	223	234	180	281	301
65 to 69 years	323	334	396	421	320	500	155	161	189	202	151	236	168	174	208	219	168	265
70 to 74 years	221	233	284	339	362	276	101	106	132	156	168	126	121	126	152	183	193	149
75 years and over	235	239	283	341	412	467	98	100	119	146	176	200	137	140	164	195	236	268

TABLE B-3.—PROJECTED POPULATION, BY 5-YEAR AGE GROUPS AND SEX—CZECHOSLOVAKIA: 1969 TO 1990

[Jan. 1 figures in thousands. Figures were independently rounded without adjustment to group totals. See text on p. 111 ff. for an explanation of the series]

Age and series	Both sexes						Male						Female					
	1969	1970	1975	1980	1985	1990	1969	1970	1975	1980	1985	1990	1969	1970	1975	1980	1985	1990
All ages:																		
A	[1] 14,403	14,486	15,008	15,634	16,200	16,716	7,031	7,073	7,338	7,655	7,944	8,207	7,372	7,413	7,671	7,978	8,257	8,510
B		14,465	14,806	15,130	15,364	15,550		7,063	7,235	7,399	7,519	7,614		7,402	7,571	7,731	7,845	7,935
C		14,454	14,722	14,942	15,065	15,141		7,057	7,192	7,303	7,367	7,407		7,397	7,530	7,638	7,698	7,734
D		14,444	14,656	14,817	14,885	14,905		7,052	7,158	7,240	7,275	7,287		7,392	7,497	7,577	7,610	7,618
Under 5 years:																		
A	1,110	1,122	1,307	1,469	1,452	1,411	567	572	665	748	739	719	543	550	642	721	712	692
B		1,101	1,126	1,166	1,117	1,078		561	573	593	569	549		539	553	572	548	529
C		1,090	1,052	1,061	1,005	967		556	535	540	512	493		534	517	521	493	474
D		1,079	996	1,003	949	911		550	507	510	483	464		529	489	492	466	447
5 to 9 years:																		
A	1,068	1,067	1,113	1,298	1,460	1,444	547	546	566	658	741	733	521	521	548	639	719	710
B			1,092	1,118	1,159	1,110			555	567	588	564			537	551	571	546
C			1,082	1,045	1,054	999			550	530	535	508			532	515	519	492
D			1,071	989	996	944			545	502	506	479			527	487	491	464
10 to 14 years:																		
A	1,217	1,176	1,064	1,111	1,295	1,457	622	601	544	564	656	739	595	575	520	547	639	718
B				1,090	1,115	1,156				553	565	586				537	550	570
C				1,079	1,043	1,052				548	528	533				531	514	519
D				1,069	987	994				543	500	504				526	487	490
15 to 19 years:																		
A	1,322	1,317	1,171	1,060	1,107	1,291	674	672	598	541	561	653	648	645	574	519	546	638
B					1,086	1,112					551	563					536	550
C					1,076	1,040					545	526					531	514
D					1,065	984					540	498					525	486
20 to 24 years:																		
A	1,195	1,236	1,309	1,165	1,055	1,102	606	627	666	593	537	557	589	609	643	572	518	545
B						1,081						547						535
C						1,071						541						529
D						1,060						536						524
25 to 29 years	963	1,006	1,228	1,301	1,158	1,049	486	508	621	660	588	532	477	499	607	641	570	517
30 to 34 years	855	858	999	1,219	1,292	1,151	429	432	502	615	654	582	426	427	496	604	639	568
35 to 39 years	911	890	850	990	1,209	1,282	453	443	426	496	608	647	458	447	424	493	601	636
40 to 44 years	1,016	995	878	840	978	1,196	496	487	435	419	489	599	520	508	443	420	490	597
45 to 49 years	815	886	976	862	825	962	394	428	475	425	410	478	421	458	501	437	415	484
50 to 54 years	710	687	860	948	838	803	341	330	411	457	409	395	369	357	449	491	429	408
55 to 59 years	850	812	655	823	907	804	407	387	310	388	431	387	443	424	345	435	476	417
60 to 64 years	813	831	754	610	769	848	381	390	351	282	354	394	433	441	402	328	415	455
65 to 69 years	646	660	740	672	546	692	285	293	336	303	244	308	362	367	404	369	302	384
70 to 74 years	458	477	546	615	559	457	183	193	231	266	240	194	274	284	315	348	319	263
75 years and over	454	467	558	653	751	768	162	166	200	241	284	290	292	301	358	411	466	478

[1] See note to Table A-3.

TABLE B-4.—PROJECTED POPULATION, BY 5-YEAR AGE GROUPS AND SEX—EAST GERMANY: 1969 TO 1990

[Jan. 1 figures in thousands. Figures were independently rounded without adjustment to group totals. See text on p. 111 ff. for an explanation of the series]

Age and series	Both sexes						Male						Female					
	1969	1970	1975	1980	1985	1990	1969	1970	1975	1980	1985	1990	1969	1970	1975	1980	1985	1990
All ages:																		
A	17,093	17,133	17,393	17,776	18,300	18,910	7,840	7,871	8,062	8,326	8,674	9,072	9,253	9,262	9,331	9,450	9,626	9,838
B		17,109	17,208	17,355	17,601	17,915		7,858	7,968	8,112	8,318	8,565		9,251	9,240	9,243	9,283	9,349
C		17,097	17,116	17,145	17,251	17,419		7,852	7,921	8,005	8,139	8,313		9,245	9,195	9,140	9,112	9,106
D		17,085	17,023	16,935	16,902	16,925		7,846	7,873	7,898	7,961	8,061		9,239	9,150	9,037	8,940	8,864
Under 5 years:																		
A	1,299	1,279	1,398	1,548	1,681	1,715	664	653	713	790	858	876	635	626	685	758	823	839
B		1,255	1,236	1,312	1,400	1,416		641	631	669	715	723		614	606	642	685	693
C		1,243	1,156	1,193	1,260	1,269		635	590	609	643	648		608	566	584	617	621
D		1,231	1,075	1,075	1,120	1,123		629	548	549	572	574		602	527	527	548	550
5 to 9 years:																		
A	1,423	1,429	1,272	1,390	1,541	1,674	728	730	648	707	785	853	695	699	624	683	756	821
B			1,248	1,230	1,306	1,395			636	626	665	711			612	604	641	684
C			1,236	1,150	1,188	1,255			630	585	605	639			606	565	583	616
D			1,224	1,070	1,070	1,116			624	544	545	568			600	525	525	547
10 to 14 years:																		
A	1,294	1,305	1,426	1,269	1,388	1,538	663	669	728	646	706	783	631	636	698	623	682	756
B				1,245	1,228	1,303				634	624	663				611	604	640
C				1,233	1,148	1,186				628	584	603				606	564	583
D				1,222	1,068	1,068				622	543	544				600	525	525
15 to 19 years:																		
A	1,251	1,294	1,301	1,422	1,266	1,385	641	663	666	725	643	703	610	631	635	697	622	682
B					1,242	1,225					631	622					611	603
C					1,230	1,145					625	582					605	564
D					1,219	1,065					619	541					599	524
20 to 24 years:																		
A	877	873	1,288	1,296	1,416	1,261	443	443	658	662	720	640	434	430	630	634	696	621
B						1,238						628						610
C						1,226						622						604
D						1,214						616						598
25 to 29 years	1,299	1,234	868	1,281	1,289	1,410	653	619	440	653	657	716	646	615	428	628	633	694
30 to 34 years	1,250	1,294	1,226	863	1,274	1,283	629	651	614	436	648	652	620	643	612	427	626	631
35 to 39 years	1,019	1,044	1,284	1,217	858	1,267	508	524	644	608	432	643	511	520	640	609	425	624
40 to 44 years	931	972	1,033	1,271	1,206	850	400	436	517	636	600	428	531	535	516	635	606	423
45 to 49 years	917	928	956	1,016	1,252	1,189	349	354	427	506	623	589	568	574	529	511	629	600
50 to 54 years	637	590	905	933	992	1,224	239	222	341	413	490	605	398	368	564	520	502	619
55 to 59 years	1,098	1,052	567	871	898	956	426	402	210	323	392	466	672	650	357	548	506	490
60 to 64 years	1,149	1,137	987	534	821	848	477	462	367	193	297	362	672	676	619	341	524	486
65 to 69 years	1,022	1,038	1,024	893	485	748	428	437	401	320	168	260	594	601	623	573	317	488
70 to 74 years	754	774	870	864	758	414	280	292	350	321	258	136	474	482	521	542	500	278
75 years and over	874	889	989	1,108	1,175	1,149	311	312	338	387	395	362	562	577	650	721	779	787

TABLE B–5.—PROJECTED POPULATION, BY 5-YEAR AGE GROUPS AND SEX—HUNGARY: 1969 TO 1990

[Jan. 1 figures in thousands. Figures were independently rounded without adjustment to group totals. See text on p. 111 ff. for an explanation of the series]

Age and series	Both sexes						Male						Female					
	1969	1970	1975	1980	1985	1990	1969	1970	1975	1980	1985	1990	1969	1970	1975	1980	1985	1990
All ages:																		
A	10,275	10,329	10,660	11,069	11,401	11,651	4,975	5,005	5,189	5,413	5,599	5,744	5,301	5,324	5,471	5,656	5,802	5,906
B		10,314	10,519	10,717	10,826	10,862		4,997	5,116	5,232	5,303	5,339		5,317	5,403	5,485	5,523	5,524
C		10,306	10,460	10,586	10,620	10,58.		4,993	5,086	5,164	5,197	5,196		5,313	5,374	5,421	5,423	5,389
D		10,298	10,413	10,498	10,496	10,425		4,989	5,062	5,119	5,133	5,114		5,309	5,351	5,379	5,363	5,311
Under 5 years:																		
A	678	716	911	1,026	974	908	34	368	469	528	501	468	329	348	442	498	472	441
B		701	785	814	749	693		361	404	419	386	357		340	381	395	363	336
C		693	733	741	674	621		357	377	381	347	320		337	356	360	327	301
D		686	694	700	637	585		353	357	360	328	301		333	337	340	309	284
5 to 9 years:																		
A	664	647	711	905	1,020	969	341	333	365	465	525	498	323	314	345	440	495	470
B			696	780	810	745			358	401	416	383			338	379	393	362
C			688	729	737	671			354	375	379	345			334	354	358	326
D			681	690	696	633			350	355	358	326			331	335	338	307
10 to 14 years:																		
A	885	822	645	709	903	1,018	453	421	332	364	464	523	431	401	314	345	439	495
B				694	778	808				357	400	416				338	378	393
C				687	727	736				353	374	378				334	354	357
D				679	688	695				349	354	357				330	335	338
15 to 19 years:																		
A	875	911	819	643	707	901	446	464	419	330	363	463	429	446	400	313	344	438
B					692	776					356	399					337	377
C					685	725					352	373					333	353
D					678	687					348	353					330	334
20 to 24 years:																		
A	772	780	906	815	640	704	390	396	461	416	328	361	382	385	445	399	312	343
B						689						353						336
C						682						350						332
D						675						346						329
25 to 29 years	723	745	775	900	810	637	360	373	392	458	413	326	363	372	383	443	398	311
30 to 34 years	672	671	740	770	895	806	325	324	370	389	454	410	347	346	370	381	441	396
35 to 39 years	721	712	665	734	765	889	353	348	321	366	386	450	368	364	344	368	379	438
40 to 44 years	736	738	703	658	727	757	356	358	343	317	362	381	380	380	360	341	365	376
45 to 49 years	721	731	725	692	647	716	338	345	351	336	311	355	382	386	375	355	336	360
50 to 54 years	444	431	711	705	673	631	206	201	333	339	325	301	238	230	378	367	348	330
55 to 59 years	664	665	413	680	676	646	310	308	190	315	320	308	355	357	223	366	356	338
60 to 64 years	562	578	619	385	636	633	259	266	281	173	288	294	303	311	339	212	348	339
65 to 69 years	474	479	515	554	346	573	215	216	231	244	151	252	259	262	284	310	195	321
70 to 74 years	339	351	395	427	461	290	140	148	172	185	196	122	199	203	222	243	265	168
75 years and over	345	352	406	464	519	572	134	136	160	187	211	230	212	217	247	277	309	342

TABLE B–6.—PROJECTED POPULATION, BY 5-YEAR AGE GROUPS AND SEX—POLAND: 1969 TO 1990

[Jan. 1 figures in thousands. Figures were independently rounded without adjustment to group totals. See text on p. 111 ff. for an explanation of the series]

Age and series	Both sexes						Male						Female					
	1969	1970	1975	1980	1985	1990	1969	1970	1975	1980	1985	1990	1969	1970	1975	1980	1985	1990
All ages:																		
A	[1] 32,330	32,676	34,738	37,285	39,872	42,142	15,719	15,898	16,962	18,276	19,614	20,794	16,611	16,778	17,776	19,009	20,258	21,348
B		32,623	34,304	36,249	38,148	39,754		15,871	16,740	17,746	18,733	19,574		16,752	17,564	18,503	19,415	20,180
C		32,597	34,088	35,731	37,286	38,562		15,858	16,629	17,481	18,292	18,965		16,739	17,459	18,250	18,994	19,598
D		32,571	33,871	35,213	36,425	37,372		15,844	16,518	17,217	17,852	18,356		16,727	17,353	17,996	18,573	19,015
Under 5 years:																		
A	2,569	2,609	3,300	3,954	4,144	3,930	1,316	1,335	1,688	2,023	2,121	2,012	1,253	1,274	1,612	1,931	2,023	1,918
B		2,556	2,918	3,350	3,453	3,262		1,308	1,492	1,714	1,767	1,670		1,248	1,426	1,636	1,686	1,592
C		2,530	2,728	3,048	3,108	2,930		1,294	1,395	1,559	1,590	1,500		1,235	1,333	1,489	1,517	1,430
D		2,504	2,537	2,745	2,762	2,599		1,281	1,297	1,404	1,414	1,331		1,223	1,240	1,341	1,349	1,268
5 to 9 years:																		
A	2,954	2,835	2,596	3,285	3,939	4,130	1,514	1,454	1,326	1,678	2,013	2,111	1,440	1,381	1,269	1,607	1,926	2,018
B			2,544	2,905	3,337	3,441			1,300	1,484	1,705	1,759			1,244	1,421	1,632	1,682
C			2,518	2,716	3,036	3,097			1,287	1,387	1,551	1,583			1,231	1,329	1,484	1,514
D			2,492	2,526	2,735	2,753			1,273	1,290	1,397	1,407			1,219	1,236	1,337	1,346
10 to 14 years:																		
A	3,535	3,485	2,831	2,592	3,281	3,934	1,805	1,781	1,451	1,324	1,675	2,009	1,730	1,705	1,380	1,268	1,606	1,925
B				2,540	2,902	3,333				1,297	1,481	1,702				1,243	1,420	1,631
C				2,514	2,712	3,032				1,284	1,384	1,549				1,230	1,328	1,484
D				2,488	2,522	2,732				1,271	1,288	1,395				1,217	1,235	1,336
15 to 19 years:																		
A	3,358	3,434	3,477	2,824	2,587	3,275	1,710	1,748	1,774	1,446	1,320	1,670	1,648	1,685	1,703	1,378	1,267	1,605
B					2,535	2,896					1,293	1,477					1,242	1,419
C					2,509	2,707					1,280	1,380					1,229	1,326
D					2,483	2,517					1,267	1,284					1,216	1,234
20 to 24 years:																		
A	2,489	2,725	3,420	3,464	2,814	2,578	1,261	1,382	1,738	1,764	1,438	1,313	1,227	1,342	1,682	1,700	1,376	1,265
B						2,527						1,287						1,240
C						2,501						1,274						1,227
D						2,475						1,261						1,214
25 to 29 years	1,991	1,938	2,711	3,404	3,449	2,803	1,005	977	1,373	1,726	1,753	1,430	986	961	1,339	1,678	1,696	1,373
30 to 34 years	2,217	2,204	1,928	2,698	3,388	3,434	1,104	1,101	970	1,363	1,715	1,742	1,114	1,103	958	1,335	1,673	1,692
35 to 39 years	2,354	2,324	2,189	1,916	2,683	3,371	1,168	1,154	1,091	962	1,353	1,703	1,185	1,170	1,098	954	1,330	1,668
40 to 44 years	2,201	2,249	2,303	2,171	1,900	2,663	1,037	1,076	1,140	1,079	952	1,340	1,164	1,173	1,163	1,092	948	1,324
45 to 49 years	1,799	1,915	2,217	2,271	2,142	1,877	837	881	1,056	1,119	1,061	936	962	1,034	1,161	1,151	1,082	941
50 to 54 years	1,253	1,221	1,870	2,166	2,220	2,097	562	558	853	1,023	1,086	1,030	691	663	1,017	1,143	1,134	1,067
55 to 59 years	1,637	1,615	1,174	1,801	2,089	2,142	749	729	528	809	972	1,032	888	886	647	992	1,117	1,110
60 to 64 years	1,460	1,499	1,517	1,106	1,701	1,974	662	681	667	485	745	897	798	818	849	621	956	1,077
65 to 69 years	1,108	1,166	1,354	1,375	1,007	1,554	474	502	595	584	426	657	634	664	759	791	581	897
70 to 74 years	724	753	982	1,145	1,168	861	282	296	404	480	472	347	442	456	578	665	695	514
75 years and over	681	704	870	1,113	1,361	1,519	234	243	308	410	514	564	448	462	561	703	847	955

[1] See note to table A–6.

TABLE B-7.—PROJECTED POPULATION, BY 5-YEAR AGE GROUPS AND SEX—RUMANIA: 1969 TO 1990

[Jan. 1 figures in thousands. Figures were independently rounded without adjustment to group totals. See text, on p. 111 ff., for an explanation of the series]

Age and series	Both sexes						Male						Female					
	1969	1970	1975	1980	1985	1990	1969	1970	1975	1980	1985	1990	1969	1970	1975	1980	1985	1990
All ages:																		
A	19,880	20,272	22,380	24,697	26,968	29,319	9,771	9,980	11,095	12,308	13,492	14,717	10,109	10,292	11,286	12,389	13,476	14,602
B		20,222	21,990	23,812	25,539	27,290		9,954	10,896	11,859	12,767	13,687		10,267	11,094	11,954	12,773	13,603
C		20,171	21,599	22,928	24,111	25,274		9,928	10,697	11,409	12,042	12,663		10,243	10,902	11,518	12,069	12,610
D		20,120	21,208	22,044	22,683	23,270		9,902	10,499	10,960	11,316	11,647		10,218	10,710	11,083	11,366	11,624
Under 5 years:																		
A	1,784	2,062	2,955	3,256	3,293	3,445	912	1,052	1,503	1,656	1,675	1,752	872	1,010	1,453	1,600	1,618	1,693
B		2,011	2,614	2,759	2,744	2,839		1,026	1,329	1,403	1,395	1,444		985	1,285	1,356	1,348	1,395
C		1,960	2,274	2,262	2,195	2,246		1,000	1,156	1,150	1,116	1,142		960	1,118	1,112	1,079	1,103
D		1,909	1,933	1,765	1,646	1,665		974	983	897	837	847		935	950	867	809	818
5 to 9 years:																		
A	1,519	1,453	2,039	2,929	3,229	3,269	779	745	1,037	1,485	1,638	1,658	740	708	1,002	1,444	1,591	1,610
B			1,989	2,591	2,736	2,724			1,012	1,314	1,388	1,382			977	1,277	1,349	1,342
C			1,939	2,253	2,244	2,179			986	1,143	1,138	1,105			953	1,111	1,106	1,073
D			1,890	1,916	1,751	1,634			961	971	888	829			928	944	863	805
10 to 14 years:																		
A	1,811	1,787	1,450	2,035	2,924	3,224	925	913	743	1,035	1,482	1,635	886	874	707	1,000	1,441	1,589
B				1,985	2,586	2,732				1,010	1,311	1,386				976	1,275	1,347
C				1,936	2,249	2,240				984	1,140	1,136				951	1,109	1,104
D				1,886	1,912	1,748				959	970	886				927	943	862
15 to 19 years:																		
A	1,793	1,795	1,782	1,446	2,030	2,917	913	915	910	741	1,032	1,478	880	880	872	705	998	1,439
B					1,980	2,581					1,007	1,308					974	1,273
C					1,931	2,244					982	1,137					949	1,107
D					1,882	1,908					957	967					925	941
20 to 24 years:																		
A	1,375	1,476	1,787	1,775	1,441	2,023	697	749	910	907	738	1,028	678	728	877	869	703	995
B						1,974						1,003						971
C						1,925						978						947
D						1,876						953						922
25 to 29 years	1,405	1,350	1,469	1,779	1,767	1,435	706	681	745	906	902	735	700	668	724	873	865	700
30 to 34 years	1,556	1,558	1,341	1,461	1,769	1,759	776	772	677	740	900	897	780	786	665	721	869	861
35 to 39 years	1,561	1,553	1,546	1,332	1,451	1,758	780	778	766	671	734	894	781	775	780	660	716	864
40 to 44 years	1,433	1,469	1,536	1,530	1,319	1,438	711	733	769	757	664	727	722	736	767	773	654	710
45 to 49 years	1,182	1,255	1,446	1,513	1,508	1,301	549	591	720	756	745	655	634	664	726	757	763	646
50 to 54 years	770	757	1,224	1,412	1,478	1,475	346	339	575	702	737	727	424	418	649	710	741	748
55 to 59 years	1,088	1,073	728	1,180	1,362	1,427	510	499	325	551	674	709	578	574	404	628	688	719
60 to 64 years	883	915	1,010	687	1,115	1,289	423	436	466	304	518	634	460	478	543	383	597	655
65 to 69 years	724	731	829	917	626	1,020	336	345	393	421	275	471	389	386	436	496	351	549
70 to 74 years	473	507	616	702	779	535	198	215	290	332	356	235	276	292	326	370	423	301
75 years and over	521	532	621	744	876	1,003	212	218	266	344	420	481	309	314	355	399	456	522

TABLE C.—PROJECTED POPULATION OF KINDERGARTEN AGE (3 TO 6 YEARS)—SIX EASTERN EUROPEAN COUNTRIES: 1969 TO 1990

[Population figures are in thousands and relate to Jan. 1. They have been independently rounded without adjustment to group totals. See text on p. 111 ff. for an explanation of the series]

Country and series	1969	1970	1975	1980	1985	1990	Percent change					
							1969–70	1970–75	1975–80	1980–85	1985–90	1969–90
Eastern Europe:												
A	6,261	6,187	7,678	9,139	9,948	9,772	−1.2	24.1	19.0	8.9	−1.8	56.1
B			7,072	7,810	8,137	7,970		14.3	10.4	4.2	−2.1	27.3
C			6,694	7,038	7,116	6,950		8.2	5.1	1.1	−2.3	11.0
D			6,323	6,323	6,196	6,031		2.2	0.0	−2.0	−2.7	−3.7
Bulgaria:												
A	497	489	585	668	707	692	−1.6	19.6	14.2	5.8	−2.1	39.2
B			536	552	546	531		9.6	3.0	−1.1	−2.7	6.8
C			514	509	492	477		5.1	−1.0	−3.3	−3.0	−4.0
D			494	482	465	450		1.0	−2.4	−3.5	−3.2	−9.5
Czechoslovakia:												
A	872	904	929	1,120	1,183	1,132	3.7	2.8	20.6	5.6	−4.3	29.8
B			851	925	914	870		−5.9	8.7	−1.2	−4.8	−0.2
C			815	854	824	783		−9.8	4.8	−3.5	−5.0	−10.2
D			783	807	778	739		−13.4	3.1	−3.6	−5.0	−15.3
East Germany:												
A	1,133	1,105	1,036	1,173	1,296	1,364	−2.5	−6.2	13.2	10.5	5.2	20.4
B			957	1,016	1,082	1,136		−13.4	6.2	6.5	5.0	0.3
C			917	937	975	1,022		−17.0	2.2	4.1	4.8	−9.8
D			877	858	868	908		−20.6	−2.2	1.2	4.6	−19.9
Hungary:												
A	503	511	654	783	815	738	1.6	28.0	19.7	4.1	−9.4	46.7
B			600	647	629	567		17.4	7.8	−2.8	−9.9	12.7
C			575	597	567	510		12.5	3.8	−5.0	−10.1	1.4
D			552	565	536	482		8.0	2.4	−5.1	−10.1	−4.2
Poland:												
A	2,161	2,111	2,303	2,914	3,306	3,233	−2.3	9.1	26.5	13.5	−2.2	49.6
B			2,125	2,522	2,761	2,693		0.7	18.7	9.5	−2.5	24.6
C			2,035	2,326	2,488	2,423		−3.6	14.3	7.0	−2.6	12.1
D			1,946	2,130	2,216	2,153		−7.8	9.5	4.0	−2.8	−0.4
Rumania:												
A	1,096	1,068	2,170	2,481	2,641	2,614	−2.6	103.2	14.3	6.4	−1.0	138.5
B			2,004	2,148	2,206	2,174		87.6	7.2	2.7	−1.5	98.4
C			1,837	1,815	1,770	1,735		72.0	−1.2	−2.5	−2.0	58.3
D			1,671	1,481	1,334	1,299		56.5	−11.4	−9.9	−2.6	18.5

TABLE D.—PROJECTED POPULATION OF PRIMARY SCHOOL AGE (7 TO 14 YEARS)—SIX EASTERN EUROPEAN COUNTRIES: 1969 TO 1990

[Population figures are in thousands and relate to Jan. 1. They have been independently rounded without adjustment to group totals. See text for on p. 111 ff. an explanation of the series]

Country and series	1969	1970	1975	1980	1985	1990	Percent change 1969–70	Percent change 1970–75	Percent change 1975–80	Percent change 1980–85	Percent change 1985–90	Percent change 1969–90
Eastern Europe:												
A	14,495	14,160	12,784	14,507	17,681	19,491	−2.3	−9.7	13.5	21.9	10.2	34.5
B				13,645	15,264	16,103			6.7	11.9	5.5	11.1
C				13,113	13,843	14,182			2.6	5.6	2.4	−2.2
D				12,596	12,517	12,444			−1.5	−0.6	−0.6	−14.2
Bulgaria:												
A	1,053	1,046	993	1,103	1,306	1,393	−0.7	−5.1	11.1	18.4	6.7	32.3
B				1,033	1,097	1,093			4.0	6.2	−0.4	3.8
C				1,001	1,018	991			0.8	1.7	−2.7	−5.9
D				974	963	936			−1.9	−1.1	−2.8	−11.1
Czechoslovakia:												
A	1,862	1,811	1,742	1,862	2,159	2,332	−2.7	−3.8	6.9	16.0	8.0	25.2
B				1,749	1,813	1,829			0.4	3.7	0.9	−1.8
C				1,699	1,681	1,658			−2.5	−1.1	−1.4	−11.0
D				1,655	1,590	1,566			−5.0	−3.9	−1.5	−15.9
East Germany:												
A	2,138	2,162	2,201	2,085	2,292	2,532	1.1	1.8	−5.3	9.9	10.5	18.4
B				1,974	2,001	2,131			−10.3	1.4	6.5	−0.3
C				1,918	1,855	1,931			−12.9	−3.3	4.1	−9.7
D				1,862	1,709	1,731			−15.4	−8.2	1.3	−19.0
Hungary:												
A	1,299	1,217	1,046	1,233	1,510	1,612	−6.3	−14.1	17.9	22.5	6.8	24.1
B				1,154	1,267	1,265			10.3	9.8	−0.2	−2.6
C				1,119	1,175	1,147			7.0	5.0	−2.4	−11.7
D				1,088	1,112	1,084			4.0	2.2	−2.5	−16.6
Poland:												
A	5,378	5,235	4,352	4,475	5,580	6,428	−2.7	−16.9	2.8	24.7	15.2	19.5
B				4,221	4,867	5,411			−3.0	15.3	11.2	0.6
C				4,094	4,510	4,903			−5.9	10.2	8.7	−8.8
D				3,967	4,153	4,394			−8.8	4.7	5.8	−18.3
Rumania:												
A	2,765	2,690	2,451	3,749	4,833	5,194	−2.7	−8.9	53.0	28.9	7.5	87.8
B				3,516	4,219	4,374			43.5	20.0	3.7	58.2
C				3,282	3,604	3,553			33.9	9.8	−1.4	28.5
D				3,049	2,990	2,733			24.4	−1.9	−8.6	−1.2

TABLE E.—PROJECTED POPULATION OF SECONDARY SCHOOL AGE (15 TO 18 YEARS)—SIX EASTERN EUROPEAN COUNTRIES: 1969 TO 1990

[Population figures are in thousands and relate to Jan. 1. They have been independently rounded without adjustment to group totals. See text on p. 111 ff. for an explanation of the series]

Country and series	1969	1970	1975	1980	1985	1990	Percent change					
							1969–70	1970–75	1975–80	1980–85	1985–90	1969–90
Eastern Europe:												
A	7,520	7,565	7,290	6,347	6,820	8,587	0.6	−3.6	−12.9	7.5	25.9	14.2
B					6,646	7,500				4.7	12.8	−0.3
C					6,534	6,852				2.9	4.9	−8.9
D					6,423	6,240				1.2	−2.9	−17.0
Bulgaria:												
A	551	542	527	503	516	642	−1.6	−2.8	−4.6	2.6	24.4	16.5
B					503	549				0.0	9.1	−0.4
C					496	511				−1.4	3.0	−7.3
D					489	484				−2.8	−1.0	−12.2
Czechoslovakia:												
A	1,058	1,052	920	847	880	1,052	−0.6	−12.5	−7.9	3.9	19.5	−0.6
B					859	899				1.4	4.7	−15.0
C					849	838				0.2	−1.3	−20.8
D					838	793				−1.1	−5.4	−25.0
East Germany:												
A	1,032	1,045	1,039	1,144	996	1,120	1.3	−0.6	10.1	−12.9	12.4	8.5
B					972	986				−15.0	1.4	−4.5
C					960	920				−16.1	−4.2	−10.9
D					949	853				−17.0	−10.1	−17.3
Hungary:												
A	706	735	626	506	581	733	4.1	−14.8	−19.2	14.8	26.2	3.8
B					566	626				11.9	10.6	−11.3
C					559	584				10.5	4.5	−17.3
D					551	553				8.9	0.4	−21.7
Poland:												
A	2,736	2,765	2,757	2,219	2,074	2,679	1.1	−0.3	−19.5	−6.5	29.2	−2.1
B					2,022	2,359				−8.9	16.7	−13.8
C					1,996	2,199				−10.1	10.2	−19.6
D					1,971	2,040				−11.2	3.5	−25.4
Rumania:												
A	1,437	1,426	1,421	1,129	1,773	2,362	−0.8	−0.4	−20.5	57.0	33.2	64.4
B					1,723	2,081				52.6	20.8	44.8
C					1,674	1,799				48.3	7.5	25.2
D					1,624	1,518				43.8	−6.5	5.6

TABLE F.—PROJECTED MALE POPULATION OF "MILITARY AGE"—SIX EASTERN EUROPEAN COUNTRIES, 1969 TO 1990

[Population figures are in thousands and relate to Jan. 1. They have been independently rounded without adjustment to group totals. Figures shown for 1990 are for projection series B]

Country and age	1969	1970	1975	1980	1985	1990	Percent change					
							1969–70	1970–75	1975–80	1980–85	1985–90	1969–90
Eastern Europe:												
17 to 19 years	2,811	2,860	2,887	2,506	2,405	2,770	1.7	0.9	−13.2	−4.0	15.2	−1.5
17 to 34 years	13,599	13,822	15,001	15,819	15,851	15,584	1.6	8.5	5.5	0.2	−1.7	14.6
Bulgaria:												
17 to 19 years	216	212	203	196	184	209	−1.9	−4.2	−3.4	−6.1	13.6	−3.2
17 to 34 years	1,134	1,138	1,181	1,222	1,185	1,182	0.4	3.8	3.5	−3.0	−0.3	4.2
Czechoslovakia:												
17 to 19 years	405	405	371	322	342	331	0.0	−8.4	−13.2	6.2	−3.2	−18.3
17 to 34 years	1,926	1,971	2,160	2,189	2,120	1,993	2.3	9.6	1.3	−3.2	−6.0	3.5
East Germany:												
17 to 19 years	373	394	395	435	392	368	5.6	0.3	10.1	−9.9	−6.1	−1.3
17 to 34 years	2,098	2,108	2,107	2,186	2,418	2,364	0.5	0.0	3.7	10.6	−2.2	12.7
Hungary:												
17 to 19 years	263	262	270	202	205	235	−0.4	3.1	−25.2	1.5	14.6	−10.6
17 to 34 years	1,339	1,355	1,493	1,464	1,400	1,324	1.2	10.2	−1.9	−4.4	−5.4	−1.1
Poland:												
17 to 19 years	1,002	1,036	1,089	892	773	854	3.4	5.1	−18.1	−13.3	10.5	−14.8
17 to 34 years	4,372	4,497	5,169	5,745	5,680	5,313	2.9	14.9	11.1	−1.1	6.5	21.5
Rumania:												
17 to 19 years	552	550	559	460	508	772	−0.4	1.6	−17.7	10.4	52.0	39.9
17 to 34 years	2,730	2,752	2,891	3,013	3,049	3,408	0.8	5.1	4.2	1.2	11.8	24.8

TABLE G.—PROJECTED POPULATION OF WORKING AGE (15 TO 64 YEARS), BY SEX—SIX EASTERN EUROPEAN COUNTRIES: 1969 TO 1990

[Population figures are in thousands and relate to Jan 1. They have been independently rounded without adjustment to group totals. Figures shown for 1990 are for projection series B]

Sex and country	1969	1970	1975	1980	1985	1990	Percent change					
							1969–70	1970–75	1975–80	1980–85	1985–90	1969–90
BOTH SEXES												
Eastern Europe	66,274	66,962	69,737	71,427	74,826	77,429	1.0	4.1	2.4	4.8	3.5	16.8
Bulgaria	5,701	5,739	5,889	5,987	6,183	6,249	0.7	2.6	1.7	3.3	1.1	9.6
Czechoslovakia	9,451	9,518	9,680	9,817	10,117	10,288	0.7	1.7	1.4	3.1	1.7	8.9
East Germany	10,428	10,418	10,415	10,704	11,250	11,489	−0.1	0.0	2.8	5.1	2.1	10.2
Hungary	6,890	6,962	7,077	6,984	7,163	7,181	1.0	1.7	−1.3	2.6	0.3	4.2
Poland	20,758	21,123	22,805	23,821	24,921	25,784	1.8	8.0	4.5	4.6	3.5	24.2
Rumania	13,047	13,201	13,870	14,114	15,191	16,437	1.2	5.1	1.8	7.6	8.2	26.0
MALE												
Eastern Europe	32,143	32,525	34,151	35,289	37,162	38,725	1.2	5.0	3.3	5.3	4.2	20.5
Bulgaria	2,863	2,882	2,958	3,009	3,110	3,151	0.7	2.6	1.7	3.4	1.3	10.1
Czechoslovakia	4,667	4,703	4,796	4,875	5,029	5,123	0.8	2.0	1.6	3.2	1.9	9.8
East Germany	4,765	4,777	4,885	5,154	5,492	5,710	0.3	2.3	5.5	6.6	4.0	19.8
Hungary	3,343	3,384	3,460	3,439	3,543	3,579	1.2	2.2	−0.6	3.0	1.0	7.1
Poland	10,095	10,287	11,190	11,777	12,367	12,874	1.9	8.8	5.2	5.0	4.1	27.5
Rumania	6,410	6,492	6,862	7,035	7,620	8,289	1.3	5.7	2.5	8.3	8.8	29.3
FEMALE												
Eastern Europe	34,132	34,438	35,585	36,138	37,664	38,703	0.9	3.3	1.6	4.2	2.8	13.4
Bulgaria	2,838	2,857	2,930	2,979	3,074	3,098	0.7	2.6	1.7	3.2	0.8	9.2
Czechoslovakia	4,784	4,815	4,884	4,942	5,088	5,165	0.6	1.4	1.2	3.0	1.5	8.0
East Germany	5,662	5,642	5,531	5,550	5,757	5,779	−0.4	−2.0	0.3	3.7	0.4	2.1
Hungary	3,547	3,579	3,616	3,545	3,620	3,602	0.9	1.0	−2.0	2.1	−0.5	1.6
Poland	10,664	10,836	11,616	12,044	12,554	12,910	1.6	7.2	3.7	4.2	2.8	21.1
Rumania	6,637	6,709	7,008	7,079	7,571	8,148	1.1	4.5	1.0	7.0	7.6	22.8

MAGNITUDE AND DISTRIBUTION OF THE LABOR FORCE IN EASTERN EUROPE

By ANDREW ELIAS*

CONTENTS

I. INTRODUCTION

A. SCOPE

This paper is concerned with change in the size and distribution of the labor force in six countries of Eastern Europe—Bulgaria, Czechoslovakia, East Germany,[1] Hungary, Poland, and Rumania—as indicated by two measures, the economically active population and civilian employment. Details of change in terms of both measures are discussed for the period from 1950 to 1967 or 1968, and projections of the economically active population are presented for the years 1969–90. Primary attention is given to total size, levels of participation, and patterns of growth, although considerable emphasis is also placed

*The author wishes to express his gratitude to Marjory E. Searing of the U.S.S.R./East Europe Branch, Foreign Demographic Analysis Division, U.S. Bureau of the Census, for her professional assistance in the research, writing, and review of this paper. Contrary to his suggestion, she declined having her name listed as the co-author.

[1] The term "East Germany" will be used in this paper to refer to the Soviet Zone of Germany plus the Soviet sector of Berlin.

on explaining differences in scope and coverage of the two measures, both among the countries in the region and by branch and sector within each country. Particular concern in this respect is paid to agriculture, especially the numerous types of collective farms, and to industry, where stress is given to the definition and classification of various categories of industrial employment.

Statistics on the economically active population and civilian employment in each of the six countries are presented in the appendix tables. Published official statistics were supplemented by numerous estimates to fill in gaps, and a considerable number of adjustments to the reported data were made to render the branch and sectoral figures more comparable among the countries and within each country over time. All data refer to the present boundaries of the six countries.

Due to the limitations of time and space, a number of important factors and characteristics of the East European labor force had to be omitted. These include age distribution, educational attainment, labor shortage or surplus, labor turnover, wages, etc. For the same reasons, only brief attention could be paid to female employment and to the projections of the economically active population, which are presented in the last chapter without detailed rationale or analysis.

B. SUMMARY

As of mid-1968, the total population of the six Eastern European countries was 102.1 million, which represents an increase of 13.6 million, or 15.4 percent, over 1950. The population of working age, defined in this paper for all countries as ages 15 through 64, grew during the same period from 58.5 to 65.9 million, or by 12.7 percent. In contrast, the economically active population of the region rose from 45.4 to 52.8 million, a gain of 16.4 percent. This greater relative rise in the economically active population resulted primarily from the increasing participation of women and the retention in the labor force of persons who had passed beyond age 65.

The economically active population engaged in agricultural activities in the six Eastern European countries is estimated to have declined from 23.4 million in 1950 to 18.6 million in 1968, or by 20.5 percent. The decline was sharpest in East Germany, 39.2 percent, followed closely by Bulgaria, 38.8 percent, and Czechoslovakia, 38.5 percent. Much smaller relative decreases were registered in the remaining three countries. The postwar rural exodus in the six countries has caused a serious shortage of efficient agricultural labor in several areas. As is the case in many other countries, agriculture in Eastern Europe is becoming increasingly an employer of women, the old, and the unskilled.

While agricultural manpower declined, the number engaged in nonagricultural activities rose steadily in each of the six countries. Thus, the economically active in nonagricultural branches increased from less than 22 million in 1950 to over 34 million in 1968, a rise of nearly 56 percent. Growth was fastest in Bulgaria, 123 percent, followed by Rumania, 84 percent, and Poland, 80 percent. Increases in the more industrialized Hungary and Czechoslovakia were much smaller, though still considerable, amounting to 60 and 51 percent, respectively. The comparatively small increase of 12 percent in nonagricultural

manpower in East Germany was due partly to its high level of industrialization in 1950, and partly to its overall shortage of labor resulting from losses in World War II and the sizable emigration to the Federal Republic of Germany.

Almost half of the increase in the number of economically active persons engaged in nonagricultural activities in the six countries took place in industry. Variations among the individual countries ranged from nearly 19 percent in East Germany to about 65 percent in Hungary. By 1968, almost 30 percent of all economically active persons in the six East European countries were employed in industrial and mining activities. Among the more advanced non-Communist countries, Japan employs some 25 percent of its labor force in industry, the United States 27 percent, and the Federal Republic of Germany 39 percent.

Civilian employment, which differs from the economically active population mainly in that it excludes the armed and security forces and certain other employment categories, grew more rapidly than the economically active population. Thus, civilian employment rose from 40.1 million in 1950 to 48.5 million in 1967, an increase of 21.2 percent. The fastest growth among the six countries was in Poland, where the increase was more than 41 percent, and the slowest growth was in East Germany, 4 percent. Nonagricultural employment increased by almost two-thirds of its 1950 size, from 19.3 to 31.2 million, whereas employment in agriculture and forestry dropped by about one-sixth, from 20.8 to 17.4 million. Within the nonagricultural branches, the largest increase in civilian employment in the region as a whole was in construction (86 percent), followed by services (68 percent), transportation (62 percent), industry (59 percent), communications (57 percent), and trade (45 percent).

Most of the decline in agricultural employment between 1950 and 1967 occurred in the private sector. As of 1950, more than 80 percent of total agricultural employment in each of the six countries was still in the private sector. In the region as a whole, over 90 percent was in the private sector. By 1967, this proportion had dropped to less than 34 percent, with Poland the only one of the six countries still having over 80 percent of its agricultural employment in the private sector. At the other extreme, East Germany had only 2 percent of its agricultural employment represented by private farmers.

The number of persons engaged in collective farming grew steadily in all countries but Poland. In the region as a whole, the proportion of the collective farm sector in total agricultural employment increased from 3.2 percent in 1950 to 52.6 percent in 1967. If Poland is excluded from the comparison, the 1967 proportion would be more than 75 percent. The largest increase took place in Rumania, where the proportion of those engaged in collective farming within total agricultural employment rose from 1 percent in 1950 to over 82 percent in 1967. However, the degree of collectivization of Rumanian agriculture as represented by this latter figure is exaggerated because, as explained in the text, the officially reported cooperative sector in Rumania includes employment in the lowest type of collective farm, which in other countries is classified under the private sector.

Judging by the increase in the number of industrial workers, heavy industry grew faster than light industry in all countries except Hun-

gary. Consequently, the proportion of all industrial workers employed in light industry declined from 36 percent in 1950 to 33 percent in 1967. The 1967 proportions among individual countries ranged from a low of 23 percent in East Germany to a high of 42 percent in Bulgaria. The largest proportion of all workers in heavy industry in the region was registered by the machine-building and metalworking branch, 45 percent in 1950 and 51 percent in 1967. The textile industry was the largest employer among the branches of light industry, with 40.6 percent of the total in 1950 and 31.6 percent in 1967.

Female employment in each country of Eastern Europe has grown faster than total employment. In 1955, only in East Germany was the proportion of women more than 40 percent of total employment in the nonagricultural branches of the socialist sector. By 1960, East Germany was joined by Czechoslovakia, and as of 1967 also by Bulgaria, with Hungary and Poland not far behind. The influx of women workers and employees was particularly sizable into such branches of the economy as health services, education, finance, and trade, where they now outnumber men in most of the six countries. Within industry, most of the employed women are concentrated in the branches which commonly have high proportions of female workers, such as the textile, leather, and shoe industries.

According to the projections presented here, the total economically active population in the region is expected to increase from 52.8 million in 1968 to 60.8 million in 1990, a rise of 15 percent. Because of both a relatively high level of labor force participation and a rapidly increasing population of working age, Poland is expected to account for 4.1 million, or over half, of the total projected increase of 8 million economically active persons in the region. Rumania is expected to register the next largest increase, 1.7 million persons, even though its labor force participation rate is expected to decline from the 1968 level. Poland and Rumania together account for almost 73 percent of the total projected increase in the economically active population of the region. Thus, the two largest countries in the region will grow proportionately still larger—in terms of total, working-age, and economically active populations—whereas the four smaller countries will become proportionately smaller.

C. SOURCES OF DATA

The data presented in this paper were derived mainly from official publications issued by the statistical offices of the six countries. For supporting and background material, the author relied heavily on his previous studies of the subject published by the U.S. Bureau of the Census. Data on the economically active population for the census years were taken from the census volumes, if available, or from other reliable sources such as yearbooks or official periodicals.[2] Statistics presented on the economically active population for all noncensus years are estimates.

Data on civilian employment were obtained from statistical yearbooks which have been published regularly by each of the countries

[2] Postwar censuses in the six countries were taken on the following dates: Bulgaria—December 31, 1946, and December 1, 1956, and 1965; Czechoslovakia—March 1, 1950, and 1960; East Germany—October 29, 1946, August 31, 1950, and December 31, 1964; Hungary—January 1, 1949, and 1960; Poland—February 14, 1946, December 3, 1950, and December 6, 1960; Rumania—January 25, 1948, February 21, 1956, and March 15, 1966.

since approximately the mid-1950's. In addition to these basic sources, which cover the whole economy, extensive use was made of specialized volumes published by some of the countries which deal specifically with a single branch of the economy, such as industry or agriculture. Certain periodicals, especially those which cover the fields of demography, labor force, and statistics, or those which cover the economy in general, were very useful. Official decrees were also helpful, particularly in defining the scope of certain branches or sectors of the economy. As noted above, it was necessary to make many estimates to fill gaps in the data reported, particularly with respect to the economically active and to civilian employment in the private sector. This paper was completed in June 1969 and does not take account of information available after that date.

A list of all sources used follows the text.

II. Labor Resources

A. TOTAL POPULATION

As of the middle of 1968, the population of Eastern Europe was 102.1 million, a figure representing an increase of 13.6 million, or 15.4 percent, over the total of 88.5 million in 1950. There were, however, considerable variations in growth among the six countries during the 18-year period—from an average decline in the East German population of 0.4 percent per year to an increase in the Polish population of 1.5 percent per year (Table 1). The decline in the East German population was for the most part due to the loss of population to the West prior to the erection of the Berlin Wall in 1961. The rapid rate of growth in Poland was a result of high rates of natural increase.[3]

TABLE 1.—AVERAGE ANNUAL RATES OF GROWTH OF THE TOTAL POPULATION—SIX EASTERN EUROPEAN COUNTRIES: 1950 TO 1968

[In percent]

Country	1950–60	1960–68	1950–68
All countries	0.9	0.7	0.8
Bulgaria	0.8	0.8	0.8
Czechoslovakia	1.0	0.6	0.8
East Germany	−0.8	0.0	−0.4
Hungary	0.7	0.3	0.5
Poland	1.8	1.1	1.5
Rumania	1.2	0.9	1.1

Source: Appendix Table II.

A comparison of the rates of growth between the first 10 and the last 8 years of the period, as given in Table 1, reveals that growth in the region as a whole and in all of the countries but Bulgaria and East Germany has been slowing down. This decline has resulted directly from the dramatic drop in the birth rate.

Differential rates of growth have caused some moderate changes in the distribution of the Eastern European population among the various countries (Appendix Table II). The proportion living in Po-

[3] For a detailed discussion of population changes during this period, see the paper by Paul F. Myers, "Demographic Trends in Eastern Europe," in this volume.

land rose from 28 to over 31 percent during the 18 years, while the proportion living in East Germany fell from almost 21 percent to less than 17 percent, moving from second to third place among the six countries. Rumania has become the second largest country, with over 19 percent of the Eastern European population living within its boundaries. The size of the total, working-age, and economically active populations in each of the countries in 1950 and 1968 is shown in Figure 1.

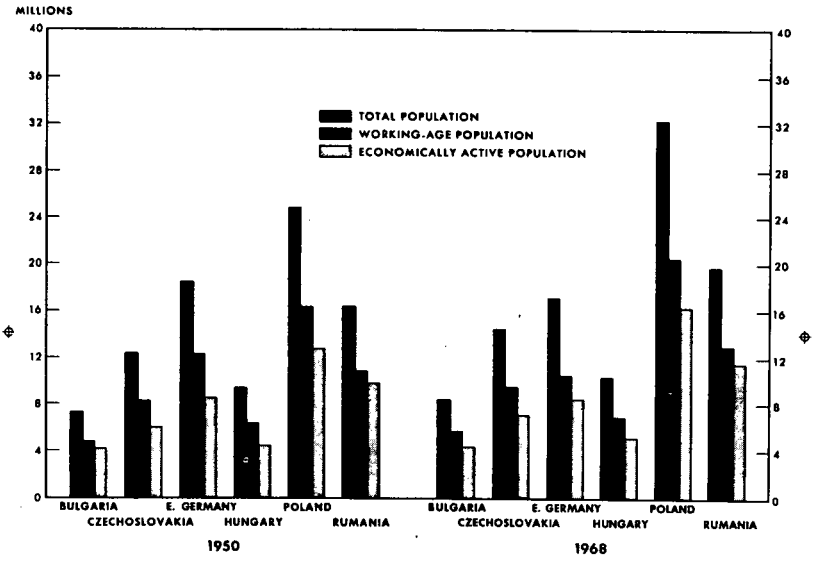

Figure 1.--Total, working-age, and economically active population--six Eastern European countries: 1950 and 1968

B. WORKING-AGE POPULATION

Limits of the legal working-age populations in Eastern Europe vary from country to country. Generally, the lower limit coincides with the age in the last year of compulsory school attendance, whereas the upper limit for both males and females indicates the respective ages at which they become eligible for pensions. The upper limit for females is lower than that for males in all six countries. In this paper, for purposes of uniformity, the working-age population has been defined for all countries and for both sexes as 15 through 64 years of age, inclusive.

As of mid-1968, the working-age population in Eastern Europe numbered 65.9 million persons. This represented an increase of nearly 13 percent over the figure of 58.5 million in 1950, and an average annual rate of growth of 0.7 percent. The total population grew slightly more rapidly, however, and the proportion of total population in the working ages declined from 66.1 percent in 1950 to 64.6 percent in 1968 (Appendix Table II). This phenomenon, which was caused primarily by the entry into these ages of the relatively small numbers born during World War II, occurred in all countries except Bulgaria.

Among the six countries, East Germany had the largest drop in the proportion, not only as a result of birth deficits but also because of the large exodus of able-bodied persons from East to West Germany prior

to the construction of the Berlin Wall. Thus, the proportion of the East German population within the working ages fell from 66.6 percent in 1950 to 61.0 percent in 1968, while the share of the total working-age population of Eastern Europe living in East Germany declined from 20.9 percent in 1950 to 15.8 percent in 1968 (Appendix Table II). In Poland, which had the second largest decline in the proportion of its population in the working ages, the share of the region's working-age population nevertheless increased from nearly 28 percent to over 31 percent. Similar but less extreme divergencies occurred in Czechoslovakia and Rumania during the same time period. Bulgaria was the only country to experience an increase in both proportions, and Hungary, like East Germany, had a decrease in both proportions.

One effect of the general decrease in the proportion of working-age to total population was an increase in the dependency ratios—that is, in the numbers of persons aged 0–14 and 65 and over per 1,000 persons 15 to 64 years of age. The dependency ratio for the region as a whole increased from 512 in 1950 to 566 in 1960, then dropped to 549 in 1968 (Table 2). In East Germany, the ratio increased from 502 to 638 between 1950 and 1968; in Bulgaria, on the other hand, the ratio fell. The 1968 figures for all countries but East Germany were much smaller, however, than that for Yugoslavia, which was 611, or for Albania, which was at the extremely high level of 914.[4]

TABLE 2.—DEPENDENCY RATIOS—SIX EASTERN EUROPEAN COUNTRIES: 1950, 1960, AND 1968

Country	1950	1960	1968
All countries	512	566	549
Bulgaria	514	504	474
Czechoslovakia	506	558	526
East Germany	502	537	638
Hungary	486	519	494
Poland	530	646	570
Rumania	518	532	521

Note: These ratios are defined as the number of persons under 15 years of age and 65 years of age and over per 1,000 persons 15 to 64 years of age.

Source: Appendix Table II.

The proportionate decline in the working-age population which has occurred in five of these countries does not necessarily imply the existence of present or forthcoming labor shortages in any of the countries. If it should become necessary, any government concerned can offset a potential shortage, at least to some degree, by bringing additional persons into the labor force, especially housewives and persons above the working age limit; by the temporary migration of labor from country to country; by better utilization of labor already employed; and by a combination of the above plus other actions.[5] At the present time only East Germany shows obvious signs of a labor shortage,[6] whereas Hungary seems to show a slight surplus. All countries in the region, with the probable exception of East Germany, seem to be experiencing a chronic shortage of skilled personnel in various

[4] Derived from estimates prepared by the Foreign Demographic Analysis Division, U.S. Bureau of the Census.

[5] For a recent discussion of a labor shortage arising in Poland from demographic trends and the Polish government's policies to offset this shortage, see Ignar, "Certain," 1969, pp. 30–48. The governments of Rumania (at the end of 1966) and Bulgaria (at the end of 1967) have, furthermore, taken steps to avoid future shortages by adopting measures to encourage the birth rate.

[6] Schröder and Seifert, "On the Step-Ladder," 1969, p. 3.

activities, but they may actually have a surplus of unskilled labor which remains underemployed, or unemployed, at least for certain periods of the year.

C. ECONOMICALLY ACTIVE POPULATION

1. Total

The term "economically active population" varies in concept and usage from country to country and even from census to census within a country. As defined in the population censuses, the term refers to a comprehensive universe of persons engaged in socially useful work. As a rule, the economically active population includes those civilians employed in all sectors of the economy, home workers, apprentices, helping family members, self-employed, employed prisoners, persons engaged in personal services, persons temporarily unemployed, and the armed and security forces. Exceptions are common, however. For example, the Rumanian census of 1956 included pupils in secondary-technical schools among the economically active, and the Polish censuses of 1950 and 1960 excluded the Armed Forces, numbering 393,000 and 290,000, respectively. In all cases, persons with several jobs are counted only once, usually in those activities from which they derive the greatest part of their income and not those in which they are employed for the longest part of the year.

The category "helping family members" accounts, particularly in agriculture, for the lion's share of conceptual differences in reporting on the economically active population among the six countries. Unfortunately, the information available on the coverage of this category is too scanty to permit meaningful intercensal or international comparisons.[7] Generally, all countries report as helping family members in agriculture those who live in the same household with the head of the family, who regularly help with at least major field work, and who are unpaid. This broad coverage is explicitly restricted in some countries by placing age limits on the category of helpers, as well as on persons in other employment categories, thus excluding from the count those active participants who are either above or below the working ages. Specific international differences in the statistical coverage of this and other employment categories in agriculture and industry are discussed below.

All census figures presented here are those reported in the various official publications, with the exception of data from the two postwar Polish censuses, which have been adjusted to include estimates for the Armed Forces. No attempt was made to exclude pupils attending secondary-technical schools from the economically active population of Rumania because of their uncertain number and unspecified branch classification.

The economically active population in Eastern Europe increased from 45.4 million in 1950 to 52.8 million in 1968, or by 16.4 percent (Appendix Table II). Thus, on the average, it grew at a slightly faster annual rate (0.8 percent) (Table 3) than the working-age population (0.7 percent), due primarily to the increasing participation of women and aged persons in economic activities. This is particularly true of

[7] Detailed information on changes in the classification of various categories of the population from census to census in an East European country, for both prewar and postwar years, is available only for Yugoslavia. See Elias, *The Labor Force of Yugoslavia*, 1965, p. 9.

East Germany where the number of economically active persons declined by less than one-half of 1 percent during the years 1950–68, although the working-age population declined by almost 15 percent. The economically active populations of Czechoslovakia, Hungary, and Poland grew at faster rates than did their working-age populations, whereas the two populations grew at the same rate in Bulgaria and the economically active grew at a slower rate than the working-age population in Rumania.

TABLE 3.—AVERAGE ANNUAL RATES OF GROWTH OF THE ECONOMICALLY ACTIVE POPULATION—SIX EASTERN EUROPEAN COUNTRIES: 1950 TO 1968

[In percent]

Country	1950–60	1960–68	1950–68
All countries	0.8	0.9	0.8
Bulgaria	0.2	0.4	0.3
Czechoslovakia	0.7	1.2	0.9
East Germany	0.1	−0.1	0.0
Hungary	1.1	0.6	0.9
Poland	1.1	1.8	1.4
Rumania	1.1	0.8	1.0

Source: Appendix Table II.

Czechoslovakia, East Germany, and Hungary each registered an increase in the proportion of its total population which is economically active, whereas Poland and Rumania, the two countries with the largest absolute and proportionate increases in economically active population, each showed a slight decline (Appendix Table II). The number of economically active persons in Bulgaria increased at a considerably slower rate than did the total population throughout the period, giving it by far the greatest decline in the proportion of the population which was economically active. Among the six countries, Bulgaria had the highest share of its economically active population engaged in agriculture at the beginning of the period. Thus, the rapid process of industrialization since 1950, with the resultant need to depend less and less on the young and old as family helpers, has had the greatest impact in that country. Changes in the distribution of the Eastern European population between 1950 and 1968 are shown in Figure 2.

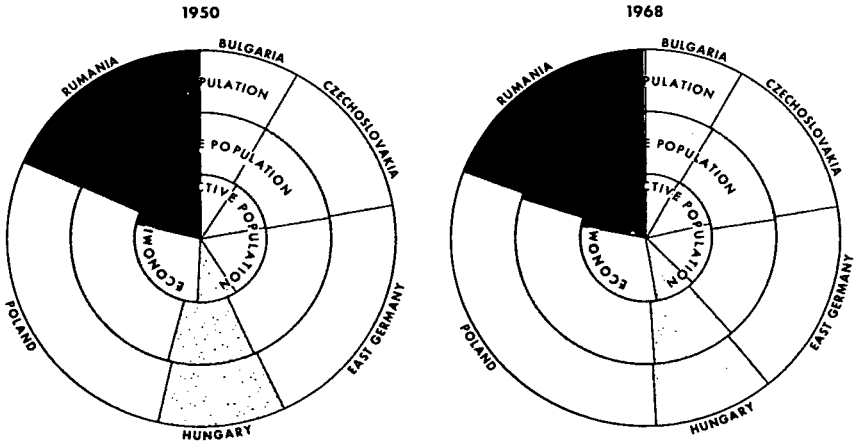

Figure 2.--Percent distribution of the total, working age, and economically active population—six Eastern European countries: 1950 and 1968

The relatively high proportion of the Rumanian population shown as engaged in economic activities is believed to be largely due to the enumeration, especially in agriculture, of many persons with occasional or temporary jobs who in other countries would be counted as inactive. Judging from other characteristics of Rumanian agriculture, such as the degree of collectivization or mechanization and the existence of a labor-day earning system similar to those in other countries, the agricultural labor force in Rumania, if conceptually consistent with that of other countries, would be proportionately much closer to that of Bulgaria or Poland.[8]

2. Agricultural Branches

The economically active population engaged in agricultural activities in the six Eastern European countries declined from 23.4 million in 1950 to 18.6 milion in 1968, or by 20.5 percent (Appendix Table III and Figure 3). Disregarding conceptual differences and statistical reclassifications, which will be discussed in the next chapter, the decline was sharpest in East Germany, 39.2 percent, followed very closely by Bulgaria and Czechoslovakia, which showed declines of 38.8 and 38.5 percent, respectively (Table 4). Hungary, Poland, and Rumania reg-

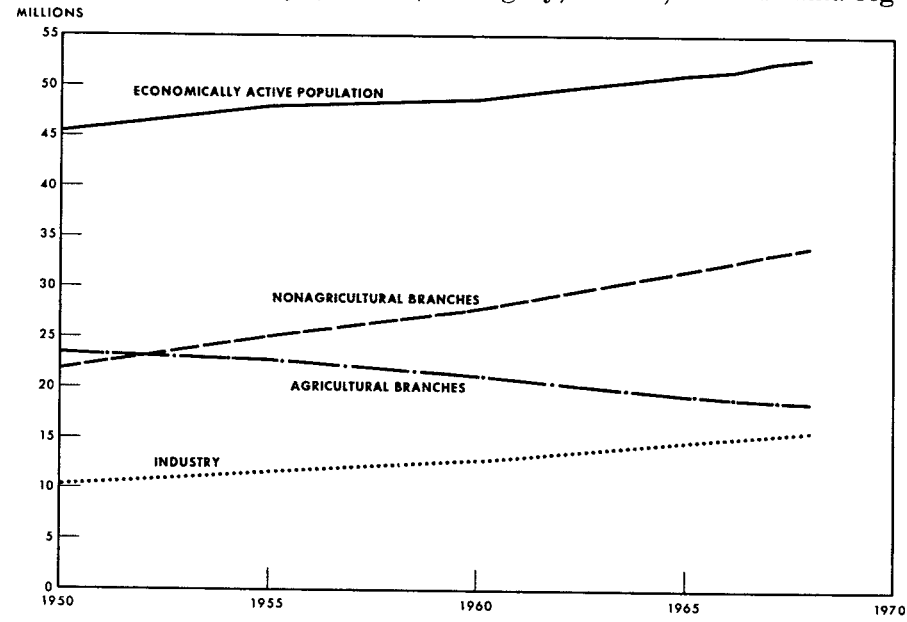

Figure 3.—Economically active population, by major branch—six Eastern European countries combined: 1950 to 1968

[8] After the final draft of this paper was completed, preliminary data on the economically active population in Rumania as of the March 15, 1966, census became available. These data show that the total as of that date was 10,362,300, or about 1 million lower than the estimate given in Appendix Table I–G. This implies that the assumption of a constant participation rate from the 1956 census, as described in Appendix Table I–G, is probably unwarranted and that the rate fell in subsequent years. It may also indicate that the definition of the economically active population in the latest Rumanian census is narrower than that in the 1956 census, and is getting closer to the definitions used in the other East European countries. Unfortunately, the information was received too late to be integrated into this paper. The projections of the economically active population presented here (Appendix Table XII), which are based on the assumption of a declining participation rate, are in later years very close to projections which would have been derived on the basis of the participation rate implied by the 1966 census results.

istered much smaller decreases over the 18 years. Comparison of changes during the two periods 1950–60 and 1960–68 indicates that in Bulgaria and Czechoslovakia the decline was sharper in the earlier period. In East Germany and Hungary the rate of decrease was higher in the later period, and in Rumania an overall increase in the years 1950–60 changed to a sizable decrease during the next 8 years.

TABLE 4.—PERCENT CHANGE IN THE ECONOMICALLY ACTIVE POPULATION ENGAGED IN AGRICULTURE—SIX EASTERN EUROPEAN COUNTRIES: 1950 to 1968

Country	1950–60	1960–68	1950–68
All countries	−9.4	−12.3	−20.5
Bulgaria	−24.9	−18.5	−38.8
Czechoslovakia	−24.7	−18.4	−38.5
East Germany	−22.5	−21.6	−39.2
Hungary	−13.8	−18.1	−29.4
Poland	−6.4	−6.5	−12.5
Rumania	+4.5	−10.6	−6.6

Source: Appendix Table III.

These differing periods of more rapid decline are, at least in part, a reflection of varying intensities in the drives for collectivization of agriculture undertaken in the different countries during the two time intervals. Collectivization in Hungary and Rumania was not pushed firmly until 1960, and the number engaged in agriculture dropped at a greater rate after that time. In Poland, agriculture has been permitted to remain largely in private hands, whereas in the remaining three countries the strong collectivization drives came prior to 1960. Collectivization, however, has not been the only impetus for the shift to nonagricultural activities. Other factors include employment opportunities coincident to rapid industrialization, the possibility of earning higher wages in many nonagricultural activities, and the attraction of cultural, social, and educational opportunities in towns and cities.

The rural exodus that has ensued has created serious shortages of efficient agricultural labor in a number of areas. Repeated attempts to recruit young people for agricultural work have been made in all of the countries, but they have met with little success and quotas for apprentices in agriculture are seldom fulfilled.[9] As in many other countries, agriculture in Eastern Europe is becoming an employer of the old, the unskilled, and other persons generally unemployable elsewhere; in all countries, the agricultural labor force now consists of an unusually high proportion of women. In Czechoslovakia and Rumania, nearly 20 percent of the economically active population in agriculture has recently been reported as over 60 years of age; in Poland the comparable figure was 16 percent. Data available for Czechoslovakia suggest that this proportion is higher where there is a lesser degree of "common ownership." Thus, in the state sector of agriculture in 1960, 10 percent of the permanently active were over age 60; comparable figures for the cooperative and private sectors were 19 and 26 percent, respectively. In Hungary, 43 percent of the

[9] See, e.g., Olajos and Öry, "Employment," 1968, pp. 1138–1139, and Elias, *The Labor Force of Czechoslovakia* (forthcoming), chapter V.

male and 47 percent of the female collective farmers were above age 60 in 1967.[10]

The predominance of women in agricultural activities is also apparent. In Czechoslovakia in 1963, for example, over 52 percent of the persons permanently active in agriculture were women; in Poland this proportion presently is 55 percent, and in Rumania 57 percent. The sex imbalance also seems to be more striking where there is a lesser degree of "common ownership." More than 52 percent of those economically active in Bulgarian cooperatives in 1965 were women, whereas in the state sector the proportion was less than 48 percent. Almost 65 percent of the permanently active in private Czechoslovak agriculture in 1963 were women, as compared with 53 percent in the cooperative sector and 41 percent in the state sector.[11]

The economically active population engaged in agriculture in the region as a whole declined from more than half in 1950 to only a little more than a third in 1968 (Appendix Table III and Figure 4). By 1968, Rumania was the only country among the six with more than half of its economically active population still in agriculture, although in view of the previously mentioned overcount of persons active in Rumanian agriculture, this proportion may be somewhat exaggerated. At the other end of the range, only 15 percent of the economically active population in East Germany were in agriculture in 1968. According to this indicator, all six countries are still more agricultural than the United States and the Federal Republic of Germany, which have 5 and 10 percent of their economically active populations engaged in agriculture, respectively.[12] All countries except East Germany and Czechoslovakia are more agricultural than Japan, which has 24 percent of its economically active population in agriculture. The three most agricultural countries in Eastern Europe, Rumania, Bulgaria, and Poland, together accounted for 72.5 percent of the region's agricultural labor force in 1950. By 1968, this proportion had increased to 77.8 percent. Thus, total agricultural manpower of the region has become increasingly concentrated in these three countries.

3. Nonagricultural Branches

The nonagricultural labor force in Eastern Europe grew from 21.9 million in 1950 to 34.2 million in 1968, an increase of 55.9 percent (Appendix Table III). As one might expect, the highest rates of increase were registered by the three countries which were less industrialized in 1950—Bulgaria, Poland, and Rumania. Again disregarding statistical reclassifications during the period under review, the number of persons engaged in nonagricultural activities in Bulgaria increased by nearly 123 percent, in Rumania by 84 percent, and in Poland by almost 80 percent. Increases in two of the three more industrialized countries, Hungary and Czechoslovakia, were less spectac-

[10] See, e.g., Zarcheva, "Trends," 1969, pp. 6–9; *Stat. roč.* [*zem.*] *1963*, pp. 436 and 439–441; *Stat. Jahr. 1967*, pp. 63–64; Nagy, "Characteristic," 1965, p. 137; *Mezö. Stat. 1968*, p. 234; *Polish Economic Survey*, 1969, p. 3; Ignar, "Certain," 1969, p. 32; and Păcuraru, "Labor," 1969, p. 3.

[11] *Stat. god. 1966*, p. 70, and *Stat. roč.* [*zem.*] *1963*, p. 439. These percentages, high as they are, seem low when compared with proportions of women working in the small private sector of agriculture in the U.S.S.R. For instance, according to the 1959 population census, females represented 91 percent of all persons enumerated as active in private agriculture in the Soviet Union. See U.S. Congress, *Annual*, 1964, p. 44.

[12] ILO, *Year Book 1968*, pp. 85, 97, and 119.

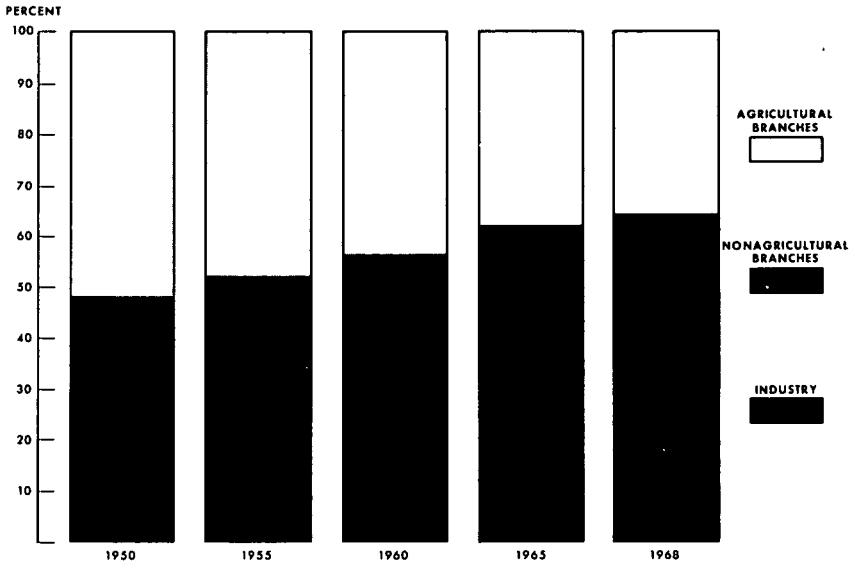

Figure 4.—Percent distribution of the economically active population, by major branch—six Eastern European countries combined: 1950 to 1968

ular, but nevetheless considerable—60 and 51 percent, respectively. In the most industrialized country of the region, East Germany, nonagricultural manpower grew by only 12 percent, or 0.6 percent annually. Average annual rates of increase in all but two of the six countries, Poland and Rumania, were higher in the period 1950–60, when the first significant flows of manpower left agriculture for the nonagricultural branches (Table 5).

TABLE 5.—AVERAGE ANNUAL RATES OF GROWTH OF THE ECONOMICALLY ACTIVE POPULATION IN NONAGRICULTURAL BRANCHES—SIX EASTERN EUROPEAN COUNTRIES: 1950 TO 1968

[In percent]

Country	1950–60	1960–68	1950–68
All countries	2.4	2.6	2.5
Bulgaria	5.6	3.2	4.5
Czechoslovakia	2.4	2.3	2.3
East Germany	0.8	0.4	0.6
Hungary	3.0	2.2	2.7
Poland	2.9	3.8	3.3
Rumania	2.7	4.5	3.5

Source: Appendix Table III.

East Germany's share of the region's economically active population engaged in nonagricultural activities decreased from more than 29 percent in 1950 to 21 percent in 1968. As can be observed in Appendix Table III, it was the less industralized countries, Bulgaria, Poland, and Rumania, which experienced the largest increases in the proportion of total nonagricultural manpower living within their bounds.

The impact of the loss of manpower by East Germany due to emigration is made clear by a comparison of absolute changes in the size of the total working-age population and the economically active popu-

lations in agricultural and nonagricultural branches in each of the countries between 1950 and 1968 (Table 6). In all countries but East Germany, the absolute increase in the size of the working-age population was less over the 18 years than the increase in the number of persons economically active in the nonagricultural branches (columns 1 and 4). Thus, in every country (including East Germany) the source of the increase in nonagricultural manpower could not have been the larger working-age population alone, but had to entail increased participation, especially of women and the aged, and/or the shift of labor from agriculture into nonagricultural branches. If one accepts the decline in agricultural employment (column 2) as a rough measure of the labor resources supplied by agriculture to the nonagricultural branches in East Germany, it becomes clear that the large loss of working-age population required an increase in participation by persons previously inactive of sufficient size to fill a gap of nearly 1.8 million (column 4 minus column 3). Hungary is the only other country which shows a similar, but much smaller, deficit (164,000 persons). In the remaining four countries, increases in the working-age population plus the shift of manpower from agriculture was larger than the increase in nonagricultural employment. This is not to imply that participation in economic activities by persons previously inactive in these four countries did not increase over the 18 years, for in fact it did.

TABLE 6.—COMPARISON OF CHANGES IN THE WORKING-AGE POPULATION AND THE NUMBERS OF PERSONS ECONOMICALLY ACTIVE IN AGRICULTURAL AND NONAGRICULTURAL BRANCHES—SIX EASTERN EUROPEAN COUNTRIES: 1950 TO 1968

[In thousands]

Country	Working-age population (1)	Number of persons economically active in agriculture (2)	Labor resources available for nonagricultural branches (1) plus (|2|) (3)	Number of persons economically active in nonagricultural branches (4)
Total	7,415	−4,806	12,221	12,247
Bulgaria	890	−1,157	2,047	1,389
Czechoslovakia	1,184	−867	2,051	1,906
East Germany	−1,811	−812	−999	772
Hungary	579	−623	1,202	1,366
Poland	4,345	−890	5,235	4,460
Rumania	2,228	−457	2,685	2,354

Source: Appendix Tables II and III.

Almost half of the increase in the number of economically active persons in the nonagricultural branches of the six countries of Eastern Europe occurred in industry, the branch with priority in the national plans of all countries (Table 7). In fact, only East German industry, largely because of its relatively advanced stage of development in 1950, absorbed less than 43 percent of the increase in the economically active population in nonagricultural activities. In Hungary and Bulgaria, considerably more than half the increase was absorbed by industrial branches. Thus, while in 1950 East Germany was the only country of the six in which industry was the largest employer, it was joined by Czechoslovakia in 1960, and by Hungary in 1968.

TABLE 7.—INCREASE IN THE ECONOMICALLY ACTIVE POPULATION IN THE NONAGRICULTURAL BRANCHES AND IN INDUSTRY—SIX EASTERN EUROPEAN COUNTRIES: 1950 TO 1968

[Absolute figures in thousands]

Country	Nonagricultural branches	Industry	Increase in industry as percent of increase in nonagricultural branches
Total	12,247	5,634	46.0
Bulgaria	1,389	810	58.3
Czechoslovakia	1,906	816	42.8
East Germany	772	150	19.4
Hungary	1,366	893	65.4
Poland	4,460	1,957	43.9
Rumania	2,354	1,008	42.8

Source: Appendix Table III.

As of 1968, almost 30 percent of all economically active persons in these Eastern European countries were engaged in industry. The growth of the industrial labor force between 1950 and 1968 in Bulgaria (178 percent) was sufficiently fast to move its position from that of least industrialized among the six countries in 1950 to a place above both Rumania and Poland in 1968. An indication of the importance of industry within the region can be seen through some international comparisons. Disregarding differences in statistical classifications, all countries but two—Poland and Rumania—have higher proportions of their labor employed in industry than the 27 percent in the United States, where services have become more important. With less than 20 percent of its economically active population in industry, Rumania is the only country registering a proportion smaller than Japan's 25 percent. On the other hand, only East Germany registers a higher proportion than the 39 percent recorded for the German Federal Republic.[13]

III. Civilian Employment

This chapter is concerned with employment data reported to statistical agencies by enterprises, institutions, and organizations. These data are derived primarily from monthly, quarterly, or annual reports by primary reporting organizations of the numbers of persons on their rolls. Employment data on the civilian economy have been reported regularly by all six countries of Eastern Europe since around the mid-1950's.

In general, the universe of employment data differs from that of the economically active population in that it does not include the armed and security forces. In addition, some countries exclude persons engaged in what they classify as confidential occupations, such as uranium mining and processing, or persons on which no meaningful employment data are available, such as helping family members. However, relationships between the two universes are complex, and simple adjustments for missing categories will not bring them into equality. A person counted in the population census as economically active may not be counted in employment statistics as employed, or vice versa, and even if counted in both cases he may not necessarily be classified under the same branch of the economy. This applies

[13] *Ibid.*

especially to persons who have temporary or seasonal jobs, or several part-time jobs, and to persons who change jobs or take a prolonged leave during the census year. Another difference in the two universes stems from the fact that census data refer to a certain point in time, and employment statistics are usually monthly or annual averages.

The employment data published by Czechoslovakia, East Germany, and Hungary appear to be more complete than those issued by the other three countries. East German employment statistics cover all sectors and branches of the material production sphere, as well as all class-of-worker categories. For the nonproductive sphere (services), however, they contain only summary data, without a distribution by branch. Czechoslovak and Hungarian statistics also cover all sectors and branches of the economy, including a detailed branch breakdown of the nonproductive sphere, but they are less comprehensive than East German statistics with respect to coverage of class-of-worker categories. The Czechoslovak employment data regularly exclude all apprentices, except those being trained at the machine and tractor stations, although the total number of apprentices is reported separately, by specialty and year of training. Apprentices are often, but not always, included in Hungarian employment data. However, Hungary's aggregate manpower balance sheet lists apprentices under nonactive categories, such as students, pensioners, etc., and since Czechoslovakia follows similar practices, apprentices in both countries have been excluded here from total civilian employment figures. The definition of apprentices in these two countries is much broader than that in the other four countries, and their inclusion in the employment data would raise the size of total civilian employment in both countries above the level of their economically active populations.

The employment statistics of Bulgaria, Poland, and Rumania cover all branches and all class-of-worker categories. Bulgaria and Poland leave out data on private agriculture, however, and Rumania excludes employment in both the cooperative and the private sectors of agriculture. These omissions are especially serious in Poland, where about 86 percent of agricultural labor is still engaged in private farming, and in Rumania, which has about 93 percent of its agricultural employment in cooperative and private farms. Consequently, it was necessary here to supplement the reported data on employment in agriculture of these three countries with estimates for the missing sectors, as described below.

In respect to other factors affecting the conceptual comparability of total civilian employment data among the six countries, such as the inclusion or exclusion of employed persons on military, sick, or maternity leave, it has been assumed here that practices are similar and consistent from country to country. Detailed information on many such factors is not available for all countries. Certain identifiable differences in the statistical coverage of employment in the two major branches of agriculture and industry are noted below.

A. TOTAL

Civilian employment in the six countries of Eastern Europe increased from 40.1 million in 1950 to 48.5 million in 1967, or by 21.2 percent (Appendix Table IV–A). Growth of employment in individual countries during the 17 years ranged from 3.8 percent in East Germany to over 41 percent in Poland; Rumania and Czechoslovakia had increases slightly above the overall average and Bulgaria and Hungary had increases slightly below it. As can be seen in Appendix Table V, there was no change in the distribution of civilian employment by order of country within the region, although the proportion in Poland increased from 25.1 to 29.3 percent and the East German share fell from 19.6 to 16.8 percent. Actually, although civilian employment increased absolutely in all six countries, only Polish employment increased as a proportion of the total.

The change in structure of civilian employment between 1950 and 1967 resulted in a reduction of agricultural employment and an increase of nonagricultural employment in all countries and in the region as a whole (Appendix Table V). Over half of the civilian labor force in 1950 was employed in agricultural activities, and the remainder was divided almost equally between industry and other nonagricultural branches. By 1960, the nonagricultural branches employed more than half of the civilian labor force, and by 1967 the proportion had reached nearly two-thirds.

Nonagricultural employment increased during the years 1950–67 by almost two-thirds of its size in 1950, from 19.3 to 31.2 million, whereas employment in agriculture and forestry dropped by about one-sixth, from 20.8 to 17.4 million. As Figure 5 shows, employment in construction had the fastest growth among the nonagricultural branches over the period (85.6 percent), followed by services, i.e., other branches (68.3 percent), transportation (62.4 percent), industry (58.6 percent), communications (57.2 percent), and trade (44.6 percent). Change in the size of employment within several of these branches may have been slightly exaggerated due to the statistical reclassification of certain personnel from one branch to another. For instance, in 1958 Czechoslovakia reclassified personnel engaged in transportation activities of the machine and tractor stations, listed previously under agriculture, to the transportation branch. Likewise, personnel engaged in industrial and construction activities of the machine and tractor stations were, in 1960, reclassified to industry and construction.[14] In 1956, East Germany reclassified repair shop personnel of machine and tractor stations from agriculture to industry, and in 1961 Bulgaria reclassified persons engaged in capital repair of roads from transportation to construction.[15]

[14] Elias, *The Labor Force of Czechoslovakia*, 1963, p. 71.
[15] Elias, *Industrial*, 1962, p. 4, and *Stat. god. 1968*, p. 69.

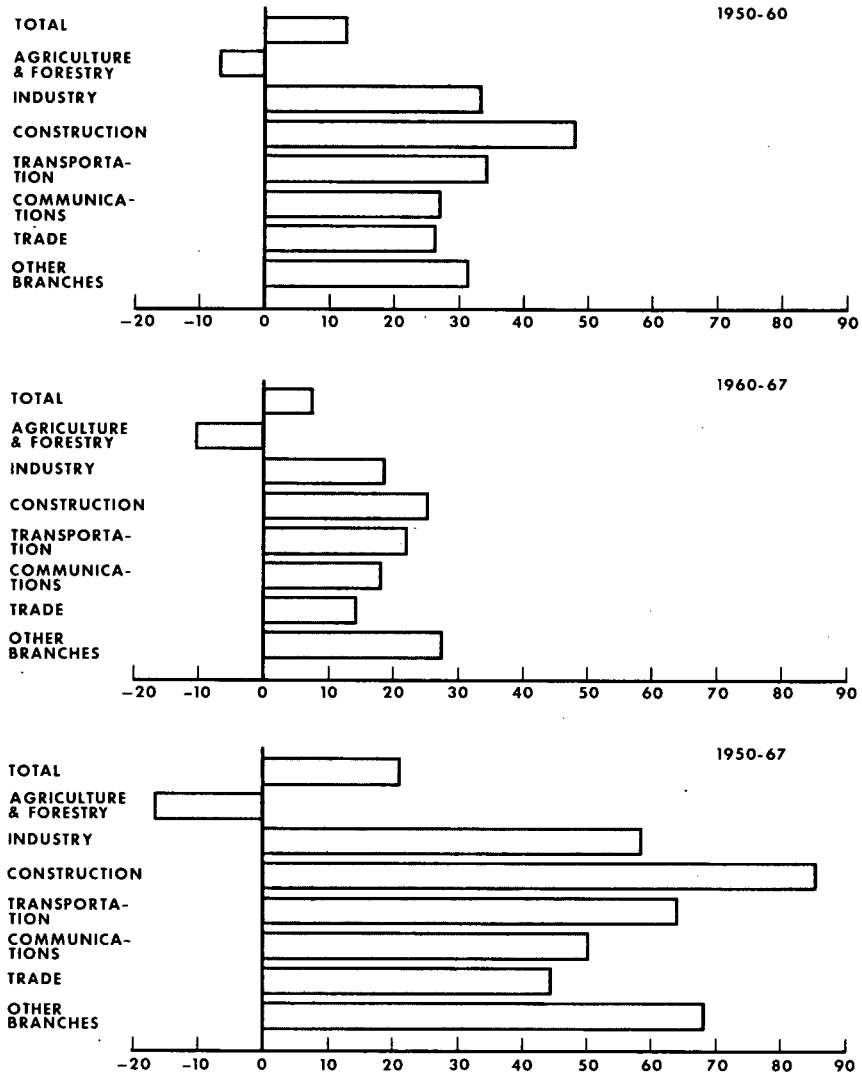

Figure 5.—Percent change in civilian employment, by branch—six Eastern European countries combined: 1950 to 1967

A comparison of the rates of growth during the two periods 1950–60 and 1960–67 (Table 8) shows that in all major branches, except agriculture and services, employment increased as fast or relatively faster in the earlier time period, and that in services, which includes such branches as science and research, health, education, and communal services, employment rose relatively faster in the later period. Civilian employment in agriculture has recently declined twice as fast as in the previous 10 years. It appears, therefore, that as the economies of the area have become more developed, employment has increased most rapidly in the tertiary branches, as it has in other more industrialized countries.

TABLE 8.—AVERAGE ANNUAL RATES OF GROWTH OF CIVILIAN EMPLOYMENT, BY BRANCH—SIX EASTERN EUROPEAN COUNTRIES COMBINED: 1950 TO 1967

[In percent]

Branch	1950–60	1960–67	1950–67
Total	1.2	1.1	1.1
Agriculture and forestry	−0.7	−1.5	−1.1
Industry	2.9	2.5	2.8
Construction	4.0	3.3	3.7
Transportation	2.9	2.9	2.7
Communications	2.9	2.4	2.9
Trade	2.4	2.0	2.2
Other	2.8	3.6	3.1

Source: Appendix Table V.

Trends in employment by branch within the six countries during the period 1950–67 are shown in Table 9. The decline in agricultural employment in each of the countries generally corresponds to the decline in the economically active population engaged in agricultural activities discussed in the preceding chapter. Total agricultural employment in Bulgaria, Czechoslovakia, East Germany, and Hungary decreased by over 2 percent annually between 1950 and 1967, whereas in Poland and Rumania the decline was much less rapid. The increases in industrial employment in each of these countries reflect, as did the increases in their economically active populations engaged in industrial activities, the extent of the industrialization drives undertaken in each country, as well as its level of industrialization at the beginning of the period under review. Thus, growth of industrial employment was relatively slower in East Germany and Czechoslovakia, the most industrialized countries in 1950, than the growth in the other four countries.

TABLE 9.—AVERAGE ANNUAL RATES OF GROWTH OF CIVILIAN EMPLOYMENT, BY BRANCH—SIX EASTERN EUROPEAN COUNTRIES: 1950 TO 1967

[In percent]

Branch	Bulgaria	Czecho-slovakia	East Germany [1]	Hungary	Poland	Rumania
Total	0.9	1.1	0.3	0.7	2.0	1.1
Agriculture and forestry	−2.6	−2.8	−2.1	−2.3	−0.2	−0.3
Industry	6.7	2.6	0.3	4.1	3.9	3.7
Other nonagricultural branches	6.3	2.8	1.3	1.9	4.1	4.4
Construction	9.0	2.7	0.2	2.2	4.4	7.6
Transportation	6.8	2.2	0.2	3.5	4.1	4.0
Communications	5.0	3.7	1.2	2.4	3.2	4.7
Trade	5.2	1.0	0.8	3.1	3.5	3.7
Other	5.6	3.9	2.4	0.9	4.2	3.4

[1] From 1952.

Source: Appendix Table V.

The redistribution of civilian employment from agriculture to industry and the other nonagricultural branches varied considerably from country to country. In Bulgaria, where perhaps the most vigorous drive for economic development was undertaken during the period, civilian employment in every nonagricultural branch increased more rapidly than in any of the other countries. Each nonagricultural branch increased by at least 5 percent annually; construction increased by 9.0 percent and industry by 6.7 percent annually. As a result, Bulgaria, the least industrialized and the most agricultural country in 1950, had by 1967 surpassed Rumania in the level of nonagricultural activities within total civilian employment (Appendix Table V).

Rumania and Poland experienced the next highest rates of growth in most of the nonagricultural branches, although by 1967 they still had smaller proportions of their civilian employment in these branches than had Czechoslovakia, East Germany, and Hungary. As could have been expected, East Germany had the lowest rates of increase in all the nonagricultural branches. Change between 1950 and 1967 in the relative position held by each country in total employment of each branch in the region is shown in Appendix Table V. Rumania and Poland both had larger shares of regional agricultural employment in 1967 than in 1950, whereas all other countries had smaller shares. East Germany and Czechoslovakia lost in the size of their shares of regional industrial employment, East Germany from more than one-third of the total in 1950 to slightly more than one-fifth in 1967. Bulgaria, Poland, and Rumania gained in their position of employment in all nonagricultural branches, whereas East Germany lost in its ranking in these branches.

Employment in the private sector of each of the countries except Poland has declined rapidly since the end of World War II (Appendix Table IV). In general, agriculture in Eastern Europe was the last and the most difficult branch to be socialized. As of 1967, there were still more than 5.8 million persons, or more than one-third of total agricultural employment, in the private sector. Even in industry and handicrafts, however, a sizable portion of total employment is in the private sector—over 1 million in 1967, and the number seems to have been growing in recent years. For other branches of the economy, employment statistics in most cases do not show a sectoral breakdown. With the exception of East Germany, private employment in these other branches is no longer important.

Data on specialized manpower—that is, employed persons with a higher or secondary-vocational education—published by the six Eastern European countries are extremely divergent with respect to several important factors, including definition and classification of the kinds of schools, definition of employment categories, reporting procedures, and date of reference. It is, therefore, difficult to present a meaningful comparative analysis of such statistics, and the brief data on employed specialists in the six countries, by level of education, are presented for various years of the period 1949–66 in Appendix Table XI without comment.[16] They can be used for general information only; relating them to employment or population data for purposes of comparison among the countries is completely unwarranted.

[16] For additional information on employment of specialists in Eastern Europe, see Snížek, Fremr, and Kříž, "Employment," 1969, p. 3; Jurânek and Blažek, "Problems," 1968, pp. 40–48; and Tsankov, "Changes," 1968, p. 15.

B. AGRICULTURE

1. Problems of Statistical Comparability

Published statistics on agricultural manpower in the six countries of Eastern Europe originate in three basic sources: (1) agricultural censuses or surveys, (2) population censuses, and (3) periodic reports. Agricultural censuses supply the most comprehensive measure of labor participation, counting each person who takes part in agricultural activities—sometimes more than once, e.g., a person who works in more than one agricultural establishment. The agricultural censuses also include persons who are regularly employed in other branches of the economy, thereby creating, in addition to the above-mentioned intrabranch double counting, a problem of interbranch double counting. Thus, statistics on labor participants obtained from the agricultural censuses, though important for estimating labor productivity in agriculture, are often unacceptable for use in conjunction with data for other branches of the economy.

Population censuses include all persons considered as economically active in agriculture. This statistical category was defined and described in the previous chapter and need not be discussed again. The periodic reports of enterprises and institutions are the source of what is termed here employment data. Published at least annually by all East European countries, these data are the least comprehensive of the three major types of manpower statistics. Nevertheless, they are very useful for long-term and detailed analyses of employment trends by branch or subbranch of the economy, and the only type of data regularly available during the intercensal periods.

a. *State Sector.*—All six countries covered in this paper publish employment data for the state sector of agriculture. On the whole, these data are reported in fairly generous detail, and no estimates were deemed necessary to supplement them here. Some of the countries have released little information on the coverage of the categories of personnel, kinds of activities, or types of establishments to which the published statistics refer, but from what is known the data of all countries seem to be fairly comparable. Figures for the state agricultural sector presented in this report apparently cover employment in agricultural activities on state farms as well as those carried on in nonagricultural state establishments. On the other hand, they exclude nonagricultural activities on state farms, contrary to data reported for the cooperative and private sectors, which seem to include persons who carry on nonagricultural activities as well as their farming duties.[17]

Except perhaps for East Germany, employment in forestry has been included under the state sector. Information on cooperative employment in forestry is very limited, and no separate estimates could be prepared.[18] In addition, employment data are not available for the private sector of forestry in any of the six countries, and it has been assumed here that if such employment exists it is carried out as an occasional activity during the slack season in agriculture by persons

[17] Elias, *Agricultural*, 1963, p. 4.
[18] Data available for Poland indicate some employment in cooperative forestry. See *Rocz. Stat. Leś. 1945–1967*, pp. 34–70.

already counted as regularly employed in the private sector of agriculture. In respect to East Germany, employment data on the private sector in forestry, if any, are reported with employment in the private sector of agriculture and the water economy, but no adjustment could be made to show employment in forestry for the private sector alone.[19]

Discernible differences among the published employment data for the state sector of the six countries can be grouped into three major types: (1) differences in the categories of personnel covered; (2) differences in the classification of marginal activities; and (3) differences in the classification of certain establishments engaged in agricultural or related activities.

In regard to differences in the categories of personnel covered, only Czechoslovakia explicitly excludes apprentices from its labor statistics, although Czechoslovak data on machine and tractor stations include an unidentifiable number of apprentices. The other five countries either specifically include apprentices in total agricultural employment, or do not mention them at all. However, as explained earlier, due to the Hungarian practice of listing apprentices in national manpower balance sheets under the nonactive population, apprentices in agriculture, as well as in other branches of the economy, were excluded from civilian employment data reported by that country. All other categories of employment in state agriculture, including seasonal workers, are assumed to be treated in a uniform manner by all six countries.

The second type of difference concerns certain activities carried on in establishments classified in the state sector of agriculture. Although forestry is included under agriculture in all countries, logging is classified differently. In Czechoslovakia, East Germany, Hungary, and Poland, logging is included under forestry. In Bulgaria and Rumania, following the Soviet practice, it is classified under industry. No adjustments were made in the data presented in this paper to make the employment in forestry comparable in all six countries.[20] Except for logging, nonagricultural activities below the subbranch level have been identified only when there has been a change in branch classification. Little information is available on these in general and it has been assumed that all such marginal activities carried on in state farms are classified uniformly in all six countries.

The third type of difference in employment data for state agriculture concerns the classification of certain units or establishments engaged in agricultural or related activities. Such establishments include agricultural units of nonagricultural enterprises, institutions, and organizations; fresh-water fishing enterprises; [21] veterinary services; and specialized agricultural enterprises, such as seed growing and supply stations, hatcheries, soil improvement stations, seed collection units, pest extermination activities, etc. Not all of these types of agri-

[19] See *Stat. Jahr. 1967*, pp. 59 and 264.

[20] For such estimates covering several years, see Elias, *Industrial*, 1962, pp. 25 and 30.

[21] Fishing and fish processing activities seem to be divided between agriculture and industry as follows: fish hatcheries, fish preserves, and establishments engaged primarily in the catching of inland water finfish and shellfish are classified under agriculture; establishments engaged primarily in the catching of sea (high sea and coastal) finfish, shellfish, and sea animals, as well as in the processing of fish caught in both sea and inland waters, are classified under industry. See *ibid.*, p. 9.

cultural enterprises are specifically listed by each of the countries under review.[22] This may be due to the fact that some countries publish more details on their state agriculture than others, that the functions of certain types of enterprises are carried on at only small scale, or that such functions are classified under other major activities. Insofar as any of these types of enterprises are specifically listed under state agriculture in at least one country, they are assumed to be included under state agriculture in each of the other countries.

b. *Cooperative Sector.*—In comparison with the employment data for the state sector, those for the cooperative sector are much less uniform and data for one country are seldom comparable with those for the others. The types of collective farms, based on the degree to which individual ownership of land and animals is maintained, differ considerably from country to country. There are also differences in the extent to which employment in the cooperative sector is reported. A rigorous attempt was made here to identify and adjust to a comparable concept as many differences in the statistics of the six countries as possible. Unfortunately, reliable adjustments could not be made in most cases, because of the lack of data. All differences which could be identified are summarized below.

(1) *Differences in Type of Cooperative Farm.*—Following the Soviet pattern,[23] the agricultural collectivization drive in Eastern Europe began with the adoption of several different types of collective organizations. Some were more advanced with respect to degree of common ownership of land and animals, as well as the system of remuneration, but official policy generally was to convert gradually the lower types into the higher ones. So far this policy seems to have been successful only in Bulgaria, where the collective farm organization resembles that of the Soviet Union. In other countries, especially in Poland and Rumania, the policy has been marked largely by failure.

Figure 6 shows the different types of cooperative farms which have existed at various times in the six countries, and the essential characteristics of each type. The types vary from country to country; at the one extreme, Bulgaria has had only one type of cooperative farm, whereas at the other Poland has had as many as nine.[24]

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[22] The types specifically listed are given in *Stat. god. 1961,* p. 75; *Stat. roč. 1968,* p. 282; *Stat. Jahr. 1967,* p. 63; *Stat. Ev. 1960,* pp. 70 and 490; *Rocz. Stat. 1968,* pp. 205–206; and *Anuarul Stat. 1968,* p. 241.

[23] See Sorokin (ed.), *Mirovaia,* 1966, p. 190.

[24] Apparently starting with January 1, 1969, the four simple types of agricultural cooperatives in Hungary were to be consolidated into two types: agricultural associations and specialized cooperatives. Hungary. *Magyar Közlöny,* no. 108, 1968.

FIGURE 6.—TYPES OF AGRICULTURAL COOPERATIVES—SIX EASTERN EUROPEAN COUNTRIES

Country	Type of agricultural cooperative
Bulgaria	*Trudovo-kooperativni zemedelski stopanstva* (*TKZS*)—Labor Cooperative Agricultural Farms: One type. Land brought into the cooperatives remains, in a collective sense, the property of individual peasants. Ownership titles refer not to the original sections of land, however, but to the amount of land contributed by each member. Net income from collective farming, in kind and in money, is distributed according to the amount of land brought into the cooperative (not more than 25 percent) and the number of labor-days earned (not less than 75 percent) presumably on an annual basis. Another way of distributing income is to convert the amount of land contributed by each member into labor-days, at the rate of four labor-days per *dekar* (0.2471 acres), add these figures to the number of labor-days earned by each member, and divide the total income of the cooperative according to the number of labor-days credited to each member. Income from the nonagricultural units of cooperative farms is divided entirely on the basis of the number of labor-days earned by each member.
Czechoslovakia	*Jednotná zemědělská družstva* (*JZD*)—Unified Agricultural Cooperatives: Four types.
	Type I: Boundaries of individual sections of land are preserved. Livestock and equipment are owned and kept separately by each member, and are used collectively only during the season of field work. Crops from the individual sections of land and livestock produced are distributed to their member-owners. Remuneration for work is usually based on the number of hours worked by a member, and he is debited by the amount needed to pay for the cultivation of his land.
	Type II: Boundaries of individual sections of land are not preserved, work is organized collectively, and crops are divided among the members on the basis of the amount of land contributed by each. Livestock and equipment are owned and kept separately by each member. Members are credited and debited with hours of work as they are in type I cooperatives, but in type II there are specific production norms according to which remuneration for work performed is calculated.
	Type III: Land is unified and worked collectively. Members are paid in kind and in money according to the amount of land brought into the cooperative (not more than 15 percent) and the number of labor-days earned (not less than 85 percent). Livestock and major equipment are owned and cared for collectively.
	Type IV: Land is given to the cooperative and worked collectively. Income is distributed entirely on the basis of the number of labor-days earned.
East Germany	*Landwirtschaftliche Produktionsgenossenschaften* (*LPG*)—Agricultural Production Cooperatives: Three types.
	Type I: Land is owned individually, but is tilled and utilized collectively. Machinery, equipment, and animals are privately owned. Net income is distributed on the basis of quantity and quality of land brought into the cooperative (not more than 40 percent) and the number of labor days earned (not less than 60 percent).
	Type II: Land is owned individually, but is tilled and utilized collectively. Machinery, equipment, and animals are owned by the cooperative through purchase from its members. Net income is distributed on the basis of quantity and quality of land brought into the cooperative (not more than 30 percent) and the number of labor-days earned (not less than 70 percent).
	Type III: Land is owned individually, but is tilled and utilized collectively. Machinery, equipment, animals, and farm buildings are kept on books for each member and used collectively. Net income is distributed on the basis of quantity and quality of land brought into the cooperative (not more than 20 percent) and the number of labor-days earned (not less than 80 percent).
Hungary	*Alacsonyabb tipusú szövetkezések*—Cooperatives of the Simpler Type: Four kinds.
	1.
	2.
	3.
	4.
	Termelószövetkezeti szektor (*TZS*)—Cooperative Sector: Two types.
	Type I
	Type II

Mezőgazdasági társulások (Agricultural associations).	*Termelői szakcsoportok* (Specialized producers' groups).	*Szakszövetkezetek* (Specialized cooperatives)	*Hegyközségek* (Vinegrowing communities).	*Termelőszövetkezeti csoportok* (Cooperative groups).	*Termelőszövetkezetek* (Production cooperatives).
Associations organized to perform collective work in a certain type of production (fruit or vine planting, plowing, etc.). Assets obtained jointly become the common property of the members. Income derived from collective work is distributed according to the work performed by each member and the size of his share in the assets.	Associations engaged in the production of certain foodstuffs (rice, wine, vegetables or fruits, etc.). Procurement and marketing are carried out jointly. Income derived from collective work is distributed according to the work performed by each member and the size of his share in the assets.	Associations resembling specialized producers' groups, but performing their joint activities independently rather than within the municipal peasant cooperatives, as do the specialized producers' groups. (Municipal peasant cooperatives maintain local stores, inns, etc., and are classified under trade as commercial cooperatives.)	Associations similar to specialized cooperatives, but organized exclusively in the vinegrowing areas.	Land is owned individually but worked collectively. Income is divided according to the value of the land and other assets brought into the cooperative (not more than 60 percent) and the number of labor-days earned (not less than 40 percent).	Land is owned individually but worked collectively. Income is distributed predominantly on the basis of the number of labor-days earned and only to a small extent according to the value of assets brought in to the cooperative.

Poland..... *Spółdzielnie produkcyjne*—Production Cooperatives: Four types.

Type I	Type II	Type III	Type IV		
Spółdzielnie zorganizowane (Organized collective farms).	*Spółdzielnie zarejestrowane* (Registered collective farms).[1]	*Spółdzielnie prowadzące gospodarkę zespołową* (Collective farms engaged in collective farming).	*Spółdzielnie dzielące dochód* (Collective farms dividing income). Registered collective farms engaged in collective farming which divide the income resulting from collective farming. They are divided into three groups:		
			Group 1.	Group 2.	Group 3.
Groups of farmers who voted for the resolution on the constitution of the collective farm and signed the membership declarations and statutes of the collective farm.	Organized collective farms which are registered as collective farms and have a confirmed name and statute.	Organized collective farms which have begun collective farm work.	Collective farms engaged in both crop growing and animal husbandry. Land is owned individually, and net income is divided according to the amount of land contributed (from 5 to 25 percent), the value of other assets brought into the collective farms (not more than 15 percent), and the number of labor-days earned (not less than 60 percent). The farms with the most advanced collectivization may distribute income entirely on the basis of the number of labor-days earned.	Collective farms engaged in crop growing only. Land is owned individually and income is distributed as in group 1.	Collective farms engaged in crop growing, but their work is only partially collectivized. Harvested crops are individually owned.

FIGURE 6.—TYPES OF AGRICULTURAL COOPERATIVES—SIX EASTERN EUROPEAN COUNTRIES—Continued

Country	Type of agricultural cooperative		
Rumania	*Gospodării agricole cooperatiste*—Cooperative Farms: Three types.		
	Type I	Type II	Type III
	Întovărăşiri agricole (Agricultural associations)	*Cooperative agricolé de producţie* (Agricultural production cooperatives)	*Gospodării agricole colective* (*GAC*) (Collective farms)
	Associations organized for the purpose of participating jointly in major agricultural work. Individual members may contribute all or any part of their land to the association. All land remains the property of the members. Net income from the jointly worked land is distributed primarily on the basis of the amount of land brought into the association.	Land is owned individually but worked collectively. Income, in kind and in money, is divided according to the amount of land brought into the cooperative (not more than 25 percent) and the number of labor-days earned (not less than 75 percent).	Land and other assets contributed to the cooperative by members become common property. Income is distributed entirely on the basis of the number of labor-days earned.

[1] Until 1956, registered collective farms were classified into four subtypes as follows: (1) associations for land cultivation; (2) agricultural cooperative associations; (3) agricultural production cooperatives; and (4) agricultural cooperative collectives. See *Rocz. Stat. 1956*, p. 154.

Source: Elias, *Agricultural*, 1963, p. 10.

Diversity in respect to types of farms would not present analytical or comparability problems if qualitative and quantitative information relating to each type were published. Problems usually arise when an effort is made to identify published employment statistics for the collective farm sector in general with specific types of farms. A large part of the difficulty lies in the fact that most countries include in the cooperative sector statistics certain higher types of collective farms only, although there is no apparent uniformity in the determination of the types to be so reported. Lower types of collective farms are either specifically included in the private sector, or are not identified.

Bulgaria, with only one type of collective farm, is a relatively simple case. As defined in Figure 6, the *TKZS* corresponds to the higher type of collective in the other five countries. The degree of collectivization of *TKZS* is not as high as that of the Czechoslovak *JZD* type IV, or the Rumanian *GAC*, where income is divided exclusively on the basis of the number of labor-days earned, but it appears to approach this most advanced state of collectivization.

Czechoslovakia has four different types of collective farms, two of which constitute the cooperative sector and the other two are included in the private sector. In all probability most of the lower types of farms have in recent years been converted into collectives of a higher type and are reported in the cooperative sector. Employment data for the cooperative sector in East Germany cover all three types of collective farms.[25] The structure of the farm and the distribution of income in the lowest type of collective in East Germany appear comparable to those in some of the higher type collectives in other countries.

Hungary has six types of agricultural collectives, but published statistics on the cooperative sector relate to the two higher types only—cooperative groups and production cooperatives. The lower types seem to be nothing more than loose associations, formed for the purpose of engaging collectively in specific activities or growing certain crops.[26] Employment statistics for the lower types are not available for all years, and estimates (made primarily by interpolation) have been prepared for missing years and added to the private sector.

Poland is the least collectivized of all the six countries but, paradoxically, it has the greatest variety of collective farms. Reported employment in type III and all three groups of type IV collective farms is usually included in the cooperative sector, while employment in type I and type II collectives is probably included in the private sector. For the purposes of comparability, employment statistics on the cooperative sector in Poland presented in this paper cover only groups 1 and 2 of type IV collective farms. Totals for type III and group 3 of type IV collectives were subtracted from the cooperative totals and added to the private sector, since these two types do not seem to have reached the degree of collectivization established for inclusion in the cooperative sector in other countries. For most years, this adjustment concerns only a few thousand persons.

Agricultural cooperatives in Rumania are divided into three types, although in the most recent publications only types I and II are listed.

[25] *Stat. Jahr. 1967*, pp. 59 and 260.
[26] *Stat. Ev. 1960*, p. 490.

It thus appears that the most advanced type of collective farm in Rumania was abandoned and a concerted effort was made to expand type II collectives. The characteristics of the least collectivized Rumanian farms, the agricultural associations, seem to correspond to those of the lower types of collectives which in other countries have been included in the private sector. However, because of the difficulties encountered in separating them from other collectives, they were left in the cooperative sector, in line with Rumanian practice. The inclusion of these associations in the cooperative sector of Rumanian agriculture increases employment in that sector by as much as 3 million in some years, and employment in the private sector is correspondingly reduced. This difference should be borne in mind when the degree of collectivization of East European agriculture is discussed further below.

(2) *Differences in Concepts of Employment Coverage.*—Another major area of variation in coverage of employment data on the cooperative sector concerns the categories of persons included. For example, nonable-bodied persons and helping family members earning labor-days do not seem to be uniformly included. The available information is generally too sketchy to support a definitive statement on coverage, but certain differences can be identified.

Not all persons permanently employed in cooperative agriculture have to be members of the collective farm. Many persons work full time in agricultural collectives as hired employees, especially in jobs for which the members of collective farms are not trained, such as agronomist, accountant, etc. On the other hand, not all members of a collective farm work full-time, or even part-time, on the farm. For example, a teacher or an industrial worker can have a full-time job elsewhere and still be a member. It is believed that such persons are generally not included in collective farm employment figures but are listed as employed in those branches of the economy under which their full-time activities are classified.

The category of "helping family members" is not clearly defined by all countries, and even within one country it may be defined differently at different times.[27] Actually, only Czechoslovakia and East Germany indicate explicitly which of the helping family members are included in employment figures on the cooperative sector.

Bulgarian data on collective farm employment include able-bodied members of agricultural cooperatives who have been given the requirement of earning a minimum number of labor-days, irrespective of whether that minimum was actually earned or not. The data probably also include able-bodied family members who have been assigned the minimum number of labor-days, but exclude the underaged and overaged population earning labor-days.[28] The underaged population consists of persons less than 16 years old, and the overaged population comprises women more than 54 years old and men more than 59 years old. Since a large number of persons employed in collective farming is above these ages, the size of Bulgarian collective farm employment seems to be in this respect considerably understated.

Statistics on the cooperative sector in Czechoslovakia cover "persons permanently active" in the cooperative sector of agriculture, consisting

[27] See, e.g., Vraný, "Persons," 1960, pp. 491–495.
[28] Cf. *Stat. god. 1961,* p. 223, and Kiranov, *Proizvoditelnost,* 1959, pp. 46–48.

of: (a) members of *JZD's* of types III and IV, members of their families, and nonmembers whose only or main occupation is work on collective farms and who have accumulated at least 240 labor-days in 1 year (130 labor-days if they work exclusively in crop growing); (b) those collective farmers who could not earn the required minimum number of labor-days because of a temporary disability, such as illness, accident, or pregnancy; and (c) personnel hired on a permanent basis.[29] Czechoslovak statistics also include the overaged population, but no mention is made of the underaged. The overaged are defined as men over 60 and women over 55 years old. It is thus obvious that employment statistics for the cooperative sector of Czechoslovak agriculture are understated by the number of persons taking part in collective farm labor who, without excuse, earned less than the required minimum number of labor-days in any particular year.

Employment data for cooperative agriculture in East Germany include members of all three types of *LPG's*, apparently with no age restrictions, as well as hired workers and employees, but seem to cover only those helping family members who themselves are members of the cooperative.[30] Consequently, East German employment statictics exclude from the cooperative sector of agriculture those active members of the families of collective farmers who have not applied for, or have not been admitted to, membership in a collective farm.

Hungarian data on cooperative agriculture presented in this paper cover working members of the two higher types of collective farms and probably include the members of their families who are themselves members of the collective farms and whose main or only occupation is cooperative farming.[31] The data apparently include persons outside the able-bodied ages and hired employees of the farms.[32] The data probably exclude those members who have not participated in collective farming and family helpers who are not members. Persons receiving pensions and old age annuities, whether they have acquired any labor-day units or not, are also not included.

Employment statistics for the cooperative sector of Polish agriculture include only members of the two higher types of collective farms which divide their commonly earned income (type IV, groups 1 and 2). No specific statement was found regarding inclusion or exclusion of helping family members, hired personnel, and underaged or overaged persons.[33] Collective farms in Poland are so varied in form and structure and so small in number that the detailed recordkeeping of their employment categories may not be worth the effort required. In any case, the doubtful categories would amount to only a few thousand people in the total agricultural employment of well over 5 million.

Agricultural employment figures presented here for the cooperative sector in Rumania are estimates, based on percent distributions of em-

[29] *Stat. roč. 1968*, p. 285.
[30] See, e.g., *Stat. Jahr. 1968*, pp. 59 and 63.
[31] Pálfai, "A Few Problems," 1960, pp. 152–153.
[32] A reference is made in *Stat. Év. 1960*, p. 461, to the inclusion in the labor force data of hired employees of cooperatives in general, which is interpreted here as applying to the hired employees of agricultural cooperatives.
[33] Polish statistics on employment in the cooperative sector of agriculture apparently exclude helping family members and hired personnel but include these outside of the working ages. *Rocz. Stat. 1968*, pp. 206 and 247, and Frenkel, "Some Problems," 1959, pp. 15 and 17.

ployment in the socialized sector as reported in various yearbooks. The statistics apparently include all persons 16 years old and over who "effectively" participate in agricultural work,[34] which may even cover persons whose work is limited to their personal plots. Rumania appears to be the only country in Eastern Europe in which collective farm employment is overstated.

(3) *Other Differences.*—The most readily identifiable difference in collective farm employment statistics other than those discussed so far concerns the date to which the statistics in different countries refer. Some statistics are annual averages, others are beginning-of-year or end-of-year figures, and still others are unidentified. Whenever possible, only annual averages or midyear data are presented in this paper; in a few instances figures reported as of a specific date were used, and they are so identified.

Another possible difference among the statistics of the six countries may be due to varying practices in crediting the number of labor-days.[35] In addition, the minimum number of labor-days to be earned, which in some countries determines who is counted as employed in the cooperative sector, may not be the same in all countries. Finally, there may also be varying degrees of efficiency in gathering and reporting statistical data on collective farms.

c. *Private Sector.*—Since the private sector in Eastern Europe is not governed by regulations concerning the submission of periodic reports on employment, manpower statistics for the sector must be obtained by different means from those used in the socialist sector. Data on employment in private agriculture usually are gathered in the censuses of population or agriculture; they may also be estimated from related statistical information.

Estimates of employment in private farming in Bulgaria are derived from reported statistics on total employment, by branch of the economy, for the years 1952, 1957, and 1960.[36] The estimates were obtained by subtracting estimates of employment in the state and cooperative sectors of agriculture from reported total employment in agriculture. For other years, estimates of private farm employment are based on ratios of employment to privately cultivated land area computed for the above 3 years, and figures on the area of cultivated land in the private sector reported for the remaining years.

Czechoslovak statistics on employment in private farming are obtained in annual agricultural censuses. They include independent farmers 18 years of age and older, family members 15 years of age (up to 1961, 14 years) and older if their sole or main occupation is in agriculture, and hired persons. Other persons living in farm households (pensioners, housewives, etc.) are included only if they regularly work on the farms.[37]

Data on private agriculture in East Germany, reported in the statistical yearbooks, include independent farmers, helping family members,

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[34] *Dezvoltarea,* 1965, p. 80.
[35] Also, within the same country the labor-day norms for similar work may differ widely from region to region, or even from farm to farm. Pandov, "To the Problems," 1963, pp. 82–88.
[36] Vutov, "On the Analysis," 1963, pp. 29–41.
[37] *Stat. roč. 1967,* p. 271.

and hired workers and employees. Those for Hungary, which have been published in several recent statistical handbooks,[38] have been adjusted here to include working members of the cooperatives of simpler types, which were either reported or derived by interpolation.

Published statistics on employment in private agriculture in Poland are available for 2 years only, 1950 and 1960. For other years, data given here are estimates derived from the ratios of employment to land area in private agriculture in 1950 and 1960, and figures on private land area reported for other years. These data for the private sector include members of all collective farms of type III and of group 3 of type IV.

Employment in the private sector of Rumanian agriculture for all years was derived as the difference between total agricultural employment and agricultural employment in the socialist sector. Data on total agricultural employment are based on percent distributions of total employment by branch of the economy, as regularly published in the yearbooks.

2. Employment Trends

Although total employment in agriculture and forestry in each of the six countries declined between 1950 and 1967, the reduction occurred almost exclusively in the private sector as a result of the transformation of agricultural activities from private to socialist ownership. In 1950, over 90 percent of the employment in agriculture and forestry in the region was still in the private sector, but by 1967 this proportion had fallen to less than 34 percent (Appendix Table VI and Figure 7). If Poland is excluded, only 10 percent of the persons employed in agriculture and forestry in the other five countries were in the private sector in 1967.

A comparison of the proportions given in Appendix Table VI will underscore a point made earlier, that the "transition to socialism" in agriculture was essentially completed during the years 1950–60, especially in Bulgaria, Czechoslovakia, and East Germany, and in the early 1960's in Hungary.[39] To achieve such reductions in the size of the private sector in 10 years, private agricultural employment in the former three countries was reduced by an average of 15 to 20 percent per year (Table 10). In Hungary, private agricultural employment in the last 7 years has been reduced by almost 13 percent annually, and East Germany experienced a striking further reduction of 29 percent per year. Private agricultural employment in Poland, on the other hand, declined on the average by only one-half of 1 percent per year during the entire period under review.

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[38] *Munka. Adat.*, p. 39, and *Magyar Stat. 1969*, p. 149.

[39] Because of the inclusion of agricultural associations in the cooperative sector of Rumanian agriculture, as mentioned above, it appears from Appendix Table VI that the socialist transition was also fairly complete in that country by 1960. Actually, however, collectivization was not pushed to an extreme until the end of 1961, when a drive was initiated to convert or combine the remaining agricultural associations into cooperatives. Thus, according to official statistics, at the end of 1961 there were 6,677 associations, while a year later the figure had fallen to 1,317. It appears, furthermore, that by 1967 practically all of these associations had been merged into cooperatives. *Anuarul Stat. 1968*, pp. 242–243.

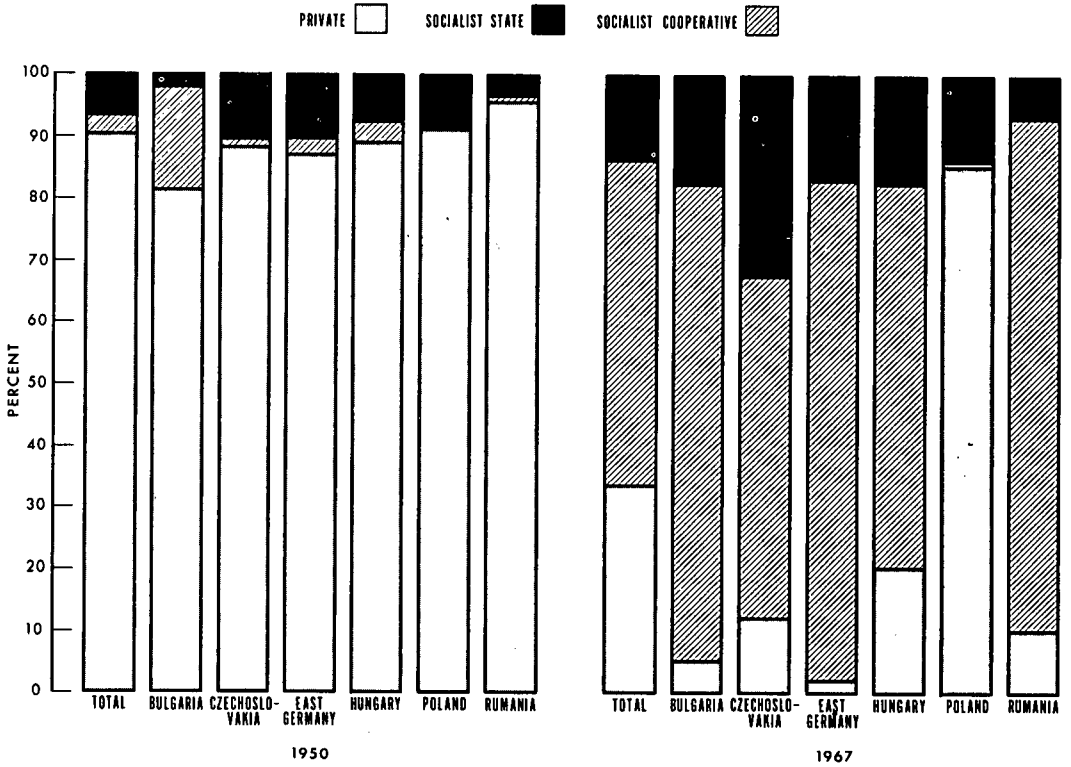

Figure 7. -- Civilian employment in agriculture & forestry, by sector—six Eastern European countries: 1950 and 1967

TABLE 10.—AVERAGE ANNUAL RATES OF DECREASE OF EMPLOYMENT IN PRIVATE AGRICULTURE AND FORESTRY—SIX EASTERN EUROPEAN COUNTRIES: 1950 TO 1967

[In percent]

Country	1950–60	1960–67	1950–67
All countries	8.3	4.3	6.7
Bulgaria	20.0	11.6	16.8
Czechoslovakia	16.7	8.5	13.4
East Germany	[1] 15.3	29.0	[1] 21.0
Hungary	8.6	12.9	10.4
Poland	0.3	0.8	0.5
Rumania	13.6	11.1	12.6

[1] From December 31, 1952.

Source: Appendix Table VI.

A rough measure of the extent to which the decline in private agriculture represents a shift of agricultural labor resources to the socialist sector rather than a decline in total agricultural employment is presented in Table 11. For example, in Bulgaria during the primary transformation period between 1950 and 1960, 1,884,000 persons left private agriculture and forestry, yet total employment in agriculture and forestry decreased by only 440,000, indicating that 1,444,000 persons shifted from the private to the socialized sector of agriculture. The other 440,000 either shifted to nonagricultural branches or left the labor force.[40] (It must be recognized that these calculations yield net results and do not take into account shifts between state and cooperative agriculture or to nonagricultural branches.) Similarly, in Czechoslovakia only 37 percent of the 1.6 million people lost from private agriculture between 1950 and 1960 actually transferred out of the agricultural branch. After 1960, on the other hand, with the socialization drives in large part completed, the decline of total agricultural employment in both countries was appreciably greater than that in private agricultural employment, indicating that most if not all of the decrease in the private sector reflected a real decline in agricultural manpower.

In East Germany and Hungary, the proportion of the decline in private agriculture actually leaving the agricultural branches was less in the earlier period than more recently, but even in the last 7 years approximately 30 percent of the decline in private agricultural employment in both countries may represent a shift of resources to the socialist sector. In Poland, private agricultural employment declined very little between 1950 and 1967, and only 34 percent (150,000 persons) of the decline represents a real drop in agricultural manpower.

Total employment in agriculture and forestry in Rumania increased by 302,000 persons between 1950 and 1960, indicating that all of the decline in employment in the private sector reflects a shift of labor into socialized agriculture, including agricultural associations and forestry, during that time. In recent years, however, it appears that most (80.6

[40] It should be noted that the 1965 estimate of private farmers in Bulgaria given in Appendix Table IV–B is several times larger than the number of "uncollectivized peasants" counted in the census of the same year (21,465). This difference may be due to the fact that the estimates of employment in private agriculture presented in Table IV–B relate to the labor requirements for the privately held land area, whereas the census data may have left out persons engaged in private farming who have some additional income, as well as older persons and women living in agricultural households but also working in the fields. It also appears that the census data include in collective rather than private farm employment a number of persons who worked on both collective and private farms. Cf. *Stat. god. 1968*, p. 17, and Table IV–B.

TABLE 11.—CHANGE IN TOTAL AND PRIVATE CIVILIAN EMPLOYMENT IN AGRICULTURE AND FORESTRY—SIX EASTERN EUROPEAN COUNTRIES: 1950 TO 1967

[Absolute figures in thousands. Figures may not add to totals due to rounding]

Country	Total (1)	Private (2)	Percent of loss in private employment actually leaving agriculture (1) ÷ (2)
1950–60			
Total	−1,427	−10,893	13.1
Bulgaria	−440	−1,884	23.4
Czechoslovakia	−585	−1,600	36.6
East Germany [1]	−274	−1,200	22.8
Hungary	−359	−1,149	31.2
Poland	−71	−170	41.8
Rumania	+302	−4,890	[2] 0.0
1960–67			
Total	−2,000	−2,105	95.0
Bulgaria	−449	−126	[2] 100.0
Czechoslovakia	−237	−141	[2] 100.0
East Germany	−171	−255	67.1
Hungary	−346	−489	70.8
Poland	−79	−266	29.7
Rumania	−667	−828	80.6
1950–67			
Total	−3,427	−12,998	26.4
Bulgaria	−940	−2,010	46.8
Czechoslovakia	−822	−1,741	47.2
East Germany [1]	−445	−1,455	30.6
Hungary	−705	−1,638	43.0
Poland	−150	−436	34.4
Rumania	−365	−5,718	6.4

[1] From Dec. 31, 1952.
[2] See text.

Source: Appendix Table VI.

percent) of the decline of 828,000 persons in private agricultural employment in Rumania represents a real decline in agricultural manpower. A more meaningful picture of the Rumanian situation is revealed by focusing on the entire 17-year period. While some 5.7 million people left the private sector during that time, civilian employment in agriculture and forestry declined by only 365,000 persons. Thus, those leaving private agricultural employment were almost completely absorbed into the socialist sector of agriculture.

The labor force which remained in agriculture shifted primarily into the cooperative sector during the years of concern here. Thus, by 1967 almost 53 percent of the total civilian agricultural employment in these six countries was in the cooperative sector (Appendix Table VI). Again, if employment in Poland is excluded, this proportion increases to over 75 percent. Cooperative agriculture comprised a larger portion of total agricultural employment in Rumania than in any other of the six countries in 1967, and included more than half of all persons employed in cooperative agriculture in the area as a whole. At the other extreme, of the five countries in which agriculture was socialized, cooperative agriculture was the least prevalent in Czechoslovakia, which had only 55.2 percent of its agricultural labor force employed in the cooperative sector in 1967. In Czechoslovakia and Bulgaria, the only countries which have in recent years experienced absolute decreases in

total agricultural employment greater than the decreases in private agricultural employment, the cooperative sector is declining in relative importance while the state sector is growing. It appears, therefore, that once the socialization drive in agriculture was essentially completed, the shifts in manpower from agricultural to nonagricultural activities in these countries have come primarily from the cooperative sectors.[41]

In East Germany and Hungary, however, where some movement of manpower from private to socialized agriculture appears to be still occurring, the state sector has declined in absolute numbers in recent years while the cooperative sector has continued to increase (Appendix Table VI). In Poland and Rumania, both the state and the cooperative sectors have continued to grow during the entire period and have increased relative to the size of the private sector.

C. INDUSTRY

1. Problems of Statistical Comparability

Generally, statistical data on industrial employment are related either to activity in which engaged or to establishment in which employed. The statistics on total employment in industry discussed below relate to the activity concept; those for workers classified by branch of industry relate to the establishment concept. The data on employment compiled according to the activity concept include all persons in industrial establishments who either participate directly in the production process, or who direct or service such a process, and all persons engaged in industrial activities carried on in nonindustrial establishments, such as industrial shops on state farms or at construction sites. They exclude those persons employed in industrial establishments who render services to other personnel but do not participate directly in the production process, such as personnel of medical, health, educational, and trading facilities, or personnel of the livestock raising and farming units belonging to industrial establishments. Statistics on employment in industry compiled according to the establishment concept, on the other hand, include all persons employed by industrial establishments, irrespective of what kind of work they do. They exclude those persons engaged in industrial activities who are employed in nonindustrial establishments.[42]

The following discussion of the coverage of industrial employment statistics in the various East European countries is limited to the industry branch as a whole and its three sectors: state, cooperative, and private. Time, space, and the lack of information have not permitted a discussion comparing either coverage by individual branch of industry among the six countries, or the changes made in such coverage within a particular country. Consequently, it has been assumed that, except where differences could be identified and adjustments made, the branch-of-industry data presented here are comparable in

[41] For a discussion of decreasing employment on Bulgarian cooperative farms, see Zarcheva, "Trends," 1969, pp. 6–9.

[42] Ellas, *Industrial*, 1962, pp. 1–2. For a presentation of the two concepts showing their interrelationship in a tabular form, see Feshbach, *The Soviet*, 1962, pp. 68–69.

coverage from country to country and from year to year.[43] Figures given below on the industry branch as a whole cover total employment, that is, all classes of workers and employees; those given for the individual branches within industry cover (wage) workers only.

a. *Total Industry.*—For industry as a whole, incomparabilities are created primarily by differences in the classification of either personnel or activities. Of the six basic categories constituting the industrial production personnel (see Figure 8, below), only the treatment of apprentices seems to present a comparability problem. Hungarian sources define industrial apprentices as persons over 14 years of age who have finished their primary school education and have either made an apprenticeship agreement with an industrial establishment or been admitted to a training workshop of the Ministry of Labor. Some Hungarian manpower statistics exclude all apprentices, some include them, and some include only those who receive wages from an establishment, irrespective of whether they have a contract with the establishment or with the Ministry of Labor. The data for Hungary presented in this chapter, as those presented in the previous chapter, exclude all apprentices for reasons stated earlier. Likewise, statistics on industrial employment in Czechoslovakia exclude all apprentices. In East Germany, apprentices who are learning their trade at independent training centers are excluded from manpower statistics. By implication, those apprentices who have individual training contracts with establishments are included in East German statistics and in this paper. It has been assumed here that the East German practice in the classification of apprentices is followed also by Bulgaria, Poland, and Rumania, but the pertinent information available on these three countries is much less explicit.

The worker category of personnel also may not refer to precisely the same concept in all six countries. Hungarian and Rumanian sources identify this category broadly as "workers," whereas Bulgaria, East Germany, Poland, and by implication Czechoslovakia, call them "industrial" or "industrial-production" workers. East Germany has further qualified this category since 1963 by including only those workers who are directly engaged in production.[44] Generally, the wageworker category in an East European industrial establishment includes persons directly engaged in the relocation, storage, and maintenance of raw and other industrial materials, those engaged in the output of semifinished and finished products, those engaged in the repair and checking of working equipment, and those whose activities comprise a combination of supervision and production work (e.g., working foreman).[45]

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[43] As an illustration of differences in coverage among the countries, Hungary classifies oil processing under the chemical industry, whereas the other countries seem to include it under the fuel industry. In respect to difference of coverage within a country over time, in 1959 East Germany reclassified establishments engaged in the production of chemical fibres from the textile to the chemical industry. (*Ipari Adatok 1968. IV.*, p. 66; Elias, *The Labor Force of Czechoslovakia*, 1963, p. 53; *Stat. Jahr, 1958*, pp. 278–281; and *Stat. Jahr, 1959*, pp. 282–285.) Employment data presented in this paper have been adjusted for these branch classification differences.

[44] *Stat. Jahr. 1965*, p. 186.

[45] For its own purposes, an industrial establishment divides its wageworkers into productive (or producing) and nonproductive (or nonproducing) workers. Productive workers participate directly in the manufacture of products; nonproductive workers perform services either for the productive workers or for the production process. Productive and nonproductive workers are not to be equated with basic and auxiliary workers. Basic production workers are usually wageworkers who participate directly in the production process in the basic shops of the plant. Auxiliary workers include both the nonproductive workers in all shops and the productive workers in all nonbasic (auxiliary, subsidiary, and, in some cases, also secondary) shops of the establishment. Elias, *The Labor Force of Czechoslovakia*, 1963, pp. 58–59.

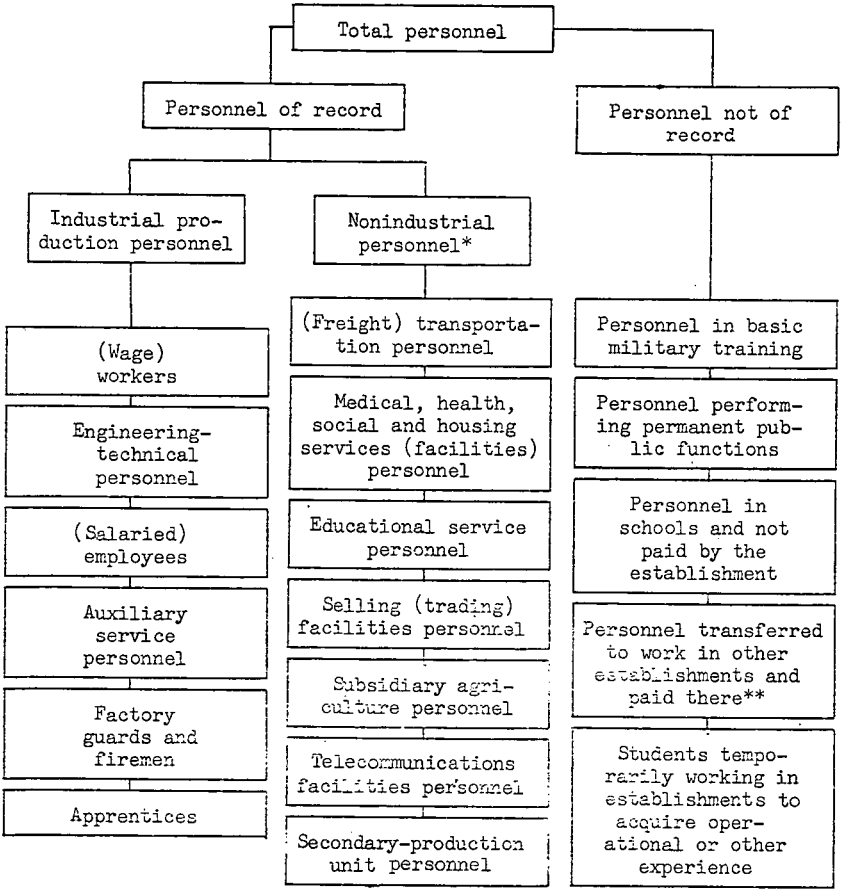
Due to the loosely used term of "worker," "wageworker," "production worker," etc., in various East European publications, it is difficult to state categorically what kind of workers are included in specific employment data. It would appear that coverage is broadest in Hungary and Rumania, where all productive workers (except in secondary production units) and possibly some auxiliary workers are counted. In Bulgaria, Czechoslovakia, and Poland, the category seems to include only productive workers, whereas in East Germany the coverage may be limited to the productive workers employed in basic shops, i.e., excluding those employed in auxiliary, subsidiary, or secondary shops.

Incomparabilities created by differences in the classification of activities can be illustrated by the various practices noted above of treating statistics on logging. Bulgaria and Rumania classify logging activities under industry, but the other four countries classify them under forestry. Due to the lack of data, no adjustments were made here to account for this inconsistency, and relative to industrial employment in the state sector of the other countries, that in Bulgaria and Rumania is overstated, on the average, by about 50,000 and 100,000, respectively.

b. *Sector.*—(1) *State.*—The state sector is defined similarly in all six countries. It includes state-owned establishments in which all personnel on the payrolls receive either wages or salaries. Employment statistics for the state sector are apparently computed by similar methods in all six countries. Total personnel in an industrial establishment are divided into "personnel of record" and "personnel not of record," as shown in Figure 8. Data for the state sector of each country presented here include only personnel of record. This group is classified into the two main categories of industrial production personnel and nonindustrial personnel. Briefly, the former category includes those persons who either participate directly in the production process or direct or service such a process; the latter category includes those persons who do not participate directly in the production process, but who render services to other personnel.

In all six countries, the average number of industrial-production personnel of record in industrial establishments seems to be computed differently for workers than for other employment categories—although some countries are more explicit as to the method of computing their average employment data than others. On the basis of available information, it seems safe to assume that the average number of workers for a specific time period, such as one month, is computed in all six countries by summing the number of workers of record on each calendar day of the month and dividing by the total number of days in that month. Sundays and holidays are counted as having the same number of workers as were recorded on immediately preceding days. If an establishment operated only during part of a particular month, the average number of workers in that month would be derived as a sum of the daily numbers of workers during the days which the establishment actually operated, divided by the total number of calendar days in that month. The average numbers of factory guards and firemen, auxiliary service personnel, and apprentices receiving hourly wages probably are computed in the same way as the average number of workers. The monthly average number of industrial-production personnel in nonworker categories (engineering-technical personnel

Figure 8.--CLASSIFICATION OF PERSONNEL IN AN INDUSTRIAL ESTABLISHMENT IN EASTERN EUROPE



* Categories presented under this group are not necessarily exhaustive.
** In Poland this category seems to be assigned to the personnel of record.

Source: Elias, Industrial, 1962, p. 11.

and salaried employees) is probably derived in all six countries by averaging their number as of the first and last day of the month. These are the categories which fluctuate very little, and for which work attendance is not recorded each day.

For periods longer than one month, the average number of workers is computed as an arithmetic average of the monthly averages, whereas for the nonworker categories the average is computed by the formula:

$$\bar{X}=\frac{X_1+2X_2+\ \ldots\ +2X_{n-1}+X_n}{2(n-1)}$$

where X is the chronological mean; $(n-1)$ is the number of monthly periods; $X_1\ X_2 \ldots X_{n-1}$ is the number of personnel of record at the beginning of the first, second, and . . . last month; and X_n is the number of personnel of record at the end of the last monthly period. Although the above procedure is explicitly mentioned only in sources available from Czechoslovakia, Hungary, and Rumania,[46] it is implicit in some Polish sources,[47] and is probably also the practice in Bulgaria and East Germany. While Bulgarian and East German yearbooks contain short notices to the effect that the average number of registered personnel is computed from the daily counts, this practice is probably applied to the computation for workers only. A notice to the same effect has been found in the Czechoslovak yearbooks, but the practice which is actually followed there with respect to personnel other than workers is the same as that outlined above.[48]

No information is available on the method used to compute the average number of nonindustrial personnel. However, it is assumed here that these numbers are derived summarily in the same manner as the number in the nonworker categories of industrial-production personnel. It should be noted that at least some labor force reporting forms contain separate lines for workers as a category of industrial-production personnel and for the total number of workers in an establishment, which would include the worker category of nonindustrial personnel.

(2) *Cooperative Sector.*—The difference between cooperative industry and cooperative industrial handicrafts, as defined in the six countries, is a difference in terminology rather than in substance. Both can be defined as associations of craftsmen or small-scale industrial producers whose labor is organized cooperatively for the purpose of handicraft production and repair. Members of both types of cooperatives have equal rights and their remuneration is based, at least in some cases, on their contribution to the cooperative's output.

East Germany gives data on cooperative industrial handicrafts separately from those on cooperative industry. The former data apparently include all cooperative industrial handicraft establishments irrespective of the number of their (cooperative) members.[49] They have been included here with data on employment in cooperative industry.

In Poland, data on cooperative industry include data on socialized industrial handicrafts—although the latter are not identified sepa-

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[46] Korda et al., *Ekonomická*, 1960, pp. 197–203; *Stat. Év. 1959*, p. 393; and Trebici and Ferenbac, *Statistica*, 1956, pp. 5–15.
[47] See, e.g., Romaniuk (ed.), *Statystyka*, 1954, pp. 196–204.
[48] Elias, *Industrial*, 1962, p. 14.
[49] There is a limit on the number of persons that cooperatives may hire (10 percent of total working personnel), and even that with special approval only. *Stat. Jahr. 1968*, p. 241.

rately as such in the latest yearbooks.[50] The criterion on which a cooperative industrial establishment is classified under industry or under handicrafts is the number of persons it employs: establishments employing six persons or more are classified under industry; those employing fewer than six persons are classified under handicrafts. Cooperative industrial establishments classified as handicrafts are required to engage only in activities similar to those specifically listed for private industrial handicrafts.[51]

There is little information available on the classification of cooperative industry and cooperative industrial handicrafts in the remaining four countries. Rumanian statistics refer to both cooperative industry and cooperative industrial handicrafts with no explanation of the difference between them. Data for Bulgaria, Czechoslovakia, and Hungary relate to cooperative industry only.

(3) *Private Sector.*—The private sector of industry is still quite important in East Germany and Poland. It is relatively small in Hungary and Rumania, insignificant in Bulgaria, and practically nonexistent in Czechoslovakia. As in the case of cooperative industry and cooperative industrial handicrafts, there is no difference in substance between private industry and private industrial handicrafts. In Bulgaria, private industrial enterprises are classified simply as private industry, with a parenthetical note that the data include both handicraft and small-scale capitalistic-type production,[52] and no explanation as to what constitutes the difference between them.

In East Germany, privately owned industrial establishments included under the handicraft branch may employ, as a rule, a maximum of 10 persons; when invalids are hired the maximum is raised to 11 persons. This total excludes the owners, their spouses, and one apprentice per training year. East German sources distinguish between a private industrial handicraft establishment and a private small-scale industrial enterprise. The owner of the first must have passed the "Master's" examination in his trade specialty and must himself work in his establishment. The owner of the second has not passed (or has not taken) the "Master's" examination; his name, therefore, is not entered in the tradesmen's register, but he must have a trade license in order to engage in his business.[53] Apparently, he is not required to work in his enterprise. The limits on the number of hired persons seem to apply equally to both types of establishments.

East Germany also has a so-called semistate (*halbstaatlich*) sector, which has been included here in the private sector. A semistate enterprise is legally defined as a *Kommanditgesellshaft*, or a company with

[50] This statement is based primarily on the following information: *Rocz. Stat. 1958*, p. 100, gives the distribution of employment in cooperative industry and handicrafts, as of December 31, 1956, as cooperative industry, 221,200, and socialized handicrafts, 100,800. The total of these two figures (322,000) is listed in *Rocz. Stat. 1961*, p. 129, under the heading of cooperative industry. In addition, a figure of 100,800 for socialized handicrafts is listed separately in *ibid.*, p. 439.

[51] Elias, *Industrial*, 1962, p. 15.

[52] *Stat. god. 1968*, p. 120. Independent handicraft workers in Bulgaria as a rule may not employ other workers. However, they may be assisted by their wives and children under 18 years of age on condition that the family works as a single unit and that its members are not bound by individual employment contracts. "Regulations," 1960 pp. 19–20. Private artisans in Hungary are entitled to employ three workers and three apprentices. In practice, however, very few seem to take advantage of this right. *Magyarország*, no. 13, 1964, pp. 1–4.

[53] *Stat. Jahr. 1968*, p. 241.

limited or special partnership, which is a common form of private entrepreneurship in some parts of Europe. In East Germany, a *Kommanditgesellshaft* is formed by a contract between a private entrepreneur and the State, the latter usually being represented by the German Investment Bank. In this partnership, the State has only a limited risk (*Kommanditist*), while the private entrepreneur has an unlimited risk (*Komplementär*)—which means that he can lose not only his venture capital but any other property he owns. Profits are divided on the basis of size of equity capital, but the *Komplementär* receives regular pay for his management services even when the enterprise suffers a loss.[54]

In Poland, the difference between a private industrial enterprise and a private industrial handicraft establishment is similar to that in East Germany. The owner of the first is a private entrepreneur, who may or may not work in the enterprise; the owner of the second must have passed a specialty trade examination, be a member of the trade guild, and perform, as his principal occupation, one of the handicraft activities listed in the official bulletin (*Dziennik Ustaw* [*Legal Daily*], 1957, no. 33, section 145, updated in 1963). In addition, the criterion of five employed persons, which is used in the cooperative sector, seems to have applied also to the classification of private enterprises under the handicraft industry branches, although in recent yearbooks this condition has been left out.[55]

There is no available indication of the division of the private industrial sector into industry and industrial handicrafts in Czechoslovakia, Hungary, and Rumania. In Czechoslovakia, until 1960, private industral handicrafts had been presented together with private nonindustrial handicrafts as a separate subbranch of the communal and housing economy. Starting with the 1962 yearbook, the listing of private handicrafts has been dropped due to their "very small number." [56] In Hungary and Rumania, private industrial enterprises are included in a separate (private) sector of all industry.

Employment statistics for private small-scale industry and private industrial handicrafts in all six countries apparently are based on estimates compiled from official taxation lists, social security forms, and special censuses. These data, as well as the data for the state and cooperative sectors, include home (cottage) workers.

In sum, it is believed that to the extent afforded by available information, most of the possible major differences in statistical coverage of industrial employment data in the six Eastern European countries have been touched upon. However, a word of caution should be given about some of the many pitfalls in this largely unexplored area of research. There are necessarily differences in the branch composition of industry from country to country, determined by natural, economic, political, and specific local factors, which cannot be adjusted for. Furthermore, there is no assurance that industry, as a branch of the economy, covers all industrial units performing similar economic functions from country to country. Other possible differences may be due to different degrees of efficiency in labor force recordkeeping and re-

[54] See Elias, *Industrial*, 1962, p. 5.
[55] Cf. *Rocz. Stat. 1961*, pp. 144 and 436, and *Rocz. Stat. 1968*, pp. 181 and 599.
[56] See *Stat. roč 1961*, p. 332, and *Stat. roč. 1962*, p. 307.

porting, to the varied exclusion of confidential activities, differences in the computation of averages, variations in the treatment of part-time employees, etc. Since meaningful statistical information on these possible differences is almost totally lacking, no adjustments could be made to account for them. On the whole, however, they are probably statistically unimportant.

2. Employment Trends

a. *Total Industry.*—As a result of the intensive industrialization drives undertaken in all the Eastern European countries since the end of World War II, the share of industry in total employment has increased significantly. Thus, in 1950 there were only 9.3 million persons, or 23 percent of the total civilian employment, engaged in industrial activities; by 1967 this figure had increased to 14.8 million persons, or 30 percent of the total (Appendix Table VII). Four out of five of these persons in 1967 were in the state sector of industry, with slightly more than half of the remainder in the cooperative sector. While the major development within the agricultural branches of the six countries between 1950 and 1967 was the transition to state and cooperative ownership, this transition had for the most part been accomplished within the nonagricultural branches prior to 1950. Only 21 percent of the region's industrial employment was in the private sector in 1950, and this proportion declined steadily to 7.4 percent in 1967 (Appendix Table VII). Thus, because of the advanced stage of this transition relative to agriculture, the decline in private industrial employment occurring since 1950 has been less dramatic, but nevertheless significant.

Comparing the proportion of industrial employment in the private sector of each country in 1950 with the proportion in 1960 and 1967 shows that the last phase in the transition to state and cooperative ownership in the industrial branches was essentially accomplished in Bulgaria and Poland prior to 1950, and between 1950 and 1960 in Czechoslovakia, Hungary, and Rumania. Employment in the private sector of East German industry, though declining somewhat in the earlier period, has remained relatively large. This is the case even when employment in the country's semistate sector is not included in the private sector. Thus, in 1967 there were still over 400,000 persons in the private sector of East German industry and industrial handicrafts, more than in the five other countries combined.

While the proportion of total industrial employment in the private sector has declined in every country during the period under review, the number of persons in the private sector has increased in several countries. In Poland, there was an increase of 40,000 persons, or 22 percent, during the 17 years, and in Bulgaria the number rose by 1,000 persons, or by 14 percent, between 1960 and 1967 (Appendix Table VII). Also, there are indications of an increase in Hungary since 1964, although not sufficient to surpass the 1960 figure. These increases reflect policies undertaken in the mid-1960's in all three countries to encourage the operation of small-scale private handicrafts as a means of fulfilling many consumer needs not being met by the socialist sector,

primarily in the countryside.[57] It should be remembered, however, that although the increases are large relative to the size of the private sectors themselves, they are neverthless insignificant relative to the total numbers of persons employed in industry.

Employment in the state sector of industry has become an increasingly larger proportion of total industrial employment during the period since 1950. Over 73 percent of industrial employment in Eastern Europe in 1950 was in the state sector, and over 83 percent in 1967 (Appendix Table VII). The two countries with insignificant private sectors, Czechoslovakia and Bulgaria, have larger proportions of their industrial employment in the state sector than the other four countries.

The cooperative sector of industry has gained importance in the region in general and in Hungary, East Germany, and Rumania in particular. Cooperative industrial employment in the region increased from 5 to almost 10 percent of the total in the 17 years, while in Hungary it rose from less than 2 percent to over 12 percent, in East Germany from 1 to almost 5 percent, and in Rumania, where it is the most important, from under 12 to almost 14 percent of total industrial employment (Appendix Table VII). The sector increased in Poland and Bulgaria between 1950 and 1960, but has declined since. Changes in the sectoral composition of industry in each of these countries and in the region as a whole between 1950 and 1967 are shown in Figure 9.

b. *Branch of Industry.*—This discussion of the numbers of persons employed in the individual branches of industry is restricted to (wage) workers only, and does not cover the other categories of personnel in total industrial employment. All countries do not publish detailed or systematic information for the other categories, and trends in size or composition cannot be charted.

The number of industrial workers employed in the socialized (state and cooperative) economy of the region in 1967 represented 67.4 percent of total civilian industrial employment (Appendix Tables VII and VIII–A). Comparable proportions for the individual countries ranged from 44 percent for East Germany to 79 percent for Rumania.[58] The proportion of workers in total industrial employment for the region has increased from 57.6 percent in 1950, indicating an overall trend to decrease the "overhead" of salaried employees and some other nonworker categories.

Following the Soviet example, the postwar development plans undertaken in these countries placed major emphasis on expanding heavy industry in preference to light industry. As a result, the number of

[57] For a discussion of the measures introduced in 1965 to improve the private artisans' position and the results in Bulgaria, see Zhivkov, "The New," 1967, p. 39; for Hungary, see Gervai, "The Role," 1968, pp. 441–447; and for Poland, see "Conditions," 1968, p. 12, and Tomaszewski, "Is the Elimination," 1969, pp. 30–33. Data on private handicrafts in East Germany and Rumania give no indication of similar increases occurring there. As mentioned previously, data on private handicrafts in Czechoslovakia are not available in the yearbooks for recent years. The increase in private sector employment in Bulgaria may cease in the near future because of the renewal of restrictions on private artisans effective in February 1969. "Directive," 1969, pp. 1–2.

[58] The marked contrast of the percentage of workers in East German industry with those of the other five countries may be in part a reflection of the more advanced technological level of industrial activities in that country which would require the employment of relatively fewer persons who would be classified as workers. It may also in part be an indication that, as suggested previously, East German statistics on workers may include only those persons engaged in productive activities of basic shops. Basically however, the difference is due to the exclusion of workers in cooperative industrial handicrafts.

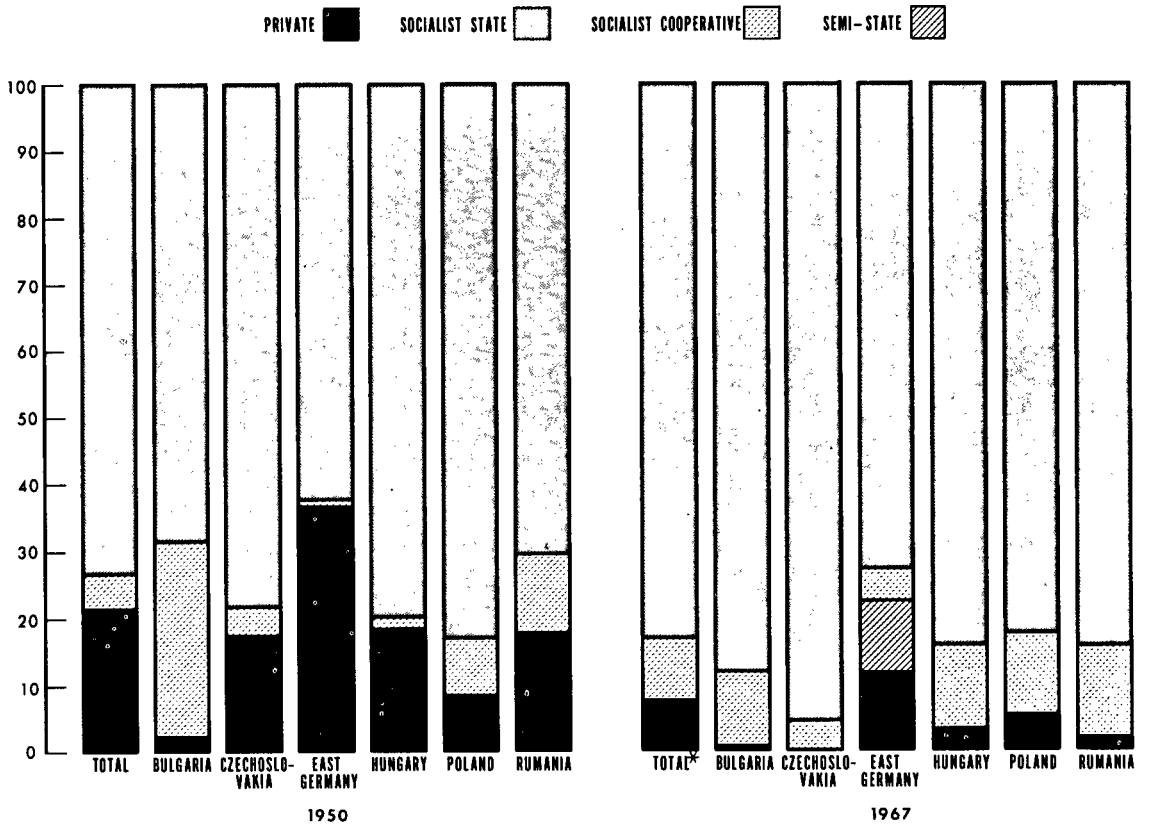

Figure 9.—Civilian employment in industry, by sector—six Eastern European countries combined: 1950 and 1967

* The semistate sector in East Germany is included with the private sector.

workers employed in heavy industry in the region increased between 1950 and 1967 by an average of 4.1 percent per year (Table 12). Light industry and the food processing industry, on the other hand, were considered less essential and therefore expanded at a less vigorous pace—3.1 and 3.5 percent per year, respectively. Hungary, where light industry outpaced the growth of heavy industry, was the only exception among the six countries.[59] It appears, furthermore, that although the average annual increases in the number of workers have slowed considerably since 1960 in all major branch groupings, the emphasis on heavy industry as reflected by employment growth has continued.

TABLE 12.—AVERAGE ANNUAL RATES OF GROWTH OF THE NUMBER OF WORKERS EMPLOYED IN SOCIALIZED INDUSTRY, BY MAJOR BRANCH GROUPING—SIX EASTERN EUROPEAN COUNTRIES: 1950 TO 1967

[In percent]

Country	Total	Heavy industry	Light industry	Food industry
1950-67				
All countries	3.7	4.1	3.1	3.5
Bulgaria	7.2	8.7	6.2	6.5
Czechoslovakia	2.3	3.4	1.0	0.0
East Germany	1.5	1.7	1.0	2.1
Hungary	5.5	4.9	6.8	4.4
Poland	3.9	4.7	2.4	4.9
Rumania	5.4	6.2	4.7	4.2
1960-67				
All countries	2.4	2.7	1.9	2.1
Bulgaria	4.7	7.5	2.7	4.0
Czechoslovakia	1.5	1.9	0.9	0.1
East Germany	−1.2	−0.6	−3.0	−1.5
Hungary	2.5	2.1	3.0	2.4
Poland	3.0	3.6	2.2	2.7
Rumania	5.6	6.2	4.8	5.4

Source: Appendix Table VIII.

The relatively rapid rate of growth of Bulgarian heavy industry over the entire period increased that country's share of all workers in socialized heavy industry in Eastern Europe from 3.1 to 6.4 percent (Figure 10 and Appendix Table IX). The share of heavy industry employment in Rumania, Poland, and Hungary also increased, and declined in the remaining two more industrialized countries. Growth in the number of workers employed in the light industry branches, on the other hand, increased as a share of the total in Bulgaria, Hungary, and Rumania, and decreased in the other three countries. Poland had the largest gain in the proportion of workers employed in the food processing industry, reaching one-third of the total in 1967. Bulgaria also increased its share from over 8 to almost 14 percent, so that in 1967 these two countries together employed almost half of all food industry workers in the region.

The proportion of all workers in socialized industry within the region who were employed in the heavy industry branches increased during the 17 years from almost 54 to over 57 percent (Table 13). This

[59] The more rapid rate of growth of the light industry branches in Hungary has resulted at least partly from the Hungarian practice of including within these branches all workers in cooperative industrial handicrafts, some of whom work in activities of a heavy industrial nature. This practice is also followed in Bulgaria.

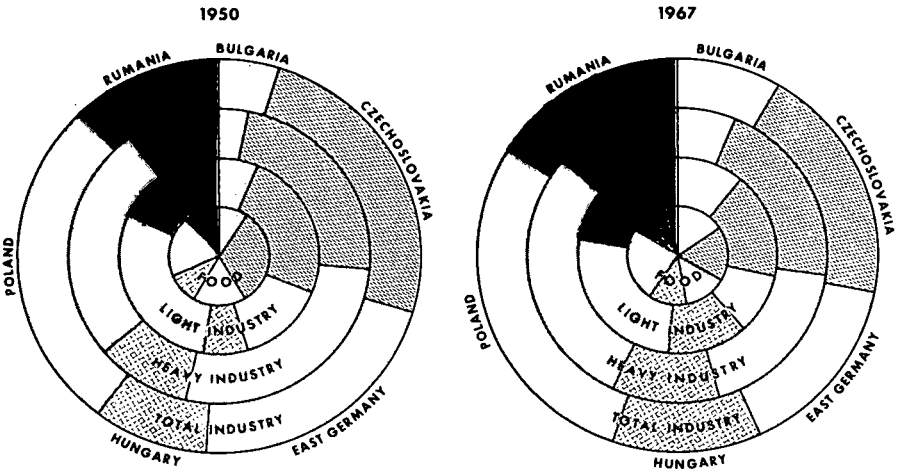

Figure 10.--Percent distribution of workers in industry, by major branch grouping - six Eastern European countries: 1950 and 1967

proportion has consistently been the highest in East Germany, reaching almost 70 percent in 1967, and the lowest in Bulgaria, where it was less than 43 percent (Appendix Table IX). On the other hand, the proportion of industrial workers employed in the light industry branches has declined in the region as a whole from over 36 percent in 1950 to 33 percent in 1967, and it dropped in every country but Hungary as well. The importance of the food industry in the region, as reflected in the proportion of all industrial workers employed, has declined only slightly over the 17 years.

TABLE 13.—PERCENT DISTRIBUTION OF WORKERS IN SOCIALIZED INDUSTRY, BY BRANCH—SIX EASTERN EUROPEAN COUNTRIES COMBINED: 1950, 1960, AND 1967

Branch	1950	1960	1967
Total	100.0	100.0	100.0
Heavy industry	53.7	56.2	57.4
Electric and thermal power	1.7	1.6	1.7
Fuel	10.3	9.5	8.2
Ferrous metallurgy	4.9	4.7	4.9
Nonferrous metallurgy	1.6	1.9	2.0
Machine-building and metalworking	24.4	27.6	29.5
Chemical, rubber, and asbestos	5.8	6.0	6.6
Construction materials	5.0	4.9	4.5
Light industry	36.5	34.2	33.1
Woodworking	7.5	6.8	6.7
Pulp and paper	1.8	1.5	1.5
Glass, porcelain, and ceramic	1.6	2.1	2.2
Textile	14.8	11.8	10.5
Sewn goods	4.7	4.5	4.5
Leather, footwear, and fur	3.7	3.6	3.6
Printing	1.8	1.2	1.2
Other	0.6	2.7	3.0
Food industry	9.8	9.6	9.5

Note: Figures may not add to totals due to rounding.

Source: Appendix Tables VIII-A and IX.

The rapid growth of heavy industry in the region since 1950 can be attributed largely to the growth of the machine-building and metalworking, chemical, rubber and asbestos, and nonferrous metallurgy branches which together employed over 66 percent of all workers in socialized heavy industry in 1967. Because of the major attention given to it in the plans of all countries, especially in the early postwar years, machine-building and metalworking has become the largest single employer of workers in Eastern European heavy industry.[60] As shown in Table 14, only in East Germany did this branch employ more than half of all workers engaged in heavy industrial activities in 1950; by 1967, however, Hungary and Czechoslovakia also had more than 50 percent of their heavy industry employment in machine-building and metalworking, and Bulgaria, Rumania, and Poland had only sightly smaller proportions.

TABLE 14.—PERCENT OF WORKERS IN SOCIALIZED HEAVY INDUSTRY EMPLOYED IN MACHINE-BUILDING AND METALWORKING—SIX EASTERN EUROPEAN COUNTRIES: 1950, 1960, AND 1967

Country	1950	1960	1967
All countries	45.4	49.1	51.3
Bulgaria	43.8	45.0	49.2
Czechoslovakia	48.1	53.9	56.1
East Germany	54.6	55.8	55.4
Hungary	44.7	46.4	50.4
Poland	33.4	42.4	47.5
Rumania	47.0	46.8	48.3

Source: Appendix Tables VIII-A and IX.

By far the most dramatic shift of heavy industry workers toward machine-building and metalworking after 1950 occurred in Poland, where the branch gained over 14 percentage points of the total in 17 years. Thus, it was largely in this rapidly developing branch that the increase in Polish heavy industry employment occurred. In fact, almost 60 percent of the increase in the number of workers in Polish heavy industry after 1950 was in the machine-building and metalworking branch. In Czechoslovakia, this branch also developed very rapidly during the same period. While the absolute employment increases in Czechoslovakia were less than those in Poland, the emphasis on machine-building and metalworking relative to other branches of heavy industry was even more marked, and the proportionate increase in the number of heavy industry workers in this branch was the largest of all the six countries. Over 66 percent of the increase in the number of workers in Czechoslovak heavy industry since 1950 was in the machine-building and metalworking branch.[61] At the same time, more than half the increase of heavy industry workers in Bulgaria, East Germany, and Hungary was in this same branch.

The chemical, rubber, and asbestos industry has also become an increasingly important branch of heavy industry, especially in Rumania and Hungary, but also in Bulgaria, Czechoslovakia, and Poland

[60] For a discussion of the development of the machine-building industry during the postwar years in all of these countries, see Luchkina, "Changes," 1969, pp. 108–114.

[61] The one-sided development of the machinery industry in the postwar years is often criticized by Czechoslovak writers. See, for example, Večeř, "Are We," 1968, pp. 13–15, and Zeman, "Structure," 1968, pp. 487–492.

(Appendix Table IX).[62] The proportion of Rumania's heavy industry workers employed in this branch nearly doubled in 17 years.[63] In Hungary, the proportion increased by over 4 percentage points, surpassing the level in Bulgaria and Czechoslovakia.[64]

The major employer of light industry workers in Eastern Europe, with the exception of Rumania, has been the textile industry.[65] The relatively slow rate of growth of employment in light industry since 1950, although largely due to the emphasis on heavy industry, is also a reflection of the slow growth of the textile industry in all countries. The number of textile workers in the area increased on the average by only 1.6 percent annually.[66] As a result, the proportion of all workers in socialized industry employed in textiles fell from 15 percent in 1950 to 10 percent in 1967 (Table 13). Moreover, the textile industry has declined as a proportion of light industry in every country as well. In Hungary, for example, the proportion of light industry workers employed in textiles fell by almost 24 percentage points over the 17 years from 51 percent in 1950 to 27 percent in 1967 (Appendix Table VIII–E).[67] Textiles in East Germany experienced a 12-point decline, and in Bulgaria, almost a 10-point decline.

D. EMPLOYMENT OF WOMEN IN THE NONAGRICULTURAL BRANCHES

This section discusses the employment of women in the socialized nonagricultural branches in each of the six countries. A lack of data on employment of women in agriculture prevents extending the discussion to the consideration of total female employment in the region. The predominance of women in agriculture throughout Eastern Europe which was pointed out in chapter II, however, should be remembered when considering the statistics presented below.

The formal participation of women in the nonagricultural labor force generally increases in areas undergoing industrialization and urbanization.[68] Thus, the rate of growth of female employment in each

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[62] This is not to imply that this branch is unimportant in East Germany. On the contrary, it has been the second largest employer of heavy industry workers in that country over the entire 17-year period. Its share of the total has, however, declined, reflecting a slowdown in employment growth within this branch since 1950. Whereas in 1950 East Germany employed over 45 percent of all workers in the chemical, rubber, and asbestos industry in Eastern Europe, in 1967 its proportion had fallen to less than 28 percent. See Appendix Tables VIII and IX.

[63] The rapid development of this branch in Rumania was facilitated by the country's considerable wealth of natural resources, including oil, natural gas, wood, and various ores. See Scarlat, "Chemical," 1969, p. 14.

[64] In Bulgaria, increasing emphasis has recently been placed on production of chemical fertilizers. See Donchev, "Development," 1969, p. 5.

[65] In Rumania, the major proportion of light industry workers are employed in the woodworking industry. If, however, logging were excluded from industry, as is the practice in four of the six countries, this would no longer be the case. For example, in 1960, the only recent year for which a breakdown is available, of the 182,000 workers employed in woodworking, 100,000 were engaged in logging activities. *Anuarul Stat. 1961*, pp. 156–157.

[66] The rapid growth of the chemical industry and the slow growth of the textile industry in at least some of the six countries may be somewhat exaggerated during certain time periods because of particular classification practices related to planned changes. If, for example, a textile establishment is designated to produce, by the end of the planned period, goods classifiable under the chemical industry, it is reclassified to the chemical industry branch even though its dominant product is still classifiable under the textile industry branch. Elias, *The Labor Force of Czechoslovakia*, 1963, p. 52.

[67] These percentages disregard the point made earlier that all workers in cooperative industrial handicrafts are included in a residual category "other branches of light industry" and are not distributed among the branches according to activity performed.

[68] This is true in all six Eastern European countries where women are expected to take part in economic activities while society takes over, to a considerable extent, the care, education, and feeding of children. For a discussion of this approach to female employment and related problems in Czechoslovakia and Rumania, see Brablcová, "Employed," 1969, pp. 33–38, and Chiţu and Filip, "Child," 1968, pp. 1 and 5.

of the East European countries during the years 1955–67 has been greater than that of total employment—a reflection of the increasing participation of women in economic activities, not only absolutely, but relative to male participation as well. For example, total employment in the socialized nonagricultural branches in Bulgaria has increased since 1955 by an average annual rate of 5.9 percent, whereas female employment has grown by 9.4 percent per year, or almost 60 percent faster (Table 15). Sizable differences between these rates occurred in most other countries as well. Female employment in Czechoslovakia, Hungary, Poland, and Rumania grew about 50 percent more rapidly than total employment. Female employment in East Germany increased at only a slightly faster rate than the total, that is, by nearly 26 percent between 1955 and 1967, as compared with an increase in total employment of only 25 percent.

TABLE 15.—AVERAGE ANNUAL RATES OF GROWTH OF TOTAL AND FEMALE EMPLOYMENT IN THE SOCIALIZED NONAGRICULTURAL BRANCHES—SIX EASTERN EUROPEAN COUNTRIES: 1955 TO 1967

[In percent]

Country	Total employment	Female employment
Bulgaria	5.9	[1] 9.4
Czechoslovakia	2.8	4.3
East Germany	1.9	1.9
Hungary	2.4	3.7
Poland	3.4	4.6
Rumania	3.8	[2] 5.8

[1] From 1956.
[2] From 1957.

Source: Appendix Tables IV and X.

As a result of these different growth rates, the proportion of female workers and employees in total employment within the nonagricultural branches of all countries has increased significantly. The largest proportionate change occurred in Bulgaria, where industrial growth has been most rapid,[69] as reflected by employment (Table 16). In 1967, four out of every 10 persons employed in the nonagricultural branches of the Bulgarian economy were women. Nevertheless, the proportion was still higher in the more industrialized countries such as Czechoslovakia, where 45 percent of all workers and employees in nonagricultural branches were women, and East Germany, where almost half were women. As table 16 shows, in Hungary, Poland, and Rumania less than 40 percent of total employment in the nonagricultural branches was comprised of women.[70]

The activities of certain branches of any economy lend themselves more readily to the employment of female workers and employees than do other branches. Those branches in the countries of Eastern Europe

[69] There is evidence that this trend will continue in Bulgaria in the future. Between 1965 and 1970, according to plan, the number of workers and employees must increase by 400,000 (150,000 from natural increase of the population and 250,000 from "mobilization of labor resources"—primarily unemployed women). Atanasov, "Women," 1968, p. 3.

[70] While the proportion of women in total employment in Poland is lower than in any of the other countries except Rumania, there is widespread unemployment of women in Poland. Krauss, "A Way," 1966, pp. 1–2.

TABLE 16.—WOMEN AS A PERCENT OF TOTAL EMPLOYMENT IN THE SOCIALIZED NONAGRICULTURAL BRANCHES—SIX EASTERN EUROPEAN COUNTRIES: 1955, 1960, AND 1967

Country	1955	1960	1967
Bulgaria	29.7	33.8	40.6
Czechoslovakia	37.1	40.7	45.0
East Germany	42.2	45.7	48.6
Hungary	33.5	34.5	38.6
Poland	33.3	32.8	37.4
Rumania	27.5	28.1	30.6

Note: Data are reported as of varying dates. See source.

Source: Appendix Table X.

with relatively more—or fewer—employment opportunities for women are discernible in Table 17, although the groupings in several countries are too broad to permit detailed comparison. In each of these countries except Rumania, construction—a branch which has few activities of the kind generally suitable to women—registered the smallest proportion of female workers and employees in 1967. On the other hand, the largest proportions were registered in trade and in health services, physical culture, and social security.[71] The branch of industry as a whole generally employed women at levels slightly lower than the other nonagricultural branches. In Bulgaria, however, the proportion of women in industry was slightly higher than in other nonagricultural branches. Although data on female employment by branch of industry are not uniformly available, most employed women appear to work in such traditionally "female" branches as textiles, clothing, and leather,

TABLE 17.—WOMEN AS A PERCENT OF TOTAL EMPLOYMENT IN THE SOCIALIZED NONAGRICULTURAL BRANCHES, BY BRANCH—SIX EASTERN EUROPEAN COUNTRIES: 1967

Branch	Bulgaria	Czecho-slovakia	East Germany	Hungary	Poland	Rumania
Total	40.6	45.0	48.6	38.6	37.4	30.6
Industry	42.6	42.0	41.1	38.3	33.2	28.9
Construction	12.7	14.7	11.4	15.1	14.2	7.8
Transportation	15.0	21.2	25.7	21.9	19.0	7.5
Communications	47.7	60.7	66.7			44.3
Trade	50.2	[1] 64.1	69.5	59.7	64.7	42.2
Housing and communal economy	42.4	52.7			35.8	28.1
Science and scientific services	48.2	32.6				34.6
Education, culture, and art	64.7	62.2			66.6	59.7
Health services, physical culture, and social security	70.9	79.0	67.8	45.2	78.5	66.4
Finance, credit, and insurance	62.8	64.0			69.5	[2]
Administration	34.6	47.6			50.3	31.8
Other	35.2	[3] 52.7			51.2	40.0

[1] Includes material-technical supply and procurement of agricultural products.
[2] Presumably reported in "other" branches.
[3] Includes social organizations.

Note: Data are reported as of varying dates. See source.

Source: Appendix Table X.

[71] Although the data in Appendix Table X indicate that employment opportunities for women are fewer in the communications branch in Hungary and Poland than in the other four countries, the extent for these opportunities cannot be determined from the statistics which combine female employment in communications with that in transportation, a much larger branch where males predominate. It is probable that the communications branch in all six countries employs relatively large proportions of women workers and employees.

fur, and shoes, but their proportions are also significant in the production of electrical appliances, paper, and chemicals.[72]

There have been considerable variations among the countries in the rate of increase in female employment within each of the branches since the mid-1950's. In Bulgaria, because of an intensive industrialization drive, almost 57 percent of the increase in female employment occurred in industry; in East Germany, on the other hand, only 19 percent of the increase in female employment was in industry (Table 18). The major portion of women not newly employed in industry in each of the six countries went into the "other" branches category, which includes education, public health, and other similar service functions. In East Germany, over half the increase in female employment occurred in these "other" branches.

TABLE 18.—PERCENT INCREASE IN FEMALE EMPLOYMENT IN THE SOCIALIZED NONAGRICULTURAL BRANCHES, BY BRANCH—SIX EASTERN EUROPEAN COUNTRIES: 1955 TO 1967

[Figures may not add to totals due to rounding]

Branch	Bulgaria [1]	Czechoslovakia	East Germany	Hungary	Poland	Rumania [2]
Total	100.0	100.0	100.0	100.0	100.0	100.0
Industry	56.5	42.9	19.4	51.6	37.2	43.0
Construction	5.1	4.1	1.6	3.6	3.6	1.7
Transportation	3.3	6.4	3.5	5.5	5.9	3.3
Communications	1.1		4.1			
Trade	10.4	11.1	20.5	16.8	16.9	12.6
Other	23.8	35.6	50.9	22.5	36.2	39.2

[1] From 1956.
[2] From 1957.

Source: Appendix Table X.

A comparison of the distribution of female employment among the branches in 1955 with that in 1967, as presented in Table 19, also illustrates the different areas of emphasis among the countries. The large flow of women into Bulgarian industry between 1955 and 1967 was sufficient to increase the proportion of total female employment engaged in industrial activities in that country from 43 to almost 52 percent, the highest proportion in the region. On the other hand, with the exception of construction, Bulgaria had relatively fewer women in the other nonagricultural branches in 1967 than any of the other countries. Similar trends occurred in Hungary as a result of the influx of women into industry. Thus, the proportion of female employment in Hungarian industry rose by 4 percentage points to almost 44 percent of the total in 1967.

In Czechoslovakia, East Germany, and Poland, the proportion of female employment in industrial activities declined and that in other branches increased, particularly in the "other" branches. Rumania is a special case in that the proportion of female employment in both industry and the "other" branches increased during the period.

[72] See, e.g., *Stat. Év. 1967*, p. 94, and *Stat. god. 1968*, p. 141.

TABLE 19.—PERCENT DISTRIBUTION OF FEMALE EMPLOYMENT IN THE SOCIALIZED NONAGRICULTURAL BRANCHES, BY BRANCH—SIX EASTERN EUROPEAN COUNTRIES: 1955 AND 1967

Branch	Bulgaria	Czecho-slovakia	East Germany	Hungary	Poland	Rumania
1955						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Industry	43.2	46.8	47.0	39.7	41.4	39.6
Construction	1.8	2.9	1.5	3.6	4.5	4.9
Transportation	1.8	4.7	3.5	5.8	4.3	4.3
Communications	2.4		2.7			
Trade	12.4	18.9	18.9	16.5	17.1	13.9
Other	37.9	26.5	26.4	34.4	32.6	37.6
1967						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Industry	51.5	45.2	41.4	43.9	39.7	41.1
Construction	3.9	3.4	1.5	3.6	4.1	3.5
Transportation	2.8	3.1	3.5	5.7	5.0	1.9
Communications	1.5	2.3	3.0			1.9
Trade	11.1	15.8	19.3	16.6	17.0	13.3
Other	29.0	30.1	31.4	30.2	34.1	38.3

Note: Data are reported as of varying dates. See source.

Source: Appendix Table X.

IV. Prospects for Future Growth

A. FUTURE POPULATION

The population of Eastern Europe is expected to grow from 102.1 million in mid-1968 to between 112 and 129 million at the beginning of 1990.[73] If fertility in each of the six countries remains at the 1968 level, migration remains negligible, and mortality continues to decline in accord with an increase in life expectancy at birth in each country of approximately 2.5 years over the projection period, a population of 120.9 million is projected for 1990 (Appendix Table XII). This would represent an increase of 18.4 percent during the period, or an average annual rate of growth of about 0.8 percent.

Given the assumptions, the fastest growth is projected to take place in Rumania—over 38 percent during the projection period, or 1.5 percent per year (Table 20). Poland is expected to have the next fastest growth, a total of 23 percent, or 1.0 percent per year, followed by Bulgaria and the three most industrialized countries, Czechoslovakia, Hungary, and East Germany. Differential rates of population growth among the six countries can be expected to result in changes in each country's proportion of the total population, although the size ranking will remain the same throughout the projection period. Only Poland and Rumania show an increase in their share of the total by 1990, while the other four countries register relative declines.

The working-age population in the region is projected to increase by 11.5 million persons between 1968 and 1990, of which Poland's

[73] Projections of the total and working-age population of the six Eastern European countries are discussed here only briefly; for a more detailed analysis, see the paper by Paul F. Myers, "Demographic Trends in Eastern Europe," in this volume.

TABLE 20.—AVERAGE ANNUAL RATES OF GROWTH OF THE TOTAL POPULATION—SIX EASTERN EUROPEAN COUNTRIES: 1968 TO 1990

[In percent]

Country	1968–80	1980–90	1968–90
All countries	0.8	0.7	0.8
Bulgaria	0.7	0.5	0.6
Czechoslovakia	0.5	0.3	0.4
East Germany	0.1	0.3	0.2
Hungary	0.4	0.1	0.3
Poland	1.0	0.9	1.0
Rumania	1.7	1.4	1.5

Source: Appendix Table XII.

share will amount to 5.2 million and Rumania's share to 3.5 million persons. The working-age population of the region is expected to grow at a slightly lower rate than the total population, though considerable variations among the individual countries are projected (Appendix Table XIII). In Czechoslovakia, East Germany, and Poland, the working-age population is expected to increase at a faster rate than the total population, whereas the reverse is expected in the other three countries.

The largest gain in working-age population during the projection period is expected in Poland between 1970 and 1975, when the projected increase of 1.7 million persons may surpass even the increase in the country's total population (Table 21). At the other extreme, Hungary is expected to have a decline in its working-age population of 93,000 persons between 1975 and 1980. East Germany may also experience a small absolute decline in its working-age population during the years between 1970 and 1975.

TABLE 21.—CHANGE IN THE WORKING-AGE POPULATION—SIX EASTERN EUROPEAN COUNTRIES: 1968 TO 1990

[In thousands]

Country	1970–75	1975–80	1980–85	1985–90	1968–90
Total	2,775	1,690	3,399	2,603	11,497
Bulgaria	150	98	196	66	570
Czechoslovakia	162	137	300	171	875
East Germany	−3	289	546	239	1,057
Hungary	115	−93	179	18	318
Poland	1,682	1,016	1,100	863	5,209
Rumania	669	244	1,077	1,246	3,467

Source: Appendix Table XII.

B. PROJECTIONS OF THE ECONOMICALLY ACTIVE POPULATION

Projections of the economically active population in Eastern Europe presented here should be viewed only as very rough approximations of manpower trends in the area during the next 20 years. They were devised as the products of aggregate participation rates, estimated for each country as of mid-1968 and held constant throughout the projection period, and projections of the working-age population. The only exception to this method was in reference to Rumania, where it was

assumed that the very high participation rate estimated for 1968 (89.5 percent of the working-age population) would, by 1990, decline to the level of the 1968 East German participation rate, the next highest rate in the region (80.9 percent). No other demographic, economic, or social factors have been taken into consideration in making these projections.

According to these rough projections, the economically active population in Eastern Europe is expected to increase from about 52.8 million in July 1968 to 60.8 million by 1990, or by 8 million persons. Due to the assumption of constant participation rates, the growth of the economically active in each country will parallel the growth of its working-age population, Rumania excepted.

As a result of the relatively high level of participation in Poland in 1968, and the relatively rapid rate of growth projected for the Polish population of working-age, that country is expected to account for 4.1 million, or over half, of the projected increase of 8 million economically active persons in the region (Table 22). Even with the assumption of a declining level of participation, the next largest increase, 1.7 million, will take place in Rumania. Taken together, these two countries are therefore expected to account for almost 73 percent of the increase in the economically active population in the region. Of the remaining 27 percent, by far the smallest portion will occur in Hungary. In fact, the projected increase in the size of the economically active population in that country is only 237,000 persons, or an average of 11,000 per year, over the projection period. It seems almost certain, therefore, that the 1968 participation rate for Hungary, 74.6 percent, one of the lowest in the region, will have to increase in the future if a labor shortage is to be avoided.

TABLE 22.—CHANGE IN THE ECONOMICALLY ACTIVE POPULATION—SIX EASTERN EUROPEAN COUNTRIES 1968 TO 1990

[In thousands]

Country	1970–75	1975–80	1980–85	1985–90	1968–90
Total	1,968	1,075	2,429	1,772	7,990
Bulgaria	115	75	150	50	436
Czechoslovakia	121	102	223	128	652
East Germany	−2	233	442	193	855
Hungary	86	−70	134	13	237
Poland	1,331	805	870	684	4,123
Rumania	317	−70	610	704	1,687

Source: Appendix Table XII.

If, as projected, the economically active populations within these countries follow the expected trends in the working-age populations, some may experience a temporary decline during the period. For example, the number of economically active persons in East Germany may decline very slightly until around 1975, while that in Hungary and Rumania may decrease between 1975 and 1980 by as many as 70,000 persons each. Thus, in addition to Hungary, East Germany may have a potential labor shortage, at least until 1975.[74]

[74] For specific problems related to the expected supply and demand of manpower in some of the countries, see Avramov and Khristov, "Our," 1969, pp. 81–86; Bartoš, "Labor," 1968, pp. 448–462; Buch, "Problems," 1966, pp. 19–20; Dzienio, "New," 1969, pp. 5–8; and Kutálek, "Possibilities," 1969, p. 3.

These projections yield only slight changes in the proportion of the total economically active population in the region living within each country over the projection period. Poland, the only country which is expected to experience an increase in its share of this population, from 30.8 percent in 1968 to 33.6 percent in 1990, will raise its dominant position in the region. The proportion in Rumania, second only to that in Poland, will remain practically unchanged, and the proportions in the remaining four countries will decline slightly.

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APPENDIX TABLES

TABLE I-A.—TOTAL, WORKING AGE, AND ECONOMICALLY ACTIVE POPULATIONS—SIX EASTERN EUROPEAN COUNTRIES COMBINED: 1950 TO 1968

[In thousands. As of July 1. Figures may not add to totals due to rounding]

Population category and branch of economy	1950	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
Total population	88,501	92,855	93,720	94,357	95,115	95,897	96,527	97,221	97,841	98,573	99,398	100,059	100,582	101,143	102,105
Male	42,012	44,349	44,824	45,169	45,590	46,017	46,385	46,759	47,096	47,492	47,929	48,288	48,576	48,884	49,368
Female	46,488	48,507	48,896	49,189	49,527	49,880	50,144	50,462	50,744	51,080	51,469	51,772	52,006	52,259	52,736
Population of working age (15 to 64 years)	58,517	60,506	60,831	60,926	61,193	61,485	61,638	61,773	62,135	62,705	63,362	64,030	64,629	65,271	65,932
Male	27,301	28,568	28,789	28,882	29,078	29,285	29,438	29,571	29,787	30,124	30,508	30,884	31,229	31,588	31,953
Female	31,216	31,939	32,041	32,045	32,113	32,200	32,200	32,202	32,348	32,584	32,854	33,146	33,398	33,684	33,979
Economically active population	45,370	47,855	48,252	48,543	48,790	48,965	48,985	49,210	49,582	49,959	50,519	51,116	51,721	52,294	52,811
Agricultural branches	23,449	22,836	22,719	22,430	22,192	21,660	21,252	20,586	20,029	19,705	19,690	19,353	19,152	18,870	18,643
Nonagricultural branches	21,921	25,019	25,533	26,113	26,598	27,305	27,733	28,624	29,553	30,254	30,829	31,763	32,569	33,424	34,168
Industry	10,139	11,688	11,903	12,246	12,463	12,712	12,893	13,176	13,564	13,815	14,126	14,634	15,015	15,377	15,773
Other	11,782	13,331	13,630	13,867	14,135	14,593	14,840	15,448	15,989	16,439	16,703	17,129	17,554	18,047	18,395

Source: Tables I-B to I-G.

TABLE I-B.—TOTAL, WORKING-AGE, AND ECONOMICALLY ACTIVE POPULATIONS—BULGARIA: 1950 TO 1968

[In thousands. As of July 1. Figures may not add to totals due to rounding]

Population category and branch of economy	1950	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
Total population	7,251	7,499	7,576	7,651	7,728	7,798	7,867	7,943	8,013	8,078	8,144	8,201	8,258	8,310	8,370
Male	3,624	3,743	3,781	3,818	3,857	3,892	3,928	3,966	4,001	4,034	4,068	4,101	4,130	4,156	4,185
Female	3,626	3,756	3,795	3,833	3,871	3,906	3,940	3,977	4,012	4,044	4,076	4,100	4,129	4,155	4,185
Population of working age (15 to 64 years)	4,789	4,938	5,003	5,068	5,125	5,179	5,231	5,291	5,353	5,414	5,476	5,540	5,587	5,635	5,679
Male	2,387	2,473	2,506	2,539	2,568	2,596	2,623	2,654	2,685	2,716	2,748	2,781	2,807	2,830	2,852
Female	2,403	2,465	2,497	2,529	2,557	2,583	2,608	2,637	2,667	2,698	2,728	2,759	2,780	2,805	2,827
Economically active population	4,114	4,142	4,147	4,156	4,172	4,185	4,195	4,212	4,229	4,245	4,255	4,262	4,284	4,315	4,346
Agricultural branches	2,982	2,734	2,693	2,636	2,569	2,416	2,240	2,196	2,160	2,078	2,031	1,926	1,868	1,847	1,825
Nonagricultural branches	1,132	1,408	1,454	1,520	1,603	1,769	1,955	2,016	2,069	2,167	2,224	2,336	2,416	2,468	2,521
Industry	455	614	613	653	682	799	883	897	920	971	1,001	1,121	1,169	1,217	1,265
Other	677	794	841	867	921	970	1,072	1,119	1,149	1,196	1,223	1,215	1,247	1,251	1,256

SOURCES

Total population: 1950, 1955–67: *Stat. god. 1968*, p. 19, 1968: United Nations, *Monthly*, July 1969. Estimates by sex were derived by extrapolation.

Population of working age: 1950, 1955–65: Based on the distribution by age and sex as of the census of Dec. 1, 1956, reported in *Stat. god. 1959*, p. 25. 1966–68: Based on the distribution by age and sex as of Dec. 1, 1965, reported in *Stat. god. 1968*, p. 15.

Economically active population: Total: 1950, 1955–56: Interpolated between the totals of the economically active population for 1946, reported in Prochazka, *The Labor Force of Bulgaria*, 1962, p. 32, and for 1956, reported in *Prebroiavane*, Kniga IV, p. 6. 1957–65: Based on interpolation of the ratios of the economically active population to the population of working age on Dec. 1, 1956, and 1965, and the population of working age during the intermediate years. The economically active population for 1965 was reported in *Stat. god. 1968*, p. 17. 1966–68: Based on the expected growth of employment in Bulgaria by 1970, reported in Tsankov, "Basic," 1967, p. 7.

Agriculture: 1950, 1955–56: Computed by the same method and using the same sources as in estimating the total economically active population. 1957–68: Residual.

Nonagricultural branches: 1950, 1955–56: Residual. 1957–65: Based on interpolated ratios of the number employed, as reported for 1956 and 1965 in *Stat. god. 1966*, p. 68, to the number of economically active in nonagricultural branches in 1956 and 1965 and the number employed in nonagricultural branches in intermediate years, as reported in various yearbooks. 1966–68: Based on Tsankov, "Basic," p. 7.

Industry: 1950, 1955–56: Computed by the same method and using the same sources as in estimating the total economically active population. 1957–65: Based on interpolated ratios of industrial employment to the economically active in industry in 1956 and 1965 and industrial employment for intermediate years, reported in various yearbooks. 1966–68: Based on Tsankov, "Basic," p. 8.

Other nonagricultural branches: All years: Residual.

TABLE I-C.—TOTAL, WORKING-AGE, AND ECONOMICALLY ACTIVE POPULATIONS—CZECHOSLOVAKIA: 1950 TO 1968

[In thousands. As of July 1. Figures may not add to totals due to rounding]

Population category and branch of economy	1950	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
Total population	12,389	13,093	13,229	13,358	13,474	13,565	13,654	13,780	13,860	13,952	14,058	14,159	14,240	14,305	14,362
Male	6,017	6,378	6,447	6,512	6,571	6,617	6,662	6,722	6,762	6,807	6,860	6,911	6,950	6,982	7,011
Female	6,372	6,715	6,782	6,846	6,903	6,948	6,992	7,058	7,098	7,144	7,198	7,248	7,290	7,323	7,35 1
Population of working age (15 to 64 years)	8,229	8,432	8,489	8,546	8,612	8,689	8,763	8,835	8,932	9,018	9,103	9,182	9,256	9,336	9,413
Male	3,989	4,095	4,126	4,158	4,195	4,237	4,278	4,329	4,383	4,430	4,477	4,521	4,561	4,604	4,646
Female	4,240	4,337	4,362	4,388	4,417	4,451	4,485	4,506	4,550	4,588	4,626	4,661	4,695	4,732	4,767
Economically active population	5,972	6,316	6,406	6,455	6,453	6,388	6,396	6,505	6,583	6,629	6,688	6,789	6,919	6,965	7,011
Agricultural branches	2,250	2,169	2,138	2,068	2,014	1,863	1,695	1,601	1,540	1,520	1,488	1,457	1,452	1,417	1,383
Nonagricultural branches	3,722	4,147	4,268	4,387	4,439	4,525	4,701	4,904	5,043	5,109	5,200	5,332	5,467	5,548	5,628
Industry	1,896	2,119	2,174	2,247	2,258	2,299	2,382	2,440	2,517	2,519	2,546	2,591	2,664	2,685	2,712
Other	1,826	2,028	2,094	2,140	2,181	2,226	2,319	2,464	2,526	2,590	2,654	2,741	2,803	2,863	2,916

SOURCES

Total population: 1950, 1955–65: Srb, *Demografická*, 1967, pp. 37 and 41. 1966–67: *Stat. roč. 1968*, p. 90. 1968: United Nations, *Monthly*, July 1969. Estimates by sex were derived by extrapolation.

Population of working age—1950: Based on the results of the census of March 1, 1950, reported in *Stat. roč. 1959*, p. 55. 1955–59: Based on official yearend estimates for 1955–59 reported in *Stat. roč.*, 1960 and 1961 editions, pp. 57 and 75, respectively, as adjusted to accord with the 1961 census. 1960–62: Based on an official distribution by age and sex for January 1, 1961, reported in *Stat. roč. 1963*, p. 109. 1963: *Stat. roč. 1965*, p. 85. 1964: *Stat. roč. 1966*, p. 75. 1965: *Stat. roč. 1967*, p. 75. 1966: *Stat. roč. 1968*, p. 91. 1967–68: Projection based on the assumptions that mortality will decline, that fertility will remain constant at the 1968 level (gross reproduction rate=98), and that there will be no migration.

Economically active population—Total: 1950: Based on Fajfr-Jureček-Ullman, *Sčítání*, 1960, p. 57. 1955–60: Based on interpolation of the ratios of the number of persons employed to the economically active populations in 1950 and 1961 and the number employed during the intermediate years. 1961: Based on ILO, *Year Book 1968*, pp. 114–115. 1962–66: Based on the assumption that the 1950–61 trend in the ratio of the number employed to the economically active population continued to 1966. 1967–68: Based on interpolation of the economically active population between January 1, 1966, and 1971, adjusted to midyear. The figure for 1971 is an average of the figures in series I and II projections, as given in Elias, *The Labor Force of Czechoslovakia* (forthcoming).

Agriculture—1950: Based on the percentage of the total economically active population in agriculture, reported in Frejka, "Long-term," 1966, p. 794. 1955–60: Based on interpolation of the ratios of reported employed to the economically active population in agriculture in 1950 and 1961. 1961: Based on ILO, *Year Book 1968*, pp. 114–115. 1962–67: Based on reported employed for 1962–67 and the 1961 ratio of reported employed to the economically active population in agriculture. 1968: Based on an expected decline in the number of persons working in agriculture and forestry between 1965 and 1970, as reported in Lacina, "Prospects," 1967, p. 4.

Nonagricultural branches—All years: Residual.

Industry—1950: Based on percentages in Frejka, "Long-term," p. 794, and the total economically active population. 1955–60: Based on interpolation of the ratios of reported employed to the economically active population in industry in 1950 and 1961. 1961: Based on ILO, *Year Book 1968*, pp. 114–115. 1962–67: Based on reported employed for 1962–67 and the 1961 ratio of reported employed to the economically active population in industry. 1968: Based on the percentage growth of employment in industry during the first half of 1968, as reported in "Reports," 1968, p. 11.

Other nonagricultural branches—All years: Residual.

TABLE I-D.—TOTAL, WORKING-AGE, AND ECONOMICALLY ACTIVE POPULATIONS—EAST GERMANY, 1950 TO 1968

[In thousands. As of July 1, except figures for 1950, which refer to Aug. 31. Figures may not add to totals due to rounding]

Population category and branch of economy	1950	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
Total population	18,388	17,832	17,606	17,370	17,205	17,131	17,058	16,938	16,902	16,951	16,988	17,028	17,066	17,082	17,092
Male	8,161	7,976	7,888	7,793	7,734	7,721	7,706	7,667	7,661	7,702	7,735	7,768	7,799	7,820	7,835
Female	10,226	9,856	9,718	9,577	9,471	9,410	9,352	9,271	9,241	9,249	9,253	9,261	9,267	9,262	9,257
Population of working age (15 to 64 years)	12,243	11,879	11,724	11,524	11,358	11,252	11,096	10,847	10,671	10,590	10,524	10,489	10,471	10,447	10,432
Male	5,185	5,150	5,108	5,044	4,995	4,977	4,929	4,833	4,768	4,749	4,736	4,736	4,745	4,752	4,760
Female	7,058	6,729	6,615	6,480	6,362	6,275	6,166	6,014	5,903	5,842	5,788	5,753	5,725	5,695	5,672
Economically active population	8,477	8,749	8,742	8,761	8,713	8,681	8,534	8,472	8,449	8,339	8,343	8,366	8,378	8,409	8,437
Agricultural branches	2,069	1,864	1,818	1,778	1,725	1,675	1,604	1,550	1,504	1,443	1,399	1,347	1,315	1,287	1,257
Nonagricultural branches	6,408	6,885	6,924	6,983	6,988	7,006	6,930	6,922	6,945	6,896	6,944	7,019	7,063	7,122	7,180
Industry	3,343	3,482	3,488	3,504	3,494	3,490	3,439	3,423	3,422	3,386	3,409	3,438	3,452	3,473	3,493
Other	3,065	3,403	3,436	3,479	3,494	3,516	3,491	3,499	3,523	3,510	3,535	3,581	3,611	3,649	3,687

SOURCES

Total population: 1950: Stat. Jahr. 1955, p. 20. 1955–64: Based on yearend figures reported in Stat. Jahr. 1968, p. 516, as adjusted to accord with the results of the census of Dec. 31, 1964. Adjustments were made on the basis of the implied net out-migration for each year. 1965–67: Estimates based on the yearend figures for 1964–67 reported in Stat. Jahr. 1968, p. 516. 1968: Projection based on the assumptions that fertility will be constant at the 1968 level (gross reproduction rate=113). that mortality will decline, and that there will be no migration.

Population of working age: 1950: Stat. Jahr. 1955, p. 20. 1955–64: Based on official yearend estimates by age and sex for 1954–63 reported in Stat. Jahr. for each year, 1955–64, as adjusted to accord with the results of the 1964 census. The adjustments were made on the basis of the net out-migration, by age and sex, for the period 1950–55, and for each year, 1956–64. 1965–68: Based on yearend estimates for 1964–67 reported in Stat. Jahr. for 1965, 1966, 1967, and 1968.

Economically active population: Total: 1950: Stat. Jahr. 1956, pp. 158–159. 1955–63: Based on interpolation of the ratios of the number of persons employed to the economically active population in 1950 and 1964, and reported employment for intermediate years, adjusted to midyear. 1964: Stat. Jahr. 1967, p. 527, adjusted to midyear. 1965–68: Based on the assumption that the trend of the ratios of the employed to the economically active populations from 1950 to 1964 continued to 1968. For 1968, it was further assumed that the rate of growth in employment between Sept. 30, 1964, and Sept. 30, 1967, continued for an additional ¾ of a year. All data were adjusted to midyear.

Agriculture: 1950: Stat. Jahr. 1956, pp. 158–159. 1955–63: Based on interpolation of the proportions of the economically active in agriculture in 1952 and 1964, reported in Nultsch, "Problems," 1968, pp. 97–98, and the total economically active population for intermediate years. 1964: Based on the proportion of the economically active in agriculture, reported in ibid., p. 98. 1965–68: Based on interpolation of the proportions of the economically active in agriculture in 1964 and anticipated in 1970, reported in ibid.

Nonagricultural branches: All years: Residual.

Industry: 1950: Stat. Jahr. 1956, pp. 158–159. 1955–63: Based on interpolation of the proportions of the economically active in industry and industrial handicrafts in 1952 and 1964, reported in Nultsch, "Problems," pp. 97–98, and the total economically active population for intermediate years. 1964: Based on the proportion of the economically active in industry and industrial handicrafts, reported in ibid., p. 98. 1965–68: Based on interpolation of the proportions of the economically active in industry and industrial handicrafts between 1964 and the anticipated level in 1970, reported in ibid.

Other nonagricultural branches: All years: Residual.

TABLE I-E.—TOTAL, WORKING AGE, AND ECONOMICALLY ACTIVE POPULATIONS—HUNGARY: 1950 TO 1968

[In thousands. As of July 1. Figures may not add to totals due to rounding]

Population category and branch of economy	1950	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
Total population	9,338	9,825	9,911	9,839	9,882	9,937	9,984	10,028	10,061	10,088	10,120	10,148	10,179	10,217	10,255
Male	4,488	4,745	4,790	4,741	4,766	4,796	4,822	4,840	4,857	4,871	4,889	4,903	4,919	4,940	4,963
Female	4,850	5,080	5,121	5,098	5,117	5,141	5,162	5,188	5,203	5,217	5,231	5,245	5,259	5,276	5,292
Population of working age (15 to 64 years)	6,284	6,460	6,488	6,429	6,497	6,540	6,572	6,579	6,609	6,648	6,686	6,736	6,780	6,818	6,863
Male	2,993	3,094	3,114	3,069	3,110	3,137	3,158	3,166	3,185	3,208	3,229	3,257	3,282	3,303	3,328
Female	3,291	3,366	3,374	3,360	3,387	3,403	3,414	3,413	3,424	3,441	3,457	3,479	3,498	3,515	3,535
Economically active population	4,379	4,676	4,704	4,718	4,789	4,858	4,872	4,834	4,848	4,895	4,944	4,993	5,050	5,086	5,122
Agricultural branches	2,121	1,943	1,977	1,979	1,945	1,900	1,828	1,742	1,668	1,597	1,545	1,524	1,517	1,513	1,498
Nonagricultural branches	2,258	2,733	2,727	2,739	2,844	2,958	3,044	3,092	3,180	3,298	3,399	3,469	3,533	3,573	3,624
Industry	920	1,221	1,207	1,241	1,311	1,355	1,398	1,437	1,476	1,531	1,596	1,636	1,656	1,691	1,813
Other	1,338	1,512	1,520	1,498	1,533	1,603	1,646	1,655	1,704	1,767	1,803	1,833	1,877	1,882	1,811

SOURCES

Total population: 1950, 1955–63: *Stat. Év. 1962*, p. 3, Estimates by sex for 1950–59 were based on interpolation of data from the censuses of 1949 and 1960; those for 1960–63 were based on figures for Jan. 1 of each year as reported in ibid., p. 4. 1964–67: Based on data in *Demog. Év. 1967*, pp. 12–13. 1968: United Nations, *Monthly*, July 1969. Estimates by sex were derived by extrapolation.

Population of working age: 1950, 1955–64: Based on the distributions by age and sex in various issues of *Magyar. Nép.* and *Stat. Év.* Figures published in the earlier yearbooks for the years 1955–60 were adjusted to accord with the loss in working-age population during these years, as revealed in the results of the 1960 census. 1965–67: Based on the distributions by age and sex for January 1, 1965, and 1966, in *Demog. Év. 1965*, p. 14. 1968: Derived from projection based on the assumptions that fertility will remain constant at the 1968 level (gross reproduction rate=99), that mortality will decline, and that there will be no migration.

Economically active population: Total: 1950, 1955–66: Based on interpolation between the ratios of civilian employment to the economically active populations on Jan. 1, 1949, and 1960, and reported civilian employment for the indicated years. The economically active populations were reported in *1960. évi*, vol. 6, p. 34. Civilian employment for all years was reported in *Munka. Adat.*, pp. 16–17. For 1961–66, the 1960 ratio was used. 1967–68: Based on the expected growth of total labor force between 1965 and 1970, reported in "Development," 1967, p. 3.

Agriculture: 1950, 1955–59: Based on interpolation between the ratio of active earners to the economically active population in agriculture on Jan. 1, 1949, and 1960, and active earners in agriculture in intermediate years, reported in *1960. évi.*, vol. 6, p. 34, and *Munka. Adat.*, pp. 16–17. 1960–67: Based on the number of active earners in agriculture, reported in *Munka. Adat.*, pp. 17, 17, and 47, and in *Magyar stat. 1969.* p. 149, adjusted to midyear. 1968: Based on an expected decline in agricultural manpower between 1965 and 1970, reported in "Development," 1967, p. 3.

Nonagricultural branches: All years: Residual.

Industry: 1950, 1955–59: Based on interpolation between the ratios of active earners, including apprentices, to the economically active populations in industry in 1949 and 1960, and the active earners, including apprentices, in industry in intermediate years as reported in *1960. évi.*, col. 6, p. 34, *Munka. Adat.*, pp. 16–17, and *Stat. Év. 1967*, p. 54. 1960–66: Based on the number of active earners in industry, including apprentices, adjusted by their 1960 ratio to the economically active population in industry, reported in *ibid.*, and in *1960. evi.*, vol. 6, p. 34. 1967–68: Based on the increase in employment in state industry during 1967 and the first half of 1968, reported in *Stat. Havi*, 1968, pp. 16–17.

Other nonagricultural branches: All years: Residual.

TABLE I-F.—TOTAL, WORKING-AGE, AND ECONOMICALLY ACTIVE POPULATIONS—POLAND: 1950 TO 1968

[In thousands. As of July 1. Figures may not add to totals due to rounding]

Population category and branch of economy	1950	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
Total population	24,824	27,281	27,815	28,310	28,770	29,240	29,561	29,965	30,324	30,691	31,161	31,496	31,698	31,944	32,305
Male	11,824	13,094	13,369	13,626	13,863	14,103	14,285	14,495	14,684	14,877	15,115	15,287	15,395	15,522	15,693
Female	13,001	14,188	14,446	14,685	14,908	15,137	15,276	15,470	15,640	15,814	16,046	16,209	16,303	16,422	16,611
Population of working age (15 to 64 years)	16,230	17,319	17,504	17,635	17,758	17,906	17,962	18,165	18,419	18,780	19,200	19,574	19,871	20,216	20,575
Male	7,624	8,207	8,312	8,392	8,463	8,546	8,607	8,712	8,838	9,035	9,265	9,462	9,625	9,809	9,998
Female	8,606	9,113	9,193	9,243	9,294	9,360	9,356	9,453	9,581	9,745	9,935	10,112	10,245	10,408	10,577
Economically active population	12,718	13,597	13,747	13,856	13,958	14,079	14,129	14,290	14,490	14,774	15,105	15,399	15,683	16,012	16,288
Agricultural branches	7,113	6,884	6,781	6,593	6,563	6,598	6,659	6,454	6,294	6,271	6,449	6,361	6,315	6,269	6,223
Nonagricultural branches	5,605	6,713	6,966	7,263	7,395	7,481	7,470	7,836	8,196	8,503	8,656	9,038	9,368	9,743	10,065
Industry	2,282	2,799	2,919	3,058	3,129	3,181	3,192	3,290	3,446	3,564	3,668	3,856	4,000	4,157	4,239
Other	3,323	3,914	4,047	4,205	4,266	4,300	4,278	4,540	4,756	4,939	4,988	5,182	5,368	5,586	5,826

SOURCES

Total population: 1950, 1955–66: *Rocz. Demog, 1945–66*, p. 14. Distributions by sex are based on reported yearend figures. 1967–68: *Biul. Stat.*, no. 3, 1969, p. 6.

Population of working age: 1950, 1960, 1965: *Rocz. Demog., 1945–66*, pp. 51–52. Other years: Based on the distributions by age and sex in various issues of *Rocz. Stat.*

Economically active population: 1950, 1960: Based on the economically active population from the censuses of Dec. 3, 1950, and Dec. 6, 1960, adjusted to include the Armed Forces and to midyear. *Biul. Stat.*, series "L," no. 23, 1964, pp. 5 and 39. 1955–59: Based on interpolation between the ratios of the economically active population to the population of working age as of the censuses of 1950 and 1960, and the estimated population of working age for each year. 1961–65: Based on the ratio of the economically active population to the population of working age as of the census of 1960. 1966–68: Sum of the figures for agriculture and the nonagricultural branches.

Agriculture: 1950, 1960: Based on data from the censuses of 1950 and 1960, adjusted to include the Armed Forces and to midyear. *Biul Stat.*, series "L," no. 23, 1964, pp. 5, 34–35, 1955–59, 1961–65: Residual. 1966–68: Based on the expected decline in agricultural manpower between 1965 and 1970, reported in Buch, "Problems," 1966, pp. 19–20.

Nonagricultural branches: 1950, 1960: Based on data from the censuses of 1950 and 1960, adjusted to include the Armed Forces and to midyear. *Biul. Stat.*, series "L," no. 23, 1964, pp. 5, 34–35. 1955–59: Sum of the estimates for industry and other. 1961–67: Figures are the sums of separate estimates for the socialist and private sectors for each year. Data for the socialist sector were based on the ratio of reported employment in the socialist sector to the economically active population at the time of the 1960 census, adjusted to include the Armed Forces, and reported employment in the socialist sector in each year. Data for the private sector were based on the ratio of reported employment in private industry and private handicrafts to the economically active population in the private sector as of the 1960 census, and reported employment in private industry and private handicrafts in each year. Data from the 1960 census and reported employment for 1961–67 are from *ibid.*, p. 37, and *Rocz. Stat. 1968*, pp. 65, 66, 180, and 602. 1968: Based on the rate of increase in nonagricultural employment from midyear 1967 to midyear 1968 as reported in *Biul. Stat.*, no. 12, 1968, p. 8, in the socialist sector and as estimated for the private sector based on data in *Rocz. Stat. 1968*, pp. 180 and 602.

Industry: 1950, 1960: Computed by the same method and using the same source as for agriculture. 1955–59: Based on interpolation between the ratios of reported employment in industry to the economically active in industry as of the censuses of 1950 and 1960, adjusted to midyear, and reported employed in industry for each year. 1961–67: Based on reported employment in industry and in private handicrafts in *Rocz. Stat. 1967*, pp. 148 and 195, and *Rocz. Stat. 1968*, pp. 66, 132, and 181, and the ratio of this reported employment to the economically active in industry and handicrafts as of the census of 1960, adjusted to midyear. 1968: Based on reported employment in the socialist sector (*Biul. Stat.*, no. 12, 1968, p. 15) and on the estimated number of persons employed in the private sector (derived from data in *Rocz. Stat. 1968*, pp. 180 and 599) and the ratio of reported employment in industry to the economically active in industry, as of the census of 1960, adjusted to midyear.

Other nonagricultural branches: 1950, 1960–68: Residual, 1955–59: Based on interpolation between the ratios of the economically active in industry to the economically active in other nonagricultural branches as of the censuses of 1950 and 1960, and the estimated economically active in industry in the years concerned.

TABLE I-G.—TOTAL, WORKING-AGE, AND ECONOMICALLY ACTIVE POPULATIONS—RUMANIA: 1950 TO 1968

[In thousands. As of July 1. Figures may not add to totals due to rounding]

Population category and branch of economy	1950	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
Total population	16,311	17,325	17,583	17,829	18,056	18,226	18,403	18,567	18,681	18,813	18,927	19,027	19,141	19,285	19,721
Male	7,898	8,413	8,549	8,679	8,799	8,888	8,982	9,069	9,131	9,201	9,262	9,318	9,383	9,464	9,681
Female	8,413	8,912	9,034	9,150	9,257	9,338	9,422	9,498	9,550	9,612	9,665	9,709	9,758	9,821	10,040
Population of working age (15 to 64 years)	10,742	11,478	11,623	11,724	11,843	11,919	12,014	12,056	12,151	12,255	12,373	12,509	12,664	12,819	12,970
Male	5,123	5,549	5,623	5,680	5,747	5,792	5,843	5,877	5,928	5,986	6,053	6,127	6,209	6,290	6,369
Female	5,618	5,929	6,000	6,045	6,096	6,128	6,171	6,179	6,223	6,270	6,320	6,382	6,455	6,529	6,601
Economically active population	9,710	10,375	10,506	10,597	10,705	10,774	10,859	10,897	10,983	11,077	11,184	11,307	11,407	11,507	11,607
Agricultural branches	6,914	7,242	7,312	7,376	7,376	7,208	7,226	7,043	6,863	6,796	6,778	6,738	6,685	6,537	6,457
Nonagricultural branches	2,796	3,133	3,194	3,221	3,329	3,566	3,633	3,854	4,120	4,281	4,406	4,569	4,722	4,970	5,150
Industry	1,243	1,453	1,502	1,543	1,589	1,588	1,599	1,689	1,783	1,844	1,906	1,992	2,074	2,154	2,251
Other	1,553	1,680	1,692	1,678	1,740	1,978	2,034	2,165	2,337	2,437	2,500	2,577	2,648	2,816	2,899

SOURCES

Total population: 1950, 1955–66: *Anuarul Stat. 1967*, p. 76. Estimates by sex were based on data in various issues of the statistical yearbook. 1967–68: United Nations, *Monthly*, July 1969. Estimates by sex were derived by extrapolation.

Population of working age: 1950 and 1955: Based on the distribution by age and sex as of the censuses of 1948 and 1956, reported in Baum, "The Labor Force of Rumania," and *Anuarul Stat. 1963*, pp. 82–83. 1956–63: Based on the distribution by age and sex as of the census of Feb. 21, 1956. 1964: *Anuarul Stat. 1965*, pp. 72–73. 1965–67: Based on data in *ibid.* 1968: Derived from projection based on the assumptions that fertility will remain constant at the 1968 level (gross reproduction rate=174), that mortality will decline, and that there will be no migration.

Economically active population: Total: 1950, 1955–65: Based on the ratio of the economically active population to the population of working age as of the 1956 census and the population of working age for each year. 1966–68: Based on interpolation between the 1965 figure and the planned total employed in 1970 reported in Belli, "Decisive," 1967, p. 145.

Agriculture: 1950, 1955–56: Based on interpolation between the proportions of the economically active in agriculture as of the censuses of 1930 and 1956, and the total economically active population. 1957–59: Based on the proportions of total employment reported as engaged in agriculture (*Anuarul Stat. 1966*, pp. 114–115), and the total economically active population. 1960–66: Residual. 1967–68: Based on interpolation between the 1966 figure and the planned figure for agricultural employment in 1970, reported in Belli, "Decisive," p. 145.

Nonagricultural branches: 1950, 1955–59: Residual, 1960–67: Based on the proportions of nonagricultural employment in industry reported for each year in *Anuarul Stat. 1968*, p. 124, and the economically active population in industry for each year. The proportion for each year was adjusted to accord with apparent changes in classification which were indicated by the employment data reported for 1959 in *Anuarul Stat. 1966*, pp. 114–115.

Industry: 1950, 1955–56: Based on interpolation between the proportions of the total economically active in industry as of the censuses of 1930 and 1956, and the economically active population for each year. 1957–67: Based on the ratio of the number employed in industry in 1956 to the economically active population in industry as of the 1956 census, and employment in State, cooperative, and private industry and handicrafts, reported in *Anuarul Stat. 1968*, pp. 218–219 and 234. 1968: Based on the percentage increases in industrial production and labor productivity, as reported in *Scinteia*, Jan. 28, 1969.

Other nonagricultural branches: All years: Residual.

TABLE II.—TOTAL, WORKING-AGE, AND ECONOMICALLY ACTIVE POPULATIONS—SIX EASTERN EUROPEAN COUNTRIES: 1950, 1960, AND 1968

[Absolute figures in thousands. As of July 1. Figures may not add to totals due to rounding]

Country	1950			1960			1968		
	Total	Working-age	Economically active	Total	Working-age	Economically active	Total	Working-age	Economically active
Total	88,501	58,517	45,370	96,527	61,638	48,985	102.105	65,932	52,811
Bulgaria	7,251	4,789	4,114	7,867	5,231	4,195	8,370	5,679	4,346
Czechoslovakia	12,389	8,229	5,972	13,654	8,763	6,396	14,362	9,413	7,011
East Germany	18,388	12,243	8,477	17,058	11,096	8,534	17,092	10,432	8,437
Hungary	9,338	6,284	4,379	9,984	6,572	4,872	10,255	6,863	5,122
Poland	24,824	16,230	12,718	29,561	17,962	14,129	32,305	20,575	16,288
Rumania	16,311	10,742	9,710	18,403	12,014	10,859	19,721	12,970	11,607
	Percent by country								
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Bulgaria	8.2	8.2	9.1	8.2	8.5	8.6	8.2	8.6	8.2
Czechoslovakia	14.0	14.1	13.2	14.1	14.2	13.1	14.1	14.3	13.3
East Germany	20.8	20.9	18.7	17.7	18.0	17.4	16.7	15.8	16.0
Hungary	10.6	10.7	9.7	10.3	10.7	9.9	10.0	10.4	9.7
Poland	28.0	27.7	28.0	30.6	29.1	28.8	31.6	31.2	30.8
Rumania	18.4	18.4	21.4	19.1	19.5	22.2	19.3	19.7	22.0
	Percent by population category								
All countries	100.0	66.1	51.3	100.0	63.9	50.7	100.0	64.6	51.7
Bulgaria	100.0	66.0	56.7	100.0	66.5	53.3	100.0	67.8	51.9
Czechoslovakia	100.0	66.4	48.2	100.0	64.2	46.8	100.0	65.5	48.8
East Germany	100.0	66.6	46.1	100.0	65.0	50.0	100.0	61.0	49.4
Hungary	100.0	67.3	46.9	100.0	65.8	48.8	100.0	66.9	49.9
Poland	100.0	65.4	51.2	100.0	60.8	47.8	100.0	63.7	50.4
Rumania	100.0	65.9	59.5	100.0	65.3	59.0	100.0	65.8	58.9

Source: Table I.

TABLE III.—ECONOMICALLY ACTIVE POPULATION, BY MAJOR BRANCH—SIX EASTERN EUROPEAN COUNTRIES: 1950, 1960, AND 1968

[Absolute figures in thousands. As of July 1. Figures may not add to totals due to rounding]

Country	1950				1960				1968			
	Total	Agricultural branches	Nonagricultural branches		Total	Agricultural branches	Nonagricultural branches		Total	Agricultural branches	Nonagricultural branches	
			Total	Industry			Total	Industry			Total	Industry
Total	45,370	23,449	21,921	10,139	48,985	21,252	27,733	12,893	52,811	18,643	34,168	15,773
Bulgaria	4,114	2,982	1,132	455	4,195	2,240	1,955	883	4,346	1,825	2,521	1,265
Czechoslovakia	5,972	2,250	3,722	1,896	6,396	1,695	4,701	2,382	7,011	1,383	5,628	2,712
East Germany	8,477	2,069	6,408	3,343	8,534	1,604	6,930	3,439	8,437	1,257	7,180	3,493
Hungary	4,379	2,121	2,258	920	4,872	1,828	3,044	1,398	5,122	1,498	3,624	1,813
Poland	12,718	7,113	5,605	2,282	14,129	6,659	7,470	3,192	16,288	6,223	10,065	4,239
Rumania	9,710	6,914	2,796	1,243	10,859	7,226	3,633	1,599	11,607	6,457	5,150	2,251
	Percent by country											
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Bulgaria	9.1	12.7	5.2	4.5	8.6	10.5	7.0	6.8	8.2	9.8	7.4	8.0
Czechoslovakia	13.2	9.6	17.0	18.7	13.1	8.0	17.0	18.5	13.3	7.4	16.5	17.2
East Germany	18.7	8.8	29.2	33.0	17.4	7.5	25.0	26.7	16.0	6.7	21.0	22.1
Hungary	9.7	9.0	10.3	9.1	9.9	8.6	11.0	10.8	9.7	8.0	10.6	11.5
Poland	28.0	30.3	25.6	22.5	28.8	31.3	26.9	24.8	30.8	33.4	29.5	26.9
Rumania	21.4	29.5	12.8	12.3	22.2	34.0	13.1	12.4	22.0	34.6	15.1	14.3
	Percent by major branch											
All countries	100.0	51.7	48.3	22.3	100.0	43.4	56.6	26.3	100.0	35.3	64.7	29.9
Bulgaria	100.0	72.5	27.5	11.1	100.0	53.4	46.6	21.0	100.0	42.0	58.0	29.1
Czechoslovakia	100.0	37.7	62.3	31.7	100.0	26.5	73.5	37.2	100.0	19.7	80.3	38.7
East Germany	100.0	24.4	75.6	39.4	100.0	18.8	81.2	40.3	100.0	14.9	85.1	41.4
Hungary	100.0	48.4	51.6	21.0	100.0	37.5	62.5	28.7	100.0	29.2	70.8	35.4
Poland	100.0	55.9	44.1	17.9	100.0	47.1	52.9	22.6	100.0	38.2	61.8	26.0
Rumania	100.0	71.2	28.8	12.8	100.0	66.5	33.5	14.7	100.0	55.6	44.4	19.4

Source: Table I.

TABLE IV-A.—CIVILIAN EMPLOYMENT, BY BRANCH AND SECTOR—SIX EASTERN EUROPEAN COUNTRIES COMBINED: 1950 TO 1967

[Annual averages in thousands. Figures may not add to totals due to rounding]

Branch and sector	1950 [1]	1955	1960	1965	1967
Total	40,065	43,799	45,098	47,205	48,548
Agriculture and forestry	20,802	20,637	19,375	17,757	17,375
Socialist	1,964	4,689	11,430	11,760	11,534
State	1,293	1,979	1,951	2,268	2,390
Cooperative	671	2,710	9,479	9,492	9,144
Private	18,839	15,949	7,946	5,998	5,841
Industry	9,310	11,088	12,424	13,982	14,768
Socialist	7,315	9,616	11,169	12,910	13,681
State	6,827	8,730	10,110	11,692	12,312
Cooperative	488	887	1,059	1,218	1,369
Private [2]	1,995	1,472	1,255	1,072	1,087
Construction	1,815	2,398	2,686	3,100	3,369
Transportation	1,403	1,737	1,863	2,167	2,279
Communications	318	366	423	476	500
Trade	2,295	2,716	2,897	3,225	3,318
Other	4,124	4,859	5,430	6,499	6,941

[1] Data for East Germany in this column are as of Dec. 31, 1952.
[2] Includes employment in the semistate sector of East Germany for the years 1960–67. See table IV-D.

Source: Tables IV-B to IV-G.

TABLE IV-B.—CIVILIAN EMPLOYMENT, BY BRANCH AND SECTOR—BULGARIA: 1950 TO 1967

[Annual averages in thousands. Figures may not add to totals due to rounding]

Branch and sector	1950	1955	1960	1965	1967
Total	3,344	3,539	3,738	3,725	3,875
Agriculture and forestry	2,575	2,412	2,135	1,738	1,635
Socialist	473	1,177	1,917	1,637	1,544
State	47	117	179	214	286
Cooperative	426	1,060	1,738	1,423	1,258
Private	2,102	1,235	218	101	92
Industry	368	478	776	959	1,103
Socialist	359	464	769	954	1,096
State	307	396	657	846	972
Cooperative	52	68	112	108	124
Private	9	14	7	5	8
Construction	64	115	161	225	276
Transportation	55	113	144	153	168
Communications	13	22	25	28	30
Trade	85	123	161	200	202
Housing and communal economy	18	34	47	63	67
Science and scientific services	2	9	15	22	32
Education, culture, and art	64	102	134	174	186
Health services, physical culture, and social security	21	46	64	88	96
Finance, credit, and insurance	10	11	10	11	13
Administration	60	59	50	44	45
Other	9	15	16	20	22

Source: Based on data in *Stat. god. 1964*, pp. 77, 107, and 118; *Stat. god. 1968*, pp. 70, 120, 135, 191, and 223; Vutov, "On the Analysis," 1963, p. 34; and Elias, *Agricultural*, 1963, p. 26.

TABLE IV-C.—CIVILIAN EMPLOYMENT, BY BRANCH AND SECTOR—CZECHOSLOVAKIA: 1950 TO 1967

[Annual averages in thousands. Figures may not add to totals due to rounding]

Branch and sector	1950	1955	1960	1965	1967
Total	5,577	5,956	6,068	6,477	6,686
Agriculture and forestry	2,155	2,027	1,570	1,366	1,333
Socialist	251	665	1,266	1,185	1,168
State	218	340	351	432	432
Cooperative	33	325	915	753	736
Private	1,905	1,363	305	181	164
Industry	1,674	1,942	2,263	2,480	2,570
Socialist	1,386	1,903	2,258	2,480	2,570
State	1,314	1,804	2,153	2,370	2,458
Cooperative	72	99	105	110	112
Private	288	39	5	(1)	(1)
Construction	352	404	501	521	557
Socialist	314	400	501	521	557
Private	38	4	(1)	(1)	(1)
Transportation	237	280	294	332	344
Socialist	220	277	294	332	344
Private	[2] 17	3	(1)	(1)	(1)
Communications	50	56	73	86	92
Material-technical supply	26	32	32	49	50
Trade	391	410	415	460	466
Socialist	272	392	414	460	466
Private	[2] 119	18	1	(1)	(1)
Procurement of agricultural products	48	36	32	38	39
Science and research	24	71	106	148	165
Communal services	63	75	87	135	157
Housing economy	13	22	35	60	81
Health and social welfare	106	153	178	215	235
Education and culture	163	237	286	380	398
Administration and justice	162	128	106	112	108
Banking and insurance	36	30	28	34	33
Social organizations	38	25	28	23	19
Other	39	28	34	38	39

[1] Less than 500.
[2] End of year.

Source: *Stat. roč. 1957*, pp. 79, 139, and 180; *Stat. roč. 1958*, p. 123; *Stat. roč. 1970*, pp. 263 and 323; *Stat. roč. 1961*, pp. 158, 263, 274, and 332; *Stat. roč. 1964*, p. 170; *Stat. roč. 1965*, pp. 121 and 188; *Stat. roč. 1966*, p. 322; *Stat. roč. 1967*, p. 205; and *Stat. roč. 1968*, pp. 129, 331, and 333. All data were adjusted to exclude apprentices.

TABLE IV–D.—CIVILIAN EMPLOYMENT, BY BRANCH AND SECTOR—EAST GERMANY: 1952 TO 1967

[Annual averages in thousands. Figures may not add to totals due to rounding]

Branch and sector	1952 [1]	1955	1960	1965	1967
Total	7,853	8,239	8,124	8,056	8,148
Agriculture and forestry	1,702	1,736	1,428	1,304	1,257
Socialist	219	481	1,145	1,274	1,229
State	173	274	254	223	220
Cooperative	46	207	891	1,051	1,009
Semistate	[2]	[2]	1	2	2
Private	1,483	1,255	282	29	26
Industry	3,224	3,379	3,390	3,335	3,387
Socialist	2,043	2,286	2,518	2,561	2,621
State	2,008	2,244	2,406	2,418	2,456
Cooperative	35	42	112	143	165
Semistate	[2]	[2]	285	354	362
Private	1,181	1,093	587	420	403
Construction	485	483	494	487	499
Socialist	263	234	354	370	387
Semistate	[2]	[2]	43	48	49
Private	222	248	97	68	63
Transportation	422	443	402	439	437
Socialist	379	407	368	410	410
Semistate	[2]	[2]	2	3	3
Private	43	36	32	26	24
Communications	120	124	131	138	142
Trade	836	897	925	923	931
Socialist	508	591	712	748	767
Semistate	[2]	[2]	3	7	8
Private	328	306	210	168	156
Other	1,066	1,179	1,355	1,431	1,496
Socialist	751	872	1,142	1,248	1,326
Semistate	[2]	[2]	3	6	6
Private	315	307	210	177	165

[1] End of year.
[2] Not applicable.

Source: *Stat. Jahr. 1956*, p. 169; *Stat. Jahr. 1960/61*, p. 187; *Stat. Jahr. 1965*, p. 47; *Stat. Jahr. 1967*, p. 59; and *Stat. Jahr. 1968*, p. 61.

TABLE IV-E.—CIVILIAN EMPLOYMENT, BY BRANCH AND SECTOR—HUNGARY: 1950 TO 1967

[Annual averages in thousands. Figures may not add to totals due to rounding]

Branch and sector	1950	1955	1960	1965	1967
Total	4,260	4,552	4,675	4,724	4,817
Agriculture and forestry	2,176	1,987	1,817	1,477	1,471
Socialist	237	588	1,027	1,123	1,170
State	160	320	287	267	268
Cooperative	77	268	740	856	902
Private	1,939	1,399	790	354	301
Industry	800	1,165	1,348	1,519	1,583
Socialist	654	1,082	1,277	1,464	1,530
State	640	969	1,124	1,297	1,334
Cooperative	14	113	153	167	196
Private	146	83	71	55	53
Construction	218	232	274	298	314
Socialist	191	213	256	281	296
State	191	200	234	248	258
Cooperative	----	13	22	33	38
Private	27	19	18	17	18
Transportation	144	192	243	261	257
Socialist	135	191	240	255	251
State	135	190	239	254	250
Cooperative	----	1	1	1	1
Private	9	1	3	6	6
Communications	32	40	43	47	48
Trade	202	236	281	326	341
Socialist	123	226	270	316	331
State	81	165	198	231	236
Cooperative	42	61	72	85	95
Private	79	10	11	10	10
Other	688	700	669	796	803
Socialist	449	647	620	745	747
State	447	637	608	725	727
Cooperative	2	9	12	20	20
Private	239	54	49	51	56

----Represents zero.

Source: Based on data in *Stat. Év. 1967*, pp. 54–56 and 163; *Mezö. Stat. 1968*, p. 233; *Magyar Stat. 1969*, p. 149; *Munka. Adat.*, pp. 36-39; and *Mezö. Adat.*, vol. II, 1965, p. 11. All data were adjusted to exclude apprentices.

TABLE IV-F.—CIVILIAN EMPLOYMENT, BY BRANCH AND SECTOR—POLAND, 1950 TO 1967

[Annual averages in thousands. Figures may not add to totals due to rounding]

Branch and sector	1950	1955	1960	1965	1967
Total	10,068	11,480	12,231	13,551	14,203
Agriculture and forestry	5,508	5,472	5,437	5,356	5,358
Socialist	467	801	566	703	753
State	445	613	539	673	720
Cooperative	[1] 22	188	27	30	33
Private	5,041	4,671	4,871	4,653	4,605
Industry	2,181	2,805	3,198	3,862	4,162
Socialist	1,999	2,685	2,998	3,666	3,940
State	1,810	2,361	2,606	3,204	3,434
Cooperative	189	324	392	462	506
Private	[1] 182	120	200	196	222
Construction	501	738	821	944	1,041
Socialist	501	727	788	892	968
Private	----	11	33	52	73
Transportation	377	468	548	684	747
Communications	76	94	111	123	129
Trade	486	651	720	849	879
Socialist	486	651	720	825	853
Private	----	----	----	24	26
Communal and housing economy	99	132	210	278	321
Education, science, and culture	247	372	471	598	673
Health, social welfare, and physical culture	138	226	308	381	407
Administration and other public institution	345	359	252	276	281
Other	110	163	155	200	206

----Represents zero.
[1] End of year.

Source: Based on data in *Rocz. Stat. 1965*, p. 253; *Rocz. Stat. 1966*, pp. 146 and 261; *Rocz. Stat. 1967*, pp. 261 and 329; *Rocz. Stat. 1968*, pp. 65-66, 131-132, 216, 247, 318, 339, 599, and 601; *Rocz. Stat. Leś. 1945-1967*, pp. 34 and 70; *Rol. Rocz. Stat. 1945-1965*, p. 17; *Rocz. Stat. Przem. 1945-1965*, pp. 712 and 718; and Elias, *Agricultural*, 1963, p. 26.

TABLE IV-G.—CIVILIAN EMPLOYMENT, BY BRANCH AND SECTOR—RUMANIA: 1950 TO 1967

[Annual averages in thousands. Figures may not add to totals due to rounding]

Branch and sector	1950	1955	1960	1965	1967
Total	8,963	10,033	10,262	10,673	10,819
Agriculture and forestry	6,686	7,003	6,988	6,516	6,321
Socialist	317	977	5,509	5,838	5,670
State	250	315	341	459	464
Cooperative	67	662	5,168	5,379	5,206
Private	6,369	6,026	1,479	678	651
Industry	1,063	1,319	1,449	1,827	1,963
Socialist	874	1,196	1,349	1,785	1,923
State	748	956	1,164	1,557	1,658
Cooperative	126	241	185	228	266
Private	189	123	100	42	39
Construction	195	426	435	625	682
Socialist	180	410	418	621	672
Private	15	16	17	4	10
Transportation	168	241	232	298	326
Socialist	140	212	210	291	320
Private	28	29	22	7	6
Communications	27	30	40	54	59
Trade	221	331	331	381	410
Socialist	189	319	330	381	410
Private	33	12	1	----	----
Housing and communal economy	62	90	148	200	242
Education	204	221	252	337	356
Science	18	30	40	49	49
Public health	97	120	148	190	203
Administration	151	156	119	98	99
Other	71	66	79	98	109

----Represents zero.

Source: Based on data in *Anuarul Stat. 1958*, p. 107; *Anuarul Stat. 1965*, pp. 112–113 and 184–185; *Anuarul Stat. 1968*, pp. 124–127, 218–219, and 234; *Rum Stat. 1960*, p. 105; and Elias, *Industrial*, 1962, p. 34.

TABLE V.—CIVILIAN EMPLOYMENT, BY BRANCH—SIX EASTERN EUROPEAN COUNTRIES: 1950, 1960, AND 1967

[Annual averages in thousands. Figures may not add to totals due to rounding]

Branch	1950							1960							1967						
	Total	Bulgaria	Czechoslovakia	East Germany [1]	Hungary	Poland	Rumania	Total	Bulgaria	Czechoslovakia	East Germany	Hungary	Poland	Rumania	Total	Bulgaria	Czechoslovakia	East Germany	Hungary	Poland	Rumania
Total	40,065	3,344	5,577	7,853	4,260	10,068	8,963	45,098	3,738	6,068	8,124	4,675	12,231	10,262	48,548	3,875	6,686	8,148	4,817	14,203	10,819
Agriculture and forestry	20,802	2,575	2,155	1,702	2,176	5,508	6,686	19,375	2,135	1,570	1,428	1,817	5,437	6,988	17,375	1,635	1,333	1,257	1,471	5,358	6,321
Industry	9,310	368	1,674	3,224	800	2,181	1,063	12,424	776	2,263	3,390	1,348	3,198	1,449	14,768	1,103	2,570	3,387	1,583	4,162	1,963
Construction	1,815	64	352	485	218	501	195	2,686	161	501	494	274	821	435	3,369	276	557	499	314	1,041	682
Transportation	1,403	55	237	422	144	377	168	1,863	144	294	402	243	548	232	2,279	168	344	437	257	747	326
Communications	318	13	50	120	32	76	27	423	25	73	131	43	111	40	500	30	92	142	48	129	59
Trade	2,295	85	465	836	202	486	221	2,897	161	479	925	281	720	331	3,318	202	555	931	341	879	410
Other	4,124	184	644	1,066	688	939	603	5,430	336	888	1,355	669	1,396	786	6,941	461	1,235	1,496	803	1,888	1,058

Percent by country: All countries	100.0	8.3	13.9	19.6	10.6	25.1	22.4	100.0	8.3	13.5	18.0	10.4	27.1	22.8	100.0	8.0	13.8	16.8	9.9	29.3	22.3
Agriculture and forestry	100.0	12.4	10.4	8.2	10.5	26.5	32.1	100.0	11.0	8.1	7.4	9.4	28.1	36.1	100.0	9.4	7.7	7.2	8.5	30.8	36.4
Industry	100.0	4.0	18.0	34.6	8.6	23.4	11.4	100.0	6.2	18.2	27.3	10.8	25.7	11.7	100.0	7.5	17.4	22.9	10.7	28.2	13.3
Construction	100.0	3.5	19.4	26.7	12.0	27.6	10.7	100.0	6.0	18.7	18.4	10.2	30.6	16.2	100.0	8.2	16.5	14.8	9.3	30.9	20.2
Transportation	100.0	3.9	16.9	30.1	10.3	26.9	12.0	100.0	7.7	15.8	21.6	13.0	29.4	12.5	100.0	7.4	15.1	19.2	11.3	32.8	14.3
Communications	100.0	4.1	15.7	37.7	10.1	23.9	8.5	100.0	5.9	17.3	31.0	10.2	26.2	9.5	100.0	6.0	18.4	28.4	9.6	25.8	11.8
Trade	100.0	3.7	20.3	36.4	8.8	21.2	9.6	100.0	5.6	16.5	31.9	9.7	24.9	11.4	100.0	6.1	16.7	28.1	10.3	26.5	12.4
Other	100.0	4.5	15.6	25.8	16.7	22.8	14.6	100.0	6.2	16.4	25.0	12.3	25.7	14.5	100.0	6.6	17.8	21.6	11.6	27.2	15.2
Percent by branch: Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture and forestry	51.9	77.0	38.6	21.7	51.1	54.7	74.6	43.0	57.1	25.9	17.6	38.9	44.5	68.1	35.8	42.2	19.9	15.4	30.5	37.7	58.4
Industry	23.2	11.0	30.0	41.1	18.8	21.7	11.9	27.5	20.8	37.3	41.7	28.8	26.1	14.1	30.4	28.5	38.4	41.6	32.9	29.3	18.1
Construction	4.5	1.9	6.3	6.2	5.1	5.0	2.2	6.0	4.3	8.3	6.1	5.9	6.7	4.2	6.9	7.1	8.3	6.1	6.5	7.3	6.3
Transportation	3.5	1.6	4.2	5.4	3.4	3.7	1.9	4.1	3.9	4.8	4.9	5.2	4.5	2.3	4.7	4.3	5.1	5.4	5.3	5.3	3.0
Communications	0.8	0.4	0.9	1.5	0.8	0.8	0.3	0.9	0.7	1.2	1.6	0.9	0.9	0.4	1.0	0.8	1.4	1.7	1.0	0.9	0.5
Trade	5.7	2.5	8.3	10.6	4.7	4.8	2.5	6.4	4.3	7.9	11.4	6.0	5.9	3.2	6.8	5.2	8.3	11.4	7.1	6.2	3.8
Other	10.3	5.5	11.5	13.6	16.2	9.3	6.7	12.0	9.0	14.6	16.7	14.3	11.4	7.7	14.3	11.9	18.5	18.4	16.7	13.3	9.8

[1] As of Dec. 31 1952.

Source: Table IV.

TABLE VI.—CIVILIAN EMPLOYMENT IN AGRICULTURE AND FORESTRY, BY SECTOR—SIX EASTERN EUROPEAN COUNTRIES: 1950, 1960, AND 1967

[Annual averages in thousands. Figures may not add to totals due to rounding]

Country	1950				1960				1967			
	Total	State	Cooperative	Private	Total	State	Cooperative	Private	Total	State	Cooperative	Private
Total	20,802	1,293	671	18,839	19,375	1,951	9,479	7,946	17,375	2,390	9,144	5,841
Bulgaria	2,575	47	426	2,102	2,135	179	1,738	218	1,635	286	1,258	92
Czechoslovakia	2,155	218	33	1,905	1,570	351	915	305	1,333	432	736	164
East Germany	[1] 1,702	173	46	1,483	1,428	254	891	283	1,257	220	1,009	28
Hungary	2,176	160	77	1,939	1,817	287	740	790	1,471	268	902	301
Poland	5,508	445	22	5,041	5,437	539	27	4,871	5,358	720	33	4,605
Rumania	6,686	250	67	6,369	6,988	341	5,168	1,479	6,321	464	5,206	651
PERCENT BY COUNTRY												
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Bulgaria	12.4	3.6	63.5	11.2	11.0	9.2	18.3	2.7	9.4	12.0	13.8	1.6
Czechoslovakia	10.4	16.9	4.9	10.1	8.1	18.0	9.6	3.8	7.7	18.1	8.0	2.8
East Germany	[1] 8.2	13.4	6.9	7.9	7.4	13.1	9.4	3.6	7.2	9.2	11.0	0.5
Hungary	10.5	12.4	11.5	10.3	9.4	14.7	7.8	9.9	8.5	11.2	9.9	5.2
Poland	26.5	34.4	3.3	26.8	28.1	27.4	0.3	61.3	30.8	30.1	0.4	78.8
Rumania	32.1	19.3	10.0	33.8	36.1	17.5	54.5	18.6	36.4	19.4	56.9	11.1
PERCENT BY SECTOR												
Total	100.0	6.2	3.2	90.6	100.0	10.0	48.9	41.0	100.0	13.8	52.6	33.6
Bulgaria	100.0	1.8	16.5	81.6	100.0	8.4	81.4	10.2	100.0	17.5	76.9	5.6
Czechoslovakia	100.0	10.1	1.5	88.4	100.0	22.4	58.3	19.4	100.0	32.4	55.2	12.3
East Germany	[1] 100.0	10.2	2.7	87.1	100.0	17.8	62.4	19.8	100.0	17.5	80.3	2.2
Hungary	100.0	7.4	3.5	89.1	100.0	15.8	40.7	43.5	100.0	18.2	61.3	20.5
Poland	100.0	8.1	0.4	91.5	100.0	9.8	0.6	89.6	100.0	13.4	0.6	85.9
Rumania	100.0	3.7	1.0	95.3	100.0	4.9	74.0	21.2	100.0	7.3	82.4	10.3

[1] As of Dec. 31, 1952.

Source: Table IV.

TABLE VII.—CIVILIAN EMPLOYMENT IN INDUSTRY, BY SECTOR—SIX EASTERN EUROPEAN COUNTRIES: 1950, 1960, AND 1967

[Annual averages in thousands. Figures may not add to totals due to rounding]

Country	1950				1960				1967			
	Total	State	Cooperative	Private	Total	State	Cooperative	Private	Total	State	Cooperative	Private
Total	9,310	6,827	488	1,995	12,424	10,110	1,059	1,255	14,768	12,312	1,369	1,087
Bulgaria	368	307	52	9	776	657	112	7	1,103	972	124	8
Czechoslovakia	1,674	1,314	72	288	2,263	2,153	105	5	2,570	2,458	112	(1)
East Germany	[2] 3,224	2,008	35	1,181	3,390	2,406	112	[3] 872	3,387	2,456	165	[3] 765
Hungary	800	640	14	146	1,348	1,124	153	71	1,583	1,334	196	53
Poland	2,181	1,810	189	182	3,198	2,606	392	200	4,162	3,434	506	222
Rumania	1,063	748	126	189	1,449	1,164	185	100	1,963	1,658	266	39
PERCENT BY COUNTRY												
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100
Bulgaria	4.0	4.5	10.7	0.5	6.2	6.5	10.6	0.6	7.5	7.9	9.1	0.7
Czechoslovakia	18.0	19.2	14.8	14.4	18.2	21.3	9.9	0.4	17.4	20.0	8.2	----
East Germany	[2] 34.6	29.4	7.2	59.2	27.3	23.8	10.6	[3] 69.5	22.9	19.9	12.1	[3] 70.4
Hungary	8.6	9.4	2.9	7.3	10.8	11.1	14.4	5.7	10.7	10.8	14.3	4.9
Poland	23.4	26.5	38.7	9.1	25.7	25.8	37.0	15.9	28.2	27.9	37.0	20.4
Rumania	11.4	11.0	25.8	9.5	11.7	11.5	17.5	8.0	13.3	13.5	19.4	3.6
PERCENT BY SECTOR												
All countries	100.0	73.3	5.2	21.4	100.0	81.4	8.5	10.1	100.0	83.4	9.3	7.4
Bulgaria	100.0	83.4	14.1	2.4	100.0	84.7	14.4	0.9	100.0	88.1	11.2	0.7
Czechoslovakia	100.0	78.5	4.3	17.2	100.0	95.1	4.6	0.2	100.0	95.6	4.4	----
East Germany	100.0	62.3	1.1	36.6	100.0	71.0	3.3	[3] 25.7	100.0	72.6	4.9	[3] 22.6
Hungary	100.0	80.0	1.8	18.3	100.0	83.4	11.4	5.3	100.0	84.3	12.4	3.3
Poland	100.0	83.0	8.7	8.3	100.0	81.5	12.3	6.3	100.0	82.5	12.2	5.3
Rumania	100.0	70.4	11.9	17.8	100.0	80.3	12.8	6.9	100.0	84.5	13.6	2.0

[1] Less than 500.
[2] As of December 31, 1952.
[3] Includes the semistate sector.
-- Entry represents zero.

Source: Table IV.

TABLE VIII–A.—WORKERS IN SOCIALIZED INDUSTRY, BY BRANCH—SIX EASTERN EUROPEAN COUNTRIES COMBINED: 1950 TO 1967

[Annual averages in thousands. Figures may not add to totals due to rounding]

Branch	1950	1955	1960	1965	1967
Total	5,365	7,146	8,445	9,478	9,957
Heavy industry	2,881	4,024	4,746	5,448	5,719
Electric and thermal power	92	117	138	167	169
Fuel	555	728	804	856	819
Ferrous metallurgy (including ore extraction)	262	349	401	463	488
Nonferrous metallurgy (including ore extraction)	85	120	157	194	202
Machine-building and metalworking	1,309	1,939	2,330	2,719	2,934
Chemical, rubber, and asbestos	310	415	503	611	660
Construction materials	267	358	414	437	449
Light industry	1,958	2,446	2,888	3,131	3,295
Woodworking	405	527	577	654	663
Pulp and paper	97	109	128	144	148
Glass, porcelain, and ceramic	[1]88	149	178	205	218
Textile	795	878	994	1,008	1,041
Sewn goods	251	303	379	411	453
Leather, footwear, and fur	198	245	303	330	357
Printing	94	93	105	114	119
Other	31	144	227	263	296
Food industry	527	678	812	899	942

[1] Excluding East Germany. Employment in East German glass, porcelain, and ceramic industry in 1950 is distributed among other unidentified branches.

Source: Tables VIII–B to VIII–G.

TABLE VIII–B.—WORKERS IN SOCIALIZED INDUSTRY, BY BRANCH—BULGARIA: 1950 TO 1967

[Annual averages in thousands. Figures may not add to totals due to rounding]

Branch	1950	1955	1960	1965	196
Total	263	348	623	762	861
Heavy industry	89	126	222	317	368
Electric and thermal power	3	6	7	10	10
Fuel	21	30	36	43	45
Ferrous metallurgy (including ore extraction)	1	3	7	17	22
Nonferrous metallurgy (including ore extraction)	4	13	24	33	33
Machine-building and metalworking	39	48	100	145	181
Chemical, rubber, and asbestos	7	12	20	30	36
Construction materials	14	15	28	39	41
Light industry	130	174	303	327	364
Woodworking [1]	48	48	64	67	69
Pulp and paper	2	4	6	8	9
Glass, porcelain, and ceramic	4	5	10	14	16
Textile	43	50	84	78	85
Sewn goods	10	20	46	44	52
Leather, footwear, and fur	12	10	16	20	24
Printing	4	4	5	6	7
Other [2]	9	33	72	89	101
Food industry	44	49	98	118	129

[1] Includes logging.
[2] Apparently includes workers in all industrial cooperative handicrafts. See source.

Source: *Stat. god, 1964.* p. 118, and *Stat. god. 1968*, p. 126.

TABLE VIII-C.—WORKERS IN SOCIALIZED INDUSTRY, BY BRANCH—CZECHOSLOVAKIA: 1950 TO 1967

[Annual averages in thousands. Figures may not add to totals due to rounding]

Branch	1950	1955	1960	1965	1967
Total	1,320	1,482	1,753	1,878	1,939
Heavy industry	673	863	1,049	1,153	1,196
Electric and thermal power	19	23	25	28	29
Fuel	121	136	154	170	151
Ferrous metallurgy (including ore extraction)	80	103	124	139	144
Nonferrous metallurgy (including ore extraction)	21	19	25	27	28
Machine-building and metalworking	324	455	565	627	671
Chemical, rubber, and asbestos	45	54	70	83	90
Construction materials	63	73	86	79	83
Light industry	500	480	558	582	596
Woodworking	78	86	93	96	99
Pulp and paper	23	26	31	31	31
Glass, porcelain, and ceramic	44	38	49	56	60
Textile	180	168	190	188	188
Sewn goods	80	76	83	87	88
Leather, footwear, and fur	62	52	70	78	82
Printing	22	20	22	23	24
Other	11	14	20	23	24
Food industry	147	139	146	143	147

Source: *Stat. roč. 1968*, p. 232.

TABLE VIII-D.—WORKERS IN SOCIALIZED INDUSTRY, BY BRANCH—EAST GERMANY: 1950 TO 1967

[Annual averages in thousands. Figures may not add to totals due to rounding]

Branch	1950	1955	1960	1965	1967
Total[1]	1,157	1,514	1,639	1,521	1,502
Heavy industry	787	990	1,089	1,050	1,046
Electric and thermal power	27	32	37	39	37
Fuel	90	103	117	118	109
Ferrous metallurgy (including ore extraction)	39	48	52	49	51
Nonferrous metallurgy (including ore extraction)	19	29	30	34	33
Machine-building and metalworking	430	555	608	570	579
Chemical, rubber, and asbestos	141	175	184	184	182
Construction materials	40	48	61	56	55
Light industry	290	414	423	356	342
Woodworking	48	62	67	60	59
Pulp and paper	28	32	35	31	30
Glass, porcelain, and ceramic	(2)	44	42	41	41
Textile	142	180	175	136	128
Sewn goods	24	38	45	34	34
Leather, footwear, and fur	22	34	35	30	30
Printing	28	24	24	21	21
Other	----	----	----	----	----
Food industry	80	110	127	115	114

--Entry represents zero.

[1] Excludes workers in industrial handicraft cooperatives. The total number of personnel (members and candidate members of cooperatives) in industrial cooperatives at the end of each year was as follows (in thousands): 1950—0; 1955—2; 1960—139; 1965—175; 1967—193. See *Stat. Jahr. 1968*, p. 242.

[2] Employment is distributed among other unidentified branches.

Source: Based on data in *Stat. Jahr. 1955*, p. 126; *Stat. Jahr. 1967*, p. 182; and *Stat. Jahr. 1968*, p. 186.

TABLE VIII–E.—WORKERS IN SOCIALIZED INDUSTRY, BY BRANCH—HUNGARY: 1950 TO 1967

[Annual averages in thousands. Figures may not add to totals due to rounding]

Branch	1950	1955	1960	1965	1967
Total	489	835	1,027	1,159	1,217
Heavy industry	295	476	578	658	670
Electric and thermal power	12	19	27	28	24
Fuel	62	103	120	122	111
Ferrous metallurgy (including ore extraction)	35	54	57	63	64
Nonferrous metallurgy (including ore extraction)	7	13	18	22	24
Machine-building and metalworking	132	218	268	320	338
Chemical, rubber, and asbestos	16	27	43	61	66
Construction materials	31	42	45	42	43
Light industry	146	281	365	406	448
Woodworking	17	30	42	46	47
Pulp and paper	5	6	7	10	11
Glass, porcelain, and ceramic	7	11	13	18	20
Textile	74	88	102	115	120
Sewn goods	13	33	43	46	56
Leather, footwear, and fur	15	29	40	44	49
Printing	11	9	12	13	14
Other [1]	2	76	106	113	129
Food industry	48	78	84	95	99

[1] Includes workers in all industrial handicraft cooperatives listed in the source under light industry, without branch breakdown.

Source: Based on data in *Ipari Adat., 1966*, pp. 502–503, and *Ipari Adatok 1968. IV*. pp. 64, 66, 76, and 86.

TABLE VIII–F.—WORKERS IN SOCIALIZED INDUSTRY, BY BRANCH—POLAND: 1950 TO 1967

[Annual averages in thousands. Figures may not add to totals due to rounding]

Branch	1950	1955	1960	1965	1967
Total	1,496	2,051	2,335	2,717	2,879
Heavy industry	758	1,149	1,300	1,559	1,664
Electric and thermal power	26	27	30	36	39
Fuel	212	286	304	320	319
Ferrous metallurgy (including ore extraction)	80	105	112	135	145
Nonferrous metallurgy (including ore extraction)	21	29	31	32	35
Machine-building and metalworking	253	467	551	723	791
Chemical, rubber, and asbestos	83	113	139	172	189
Construction materials	83	122	134	141	146
Light industry	599	691	774	857	901
Woodworking	96	121	129	144	149
Pulp and paper	32	33	38	42	43
Glass, porcelain, and ceramic	25	40	48	55	60
Textile	271	280	314	332	344
Sewn goods	97	97	107	124	133
Leather, footwear, and fur	52	80	91	99	106
Printing	20	23	26	32	35
Other	6	17	22	31	33
Food industry	139	211	261	301	314

Source: Based on data in *Rocz. Stat. Przem. 1967*, pp. 173–174 and 191–194.

TABLE VIII-G.—WORKERS IN SOCIALIZED INDUSTRY, BY BRANCH—RUMANIA: 1950 TO 1967

[Annual averages in thousands. Figures may not add to totals due to rounding]

Branch	1950	1955	1960	1965	1967
Total [1]	640	916	1,068	1,441	1,55
Heavy industry	279	420	508	711	775
Electric and thermal power	5	10	12	26	30
Fuel	49	70	73	83	84
Ferrous metallurgy (including ore extraction)	27	36	49	60	62
Nonferrous metallurgy (including ore extraction)	13	17	29	46	49
Machine-building and metalworking	131	196	238	334	374
Chemical, rubber, and asbestos	18	34	47	81	97
Construction materials	36	58	60	80	81
Light industry	293	406	465	603	644
Woodworking [2]	118	180	182	241	240
Pulp and paper	7	8	11	22	24
Glass, porcelain, and ceramic	8	11	16	21	21
Textile	85	112	129	159	176
Sewn goods	27	39	55	76	90
Leather, footwear, and fur	35	40	51	59	66
Printing	9	13	16	19	18
Other	3	4	7	7	9
Food industry	69	91	96	127	139

[1] Excludes workers in industrial handicraft cooperatives. The total number of personnel in industrial cooperatives at the end of each year was as follows (in thousands): 1950—65; 1955—131; 1960—110; 1965—129; 1967—146. See *Anuarul Stat. 1968*, p. 234.

[2] Includes logging.

Source: *Anuarul Stat. 1968*, p. 221.

TABLE IX.—PERCENT DISTRIBUTION OF WORKERS IN SOCIALIZED INDUSTRY, BY BRANCH—SIX EASTERN EUROPEAN COUNTRIES

[Figures may not add to totals due to rounding]

Branch	1950							1967						
	Total	Bulgaria	Czecho-slovakia	East Germany	Hungary	Poland	Rumania	Total	Bulgaria	Czecho-slovakia	East Germany	Hungary	Poland	Rumania
DISTRIBUTION BY BRANCH														
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Heavy industry	53.7	33.8	51.0	68.0	60.3	50.7	43.6	57.4	42.7	61.7	69.6	55.1	57.8	49.7
Electric and thermal power	1.7	1.1	1.4	2.3	2.5	1.7	0.8	1.7	1.2	1.5	2.5	2.0	1.4	1.9
Fuel	10.3	8.0	9.2	7.8	12.7	14.2	7.7	8.2	5.2	7.8	7.3	9.1	11.1	5.4
Ferrous metallurgy	4.9	0.4	6.1	3.4	7.2	5.3	4.2	4.9	2.6	7.4	3.4	5.3	5.0	4.0
Nonferrous metallurgy	1.6	1.5	1.6	1.6	1.4	1.4	2.0	2.0	3.8	1.4	2.2	2.0	1.2	3.1
Machine building and metalworking	24.4	14.8	24.5	37.1	27.0	16.9	20.5	29.5	21.0	34.6	38.5	27.8	27.5	24.0
Chemical, rubber, and asbestos	5.8	2.7	3.4	12.2	3 3	5.5	2.8	6.6	4.2	4.6	12.1	5.4	6.6	6.2
Construction materials	5.0	5.3	4.8	3.5	6.3	5.5	5.6	4.5	4.8	4.3	3.7	3.5	5.1	5.2
Light industry	36.5	49.4	37.9	25.1	29.9	40.0	45.8	33.1	42.3	30.7	22.8	36.8	31.3	41.3
Woodworking	7.5	18.3	5.9	4.1	3.5	6.4	18.4	6.7	8.0	5.1	3.9	3.9	5.2	15.4
Pulp and paper	1.8	0.8	1.7	2.4	1.0	2.1	1.1	1.5	1.0	1.6	2.0	0.9	1.5	1.5
Glass, porcelain, and ceramic	1.6	1.5	3.3	(1)	1.4	1.7	1.3	2.2	1.9	3.1	2.7	1.6	2.1	1.3
Textile	14.8	16.3	13.6	12.3	15.1	18.1	13.3	10.5	9.9	9.7	8.5	9.9	11.9	11.3
Sewn goods	4.7	3.8	6.1	2.1	2.7	6.5	4.2	4.5	6.0	4.5	2.3	4.6	4.6	5.8
Leather, footwear, and fur	3.7	4.6	4.7	1.9	3.1	3.5	5.5	3.6	2.8	4.2	2.0	4.0	3.7	4.2
Printing	1.8	1.5	1.7	2.4	2.3	1.3	1.4	1.2	0.8	1.2	1.4	1.2	1.2	1.2
Other	0.6	3.4	0.8	(1)	0.4	0.4	0.5	3.0	11.7	1.2	(1)	10.6	1.1	0.6
Food industry	9.8	16.7	11.1	6.9	9.8	9.3	10.8	9.5	15.0	7.6	7.6	8.1	10.9	8.9

DISTRIBUTION BY COUNTRY

All countries	100.0	4.9	24.6	21.6	9.1	27.9	11.9	100.0	8.6	19.5	15.1	12.2	28.9	15.7
Heavy industry	100.0	3.1	23.4	27.3	10.2	26.3	9.7	100.0	6.4	20.9	18.3	11.7	29.1	13.6
Electric and thermal power	100.0	3.3	20.7	29.3	13.0	28.3	5.4	100.0	5.9	17.2	21.9	14.2	23.1	17.8
Fuel	100.0	3.8	21.8	16.2	11.2	38.2	8.8	100.0	5.5	18.4	13.3	13.6	38.9	10.3
Ferrous metallurgy	100.0	0.4	30.5	14.9	13.4	30.5	10.3	100.0	4.5	29.5	10.5	13.1	29.7	12.7
Nonferrous metallurgy	100.0	4.7	24.7	22.3	8.2	24.7	15.3	100.0	16.3	13.9	16.3	11.9	17.3	24.3
Machine building and metalworking	100.0	3.0	24.8	32.8	10.1	19.3	10.0	100.0	6.2	22.9	19.7	11.5	27.0	12.7
Chemical, rubber, and asbestos	100.0	2.3	14.5	45.5	5.2	26.8	5.8	100.0	5.5	13.6	27.6	10.0	28.6	14.7
Construction materials	100.0	5.2	23.6	15.0	11.6	31.1	13.5	100.0	9.1	18.5	12.2	9.6	32.5	18.0
Light industry	100.0	6.6	25.5	14.8	7.5	30.6	15.0	100.0	11.0	18.1	10.4	13.6	27.3	19.5
Woodworking	100.0	11.9	19.3	11.9	4.2	23.7	29.1	100.0	10.4	14.9	8.9	7.1	22.5	36.2
Pulp and paper	100.0	2.1	23.7	28.9	5.2	33.0	7.2	100.0	6.1	20.9	20.3	7.4	29.1	16.2
Glass, porcelain, and ceramic	100.0	4.5	50.0	(1)	8.0	28.4	9.1	100.0	7.3	27.5	18.8	9.2	27.5	9.6
Textile	100.0	5.4	22.6	17.9	9.3	34.1	10.7	100.0	8.2	18.1	12.3	11.5	33.0	16.9
Sewn goods	100.0	4.0	31.9	9.6	5.2	38.6	10.8	100.0	11.5	19.4	7.5	12.4	29.4	19.9
Leather, footwear, and fur	100.0	6.1	31.3	11.1	7.6	26.3	17.7	100.0	6.7	23.0	8.4	13.7	29.7	18.5
Printing	100.0	4.3	23.4	29.8	11.7	21.3	9.6	100.0	5.9	20.2	17.6	11.8	29.4	15.1
Other	100.0	29.0	35.5	(1)	6.5	19.4	9.7	100.0	34.1	8.1	(1)	43.6	11.1	3.0
Food industry	100.0	8.3	27.9	15.2	9.1	26.4	13.1	100.0	13.7	15.6	12.1	10.5	33.3	14.8

[1] Not reported separately. Presumably included in data for other individual branches.

Source: Tables VIII-A through VIII-G.

TABLE X-A.—WOMEN EMPLOYED IN THE SOCIALIZED NONAGRICULTURAL BRANCHES—BULGARIA: 1952 TO 1967

[Absolute data in thousands. As of Aug. 1, unless otherwise noted]

Branch	1952 [1]		1956 [1]		1960		1965		1967	
	Number	Percent of branch total	Number	Percent of branch total	Number	Percent of branch total	Number	Percent of branch total	Number	Percent of branch total
Total	248	26.5	338	29.7	539	33.8	755	38.1	906	40.6
Industry	111	27.8	146	30.3	279	36.3	371	38.9	467	42.6
Construction	5	4.2	6	4.5	12	7.2	24	10.6	35	12.7
Transportation	7	13.8	6	9.7	12	8.1	19	12.6	25	15.0
Communications	6	33.8	8	37.5	10	39.4	13	47.1	14	47.7
Trade	25	23.0	42	33.8	61	37.7	95	47.2	101	50.2
Housing and communal economy	6	22.9	10	27.2	15	33.2	25	38.9	28	42.4
Science and scientific services	45	51.6	63	54.3	8	52.3	11	50.0	15	48.2
Education, culture, and art					80	59.7	109	62.5	120	64.7
Health services, physical culture, and social security	18	57.9	30	60.6	41	64.4	61	68.8	68	70.9
Finance, credit, and insurance	7	34.0	6	34.7	5	47.9	7	58.3	8	62.8
Administration	18	25.3	17	27.1	12	24.9	13	29.4	16	34.6
Other	1	12.3	2	6.5	5	29.1	6	31.7	8	35.2

[1] As of Sept. 30.

Source: *Stat. god. 1961*, pp. 77 and 79, and *Stat. god. 1968*, pp. 70 and 72.

TABLE X-B.—WOMEN EMPLOYED IN THE SOCIALIZED NONAGRICULTURAL BRANCHES—CZECHOSLOVAKIA: 1950 TO 1967

[Absolute data in thousands. As of December 31, unless otherwise noted]

Branch	1950 [1]		1955		1960		1965		1967	
	Number	Percent of branch total	Number	Percent of branch total	Number	Percent of branch total	Number	Percent of branch total	Number	Percent of branch total
Total	1,021	29.9	1,458	37.1	1,830	40.7	2,255	44.1	2,407	45.
Industry	489	29.5	683	35.1	876	37.7	1,037	41.1	1,089	42.0
Construction	26	6.9	43	10.0	61	12.3	73	14.0	82	14.7
Transportation	28	9.8	69	19.9	50	17.3	67	20.2	74	21.2
Communications					38	50.7	50	58.1	56	60.7
Material-technical supply	24	32.4	23	35.9	15	46.2	23	46.2	24	27.1
Trade	164	42.7	253	63.2	289	68.3	324	71.6	343	73.6
Procurement of agricultural products	(2)	(2)	(2)	(2)	10	31.1	14	38.3	14	36.2
Science and research	34	34.0	61	39.1	31	29.3	48	31.4	55	32.6
Communal services					41	46.5	73	54.2	82	52.7
Housing economy					25	65.3	34	54.4	43	52.8
Health and social welfare	65	61.4	112	71.5	132	73.5	174	77.5	186	79.0
Education and culture	85	52.3	133	56.4	176	59.7	236	61.0	257	62.2
Administration and justice	106	38.4	81	37.7	43	42.6	49	44.6	52	47.6
Banking and insurance					15	54.2	21	61.6	21	64.0
Social organizations					7	34.6	8	35.2	6	34.4
Other					21	61.8	24	63.8	23	60.4

[1] Annual averages.
[2] Included in material-technical supply.
[3] Not applicable.

Source: *Stat. roč. 1958*, p. 89, and *Stat. roč. 1968*, p. 132.

TABLE X-C.—WOMEN EMPLOYED IN THE SOCIALIZED NONAGRICULTURAL BRANCHES—EAST GERMANY: 1952 TO 1967

[Absolute data in thousands. As of Sept. 30, unless otherwise noted]

Branch	1952 [1]		1955 [1]		1960		1965		1967	
	Number	Percent of branch total	Number	Percent of branch total	Number	Percent of branch total	Number	Percent of branch total	Number	Percent of branch total
Total	2,237	40.5	2,476	42.2	2,793	45.7	2,985	45.6	3,110	48.6
Industry	1,064	36.2	1,163	37.8	1,228	39.4	1,240	40.3	[1] 1,286	41.1
Construction	52	11.8	36	8.2	36	8.9	41	10.4	46	11.4
Transportation	76	18.9	87	20.9	93	24.2	106	25.1	109	25.7
Communications	63	52.6	68	55.4	81	61.4	90	65.1	94	66.7
Trade	396	60.0	469	62.1	552	66.7	588	69.1	599	69.5
Other	586	61.2	653	62.5	803	6.4	920	67.1	976	67.8

[1] End of year.

Source: *Stat. Jahr.* 1968, pp. 65–66

TABLE X-D.—WOMEN EMPLOYED IN THE SOCIALIZED NONAGRICULTURAL BRANCHES—HUNGARY: 1950 TO 1967

[Absolute data in thousands. As of Jan. 1]

Branch	1950		1955		1960		1965		1967	
	Number	Percent of branch total	Number	Percent of branch total	Number	Percent of branch total	Number	Percent of branch total	Number	Percent of branch total
Total [1]	500	30.2	758	33.5	866	34.5	1,125	38.0	1,175	38.6
Industry	158	24.5	301	32.6	364	33.6	499	37.6	516	38.3
Construction	12	10.8	27	14.6	27	12.1	38	15.9	42	15.1
Transportation and communications	18	11.3	44	19.2	48	17.1	63	20.6	67	21.9
Trade	53	44.7	125	48.4	149	51.2	189	58.7	195	59.7
Other	259	41.5	261	39.1	278	44.0	336	43.9	355	45.2

[1] Data include a small number of hired women in the private sector.

Source: *Munka. Adat.*, pp. 28–37.

TABLE X-E.—WOMEN EMPLOYED IN THE SOCIALIZED NONAGRICULTURAL BRANCHES—POLAND: 1955 TO 1967

[Absolute data in thousands. As of Dec. 31]

Branch	1955		1960		1965		1967	
	Number	Percent of branch total	Number	Percent of branch total	Number	Percent of branch total	Number	Percent of branch total
Total	1,964	33.3	2,297	32.8	3,005	35.7	3,376	37.4
Industry [1]	814	30.2	932	30.2	1,193	31.5	1,339	33.2
Construction	89	12.4	82	10.1	116	13.1	140	14.2
Transportation and communications	85	15.1	104	15.0	144	17.5	169	19.0
Trade	336	51.4	408	55.0	524	61.2	575	64.7
Housing and communal economy	42	30.9	60	28.0	93	32.6	123	35.8
Education, science, and culture	225	56.5	294	62.3	400	65.4	455	66.6
Health, social security, and physical culture	175	76.8	237	76.1	301	77.8	322	78.5
Administration and justice	121	38.8	78	40.0	101	48.1	106	50.3
Financial and insurance	29	58.0	36	60.2	49	67.1	54	69.5
Other	48	44.0	64	48.1	86	49.4	91	51.2

[1] Excludes handicrafts.

Source: *Rocz. Stat. 1968*, p. 50, and *Rocz. Stat. 1968*, pp. 68–69.

TABLE X-F.—WOMEN EMPLOYED IN THE SOCIALIZED NONAGRICULTURAL BRANCHES—RUMANIA: 1957 TO 1967

[Absolute data in thousands. As of Dec. 31, unless otherwise noted]

Branch	1957 [1]		1960		1965		1967	
	Number	Percent of branch total	Number	Percent of branch total	Number	Percent of branch total	Number	Percent of branch total
Total	720	27.5	838	28.1	1,142	29.2	1,299	30.6
Industry	285	25.5	343	26.4	459	26.9	534	28.9
Construction	35	9.9	25	6.7	37	7.3	45	7.8
Transportation	31	14.1	16	7.2	21	7.3	25	7.5
Communications			15	38.1	22	42.9	25	44.3
Trade	100	35.7	109	34.9	157	40.6	173	42.2
Housing and communal economy	26	22.6	29	23.6	52	28.7	61	28.1
Education, culture, and arts	111	54.2	138	55.6	193	57.5	209	59.7
Science and scientific services			11	27.8	17	32.7	19	34.6
Health services, social assistance, and physical culture	72	64.2	102	65.5	122	65.0	137	66.4
Administration	30	24.7	29	27.7	29	29.8	31	31.8
Other	32	31.1	49	30.5	34	36.2	41	40.0

[1] As of July 1.

Source: *Anuarul Stat. 1968*, p. 77; *Anuarul Stat. 1961*, p. 106; *Anuarul Stat. 1968*, p. 126; and *Anuarul Stat. 1968*, p. 138.

TABLE XI.—NUMBER OF SPECIALISTS WITH HIGHER AND SECONDARY VOCATIONAL EDUCATION—SIX EASTERN EUROPEAN COUNTRIES: SELECTED YEARS, 1949 TO 1966.

[In thousands]

Country	Date	Total	With higher (college) education	With secondary vocational education
Bulgaria	Aug. 1, 1956	159	67	92
	Nov. 1, 1966	397	129	268
Czechoslovakia	Sept. 30, 1959	733	149	584
	Oct. 31, 1966	1,111	225	887
East Germany [1]	Sept.–Dec. 1961	363	130	233
	Sept.–Dec. 1966	557	203	354
Hungary	Jan. 1, 1949	[2] 264	91	[2] 172
	Jan. 1, 1960	[2] 503	151	[2] 352
Poland [1]	Jan. 31, 1958	679	240	439
	Oct. 31, 1964	909	310	598
Rumania	Nov. 15, 1958	[2] 464	158	[2] 306
	June 1, 1964	[2] 668	210	[2] 457

[1] Employed in the socialized sector only.
[2] Includes general secondary school graduates.

Source:
Bulgaria: *Stat. god. 1968*, pp. 93 and 95.
Czechoslovakia: *Stat. roč. 1960*, p. 94, and *Stat. roč. 1967*, p. 115.
East Germany: *Stat. Jahr. 1968*, p. 74.
Hungary: *1960. évi.* vol. 6, pp. 28 and 32, and vol. 10, p. 127, and *Stat. Év. 1949–55*, p. 5.
Poland: *Rocz. Stat. 1967*, p. 74.
Rumania: *Anuarul Stat. 1968*, p. 139.

TABLE XII.—ESTIMATED AND PROJECTED TOTAL, WORKING-AGE, AND ECONOMICALLY ACTIVE POPULATIONS—SIX EASTERN EUROPEAN COUNTRIES: 1968 TO 1990

[In thousands. As of Jan. 1, except as otherwise noted. Figures may not add to totals due to rounding]

Country and population category	1968 [1]	1969	1970	1975	1980	1985	1990
TOTAL POPULATION							
Total	102,105	102,464	103,200	107,623	112,350	116,801	120,883
Bulgaria	8,370	8,401	8,468	8,796	9,087	9,322	9,511
Czechoslovakia	14,362	14,389	14,465	14,806	15,130	15,364	15,550
East Germany	17,092	17,093	17,109	17,208	17,355	17,601	17,915
Hungary	10,255	10,275	10,314	10,519	10,717	10,826	10,862
Poland	32,305	32,426	32,623	34,304	36,249	38,148	39,754
Rumania	19,721	19,880	20,222	21,990	23,812	25,539	27,290
WORKING-AGE POPULATION							
Total	65,932	66,274	66,962	69,737	71,427	74,826	77,429
Bulgaria	5,679	5,701	5,739	5,889	5,987	6,183	6,249
Czechoslovakia	9,413	9,451	9,518	9,680	9,817	10,117	10,288
East Germany	10,432	10,428	10,418	10,415	10,704	11,250	11,489
Hungary	6,863	6,890	6,962	7,077	6,984	7,163	7,181
Poland	20,575	20,758	21,123	22,805	23,821	24,921	25,784
Rumania	12,970	13,047	13,201	13,870	14,114	15,191	16,437
ECONOMICALLY ACTIVE POPULATION							
Total	52,811	53,058	53,557	55,525	56,600	59,029	60,801
Bulgaria	4,346	4,363	4,392	4,507	4,582	4,732	4,782
Czechoslovakia	7,011	7,039	7,089	7,210	7,312	7,535	7,663
East Germany	8,437	8,434	8,426	8,424	8,657	9,099	9,292
Hungary	5,122	5,142	5,196	5,282	5,212	5,346	5,359
Poland	16,288	16,432	16,721	18,052	18,857	19,727	20,411
Rumania	11,607	11,648	11,733	12,050	11,980	12,590	13,294

[1] As of July 1.

Source: 1968: Table II. 1969–70: Total and working-age populations: Projections prepared by the Foreign Demographic Analysis Division, U.S. Bureau of the Census. See the paper by Paul F. Myers, "Demographic Trends in Eastern Europe," in this volume. These figures are from the series B projections, which assume for each country that mortality will decline, that fertility will remain constant at the 1968 level, and that migration will be negligible.
Economically active population: Projected as a constant proportion of the working-age population, at the level estimated for 1968, except for Rumania, where the high participation rate estimated for 1968 is assumed to decrease by 1990. See text.

TABLE XIII.—PERCENT CHANGE IN THE TOTAL, WORKING AGE, AND ECONOMICALLY ACTIVE POPULATIONS—SIX EASTERN EUROPEAN COUNTRIES, 1968 TO 1990

[Change as a percent of the July 1, 1968, population]

Country and population category	1969	1970	1975	1980	1985	1990
TOTAL POPULATION						
Total	0.4	1.1	5.4	10.0	14.4	18.4
Bulgaria	0.4	1.2	5.1	8.6	11.4	13.6
Czechoslovakia	0.2	0.7	3.1	5.3	7.0	8.3
East Germany	0.0	0.1	0.7	1.5	3.0	4.8
Hungary	0.2	0.6	2.6	4.5	5.6	5.9
Poland	0.4	1.0	6.2	12.2	18.1	23.1
Rumania	0.8	2.5	11.5	20.7	29.5	38.4
WORKING-AGE POPULATION						
Total	0.5	1.6	5.8	8.3	13.5	17.4
Bulgaria	0.4	1.1	3.7	5.4	8.9	10.0
Czechoslovakia	0.4	1.1	2.8	4.3	7.5	9.3
East Germany	0.0	−0.1	−0.2	2.6	7.8	10.1
Hungary	0.4	1.4	3.1	1.8	4.4	4.6
Poland	0.9	2.7	10.8	15.8	21.1	25.3
Rumania	0.6	1.8	6.9	8.8	17.1	26.7
ECONOMICALLY ACTIVE POPULATION						
Total	0.5	1.4	5.1	7.2	11.8	15.1
Bulgaria	0.4	1.1	3.7	5.4	8.9	10.0
Czechoslovakia	0.4	1.1	2.8	4.3	7.5	9.3
East Germany	0.0	−0.1	−0.2	2.6	7.8	10.1
Hungary	0.4	1.4	3.1	1.8	4.4	4.6
Poland	0.9	2.7	10.8	15.8	21.1	25.3
Rumania	0.4	1.1	3.8	3.2	8.5	14.5

Source: Table XII.

ECONOMIC EFFICIENCY IN EASTERN EUROPE

By EDWIN M. SNELL*

CONTENTS

INTRODUCTION

Beyond doubt, technological change has been slower in Eastern than in Western Europe since World War II, and efficiency has risen more slowly. The two parts of Europe have belonged to different worlds—the one dominated by the U.S.S.R., the other deeply influenced by the United States. The U.S.S.R. has imposed on Eastern Europe its own repressive institutions and policies and its lagging civilian technology. With some U.S. help and under continued U.S. influence, Western Europe has preserved its traditional freedoms, and private enterprise and free institutions have rapidly accommodated to technological change.

This study is chiefly concerned, not with the manifold causes, but with the results of the economic divergence between Eastern and Western Europe. How great are the differences? Are they increasing? Can Eastern Europe "catch up?" The same questions weigh on the East European leaders. Technological backwardness and lagging efficiency in the long run are heavy liabilities for regimes that set out to "demonstrate the superiority of socialism."

*The author is indebted to many friends for helpful suggestions and critical remarks. He bears, of course, full responsibility for the deficiencies of this study. He also wishes to thank David Wigg for his contribution to the research.

The growing economic differences between Eastern and Western Europe since World War II—there were differences before the war—are the subject of a previous study in this series by Maurice Ernst.[1] He carried out broad comparisons of efficiency in the main economic sectors, matching Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, and Romania against the most nearly comparable Western European economies. Before World War II, per capita output and efficiency were about the same in East as in West Germany and in Austria as in Hungary and not greatly different in Czechoslovakia and France (or Belgium), in Poland and Italy, and in Bulgaria and Romania and Greece. This study, dealing with the same group of countries, will take a closer look at industry, the largest and most dynamic sector, the crucial sector for economic growth.

The evidence to be presented supports the following conclusions:

(1) Industrial output has grown in Eastern Europe about as fast as in Western Europe, relative to prewar levels. As in Western Europe, the growth of output has been especially rapid in heavy industry—except mining—and more rapid in the industrializing than in the industrialized countries.

(2) But the general similarity in growth patterns hides great contrasts. In Eastern Europe the most urgent demand has been to meet the year's targets for increasing output and investment; in Western Europe, to raise efficiency and maintain or increase the firm's share of the market. The East European regimes have achieved high rates of industrial growth by making growth itself the objective. The costs of this policy have been passed on in part to workers and consumers; in part, they have been deferred.

(3) Large differences have arisen in the structure of industry. East European industries, for example, use more fuel and steel to produce a given amount of goods for final demand—for export, investment, and consumption. Such differences are associated with differences in the composition of final demand and in the kind of plant and equipment used, differences that ultimately reflect isolation from the world market and insistence on "production for production's sake."

(4) The industrial exports of Eastern Europe have become less competitive in Western markets, and trading practices are unbusinesslike. Eastern European countries generally sell at lower prices and buy at higher prices in the West than do Western firms. The price gap is large and has been widening. As a result, the Eastern European countries' growing trade with the West is at less and less favorable terms, a sigificant cost as well as an indication of technological lag and inefficiency.

(5) Inventory costs in Eastern Europe are higher because of the inferior mix of output and unbusinesslike operation.

(6) In Czechoslovakia and Hungary, surprisingly, labor productivity in many of the neglected light and food industries is at or above the levels in France and Austria. But in heavy industry, on which resources have been lavished in the pursuit of growth, labor productivity is generally far lower in Czechoslovakia and Hungary.

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[1] Maurice Ernst, "Postwar Economic Growth in Eastern Europe," in U.S. Congress, Joint Economic Committee, *New Directions in the Soviet Economy*, Washington, G.P.O., 1966, Part IV, pp. 873–916.

(7) Overall efficiency in the use of labor and capital in industry has risen less since World War II in Czechoslovakia and East Germany than in the highly industrialized countries of Western Europe. The industrializing countries of Eastern Europe have come closer to matching the performance of comparable West European countries. The Soviet-imposed system, effective in mobilizing labor and maintaining a high level of investment, still works fairly well in industrializing countries. But the relatively low efficiency of industry in Czechoslovakia and East Germany, now operating with factor productivity about three-fifths that of French and West German industry, indicates that high-grade labor and a strong industrial tradition have been in good part wasted under the Soviet-imposed system. A crucial factor in this inefficiency has been the production—and consumption—of the wrong investment goods. With the capital stock now available, and without accepting unemployment and large-scale foreign aid, the most industrialized East European economies can only very slowly increase efficiency.

(8) These evidences all suggest that Eastern Europe is not "catching up" with Western Europe, in spite of the impressive official production indexes. And most East Europeans, including economists, have come to the same conclusion. In earlier years, while the East European regimes were struggling to establish themselves and the foundations of Western Europe's economic success were being laid, the lesson was far from clear. But since economic recovery was completed and as the two systems have taken shape, there has been less and less room for doubt.

(9) The economic success of Western Europe, obtained without sacrificing traditional freedoms, has put serious political strains on some of the East European regimes. Western Europe has acquired a dangerous attraction for the elite—"the new class"—as well as for the rank and file of the population. In both cases, the attraction is strongest for the young. The leaders need to compete with Western Europe, in economics as in politics, if they are to hold out some kind of future. But the risks are great. Cultural and political influences accompany the acceptance of Western standards, the introduction of Western practices, and familiarity with Western people and life. Such influences are bound to weaken the hold of the Communist Party on people's loyalties, to pose difficult policy questions about which leaders will disagree, and to offer limitless possibilities of frustration for the elite and the rank and file over half-way measures and shifts in policy.

(10) In the situation created by mounting Soviet reaction against reform and risk-taking, these strains will be suppressed as long as possible. Modifications in the system will still be permitted—in planning and management, incentives, pricing, priorities, and the conduct of foreign trade. But safe reforms will not go far toward "catching up" with the West—toward reducing the technological lag and narrowing the gap in efficiency. The economic and political cost of that undertaking would be high. It would require outside resources on a large scale—Western resources, for the U.S.S.R. has its own resource problems. It would require the establishment of political freedoms in Eastern Europe, at least as broad as those existing in Yugoslavia or those sought by the Czech reformers in 1968. No East European regime can now afford to move far in this direction, and the economic differ-

ences between Eastern and Western Europe will remain, a cause of political instability in Europe.

1. Growth of Industry

In Eastern Europe, according to official claims, the postwar growth of industry has been substantially faster than in Western Europe, especially in relation to prewar levels. The claims, based on indexes of gross output, are undoubtedly overstated, mainly the links with prewar and the increases for the early postwar years. But on any measure, industrial growth in Eastern Europe has been rapid.

For purposes of comparison, Western economists have developed value-added indexes calculated from official data on output in physical terms, similar in concept and method to Western growth measures.[2]

The most elaborate and complete work is that of Thad P. Alton and his associates of the Research Project on National Income in Eastern Europe, who have constructed value-added indexes for industry in all the countries of the area.[3]

These estimates are shown in Table 1, along with data on industrial growth in more or less comparable West European countries. Two things stand out. First, the diverse effects of World War II and its aftermath—destruction of life and property, military occupation, population movements, and civil war—are reflected in postwar recovery especially in East and West Germany, Poland, and Greece. Second, the less industrialized countries have increased output the most, in great part because of the availability of ample labor. But there is no consistent difference between the performance of East and West European industries, as measured by these index numbers, no *prima facie* case for either the Soviet or the Western economic system.

TABLE 1.—INDUSTRIAL GROWTH IN EASTERN AND WESTERN EUROPE (1955=100)[1]

	Prewar[2]	1950	1960	1965	1967
Bulgaria	24	60	200	348	444
Czechoslovakia	60	77	157	190	213
East Germany	95	58	140	168	177
Hungary	43	61	132	186	205
Poland	60	62	147	205	230
Romania	43	63	161	276	342
Austria	44	64	133	166	174
Belgium	64	80	112	148	153
France	64	76	133	166	183
West Germany	60	56	140	185	184
Greece[3]	63	63	131	187	220
Italy	51	64	152	212	252
Netherlands	53	74	133	178	198
Norway	51	75	125	167	186

[1] Where possible, small-scale industry ("handicrafts") is excluded. The index for Hungary is "socialized industry."
[2] Except for Bulgaria, Greece, and Poland, the prewar year is 1937 or 1938. The prewar year for Bulgaria and Poland is 1939, and for Greece it is the 1936–38 average.
[3] Manufacturing only.

Sources: East European indexes are taken from Thad P. Alton & Associates.
West European indexes are from U.N. sources. The weights for East European indexes are 1955 or 1956; for West European indexes, 1958.

[2] For example, Wolfgang Stolper's comparison of East and West German growth in *The Structure of the East Germany Economy*, Cambridge, Harvard Univ. Press, 1960; Alfred Zauberman's independent calculations of growth in *Industrial Progress in Poland, Czechoslovakia, and East Germany, 1937–62*, London, Oxford Univ. Press, 1964, pp. 109ff; R. Wagenfuhr's universal calculations in "Die industrielle Weltproduktion 1950 bis 1964," *Quarterly Review of Economic Integration in Europe*, no. 4, 1965, pp 5ff; the Lee-Montias index for Romanian industry in John Michael Montias, *Economic Development in Communist Romania*, Cambridge, M.I.T. Press, 1967, pp. 248–66.
[3] These indexes are presented and discussed by Dr. Alton and some of his present and former associates in the present volume.

As prescribed in Leninist economic theory, growth has been most rapid in heavy industry, except for mining, which leveled off after the mid-1950's as Soviet deliveries of crude oil and iron ore mounted. Output of other branches of heavy industry has far outpaced the rest of industry in Bulgaria and Romania. For other East European countries, the differences in growth, although smaller, are still significant. Indexes of growth in heavy industry (less mining) and in total industry are compared in Table 2.

TABLE 2.—GROWTH OF HEAVY INDUSTRY COMPARED WITH GROWTH OF ALL INDUSTRY, 1950-65

	Heavy industry (excluding mining)	All industry	Ratio of heavy industry to all industry
Bulgaria	1,098	580	1.89
Czechoslovakia	305	247	1.23
East Germany	358	290	1.23
Hungary	364	305	1.19
Poland	461	331	1.39
Romania	641	438	1.46

Sources: Monographs of Thad P. Alton and associates.

If the same comparison is made for the European Economic Community—the group with the most rapid industrial growth in Western Europe—the parallel indexes for growth from 1950 to 1965 are 278 for all industry (including mining and power) and 355 for heavy industry less mining. The ratio between the two indexes (1.28) is slightly more than the ratios for the more developed countries of Eastern Europe. The growth rates themselves are somewhat lower than those for East Germany and Hungary, somewhat greater than those for Czechoslovakia and far less than for Bulgaria and Romania.

2. Lag in East European Efficiency

In spite of resemblances in growth patterns between Eastern and Western Europe, the growth processes were quite different. In Western Europe, political decisions and other non-market factors everywhere influence rates of growth, partly determine final demands, and affect prices and profits, but the forces of the market do the rest. In particular, they determine the intermediate structure of the economy. In Eastern Europe, the political leaders and their planning staffs set out to determine the intermediate structure—the derived demands—as well as final demand. They are indeed obliged to do so in the absence of a market, but they also have welcomed the task. The development of basic industrial capacity—first, in mining and metallurgy, later in electric power and chemicals—has been their major objective.

The East European growth strategy, adapted from Soviet example, has been well described by numerous writers.[4] Ota Šik gave the following colored description in one of his television broadcasts to the people of Czechoslovakia in the fateful summer of 1968:

> Our main investments were in the sphere of mining, steel works, heavy industry, and the like. It is understandable that other

[4] A broad discursive survey recommended to students, is that of Alfred Zauberman, *Industrial Progress in Poland, Czechoslovakia and East Germany, 1937–62*, London, Oxford Univ. Press, 1964, especially Chapters IV–V.

countries must also invest to a certain degree in these branches of industry. But here we gave them top priority. For instance, in 1948 we invested in mining, in the utilization of fuels, in electric power, and in metallurgy 35 percent of our total investment; in 1963, 44.5 percent, and in 1966, over 47 percent. The expansion of this branch of industry was such that our economy could not carry it. This was the result of very subjective, ill-considered, unscientific decision-making and of primitive planning methods, and what we did with all this was to create the so-called production for production. In other words, the creation of heavy machinery production required more and more steel, therefore we had to build steel works, and the building of steel works required large construction works, which in turn required again heavy machinery. And as the heavy machinery industry increased, it again required steel works, and so on.

In other words, they delivered to each other. According to the plan balance sheets, everything was in order. There was always a certain demand which was met from resources, but the end result for the population was minimal.

The reasons for concentrating on heavy industry were originally quite compelling, even apart from faith in the doctrine of developing output of "producer goods" faster than output of "consumer goods." In the late 1940's and early 1950's, given the Soviet decision to remake Eastern Europe on Stalinist lines and the resulting division of Europe into hostile camps, the new East European regimes had no choice but to develop their own heavy industry. The U.S.S.R., with its own enormous problems of economic recovery, was prepared to replace only a part—at first a small part—of the industrial materials and machinery formerly supplied by the West. For some years the U.S.S.R. actually took out of the area more than it put in. It was also inevitable that the new leaders, preoccupied with establishing their power, should follow doctrine and Soviet example. Most of the professional advice they received on economic policy was politically suspect, and they ignored it.

The death of Stalin and changing Soviet policy gave the East European leaders the first chance to shift their economic priorities, that is, to revive trade with the West and to deemphasize heavy industry. They moved in this direction in the "new course." Trade with the West began to rise rapidly and some attention was given to the needs of agriculture and the light and food industries, with resulting increases in consumer welfare. But the rapid recovery and growth of the Soviet economy allowed Khrushchev to increase the scale of deliveries to Eastern Europe, including industrial materials. And his readiness to do so encouraged the Eastern Europeans—after a short lull—to resume their effort to expand the heavy industrial base. As already noted, the big increase in Soviet deliveries after 1955 eased the pressure to develop low-grade resources, particularly iron ore and coal. But it also created a new need to expand the output of the heavy manufacturing industries, especially the machinery and equipment industries, in order to use and pay for additional Soviet deliveries. This need, in turn, created an opportunity to push investment.

The determination of the East European leaders, as of Khrushchev, to "catch up" with the West replaced in this period the drive for self-sufficiency as the motive force for growth in heavy industry. In the late 1950's most of the East European leaders, against the recommendations of their economic advisers, insisted on forcing such growth to the limit of their resources. They maintained these rates until the early 1960's, when Bulgaria and East Germany (in 1961), then Czechoslovakia (in 1962), and finally Hungary and Poland (in 1963) were forced to readjust for lack of resources and markets and to cut back to rates that put less strain on their economies.

It was only at that point that the East European regimes began to take a more critical view of "production for production" and, specifically, of forcing the expansion of heavy industry. Thus far only Czechoslovakia has proposed major changes in priorities for future development, shifting investment resources to construction and to transportation and communications.

3. The Structural Differences in Heavy Industry

It is in heavy industry that one finds the most rapid growth and the greatest divergence in structure and product mix between East and West European economies—and the widest gap in efficiency. Eastern Europe has pushed especially the output of coal, electric power, steel, and cement. As its propagandists are still fond of claiming, output of these commodities has grown more rapidly than in Western Europe. A summary comparison between Eastern Europe and the European NATO powers, shown in Appendix Table 1, makes this clear. In most other industrial materials, Eastern Europe has approached West European growth rates; the very small prewar and 1950 base figures often make for rather misleading comparisons of growth. Appendix Table 2 shows per capita output figures in East and West European countries for most of the important industrial materials in 1968.

But in Eastern Europe, the rapid expansion of heavy industry has not been accompanied by the same changes in industrial structure as have occurred in Western Europe. For example, the consumption of fuels and metals in Eastern Europe has increased more rapidly than the output of manufactures. In Western Europe, on the other hand, the output of manufactures has increased more rapidly than the consumption of fuels and metals. A dramatic indication of these growing differences in economic structure was given by Prof. Ota Šik. This example, given in Table 3, contrasts tons of steel and fuels consumed per $1,000 worth of industrial output in the Czech economy and in various Western economies. According to Šik, Czechoslovakia uses roughly twice the tonnage of steel per unit of output required in France, Italy, and the United States, and one-third more than in West Germany. Consumption of fuels per unit of output is from two to three times the level in France, Sweden, and the United States.

Czechoslovakia is an extreme case, but much the same holds true for the other East European countries. The Hungarian economist Éva Ehrlich (following a method devised by Ferenc Jánossy) estimated that energy consumption is about 75 percent greater in relation to GNP than the average for a wide range of Western countries; and

TABLE 3.—COMPARISON OF CONSUMPTION OF STEEL AND FUELS IN INDUSTRY IN CZECHOSLOVAKIA AND SELECTED WESTERM COUNTRIES

[Tons of input per $1,000 of output]

	Steel	Fuels
Czechoslovakia	0.44	5.05
France	.19	1.60
West Germany	.32	
Italy	.23	
Sweden		1.90
United States	.19	2.60

Source: A. Bednarič, "Ide o jednotu, ale nie formalnu" (The question is about unity, but not a formal one), Bratislava *Pravda*, Feb. 27, 1968, p. 1. These figures relate to consumption in industry, those in tables 14, 15, and 16 relate to consumption within branches of industry.

64 percent greater for steel consumption.[5] Since agriculture is more important in Hungary than in most advanced Western countries, a comparison for the non-agricultural sectors (and for industry) should yield somewhat greater differences.

A. FUEL AND ENERGY CONSUMPTION

Eastern Europe depends far more on coal than Western Europe. Because the U.S.S.R. for many years did not have the oil to spare, because the East European countries—except for Romania—did not have important oil resources, and because they could not afford to buy much in the West, they had to delay conversion to petroleum. Conversion began in earnest only in the 1960's, with the enormous increase in Soviet crude oil deliveries through the Friendship Pipeline. Consumption of solid fuels has nearly doubled since 1950 in the more industrialized countries of Eastern Europe—and even more in Bulgaria—whereas characteristically (Italy is the only exception) coal consumption has been declining in Western Europe.

Even Romania with its substantial oil reserves pushed the development of its low-grade coal. Comparative statistics are shown in Appendix Table 3. Furthermore, except in Rumania, consumption of solid fuels is a much larger share of gross consumption of energy than in most West European countries, as shown in Appendix Table 4. Even in coal-rich Belgium and West Germany, solid fuels account for barely one-half of gross consumption; the shares in Eastern Europe (other than Romania) range from two-thirds for Hungary up to 90 percent for Poland. A third way of looking at the difference is provided in Appendix Table 5 by data for per capita consumption of the various types of energy. On a per capita basis, Czechoslovakia and East Germany use double the amount of solid fuels used in Belgium and West Germany. In the other countries, consumption exceeds by even more the amounts in West European countries at similar levels of development. Conversely, no East European country reaches the per capita consumption of Greece in liquid fuels; on the average, consumption is far below West European levels. In Romania and, to a lesser extent, in Hungary, these disadvantages are partly compensated for by the consumption of gaseous fuels.

[5] Éva Ehrlich, "International Comparisons by Indicators Expressed in Physical Units," *Acta Oeconomica*, nos. 1–2, 1967, pp. 107–122. (Also *Czechoslovak Economic Papers*, no. 7, 1966, pp. 109ff.)

When gross energy consumption of all types is totaled, as in Appendix Table 5, the per capita level in East European countries is generally higher than in the most nearly comparable West European countries. Consumption is higher in Czechoslovakia and East Germany than in France or West Germany, in Poland than in Italy, in Bulgaria and Romania than in Greece. Per capita consumption in Austria, however, is higher than in Hungary; and Norway and Sweden, with their major developed resources of hydroelectric power, have the highest consumption of all European countries. Differences in climate, of course, play some part in these relationships. But industrial use patterns are the main cause.

The economic consequences of the difference in fuel consumption patterns run very deep throughout the economy. In industry, perhaps the most important effect is the retention of less efficient processes ultimately dependent on coal. They include carbide chemistry,[6] which is a heavy user of electric power and important in the organic chemicals production of East Germany and Poland, the leaders in Eastern Europe. Another effect is the lag in the production of synthetics, plastics, and other organic chemicals (for which comparative data are given in Appendix Table 6). The relatively small supply of synthetics and plastics has significant effects on user industries, which have as a result been slow in modernizing designs, not only to cut material costs but to meet changes in demand.

Other still less direct effects include the pervasive inefficiencies that come of relying almost exclusively on rail transport. The contrast between Eastern and Western Europe in the relative importance of rail transport and long distance trucking is shown in Appendix Table 7. Dependence on rail transport plays a part in the stop-and-go operation of East European industry, and in the retention of large inventories of materials.

Eastern Europe uses more fuel than Western Europe to produce electric power. One reason is that Eastern Europe has a smaller potential for hydroelectric power and has done less to tap this source of power, which would be more expensive than thermal power. Primary power accounts for 35 percent of Western Europe's consumption; 5 percent of Eastern Europe's (see Appendix Table 8). Soviet help with the development of nuclear power, on which the Eastern Europeans count heavily in the longer run, has come slowly, apparently because of technical difficulties.

A second reason for high fuel consumption in generating electric power is the use of old generating equipment and the installation of obsolescent units since World War II. In East Germany, for example, more than one-half of the capital stock used in generating electric power and producing gas was of prewar vintage as late as 1963.[7] Western Europe has been quicker to install large, efficient generating units. Only Romania, which, as noted, has been shifting rapidly to the use of natural gas for power generation, relies heavily on new equipment, and as a result, approaches West European efficiency. Differences be-

[6] Calcium carbide is used to produce acetylene, a basis for organic chemicals. The petroleum derivate, ethylene, has largely replaced acetylene in the West.

[7] Kurt Matterne, and Siegfried Tannhäuser, *Die Grundmittelwirtschaft in der sozialistischen Industrie der DDR* (*Fixed Assets in the Socialized Industry of East Germany*), East Berlin, Wirtschaft, 1968, p. 40.

tween Eastern and Western Europe in specific consumption of fuels in generating power, though sharply reduced in recent years, are still large, as shown in Table 4.

TABLE 4.—*Specific fuel consumption in thermal power plants in East and West European countries, 1967*

[Grams of standard fuel equivalent per kilowatt-hour]

Bulgaria [a]	455	Austria	397
Czechoslovakia	454	Belgium	370
East Germany [a]	442	Denmark [b]	380
Hungary	494	France	366
Poland	432	West Germany	375
Romania	364	Greece	480
		Italy [c]	349
		Netherlands [b]	380

[a] From official yearbooks of countries involved.
[b] Public net only.
[c] 1966 data.

Source: Except as otherwise noted, U.N., ECE, *The Electric Power Situation in Europe in 1967*, U.N., 1968 (EP/Working Paper No. 346).

Another significant difference in the utilization of fuels is in specific consumption of coke in blast furnaces, which remains well above West European levels, as shown in Table 5. In 1966, the most efficient East European country, Romania, did slightly better than France, the least efficient of the West European countries listed. Efficiency in coke consumption in blast furnaces varies with the quality of coke and the iron ore charge, and the age and design of equipment. Eastern Europe generally lags in all these respects.

TABLE 5.—*Specific coke consumption in the production of pig iron,[a] East and West European Countries, 1966*

[Kilograms of coke per ton of pig iron]

Bulgaria	NA	Austria	589
Czechoslovakia	[b] 768	Belgium	632
East Germany	[c] 1,020	France	744
Hungary	[c] 863	West Germany	622
Poland	850	Italy	614
Romania	714	Netherlands	540
		Norway	681
		Sweden	[b] 527

[a] Only in blast furnaces.
[b] 1965 data.
[c] From official yearbooks of countries involved.
NA.—Not available.

Source: Except as indicated in footnote c, U.N., ECE. *The European Steel Market in 1966*, 1968 (ST/ECE/Steel/21), p. 106; and U.N., ECE. *Quarterly Bulletin of Steel Statistics for Europe*, v. 19, no. 4, 1968.

These two important uses of solid fuels—in generating electric power and in blast furnaces—account for roughly one-half of all uses of solid fuels and a large share of industrial uses. As the comparisons have indicated, in these two uses alone East European countries use as much as one-third more solid fuel per unit of output than West European countries that were at similar levels of development before World War II. These comparisons well illustrate, though they

by no means exhaust, differences in efficiency in the use of fuel and energy between the two areas.[8]

B. STEEL CONSUMPTION

The consumption of steel in industry shows no less dramatic differences between Eastern and Western Europe. The machinery and equipment industries are the largest consumers of steel in industry—in some countries they account for one-half of domestic consumption of finished steel. Comparisons of finished steel inputs (excluding castings) and the value of output in these industries are shown in Table 6 for four East European and selected West European countries in 1960. This crucial table reveals that the input per dollar's worth of machinery output in 1960 varied widely from a high for Czechoslovakia to a low for Belgium-Luxembourg—less than one-fifth the Czech level. Intermediate are the rates for Hungary—the low for Eastern Europe—and for Austria—the high for Western Europe.

Evidence on the distribution of steel among the principal branches of the machinery and equipment industries, given in Appendix Table

TABLE 6.—STEEL CONSUMPTION IN PRODUCING MACHINERY IN EAST AND WEST EUROPEAN COUNTRIES,[1] 1960

	Steel inputs (thousand tons) [2]	Output of machinery and equipment (million dollars) [3]	Steel inputs per thousand dollars of machinery and equipment output
Czechoslovakia	1,680	2,500	0.67
East Germany	2,110	4,200	0.50
Hungary	470	1,040	0.45
Poland	1,440	2,360	0.61
Austria	240	650	0.37
Belgium-Luxembourg	190	1,420	0.13
West Germany	3,990	21,600	0.18
Italy	1,430	5,180	0.28

[1] Output is "gross"; that is, includes deliveries to producers of machinery. It excludes metal products, but includes some repair services, particularly of shipping and railroad rolling stock.

[2] Except in the case of East Germany, estimates of steel inputs are based on data in U.N., ECE, *Quarterly Bulletin of Steel Statistics for Europe*. They have been adjusted, where necessary, to include imports chiefly through the use of official input-output tables, and rounded. The estimate for East Germany is based on data given by Klaus Steinitz, *Die Eisenmetallurgie in der Reproduktion der DDR (Ferrous Metallurgy in the Economic Process* [lit. "Reproduction"] *of East Germany)*, East Berlin, 1961. It accords with the U.N. figure for East German deliveries to metalworking in 1956 and East German information on trends in deliveries. In 1963, deliveries were 2.3 million tons. Gunther Kohlmey, et al., *Nationale Produktivität, dynamische Produktionen, internationale Arbeitsteilung (National Productivity, Dynamic Production, International Division of Labor)*. East Berlin, Wirtschaft, 1966, p. 51. (JPRS 11,724, Dec. 27, 1961.) A JPRS number following a citation indicates the availability of a translation by the Joint Publications Research Service. It may be ordered by JPRS number, title, date, and author, from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Va. 22151.

[3] Estimates of the value of machinery and equipment output for Czechoslovakia, Hungary, and Poland are based on dollar estimates by Artur Bodnar, in "Miedzynarodowa specjalizacja produkcji" (International Specialization of Production), *Życie Warszawy*, Mar 12, 1966, p. 3. His estimates of "output of products of the machinery industry" (produkcja towarowa przemysłu maszynowego) appear to include, as would be expected, "metal products." The estimates have been reduced here by the percentage of metal products in total output of the metalworking industries. The estimate for East Germany is based on a conversion of the value in East German marks ("commodity production" at producer prices, excluding turnover tax) to dollars at 1 mark=$0.189 obtained by comparing foreign exchange earnings from machinery exports with the domestic currency value of machinery exports. It is a fair approximation, for most machinery is sold to Communist countries at somewhat above "world market" prices, while the remainder is sold in the West at far below prevailing prices. Estimates for Western countries are domestic currency values converted at official rates, adjusted for purchasing power parities. See J. M. McGeehan, "Competitiveness: A Survey of Recent Literature," *The Economic Journal*, June 1968, p. 247. Also see Irving B. Kravis and Robert E. Lipsey, "The Measurement of Price Change, a Report on the Study of International Price Competitiveness," *Papers and Proceedings of the American Economic Association*, December 1966, pp. 482–491.

[8] See, for example, the comparison of electric power consumption per dollar's worth of output in Appendix Table 20.

9, gives some indication that, as would be expected, differences in finished steel consumption are influenced a great deal by the branch structure. In Austria, where steel consumption in relation to machinery output is high by West European standards, about one-half of the total steel input goes to industries producing industrial equipment. The same is true for Poland. Earlier data indicate that the share is probably even larger in Czechoslovakia and East Germany; in 1960 the share was about 70 percent for both countries.[9] In Hungary, with the lowest consumption relative to output in Eastern Europe, the share is relative low for the area.

The product mix, likewise, is weighted in favor of heavy machinery in Czechoslovakia and to a lesser extent in East Germany and Poland. The structure and mix reflect in part the fact that these countries are better able to export heavy machinery, together with the preferences of the U.S.S.R., the major foreign customer for heavy machinery. Even more important, heavy machinery has been built to fulfill the ambitious industrial construction programs of these countries. Hungary is exceptional in that it has imported more of its industrial equipment than have Czechoslovakia, East Germany, or even Poland.

Relative efficiencies, however, also have something to do with the higher specific consumption of steel in East European machinery industries. As Table 7 shows, Hungary in 1965 used more steel per dollar's worth of output than Austria in each of the three main branches of engineering—machinery and steel construction, transport equipment, and electrical and electronic equipment and precision machinery.

TABLE 7.—COMPARISON OF STEEL INPUTS AND MACHINERY AND EQUIPMENT OUTPUT IN AUSTRIA AND HUNGARY, BY MAJOR SUBSECTOR 1965

	Machinery and steel construction	Transport equipment	Electrical machinery and precision equipment	Total
Austria:				
Steel inputs (thousand tons)	84	89	27	200
Output (million dollars) [2]	457	201	293	951
Steel inputs per thousand dollars of output (kilograms)	184	443	92	210
Hungary:				
Steel inputs (thousand tons) [1]	153	237	71	461
Output (million dollars) [2]	707	427	421	1,555
Steel inputs per thousand dollars of output (kilograms)	216	553	169	296

[1] Data on steel inputs are from U.N., ECE, "The European Steel Marketin 1966" (ST/ECE/STEEL/21), New York, 1968 The data for Hungary have been adjusted upward 14 percent to include imports, by allocating to each sector a share in imports proportionate to its share in net domestic production.

[2] Data on output of machinery for both countries are figures in Austrian schillings converted at the official exchange rate taken from a staff study comparing labor productivity in industry in Austria and Hungary. This study was carried out by representatives of the statistical offices of the two countries under the auspices of the Conference of European Statisticians. Conversion at the official rate understates the value of output in both countries.

The main reason for the high specific consumption of finished steel is the inferior mix of steels in Eastern Europe. (Other materials, including plastics and nonferrous metals, play only a small part in machinary construction in both parts of Europe, as illustrated by comparative data for aluminum and steel in Appendix Table 10.) The differences in mix and quality are enormous, according to Ota Šik's

[9] Data for Czechoslovakia are from U.N., ECE, *Quarterly Bulletin of Steel Statistics for Europe;* for East Germany, Steinitz, *op. cit.* in Table 6, footnote 2.

description of Czech steel output in a television broadcast in midsummer 1968. In 1964, he said, one-half of the steel output of Czechoslovakia was of low quality, 45 percent was of medium quality, and less than 5 percent was of high quality. Of course, practically all types of steel produced in Czechoslovakia are also produced in Western Europe, if not in exactly the same specifications, including substantial amounts of "low" and "medium" quality steel. In Czechoslovakia, as in other East European countries, the real difference from Western practice is that a substantially smaller range of steels is available, and that changes in the mix and in machinery design have been fewer and slower than in Western Europe. In particular, as Šik pointed out in his broadcast, this production of high-grade steels and of thin sheet has lagged in Eastern Europe. The resulting differences in product design are large; according to a recent East German statement, many kinds of East German machinery are still up to 60 percent heavier than high-grade Western products.[10]

An indication of differences in steel consumption is shown in U.N. steel statistics for Hungary and Poland and selected Common Market countries (plus Austria). These statistics show that compared with Western practice, a relatively large share of the steel consumed by the electrical machinery sector in Hungary and Poland consists of heavy steel sheets and plates, and a relatively small share consists of thin sheets (less than 3 mm). (See Appendix Table 11.) Thin steel sheet is used in many high quality electrotechnical products. The much higher ratio of heavy sheet consumed in Hungary and Poland is doubtless explained in part by differences in product mix; but it also reflects differences in design, influenced by the restricted mix of steels available.

Differences in mix are also found in comparing deliveries of thick steel sheet (3 mm and over) and thin sheet (less than 3 mm) to nonelectrical machinery manufacturing (Appendix Table 12). Poland and Hungary use a much larger percentage of heavy sheet in this sector. Thin sheet is used in many Western products, where the East European version uses heavier sheet.

Finally, a comparison of deliveries of hot-rolled sections to total deliveries to producers of machinery and transport equipment shows a much larger percentage (about one-third) going to East European steel consumers (Appendix Table 13). Unlike their Western counterparts, the East European steel industries are tailored to produce great quantities of large section steel for use in Soviet-style machinery production.

Such evidence as is at hand on changes in consumption of steel inputs relative to changes in machinery and equipment output (Table 8), indicates that some of the East European industries have succeeded in reducing specific consumption in the 1960's, but on the whole less rapidly than the Western European industries, which already had a lower ratio of steel inputs to output.

A comparison including steel castings would show slightly greater

[10] BBC. *Summary of World Broadcasts*, second series EE/W 546/A/10, Nov. 13, 1969. The broadcast cited was East German home service of Nov. 4, commentary by Hannes Potthast.

differences in finished steel consumption relative to machinery output in Eastern and Western Europe. Steel castings have declined in the 1960's from 2 to 1 percent of total finished steel consumption in Western Europe; in Eastern Europe, on the other hand, the share has remained at about 3 percent. In terms of finished steel consumption in the machinery industries, the shares of castings are nearly double the above percentages.

TABLE 8.—GROWTH OF OUTPUT OF MACHINERY AND EQUIPMENT AND OF STEEL INPUTS IN EAST AND WEST EUROPEAN COUNTRIES, 1955–65

	Growth of machinery production		Growth of steel inputs		Ratio of growth of steel inputs to growth of machinery production	
	1960 over 1955	1965 over 1960	1960 over 1955	1965 over 1960	1960 over 1955	1965 over 1960
Czechoslovakia	180	112	167	107	93	96
East Germany [1]	160	121	204	143	128	118
Hungary		125	(2)	98	(2)	78
Poland	[3] 137	137	[3] 135	128	[3] 99	94
Austria	[1] 129	116	[1] 122	84	[1] 95	72
France	156	135	133	98	85	73
West Germany	151	131	113	100	75	76
Italy	156	125	174	120	112	96

[1] Base year 1956.
[2] Not available.
[3] Base year 1958.

Sources: Growth of machinery production—Alton and associates for Eastern Europe; U.N. statistics for Western Europe. Crude steel—U.N., ECE, *Quarterly Bulletin of Steel Statistics for Europe* (except Czechoslovakia and East Germany). The growth of steel consumption in Czechoslovakia is that implied in estimates given by Josef Krejčí, "Stav a možnosti československého průmyslu (Status and possibilities of Czechoslovak industry)," *Hospodářské noviny*, Mar. 28, 1969, special supplement, p. IV. The growth of steel consumption in East German machinery industries in 1956–60 and 1961–62 is from Kohlmey, et al., *op. cit.*, p. 52. The series is continued to 1964 in Hans-Joachim Lotze, *Rationalisierung—weshalb—wie?* (*Rationalization—What For? How?*). East Berlin, Urania, 1968, p. 73.

Until more data are published and further work is done, what can be concluded is that most of the factors that could be expected to raise steel consumption per unit of output have had some effect on differentiating East European from West European ratios. Differences in branch structure and product mix probably are the most important; but steel quality and machine design are significant factors; and relative success in reducing machining losses probably has had some effect.

C. CONCLUSIONS

To summarize, the consumption of fuel and energy and steel by industry is much higher relative to output in Eastern than in Western Europe, because technological change has been slower in Eastern Europe. As a result, it would be expected that costs of fuels, power, and metals would be larger relative to total material costs in Eastern Europe, and that total material costs would be higher relative to the value of gross output. If the same prices and accounting practices were used, that would undoubtedly be true. Substantial variations in price structure and numerous differences in accounting prevent a close comparison. Comparisons of input-output tables do show, however, that fuels, power, and metals constitute a relatively high share

of material costs in Eastern Europe in the years following the reduction of the large subsidies long granted to mining and metallurgy. In East Germany, the share rose from 18 percent in 1959 to 27.5 percent in 1965, after the major price reform of 1964. In Hungary, the price reform of 1959 left the share at 34.3 percent. In Poland, after the price reforms of the late 1950's, the share rose to 27.5 percent. In contrast, input-output tables for 1959 of France, Italy, and the Netherlands all show shares of 23 to 24 percent. These comparisons at least suggest the impact of high energy and steel consumption on the cost structure of Eastern Europe.

4. Ability To Export and the Terms of Trade With the West

Significant indicators of the technical backwardness of the East European economies are the difficulty they have in exporting manufactures, especially finished goods to the West; the heavy discounts they normally offer below prevailing prices in order to sell such goods; and the high prices they pay for imports from the West. Trade with the West is of considerable importance for East European countries, accounting for between 20 percent of total trade—in the case of Bulgaria—and over 45 percent—in the case of Romania. The trade increased rapidly from the mid-1950's to 1968.

The composition of Eastern Europe's exports to the West, and especially of exports to developed countries, is evidence that East European manufactures, finished goods especially, are not of the best. Even Czechoslovakia and East Germany, deficient as they are in most foodstuffs, industrial materials, and fuels, rely on such products—SITC categories 0 through 4—to make up one-third or more of their exports to the industrial West. Semimanufactures also make up about one-third. Thus only about one-third consists of finished goods, of which at least one-half are consumer goods. Only about one-sixth of Czechoslovakia's exports to industrialized countries, and one-eighth of East Germany's, are machinery and equipment—the mainstay of their export trade with the Communist world.

For the other East European countries, the contrasts are even sharper. From one-half to three-fourths or more of their exports to the industrial West are in SITC categories 0 through 4. Only about one-sixth of the exports of Hungary to the industrial West, one-tenth of the exports of Poland, and even smaller shares of Bulgarian and Romanian exports are finished goods, of which machinery and equipment make up less than one-half.

It is not that the East European countries do not have finished goods to export. Finished goods figure increasingly in their trade with one another and the U.S.S.R. And they are eager to increase exports of manufactures to the West, ready to sell the pick of their output at very low prices, as will appear. But it is very slow going, even in the less demanding markets of Latin America, Africa, and Asia.

Machinery exports to the Free World now run about as follows (in million dollars and percent of total machinery sales) : [11]

	Total free world		Industrial countries	
	Amount	Percent	Amount	Percent
Czechoslovakia	235	17	75	5
East Germany	180	11	90	6
Poland	104	11	28	3
Hungary	27	6	[1] 13	3
Romania	14	7	[2]	[2]
Bulgaria	19	5	4	1

[1] About.
[2] Not available.

Moreover, such success as the East European countries have had increasing exports of manufactures to the Free World, especially machinery, has been costly. The evidence is ample for exports to Western Europe. Scantier evidence suggests that in the less developed countries as well, East European trade representatives have had to make major price concessions, together with generous credit offers, in order to place their machinery and other finished goods in sizable amounts.

Among the first published discussions of relative prices in trade with the West is an East German account of 1960–61. In 1960, an article, entitled "Terms of Trade—A Danger Signal," appeared in the foreign trade journal.[12] In this article the prices East Germany paid and received in trade with Austria, Belgium, and the Netherlands were compared with average prices of other traders. The results were as follows:

> For 88 items exported by Austria to East Germany, 63 show higher expenditures for East Germany; for 133 items exported by East Germany to Austria, 116 show lower yields for East Germany.
>
> For 40 items exported by the Netherlands to East Germany, 24 show higher expenditures for East Germany; for 131 items exported by East Germany to the Netherlands, 107 items show lower yields for East Germany.
>
> For 21 items exported by Belgium to East Germany, 18 items show higher expenditures for East Germany; for 61 items exported by East Germany to Belgium, 53 show lower yields for East Germany.

The article then listed a number of narrowly defined commodities, with comparison of prices received or paid with the average for other traders. A selection of relative export prices is shown in Table 9. The best prices, running about 80 percent of competitors' prices, were obtained for chemicals and portable typewriters. For other products the range was from one-half to two-thirds of competitors' prices.

[11] Figures are for 1967, except figures for Romania, which are for 1966. All are based on East European statistics.
[12] G. Biereck, "Austauschrelationen—ein Rotes Signal" (Terms of trade—A Danger Signal), *Der Aussenhandel,* no. 18, 15 September 1960, pp. 12–13.

TABLE 9.—*Pricing of selected articles exported by East Germany in trade with West European countries, 1959* [a]

[Average price of all other imports of such articles for the Western country=100]

Unexposed movie film	44
Potassium nitrate	70
Acetic acid	83
Magnesium sulfate	85
Barium carbonate	78
Drawn plows	43
Portable typewriters	78, 79
Bookbinding machinery	67
Turret and automatic lathes	38
Unprocessed glass sheets	53
Cotton tulle	49
Synthetic hose	47

[a] Individual transactions are with partners in Austria, Belgium, and the Netherlands. Comparisons are based on prices per ton, except for drawn plows and portable typewriters, which are based on prices per unit, and for synthetic hose, which are based on prices per pair. Export sales represent from 21 to 69 percent of sales of the specific item on that market.

Source: Biereck, *op. cit.*

Czech economists have discussed the same subject more recently and in more detail. Like the other industrialized countries, Czechoslovakia has been particularly discouraged by the inferiority of its investment goods. The Czechs count heavily on exports of these goods to the U.S.S.R. and less developed countries to pay for industrial and agricultural materials. But they have found it extraordinarily hard to expand such exports to the industrial West, and any export push tends to reduce still further the prices they can command. The Czechs published in 1967 the results of a study of the prices they paid and were paid for a selection of machinery items traded with the European Economic Community (EEC), compared with those paid and received by competitors from the European Free Trade Area (EFTA). In sum, they found just what the East Germans had earlier found, except to a more extreme extent: Czech machinery prices ran at the average only about one-half of the prices of competing products from EFTA countries; Czech imports, on the average, ran well above prices charged to EFTA importers, and in part close to or more than double those prices. The data on selected machinery items are summarized in Table 10.

TABLE 10.—PRICES OF SELECTED MACHINERY EXPORTS AND IMPORTS OF CZECHOSLOVAKIA IN TRADE WITH THE EEC, COMPARED WITH PRICES RECEIVED AND PAID BY EFTA COUNTRIES FOR THE "SAME" ITEMS, 1964

[EFTA prices=100]

	Prices of Czech exports	Prices of Czech imports
Sewing machines	44.4	193.6
Sorting and crushing machines	32.2	159.8
Excavating machinery and excavators	40.4	259.3
Generators and electric motors	38.2	182.6
Bearings	59.2	96.5
Passenger automobiles	49.0	84.8
Tractors	68.0	159.2
Metalworking machines	43.7	118.4

Source: Jan Klacek and Jan Pleva, "Efektivnost zahraničně obchodních operací na trhu EHS" (Effectiveness of Foreign Trade Operations in the EEC market), *Politická Ekonomie* no. 7-8, July-August 1967, p. 617.

Summarizing the results for machinery, the Czechs concluded that the characteristics of products and product mix, service, and marketing practices were the main variables. Sales and service activities are restricted by the relatively small scale of Czechoslovakia's machinery exports to the West—although they are the largest in Eastern Europe—and the predominantly short-term outlook of the foreign trade organizations, more concerned with current earnings of hard currency than with developing markets. As a result of these factors, Czech sales prices for the machinery items investigated range between 30 and 70 percent of the sales prices received by EFTA countries. Parallel figures for Belgium were 60 to 100 percent; for Austria, 70 to 80 percent; and for Sweden, about 100 percent. For imports, the Czechs paid between 90 and 260 percent of the prices paid by EFTA countries. The parallel figures for Belgium were 90 percent; for Austria, 100 to 120 percent; and for Sweden, about 100 percent.

A serious disparity also exists for prices of other goods, which represent a much larger share of Czech trade with Western Europe. For semifinished metal products, bars, and the like, the Czechs received 60 to 100 percent of the prices received by EFTA competitors, but the comparison was less favorable for exports of finished products, sold at as little as 30 percent of the going price. Here too Czechoslovakia paid up to double the prices paid by importers from the EFTA countries.

There is also a wide variation of export prices for light industry products. For glass, the prices were close to the average for EFTA exporters, though far below the prices for Swedish and Austrian glass. The prices received for cotton fabrics were the lowest, while, once again, Czechoslovakia paid the highest prices.

The best results were obtained for exports of raw materials and semimanufactures, which Czechoslovakia sold at 70 to 100 percent of the price level for EFTA exports, though never at higher prices than any other country was getting. Moreover, in this field, once again, Czechoslovakia paid peak prices.

Hungary has had much the same results in its exports to the West, judging from Paul Marer's analysis of prices in Austro-Hungarian trade, but has been more prudent in its import policy. According to Marer, the average prices received for exports to Austria in 1958–64 were 87 percent of prices of other exporters ("world market prices") for industrial raw materials, and 97 percent for agricultural products, but only 73 percent for manufactured goods and only 57 percent for machinery.[13] What is striking is that Hungary imports from Austria at almost exactly "world market" prices in all categories, an impressive contrast with East Germany and Czechoslovakia and probably with other East European countries.

As indicated by the above data, East European selling prices are most affected when the products are highly processed, indicating that differences in technology and design are the main factor, though not the only factor, by which the Eastern Europeans are disadvantaged—

[13] Paul Marer, *Foreign Trade Prices in the Soviet Bloc: A Theoretical and Empirical Study*, dissertation, University of Pennsylvania, 1968, University Microfilms, p. 197. The low relative price for machinery is only apparently in contradiction to the high per kilogram price shown in Appendix Table 15, for Hungary exports substantial amounts of electrical equipment.

precisely the result shown by the composition of exports to the West. Technology and design are especially important in machinery, the Czechs concluded: [14]

> A manufacturer who delivers equipment of average technological world standard (100 percent) achieves roughly the average world price (100 percent). A manufacturer who delivers products of a higher than average world standard (e.g., 110 percent) achieve a much higher price (e.g., 130 to 150 percent. Conversely, a decline in the technological standard of 10 percent below the world standard causes a substantially larger drop in price by 15 to 20 percent; a decline in the technical standard of 15 to 20 percent causes a price drop of 40 to 50 percent; a product whose technological standard is 40 to 50 percent below the world standard is usually unsaleable (its exchange value equals zero).

The proposition that even small differences in products and service can greatly affect prices as well as the potential size of the market undoubtedly does go far to explain the low export prices received by East European countries, especially for machinery.

Evidence of the general difference between prices received by East European exporters and those received by West European exporters in the same markets is provided by calculations, reprinted by the Czechs, of dollars per kilogram received by various exporters for machinery sold in the West European market. The average U.S. price per kilogram is double the West European average; that in turn is double the average for Eastern Europe. The data are presented in Appendix Table 14.[14a] Differences in product mix are undoubtedly a factor, but even that is significant, for the more advanced a country is technologically, the more its machinery exports are likely to be sophisticated products, with a very high ratio of value to weight. Differences in unit weight for similar machines also play a part. As shown earlier, some part of the large steel consumption of Eastern European machinery producers reflects the lack of high-strength steels. But the heavy weight itself is closely associated with obsolete design and thus with factors affecting economies of operation. There can be little doubt that East European machinery is inferior. The Czech economists Goldmann and Kouba say:

> The fact that Czechoslovak machinery can command on Western European markets in general under two-thirds of the per kilogram prices attained by capitalist competitors, although the factor inputs for the Czechoslovak goods are often higher, is due to a lower technological level, inferior quality in the widest sense, inadequate equipment and servicing, etc.[15]

The same data show something else interesting, indicated in Appendix Table 15. The per kilogram prices of Western machinery and equipment exports rose in 1962–64, but prices of East European exports slipped, in just three years reducing the average relative price

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[14] Miroslav Kolanda, "Vývoj cen strojírenských výrobků na světových trzích" (The Development of Prices of Machinery Products on World Markets), *Podniková Organizace,* no. 12, 15 December 1967, pp. 551–556.

[14a] Similar data were presented earlier, with some interesting discussion by a Polish author. See Stanisław Kuziński, "Eksport maszyn—problemy i zadania (Problems and tasks in the exports of machinery)," *Nowe drogi,* v. 18, no. 10 (185), Oct. 1964, pp. 13–25; transl. in *JPRS,* 27,225, Nov. 4, 1964.

[15] Josef Goldmann and Karel Kouba, *Economic Growth in Czechoslovakia,* Prague, Academia, 1969, pp. 88–89.

for machinery exports of Eastern Europe (excluding the U.S.S.R.) by 10 percent. This is in line with the long-term trend. Czechoslovakia, for example, in 1947 earned 87 percent more per kilogram of exports to the West in relation to existing world prices than in 1966.[16] Export terms of trade, indeed, declined for exports as a whole. From 1950 to 1968 the cost in current crowns of producing one dollar's worth of exports to the Free World tripled. The cost rose from 10 crowns (1950 exchange rate, 10 crowns=$1) to 30 crowns (1968 exchange rate, 7.2 crowns=$1).[17] Of course, there has been a large rise in Czech producer prices, only in part accounted for by the revaluation in 1953. According to Goldmann and Kouba, producer prices doubled from 1947 to 1962.[18] Thus in constant domestic prices, the cost of earning one dollar by exports to the Free World increased 50 percent. But there has also been some increase in world market prices. It is safe to say that terms of trade for exports to the West have declined by about 40 percent.

The effect of tariffs on the level and terms of trade is fairly small; the effect on the price of exports to Western Europe is a reduction of probably not over 10 percent. The impact of customs unions may now be more important—especially the delayed effect (since 1965) of protection in stimulating Common Market output of the agricultural products that Eastern Europe has been exporting to the Common Market, particularly meat.[19]

5. Inventory Costs

East European economists are in agreement that inventory costs have been higher relative to production in their economies than in Western Europe, at least in the 1960's. The evidence usually adduced—that additions to inventories are a larger share of the national income than in Western Europe—is not conclusive. The entry for "additions to inventories" often includes changes in unfinished construction and sometimes includes purchases of military end items. On the other hand, producers' inventories of unfinished and finished goods may be priced at cost, and producers' machinery inventories may not even be included. Other evidence, however, is available that does establish the point that East European inventory costs are relatively high.

The best statistics are on the growth of industrial inventories. As shown in Table 11, the relation between changes in inventories and output in industry varies somewhat from country to country. From 1955 to 1960, Hungary was most successful in controlling inventories. Since then, however, the others have improved their control while Hungary has not (through 1965). The table does not show the wide

[16] R. Schmelz and others. "Jak jsme na tom v zahraničním obchodě" (How Is It in Foreign Trade), *Hospodářské Noviny*, 16 August 1968, special supplement, pp. 1–15.

[17] Miroslav Polívka, "Aby obchody šly dobře" (That trade might prosper), *Rudé Právo*, 30 June 1969, p. 2. Actually the ratio reached 32 crowns to the dollar in 1967–68. The cost in current crowns of producing exports to the Communist world also increased by 125 percent—from 9 to 20 crowns per accounting dollar—strongly indicating some decline as well in exports terms of trade with the Communist world.

[18] Goldmann and Kouba, *op. cit.*, pp. 83–91. The 1953 revaluation caused a price rise of 39 percent; the increase resulting from cost-push factors was over 40 percent.

[19] For a related discussion, see Bela Balassa, "Trade Creation and Trade Diversion in the Common Market," *The Economic Journal*, no. 305, March 1967, p. 1–21; Bela Balassa and Mordechai E. Kreinin, "Trade Liberalization Under the 'Kennedy Round': The Static Effects," *The Review of Economics and Statistics*, no. 2, May 1967, pp. 125–137.

variation in inventories from year to year. There were significant increases in inventories in the early 1960's in all four countries, not only of unsold finished goods but also of materials and unfinished production, accumulating as abrupt cuts were made in production goals and in export orders.

TABLE 11.—THE GROWTH OF INDUSTRIAL INVENTORIES IN EAST EUROPEAN COUNTRIES FROM 1955 TO 1965

	Growth, 1956–60 (1955=100)	Growth, 1961–65 (1960=100)	Average annual rate of growth, 1956–65 (percent)	
			Inventories	Output
Czechoslovakia	140	125	5.8	6.5
East Germany	164	144	9.0	5.6
Hungary	126	130	5.1	6.1
Poland	151	145	8.1	8.3

Sources: Czechoslovakia: Svatopluk Potáč, "Efektivněji hospodařit se zásobami v národním hospodářství" (More Effective Management of Stocks in the National Economy). *Plánované hospodářství*, no. 9–10, 1962, p. 35. This source goes only through 1962. Changes from 1962 to 1965 are estimated from changes in the turnover period for inventories, as given in statistical yearbooks and current reporting.

East Germany: Data from Klaus Gürmann, *Vorratsproportionierung* (Calculation of the Proper Shares of Stocks), East Berlin, 1968, pp. 6, 23; Carl-Jürgen Strauss, et al., *Die Materialwirtschaft der DDR (The Material Economy of the GRD)*, East Berlin, 1964, p. 370. A still higher figure for the increase in industrial inventories (57 percent) in 1961–65 is given in study material for industrial economists prepared by the East German state bank and published in *Deutsche Finanzwirtschaft*, v. 20, no. 20, 1966, p. G9. It seems quite possible that the larger increase is based on figures in current prices.

Hungary: Growth of total inventories from 1955 through 1957 was only 3 percent, based on national accounts data, and the same figure is taken for industrial inventories. The growth of industrial inventories was 20 percent from 1957 through 1960 (January 1958–January 1961). Attila Csernok, "A nemzeti jövedelem a második háromméves terv időszakában," (The National Incomes and the Living Standard of the Population in the Three Year Plan Period), *Statisztikai Szemle*, no. 3, March 1962, p. 260. The growth from 1960 to 1965 is obtained from estimates for total inventories of 22 percent in 1961–64 implied in calculations of Julia Fogaras-Zala, "The Stock Problem in Hungary," *The Review of Income and Wealth*, series 14, no. 4, December 1968, pp. 403–409, and deflation of growth of trade inventories in official yearbooks by the consumer price index, yielding a 26 percent increase over 5 years.

Poland: Estimate for 1956–60 from Krzysztof Porwit, "Zapasy w gospodarce narodowej w latach 1956–60" (Inventories in the National Economy in 1956–60), *Gospodarka Planowa*, no. 5, May 1962, p. 23 (JPRS 10096). Estimates for 1961–65 are from data in current prices, deflated by the implied industrial price index (Porwit's practice); the data are from *Concise Statistical Yearbook of Poland*, 1968, p. 87.

Estimates for West European countries by Edward F. Denison for 1955–62 show some overlap with the East European figures in the rate of growth of industrial inventories. The highest average annual rate in Western Europe, that of 6.7 percent for West Germany, is higher than the estimated rate of 5.1 and 5.8 percent in 1956–65 for Hungary and Czechoslovakia respectively. But whereas the other East European rates are still higher, rising to a peak of 9 percent for East Germany, the other West European rates are lower, falling to 1.8 percent for Belgium, 2 percent for Norway, 3.2 percent for the United Kingdom, and 3.4 percent for Italy.[20]

In evaluating these figures—all of which relate to increments or increases in inventories—the level of inventories should also be taken into account. A Hungarian economist has made a very interesting comparison between Hungary and the United States—in the absence of West European data—breaking down inventories in the two countries in 1964 by types and sectors. This comparison, given in Appendix Table 16, shows that the overall ratio of stocks to sales in Hungary runs far above the U.S. level. For materials and supplies—roughly one-half of total Hungarian inventories—the ratio is more than three times the

[20] Edward F. Denison, *Why Growth Rates Differ*, Washington, Brookings, 1967, p. 176.

U.S. ratio; for work in process, only one and one-half times; in industry, almost two and one-half times; but in trade, less than double. In all the East European countries, well over half of inventories is concentrated in materials and well over half is held by industrial enterprises.

In most of the East European countries—Czechoslovakia was perhaps an exception—stocks were certainly low in the early 1950's, and it was appropriate to add to them quite substantially in the mid-1950's, although the planners were disinclined to authorize that. But subsequent increases have undoubtedly resulted in very high levels, especially in material and finished goods inventories. In Hungary, in which they have risen the most slowly relative to total output, inventories in 1964 equaled 90 percent of the national product (evidently net material product), according to the same Hungarian economist quoted above. Thus they amounted to about 74 percent of GNP. In Czechoslovakia inventories have risen to about three-fifths the value of GNP. In East Germany and Poland the share probably is still less than one-half of GNP. The available data are brought together in Table 12. Denison's estimates for Western countries' inventories relative to national income indicate that although the ratios practically all run higher than the U.S. ratio of less than one-third of national income, only the peak figure of over 40 percent for the Netherlands approaches the lowest East European ratios.[21]

TABLE 12.—SIZE OF INVENTORIES COMPARED WITH GROSS NATIONAL PRODUCT IN EAST EUROPEAN COUNTRIES

	Year	Inventories [1]	GNP [2]	Inventories as a percent of GNP
Czechoslovakia (crowns)	1967	[3] 176	280	63
East Germany (marks)	1966	[4] 51	110	46
Hungary (forints)	1964	[5] 155	209	74
Poland (złoty)	1965	[6] 294	638	46

[1] Billion units of domestic currency.
[2] GNP represents official data for national income (net material product), plus estimated value added in "nonproductive services." GNP is 20 to 25 percent higher than national income. (Units in billions of domestic currency.)
[3] Midyear figure, presumably at current prices, given in article "Vysoká tvorba důchodu" (High Creation of Income) a comment on plan fulfillment in the first half of 1967, *Rudé Právo*, Aug. 29, 1967, p. 3.
[4] East German estimate of fixed capital plus inventories in "productive" enterprises, less published figure for fixed capital. See Karl-Heinz Stiemerling, *Wachstumsprobleme des Notionaleinkommens in der Deutschen Demokratischen Republik* (*Problems of the Growth of National Income in East Germany*), East Berlin, Dietz, 1968, p. 83.
[5] Based on 90-percent estimate given by Julia Fogaras-Zala, "The Stock Problem in Hungary," *The Review of Income and Wealth*, Series 14, no. 4, December 1968, p. 406.
[6] The estimate for Poland is based on an estimate, at current prices, of 203,000,000 złoty in 1960 moved to 1967 at the same rate as the movement of industrial inventories. From Leopold Gluck, "Zapasy—Problem na co dzień" (Inventories, an Everyday Problem), *Nowe Drogi*, no. 7, July 1961, p. 61.

Finally, there is the question of additions to inventories as a share of the national product. The only plausible attempt by Eastern European writers is by the Hungarian economist cited above. She calculated that additions to inventories averaged 4.4 percent of the national product (net material product) in 1955–64 and 4.6 percent in 1960–64. From the estimates in Tables 11 and 12, an approximate calculation may be made independently of the share of additions to inventories in GNP by using the assumption—which appears roughly correct—that

[21] Denison, *op. cit.*, p. 177.

all inventories increase at about the same rate as industrial inventories. On that assumption, the shares of inventories in national income in 1965 is estimated from the shares in GNP shown in Table 12 and estimated for 1955 by using the indexes in Table 11. The difference, divided by the sum of national incomes in 1956–65, represents the average share of additions to inventories in national income. The results are then converted back to a GNP base. (See Appendix Table 17.) They yield estimates of additions to inventory in GNP running from somewhat under 3 to nearly 4 percent, or double the average for West European countries. Even the smaller West European countries, which have the highest inventories, average less than 2 percent, though in single years several countries have run higher. Data for West European countries are shown in Table 13.

TABLE 13.—*Additions to inventories as a share of GNP in West European countries, average for 1957–66* [a]

[In percent]

Austria [b]	1.5
Belgium [b]	0.3
France	1.3
West Germany	1.6
Italy	1.2
Netherlands	2.0
Norway	0.7
Sweden	1.1

[a] 1958 prices.

[b] Includes statistical discrepancies between production and expenditure accounts for GNP.

Source: OECD, *National Accounts of OECD Countries, 1957–66.*

The high inventory levels in Eastern Europe doubtless reflect in part the relatively small size of the economies but they are also characteristic of the economic system. They are high, to begin with, because the cost of maintaining large inventories for many years was largely borne by the state budget. Now that it is being shifted to enterprises, through financing inventories increasingly by credit, the incentive to minimize inventories is still not very strong. Financial considerations remain secondary to the obligation to maintain employment and increase production. This obligation compels enterprises to go on producing goods for which there is little demand. Much of this output necessarily ends up in inventories, whether in the hands of the producers or in the hands of customers that are forced to take undesirable goods in order to get delivery of desirable goods. The undependable supply of more desirable—and relatively scarce—commodities also leads to "hoarding." The East European press is full of descriptions of this phenomenon. Everyone recognizes that one of the costs of "production for production's sake" is the accumulation of undesirable goods in warehouses and the hoarding of desirable goods.

In Western Europe, there are also pressures to expand inventories—the growing diversity of products and the competitive pressure to fill orders promptly. But pressure to reduce costs has stimulated the development of market research, sophisticated inventory and account controls, and rapid transport (especially trucking and air freight). As a result the highly complex economies of Western Europe operate with low and declining inventory costs.

The East European economies have been slow to develop these techniques because the cost is less justified under the conditions that prevail in command economies. Changes are beginning to take place, however. Enterprise managers are under increased pressure, not only economic but also administrative, to anticipate demand, to produce only what will sell, and to show a profit. One of the signs of success should be a sharp reduction in inventory costs.

6. Comparisons of Labor Productivity

Much light is cast on the differences between East and West European industry by some detailed bilateral comparisons of labor productivity done on a cooperative basis under the auspices of the Conference of European Statisticians. Austria and Hungary have finished such a comparison for 1965. France and Czechoslovakia have finished a comparison for 1962, the results of which have been moved to 1967 by country indexes. The least valuable service of these expert studies—based to a considerable degree on unpublished data—is to establish more firmly an overall judgment of relative labor productivity. The main value lies in the comparisons for individual industries. These show that East European labor productivity is nearly as high as—or even higher than—the Western level in most branches of food and light industry. On the other hand, East European labor productivity is typically low in electric power generation, metallurgy, production of most building materials, and the machinery and equipment industries. The exception in the heavy industry field is chemicals, as shown by the Hungarian-Austrian comparison and even more vividly by the Czech-French comparison, which shows labor productivity in the Hungarian chemical industry to be at or above the French level (depending on the weights used). The comparisons are summarized in Appendix Tables 18 and 19.

Now it is striking that the branches in which the Eastern Europeans do the best are just those that have been so neglected, not only in capital investment but also in research, management, and priorities for imports. It may well be true for other countries as well—Fritz Behrens claimed the same results in comparing East and West German industry in 1955.[22] The branches in which labor productivity is relatively lowest include most of those in which new plants were built, those in which growth was pushed, those for which imports were procured as a matter of urgency, those managed by senior *apparatchiki* and coming young engineers, those whose accomplishments have been the boast of the state.

Comparisons of output per worker between East and West European industries, however careful, do not take into account differences in the assortment of goods produced. West European manufacturers produce a greater variety of goods, new products involving technological sophistication make up a larger share of their output, and the specific mix of goods produced better satisfies demand. Less resources are required to produce the East European mix—in either Eastern

[22] Fritz Behrens, *Die Arbeitsproduktivität* (*Labor Productivity*), East Berlin, Wirtschaft, 1961, pp. 52–3.

or Western Europe—than to produce the West European mix. These considerations both qualify and help to explain the finding that labor productivity in light and food industries is often as high in Eastern as in Western Europe.

But the same considerations, to one degree or another, also qualify the findings in other sectors. In heavy industry, in which there are such wide differences in labor productivity, the East European mix is likewise inferior. Indeed, when Eastern European export prices of machinery and industrial consumer goods are compared with the prices obtained by Western exporters (as above, in section 4), the results suggest that the mix of machinery is inferior to the mix of consumer goods. Importers in the Communist world likewise prefer consumer goods to machinery. Semi-manufactures, such as steel and chemicals, sell somewhat better than consumer goods, but the differences in marketability are not great. Exports represent the best of what is produced, but these comparisons still say something about the product mix.

Thus the *relatively* high labor productivity of the light and food industries of Eastern Europe is not explained by the differences between the East and the West European product mix. The explanation of differences in relative labor productivity from sector to sector may be somewhat as follows. In the light and food industries of both Eastern and Western Europe not only a larger share of the equipment but also, probably, of the personnel was carried over from before the war into the 1950's. That suggests that Eastern Europe lost out especially in respect to the new equipment, new workers, and new managers added in the more dynamic industries—dynamic in the West as well as the East.[23]

But there are other factors. As in Western Europe, especially in France, the consumer goods industries are to a great extent—with some conspicuous exceptions—scattered in quite small enterprises. They thus escaped effective central control. They fell mainly under the control of local authorities more concerned with maintaining supplies than pursuing the elusive index number. The dynamic industries were to a much greater extent organized in large units, for the most part unavoidably, and thus far more subject to political control. The head of a large plant in heavy industry generally has been an ambitious functionary, sometimes well qualified, but sensitive to political pressure.

Policy itself is an important factor. The regimes normally have set their least realistic targets for the dynamic heavy industry branches, forcing them to play to the hilt the farce of "production for production's sake." In the light and food industries, smaller production increases have been planned and the game has been taken less seriously.

7. The Productivity of Labor and Capital

When East European countries are compared with countries at more or less the same economic level before World War II, the fol-

[23] In this connection may be noted the oft cited comparison by the Poles of costs in new plants compared to costs in old plants, in 1957. Only in the electric power industry were costs in new plants less, Zygmunt Sprycha, "Czy pesymistyczne gtosy o kosztach w nowych zakladach przemyslowych są uzasadnione?" (Are pessimistic views on the costs of production in new industrial plants justified?), *Gospodarka Planowa*, no. 4, 1958, pp. 5–8.

lowing summary judgments may be made. Czechoslovakia has done quite well in raising output per worker but not in raising output per unit of fixed capital. Hungary has done just the opposite. Poland has done respectably in both respects; East Germany, in neither. The following discussion provides some indicators of the productivity of labor and capital, with a tentative evaluation of their significance.

A. PRODUCTIVITY OF LABOR

Measured against prewar levels, output per worker in industry has grown more slowly in Eastern than in Western Europe. In particular, East Germany and Hungary have lagged behind the other European countries whose economies were disrupted by World War II. In both these countries output per worker rose above 1938 levels only in the early 1960's. The lag in East German productivity dates from the early postwar period and reflects above all the profound effect of the division of Germany. Even apart from the contrasting occupation policies of the USSR and the Western Allies, the small economy of East Germany, cut off from the world market, would have suffered far more from the division of Germany than the large, well endowed West German economy. Hungarian industry has also suffered from a lack of industrial imports and foreign markets; only East German industry was hit harder in this respect. But another important reason for the slow increase in output per worker was the determination of the regime, until the late 1950's, to increase industry employment with little regard to cost. As one Hungarian writer says, policy has been "aimed at raising employment rather than productivity." [24]

Comparative data on increases in output per worker in industry (excluding handicrafts) from 1938 to 1950 and from 1950 to 1965 are shown in Table 14. Output per worker in Poland has increased faster than in any of the other countries, but only because of the large increase in productivity from 1938 to 1950, when the 1938 output of Poland in postwar boundaries is used as a base. None of the other East European countries show such large increases as France and Italy over the 1938 level; the most nearly comparable country, Czechoslovakia, has shown a substantially smaller increase. If changes in structure and man hours worked were taken into account, the relative position of the countries would probably not change. The data on employment, particularly comparisons between prewar and postwar levels, are by no means good enough to attempt such refinements. In recent years, production workers in Czechoslovakia, Hungary and Poland have averaged somewhat more than 2,100 hours per year, in West Germany just under 2,000 hours, and about the same in East Germany, although official statistics imply a lower figure.

As a result of the differences shown in the growth of output per worker, the relative levels have also changed. Output per worker in East Germany, which was practically the same as in West Germany in 1938,[25] is only two-thirds the West German level. Output per

[24] Z. Roman, "The Hungarian Industry: An International Comparison," *Acta Oeconomica*, no. 1, 1968, p. 66.

[25] See, for example, the classical comparison by Bruno Gleitze, *Ostdeutsche Wirtschaft* (East German Economy), West Berlin, Duncker and Humblot, 1956, especially Table 31, comparison of output and employment in industry in 1936, with grand totals on p. 184.

TABLE 14.—INDEXES OF OUTPUT PER WORKER IN INDUSTRY IN EAST AND WEST EUROPEAN COUNTRIES SINCE 1938

	1950 (1938=100)	1965 (1950=100)	1965 (1938=100)
Czechoslovakia	[1] 110	167	184
East Germany	57	232	132
Hungary	99	139	138
Poland	[2] 183	181	331
Austria	[1] 90	209	188
Belgium	109	176	192
France	107	195	209
West Germany	94	194	182
Italy	123	197	242
Netherlands	89	191	170
Norway	95	196	186

[1] 1937=100.
[2] Postwar borders.

Sources: Prewar to 1950 changes in employment as reported in U.N. Economic Commission for Europe, Economic Survey of Europe Since the War, Geneva, 1953, p. 240.
Changes in employment from 1950 to 1965 from official sources for East European countries and West Germany; for other West European countries, data for 1950 and 1965 are from U.N. and O.E.C.D. sources.
For output indexes, see Table 1, above.
If the above indexes were used and estimates of prewar output per worker were made, using the labor force figures cited above andtthe output estimates in U.N., E.C.E., Economic Survey of Europe in 1949, ch. 1, p. 3, comparative output per worker in the 1960's would be much the same as estimated in Tables 15 and 18.

worker in Hungary, which was at the Austrian level before World War II, has dropped to three-quarters of that level. Czechoslovakia has fallen further behind France, indeed behind all the Western European countries shown. Poland has done as well as the industrialized countries, but nowhere near so well as Italy.

A comparison of output per worker in 1967 is given in Table 15, using estimates of gross industrial production and suitable employment figures. Because industrial employment is not known very precisely in Bulgaria and Romania, no comparison is made for either country. Both have undoubtedly done quite well compared with Western countries starting at the same point (Balkan and Mediterranean countries), although labor productivity remains low.

The estimates of gross industrial production in Table 15 so far as possible exclude handicrafts. For West European countries, estimates represent gross production at factor costs (that is, excluding indirect taxes and adjustment for subsidies) at current prices, converted at official exchange rates. The estimates for Eastern Europe are linked via Maurice Ernst's comparison of East European and West German industrial output in 1961 and brought forward by Alton's indexes. The Ernst comparison was for value added (i.e., West German value added weights were used), but no explicit allowance was made for differing material consumption patterns, so that Ernst's estimates can at least as appropriately be used for comparisons of gross output. Alton's indexes likewise are for value added, but given the negligible change in the relation of net to gross output in Eastern Europe (and West Germany during these years), they will do as well as indexes of gross output. As various writers have noted, the use of gross or net weights in production indexes makes little difference.

The comparisons in Table 15 correspond fairly well with the comparison for Hungary and Austria in the full-scale cooperative study for 1965 cited above. Table 15 shows labor productivity 34 percent greater in Austrian than in Hungarian industry in 1967; the study

TABLE 15.—CALCULATION OF INDUSTRIAL LABOR PRODUCTIVITY IN EAST AND WEST EUROPEAN COUNTRIES 1967

Country	Gross industrial output (million dollars)[1]	Number employed (thousands)[2]	Output per person employed (dollars)	Index of labor productivity (West Germany=100)
Bulgaria	5,097	(3)	(3)	(3)
Czechoslovaika	20,226	2,650	7,630	54
East Germany	26,047	2,961	8,800	62
Hungary	8,023	1,629	4,930	35
Poland	28,175	3,958	7,120	50
Romania	14,509	(3)	(3)	(3)
Austria	6,170	933	6,610	47
Belgium	16,440	1,339	12,280	87
France	61,370	5,325	11,520	81
West Germany	116,826	8,251	14,160	100
Italy	55,429	5,854	9,500	67

[1] Estimates of gross industrial output in dollars for the East European countries are based on relationships to the figure for West German industry. The relationships are those given by Ernst, op. cit., for 1961, moved by production indexes (see Table 1) and the West German index. The basic relationships in 1961 and the indexes relate to net rather than gross output. But the 1961 relationships are based on comparisons of production with West German value added weights and do not take into account differences between the East and West European cost structures; they are thus at least as valid for gross output comparisons. The production indexes are little different from those that would be obtained with gross weights.

West European gross output is converted from domestic values at estimated purchasing power parities. The basic data for gross output in domestic currencies are taken in part directly from statistical yearbooks; in part, they are obtained from input-output tables for earlier years, moved by production and price indexes to 1967.

[2] For Eastern Europe, and West Germany, from statistical yearbooks; for West European countries (except West Germany) from U.N. ILO, Bulletin of Labor Statistics. Data cover mining, power and gas and manufacturing. Construction and handicrafts are excluded, where possible, from output estimates. Numbers include apprentices. Handicrafts—very small enterprises—could be treated in the same way in all countries; some relationships would be changed significantly, though without greatly affecting the main East-West contracts.

[3] Not available.

cited above puts the difference as 38 percent. Given the more rapid growth of output per worker in Hungary in the intervening years, the two results do not differ greatly. The cooperative study done by Czechoslovakia and France shows labor productivity in French industry about 25 percent greater in 1962, using employment weights, and 30 percent greater, using value added weights.[26] The latter estimate is not far from estimates shown in Table 18 for 1961, which show value added per employed person in French industry at about 35 percent above the Czech level. For 1967, the French-Czech study finds little change in relative labor productivity, based on the use of official indexes of the change in labor productivity. The Czech index, however, which shows growth of 21 percent, is inflated; the estimates of the Alton group show a growth of only 11 percent. If applied to the French-Czech 1962 figure with value added weights, French labor productivity would be 43 percent above the Czech level; if similar figures were applied to the present estimate in Table 18, the French lead would be 48 percent. The comparison in Table 15, showing French labor productivity at 50 percent above the Czech level, is very nearly comparable. The relations for the other countries are within the range of various estimates by Communist economists; as estimated by the Council for Mutual Economic Assistance for 1961, the relationships among the industries of Eastern Europe differ very little from Ernst's.[27]

Nowadays, only the East Germans try to minimize the growing difference in labor productivity. When Fritz Behrens estimated East German labor productivity in 1958 as 80 percent of the West German

[26] See the source cited in Appendix Table 19.

[27] See Ernst, *op. cit.* Various Communist estimates of relative levels of output are tabulated by Michael Kaser, *Comecon*, 2nd ed., London, Oxford, 1967, pp. 206–7.

level, that was based on a detailed study for 1955, distorted somewhat by being moved by official data to 1958.[28] In the bleak winter of 1962–63, when the East Germans were replanning their economic development, no less a personage than Walter Ulbricht put the figure at 75 percent, not an unreasonable figure.[29] More recently, however, the East Germans have claimed once again to be "catching up." In the spring of 1969, Erich Honecker quoted Ulbricht to the effect that West German productivity was still 20 percent higher—that is, that the East Germans were now at 83 percent of the West German level.[30]

B. PRODUCTIVITY OF CAPITAL

Very little has been done to compare fixed capital costs in Eastern and Western Europe. Maurice Ernst made a very interesting comparative study of investment costs, demonstrating with the help of Alton's production indexes and adjusted investment figures that they have been much higher in Eastern Europe.[31] He concluded:

> Investment costs in Eastern Europe were higher than in Western Europe—on the average by some 25 percent for the total economy, by 40 percent for industry, and by a great deal in agriculture. Only for services were the ratios similar in the two areas. Very few Western investment ratios exceed those in any of the Eastern countries and the differences between the most comparable countries of the two groups are very large.

But, as Denison reminds us, fixed capital costs are another matter.[32] Evidently the level of investment can vary widely relative to the size of the capital stock, and comparisons of investment costs and of average capital costs may therefore yield quite different results. Of course, investment costs over time should bear some relation to changes in average capital costs, although the two measures probably will not be entirely consistent. If two countries follow markedly different policies on retiring old or obsolete plant and equipment, that will affect changes in average capital costs. In addition, of course, there may be inconsistencies between investment data and estimates of fixed capital, especially in coverage and pricing.

Changes in capital/output ratios in the industries of the more advanced East European countries, shown in Table 16, so far as available, seem consistent with Ernst's findings.[33] In all probability (see Tables 17 and 18, below), average capital costs throughout one period are higher in most East European industries than in West European industries with similar prewar backgrounds. Hungary is an exception; capital costs in Hungarian industry are lower than in Austrian industry (not included in Tables 16 and 17). If so, the higher incremental costs shown by Ernst simply maintain, with some fluctuations, the initial differences in average capital costs—until the 1960's, when some divergences appear.

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[28] Behrens, *op. cit.*, p. 52–3.
[29] *Neues Deutschland*, 16 January 1963.
[30] *Ibid.*, 29 April 1969. p. 3.
[31] Ernst, *op. cit.* Ernst differs with the ECE staff, which concludes that Eastern European investment costs are no higher than Western European (U.N., ECE, *Some Factors in Economic Growth in Europe in the 1950's*, New York, 1964, Chapter II). The main reason is that the ECE staff unavoidably uses inflated official production indexes for Eastern Europe.
[32] Denison, *op. cit.*
[33] See Ernst, *op. cit.*, p. 892.

TABLE 16.—CHANGES IN CAPITAL/OUTPUT RATIOS, 1950–65, CZECHOSLOVAKIA, EAST GERMANY, BELGIUM, AND WEST GERMANY

(Ratio in 1960=100)

	Ratio 1950	Ratio 1960	Ratio 1965
Czechoslovakia	108	100	116
East Germany	146	100	122
Hungary	94	100	107
Poland	(1)	100	90
Belgium	99	100	[2] 96
Italy	(1)	100	[3] 120
West Germany	125	100	10_7

[1] Not available.
[2] 1963.
[3] 1966.

Source: Estimates of capital and net output in 1965 for Czechoslovakia, East Germany, and Hungary are from statistical yearbooks. The statistical yearbooks for Czechoslovakia also furnish a series for capital stocks in industry going back to 1950. The official series for East Germany goes back only to 1960; the 1950 level is estimated on the basis of new East Germany figures going back to 1955 for fixed capital (*Statistisches Taschenbuch der DDR*, 1969, p. 27) and the estimate that the growth of fixed capital was considerably slower in the early than in the late 1950's. For Hungary, the fixed capital series is carried back by estimates of Jenö Rácz, *Az állóalapok és a termelés összefüggése a magyar iparban* (The Relationship of Fixed Capital and Output in Hungarian Industry), published in a volume with an essay by András Bródy (A termelés tökeigényessége a Kapitalismusban), Budapest, Akadémiai Kiadó, 1966, p. 300–1. The capital/output ratios for Belgium, Italy, and West Germany are taken directly from Fritz Franzmeyer, "Versuch einer Berechnung des industriellen Anlagevermögens in Belgien," (Attempt at a Calculation of Industrial Fixed Capital in Belgium), *Vierteljahrshefte zur Wirtschaftsforschung*, no. 1, 1965, p. 112–3; the same author, "Das Anlagevermögen der italienischen Industrie im Jahre 1961" (The Fixed Capital of Italian Industry in the Year 1961) and "Das anlagevermögen der italienischen Industrie 1961–1966," (The Fixed Capital of Italian Industry in 1961–1966) *Vierteljahrshefte zur Wirtschaftsforschung*, no. 3, 1965, pp. 357ff and no. 3, 1967, pp. 382ff; and Rolf Krengel, "Produktionsvolumen und Produktionsfaktoren der Industrie im Gebiet der Bundesrepublik Deutschland" (The Volume of Production and Factors of Production in West Germany) *Vierteljahrshefte zur Wirtschaftsforschung*, no. 4, 1964, p. 365 and no. 4, 1967, pp. 409–410.

Such evidence as there is indicates a considerable variation in capital/output ratios in Eastern Europe, as in Western Europe. One readily available indication of capital intensity in industry is the consumption of electric power compared with industrial output. Figures for several countries presented in Appendix Table 20 show much higher consumption per unit of output in East than in West Germany, but also much higher consumption in Austria than in Hungary. Except for Bulgaria and East Germany, the electric power consumption/industrial output ratios are on the low side; those for Austria and Sweden are higher.

Less extreme differences are indicated by a comparison of capital/output ratios, shown in Table 17. These are based on estimates of fixed capital and value added in industry, calculated in West German marks. It is in some respects quite misleading to compare available capital/output ratios as given. There are differences among countries in relative prices of investment goods, construction, and industrial output as a whole and large differences in the composition of industrial investment (as between construction and machinery and equipment). There are also accounting differences. If a systematic comparison is to be made, these factors should be taken into account. The simplest way of doing so—for the reader—is through synthetic estimates. Comparisons of each country's industrial fixed capital with West German fixed capital, using alternately one country's quantities and the other's prices and taking the geometric mean, yield estimates in West German marks. The extremes differ from the mean by no more, and generally much less, than 10 percent. The output estimates for Eastern Europe are based on Maurice Ernst's comparisons with West Germany, which are conceptually comparable. In the case of output estimates, likewise,

the geometric means would differ by not more than 10 percent from the extremes. The data selected are for 1961 because fewer data are available for later years. A general description of sources and methods is furnished in Appendix B.

TABLE 17.—CAPITAL/OUTPUT RATIOS IN INDUSTRY EAST AND WEST EUROPEAN COUNTRIES, 1961

[Billion 1961 West German marks]

	Gross fixed capital	Value added	Capital/output ratios
Czechoslovakia	76.9	25.8	3.0
East Germany	74.8	31.5	2.4
Hungary	20.3	9.0	2.3
Poland	83.6	29.2	2.9
Belgium	43.5	18.1	2.4
France [1]	146.0	84.3	1.7
West Germany	242.1	139.5	1.7
Italy	110.7	52.5	2.1

[1] Excluding utilities.

Sources: See Appendix B.

The estimates in Table 17 show Czechoslovakia and Poland with very high capital/output ratios, followed by Belgium and East Germany. Ratios for Hungary and Italy are not far apart. West Germany and France have by far the lowest. To compare the most nearly related economies—the ratios for East Germany and Czechoslovakia are higher than for West Germany and France and higher for Poland than for Italy. As already noted, however, the capital/output ratio would doubtless be substantially higher for Austria than for Hungary—unfortunately no estimate of fixed capital in Austrian industry appears to have been made.

C. FACTOR PRODUCTIVITY

The comparison in Table 17, taken together with estimates of labor productivity in 1961, offers some basis for a comparison of over-all efficiency in industry for the European countries included. The industries rank in much the same order in respect to labor productivity as to capital efficiency, so there are few surprises. In Table 18, factor productivity in these industries is compared on the basis of alternative fixed weights assigned to labor and capital inputs in West Germany (3:1 and 3:2).

TABLE 18.—FACTOR PRODUCTIVITY IN INDUSTRY OF EAST AND WEST EUROPEAN COUNTRIES IN 1961

[West Germany=100]

	Productivity of capital	Productivity of labor	Factor productivity	
			Weights A [1]	Weights B [1]
Czechoslovakia	57	65	62	61
East Germany	71	65	67	67
Hungary	74	40	45	49
Poland	58	56	56	57
Belgium	71	88	83	81
France	100	88	91	93
West Germany	100	100	100	100
Italy	81	69	72	73

[1] West German labor and capital inputs are weighted: A 3/1; B 3/2.

Sources: Fixed capital and output estimates from Table 17. Employment data, excluding handicrafts, from official sources and U.N. publications.

With either set of weights, France is next to West Germany in efficiency, followed by Belgium and Italy. East Germany has clearly the most efficient industry in Eastern Europe, followed by Czechoslovakia, Poland, and Hungary. If the countries most nearly comparable before World War II are paired, it is evident that the East European industries have lost ground. Factor productivity in industry in Czechoslovakia and East Germany is only about two-thirds of the French and West German levels, respectively; and in Poland, only three-quarters of the Italian level.

Comparisons for later years would yield less favorable results for Czechoslovakia and East Germany. As shown in Table 14, labor productivity in Czech industry falls further behind that in West German and French industry. And as shown in Table 16, capital/output ratios rise faster in both Czechoslovakia and East Germany than in West Germany. In all likelihood the rise is more rapid than in any West European industry. A comparison for the middle or late 1960's would show factor productivity in Czechoslovakia and East Germany at 60 percent or less of the French and West German levels, respectively. A significant difference, moreover would open up between factor productivity in Belgium and East Germany. The relative efficiency of Hungarian industry, on the other hand, would change little; and that of Polish industry would rise. Thus differences in efficiency among East European industries would continue to diminish.

Finally, comparisons of factor productivity in industry using not only fixed capital but also inventories would show differences in efficiency somewhat greater than the comparisons in Table 18. Industrial inventories in 1961 ran at about one-quarter of the value of fixed capital in Eastern Europe but only about one-tenth in Western Europe, and the differences have been growing.

Data on the growth of fixed capital in East European industries do not offer a satisfactory basis for comparing the growth of factor productivity in East and West European industries. The estimates in Tables 14 and 16 indicate that differences in the rate of growth of labor productivity are greater than the differences in the rate of change in capital/output ratios. Since labor productivity changes so much faster than returns to capital and is weighted more heavily in estimating changes in efficiency, it may be expected that East and West European industries would rank in the same order in respect of rates of increase in factor productivity as in respect of rates of increase in labor productivity.

The generally higher rates of growth of capital costs in East European industry, like the generally lower rates of growth of labor productivity, reflect the Communist preference for the construction of new plants and increases in employment rather than the pursuit of efficiency by modernizing the capital stock.

D. "QUALITY" OF FACTOR INPUTS

A look at the "quality" of factor inputs leads to the conclusion that differences in the quality of labor probably are not an important factor—as between countries with the same prewar level of development—but that differences in the quality of fixed capital are important.

Since most of the plant and equipment added in Eastern Europe since World War II was produced in Eastern Europe—and the U.S.S.R.—the production of the wrong kind of plant and equipment would appear to be one of the main reasons for East European inefficiency.

Probably the most important indicator of "qualitative" differences in labor inputs is the education and experience of the labor force. Age and sex differences and differences in participation rates, which tend to correlate with differences in education, also have some independent effects. The presence of more young males in the labor force is an advantage, even abstracting from educational attainments. High participation rates, which reflect mainly high participation by other than young males, may indicate the employment of significant numbers of marginal workers.

Differences in the educational attainments of the labor forces seem to bear some relation to differences in labor productivity within Eastern Europe. Czechoslovakia, Poland, and Hungary rank in this order both in industrial labor productivity and in the educational attainments of the labor force. East Germany, with the highest labor productivity, ranks next to Czechoslovakia in education. To be sure the relationships are not close. The difference in industrial labor productivity between Czechoslovakia and Poland is small, the difference in educational attainments large; the difference between Poland and Hungary is great in labor productivity, but small in educational attainments. Summary data on educational attainments are shown in Appendix Table 21.

But educational attainments are of no apparent use to help explain the differences between labor productivity in Eastern and Western Europe. Communists have placed high value on broadening the educational base, partly to create a "new class" owing its training and outlook to the Communist regime but also to help increase output. Judging from the numbers educated since 1950, nearly as many younger people with secondary education and at least as many with higher education are working in the East European countries as in comparable West European countries. U.N. data on enrollment, which provide some basis for international comparisons, are shown in Appendix Table 22.

A striking comparison was made by the Economic Commission for Europe of the numbers of engineers employed in Eastern and Western Europe.[34] The comparison shows that all the East European countries had far more engineers per thousand workers (outside agriculture) than leading West European countries in the middle or late 1950's. (See Appendix Table 23.) From scattered evidence presented by ECE there appear to be relatively more technicians as well. Quite possibly the East European engineers and technicians are less well prepared academically, particularly those from the less developed countries. A great many of them are doubtless in jobs that do not require an engineer's training. But there is little reason to suppose that the educational attainments of the labor force are less in East European countries than in West European countries with the same prewar background.

As to experience, Eastern Europeans receive more job-related tech-

[34] U.N., ECE, *Some Factors in Economic Growth During the 1950's*, New York, 1964, Chapter V, pp. 13ff.

nical training and are skilled in keeping the equipment going with such inputs as are available. On the other hand, they have little experience with advanced equipment, and that is clearly a barrier to technological change. In effect, East and West European workers—including managers—have adapted to the work they had to do.

Differences in age and sex ratios and participation rates probably have some effect on the "quality of the labor force." Participation rates for women are higher in all the East European countries—the rates run at 50 percent or more—than in most West European countries (Austria, with a rate of 55 percent is the exception). The high rates of participation reflect a combination of demographic factors—heavy losses of men in war—and emphasis on growth and full employment. No doubt, the East European insistence on full employment and maximizing output has clearly been a factor in low labor productivity; marginal labor productivity could probably be raised almost as much by laying off selected workers at random as by reducing employment of average workers and mothers with young children.

The quality of fixed capital is an even more important factor in the lower efficiency of East European industry. Indeed, the unbusinesslike practices and policies of the East European regimes are to a large extent "embodied" in fixed capital. These factors include the allocation of large resources in the 1950's to developing high cost raw materials, the continued production and import of machinery of old design, the retention in operation of prewar equipment almost without regard to operating and maintenance costs, and the building of too many new plants at the expense of modernization—especially the failure to invest heavily in labor-saving machinery—which could have freed enough labor to permit maximum use of high-cost facilities. All these findings, which have been discussed for years by East European leaders, planning officers, and economists, are borne out by the available evidence.

The extremely low prices received for East European and Soviet machinery exports to the West and the high prices paid for West European machinery, as described above, are pretty good evidence that the machinery invested in Eastern Europe was generally inferior to Western machinery.

The retirement rates for fixed capital stock in Eastern Europe during most of the postwar period were generally well under 1 percent per year; except in Italy, where the rate in the 1960's is estimated at only 1–2 percent, rates in Western Europe ranged from what is probably the low of 2 to 2½ percent for West Germany to 3 to 4 percent for Belgium, which is probably a high.[35]

The low for Eastern Europe is probably the rate in Czechoslovakia. According to one Czech account, the annual rate from 1949 through 1958 was 0.3 percent; from 1956 through 1960, 0.5 percent.[36] Compari-

[35] Rolf Krengel, "Die ersten Ergebnisse der Neuberechnung des industriellen Anlagevermögens fur das Gebiet der Bundesrepublik auf der Preisbasis 1958" (First Results of the Revaluation of Industrial Fixed Capital for the Federal Republic in 1958 Prices). *Vierteljahrshefte zur Wirtschaftsforschung*, no. 3, 1963, pp. 274–293.
Fritz Franzmeyer, "Versuch einer Berechnung des industriellen Anlagevermögens in Belgien" (Trial Calculation of Industrial Fixed Capital in Belgium). *Vierteljahrshefte zur Wirtschaftsforschung*, no. 1, 1965, pp. 97–121.
Fritz Franzmeyer, "Das Anlagevermögen der italienischen Industrie 1961 bis 1966" (Fixed capital in Italian Industry; 1961 to 1966). *Vierteljahrshefte zur Wirtschaftsforschung*, no. 3, 1967, pp. 328–336.

[36] Vladimír Nachtigal, "Capital Investment and Fixed Assets in Czechoslovakia," *Czechoslovak Economic Papers*, no. 18, 1967, pp. 120–1.

son of investment and capital assets figures for Poland from 1960 to 1967 indicates that retirements even in the 1960's have run only about 1 percent of capital assets in industry. The retirement rates for Hungarian industry are given for the years 1959–61—they are 0.7 percent, 1.5 percent, and 1.3 percent, respectively.[37] It seems probable that the rate in the 1950's averaged less than 0.7 percent. The East German rate was also very low in the 1950's, especially the early 1950's. It has since risen to about 0.8 percent in 1964 and 1.3 percent in 1966.[38]

As a result, less fixed capital has been retired in Eastern than in Western Europe during the 20-some postwar years. In a hypothetical case in which gross additions to capital over 20 years are double the original capital stock, beginning with a gross addition (in the first year) of 5½ percent of the original stock, the difference between retiring capital at 1 percent and at 2½ percent per year amounts to net increases of 150 and 80 percent, respectively, over the period. Assuming that all retirements are from the original capital stock, about one-fifth of the larger capital stock would be more than 20 years old, but none of the smaller capital stock.

No less significant is the difference between Eastern and Western Europe in the distribution of fixed capital between machinery and building and structures. (See Appendix Table 24.) The broadening of the industrial base in Eastern Europe kept at a minimum the investment resources available for installing labor saving equipment and reequipping old plants with new, more capital intensive equipment. East Germany stands out as an exception, partly because there was relatively little to invest in the early 1950's, when "extensive" investment was most in fashion, and partly because the scarcity of labor since the late 1950's has helped to encourage modernization of plants and to discourage building of new plants.

Obviously more work will have to be done—and more data will be needed—to make solid estimates of relative efficiency in East and West European industry. To repeat, however, it does seem clear that differences in the composition of investment over the postwar period largely account for lagging efficiency in the most industrialized countries of Eastern Europe. The feeding of the wrong investment mix back into the economic system has created an industrial plant that perhaps could not even be operated by other than Communist methods for other than Communist goals.

This conclusion illustrates a line of reasoning advanced by Abram Bergson in pointing out the limitations of international comparisons chiefly based on data on factor productivity. He said: [39]

> I have in mind the fact that such data, as usually compiled, bear on performance only in the use of available supplies of factors and do not really illuminate performance in respect of the creation of such supplies. This is true, not only of data on comparative levels of productivity in different countries at one time, but of data on changes in productivity in a single country

[37] *A népgazdaság állóeszközei* (*The Fixed Assets of the National People's Economy*) Budapest, 1963, p. 10.
[38] Roland Müller, *Aussonderung von Grundmitteln* (*The Disposal of Fixed Captital Assets*) East Berlin, 1969, p. 113.
[39] Discussion of Papers on "Centralization and Decentralization in Economic Systems," *Papers and Proceedings of the 81st Annual Meeting of the American Economic Association*, May 1969, p. 537.

> over time and for supplies of both different kinds of labor and different kinds of capital goods. Conceivably, for example, an economy might show a high rate of growth of factor productivity and still not be especially effective dynamically because of a failure year after year to produce an appropriate mix of capital goods.

That seems to be what has happened in Eastern Europe. Professor Bergson goes on to say:

> Such a failure, of course, might disclose itself in diverse ways, particularly the inordinately limited increase in consumption levels achieved, given the initial and terminal capital stocks, but it could not be detected from the productivity data alone.

Economic growth at the cost of consumers—and of the future—is characteristic of all the East European economies. Professor Šik was a pioneer in proclaiming it in the streets, but Eastern Europeans have been increasingly aware of it for years.

8. East European Views of East-West Comparisons

Eastern Europeans have many ways of knowing about the enormous difference between their economies and those of Western Europe—correspondence with relatives, contact with tourists, professional conferences, trade fairs, radio and (in the border countries) television, occasional movies, business trips, magazines and journals, and so on. Except in East Germany, the regimes are willing to acknowledge the difference.

In Czechoslovakia, no lesser a luminary than Premier Oldřich Černik stated in 1968 that the per capita national income of Czechoslovakia was 30 to 40 percent below the level of "advanced Western countries." [40] An even lower estimate has been given, that Czech national income per capita was only 40 percent of French national income in 1964.[41] A Hungarian economist has published an estimate showing Hungarian national income per capita in 1960 at 50 to 60 percent lower than in the Common Market countries and more than 60 percent below the level of the United Kingdom.[42] The secretary of the Polish Central Committee, Bolesław Jaszczuk (now the economics specialist in the Politburo) gave an interviewer in 1964 an estimate of per capita Polish national income in 1960 putting it significantly behind Italy's, only three-quarters of Austria's, and 50 to 60 percent below those of France, West Germany, and the United Kingdom.[43] These estimates are not far from those of Maurice Ernst; when they differ, they are generally more conservative. The Hungarian and Polish calculations are compared with his estimates in Table 19.

What is even more to the point, Eastern Europeans realize that personal consumption is lower than national product relative to West European levels because so much more of output is reabsorbed, in one way or another, into production. The main factors are the higher

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[40] Radio broadcast in Czech, 24 April 1968, BBC, Part II (EE/2754/C1/1).

[41] Ivan Štrup, "Comparing the Standard of Living and the Over-all Efficiency of Production in the CSSR and France." *Eastern European Economies,* vol. VI, no. 4, Summer 1968, p. 42 (From *Politická ekonomie,* no. 2, 1968).

[42] Ehrlich, *op. cit.*

[43] *Żołnierz Wolności,* Horyzont (special issue), 21–22 July 1964, p. 4.

TABLE 19.—EAST-WEST COMPARISONS OF NATIONAL PRODUCTS (NATIONAL INCOME PER CAPITA) BY EASTERN EUROPEANS

Western country	Hungary, 1960 (Hungary=100)		Western country	Poland, 1960 (Poland=100)	
	Ehrlich	Ernst		Jaszczuk	Ernst
Belgium-Luxembourg	238	188	Turkey	57	----
Denmark	250	207	Greece	71	60
France	210	201	Italy	116	122
Italy	122	109	Austria	141	147
Netherlands	220	174	France	218	225
Norway	242	183	West Germany	227	232
United Kingdom	272	201	United Kingdom	244	223
West Germany	239	208			

Sources: Hungary—Ehrlich, *op. cit.* and Ernst, *op. cit.* Poland—Ernst, *op. cit.* and Bolesław Jaszczuk, as interviewed in *Żołnierz Wolności*, loc. cit. Similar estimates of the national income of Poland in 1958, compared with a somewhat different set of countries, were made by Andrzej Karpiński, *Poland and the World Economy*, Warsaw, Polonia, 1960, p. 115.

inventory costs and higher capital costs mentioned above, but higher material costs and unfavorable terms of trade are also significant. Two Czech economists, for example, find it shocking that whereas Czech industrial production per capita is higher than that of France (it is somewhat below the French level, according to the estimates in Table 15), the Czech standard of living may be as little as 30 percent of the French, if all factors are taken into account. Even by the usual methods of comparing goods and prices—plus an allowance for the cost of higher participation by women in the labor force, they find it only just over 40 percent of the French level.[44] Obviously, the relative inefficiency of other sectors of the Czech economy is also involved, but the contrast is still impressive.[45]

Another example is furnished by Austria and Poland. According to the author's estimates (in Table 15), industrial labor productivity in Poland 8 percent higher than that in Austria (in 1967). But according to a bilateral comparison of consumption levels in the two countries (excluding housing and some other services), carried out by representatives of their statistical services, per capita consumption in Austria in 1964 was 57 percent higher than in Poland.[46] The difference in per capita consumption of industrial products as a group (excluding foodstuffs) is even greater.

9. Political Consequences

Awareness of these differences is a major cause of political instability in Eastern Europe.[47] The long-term threat to the East European regimes is twofold. First, the young are intolerant and impatient of waste and shortages—as of oppression and humbug—and they have

[44] Ivan Štrup, *op. cit.* On the basis of the usual comparison of consumption levels, their estimate for Czechoslovakia amounts to about 44 percent of the French level, which is still on the low side.

[45] A comparison with France is exceptionally unfavorable to Czechoslovakia, for the French standard of living is high relative to the level of industrial productivity. A comparison with West Germany, for example, would show both industrial output per worker (not per capita) and per capita consumption at about the same level—55 to 60 percent—relative to West Germany's.

[46] U.N., Statistical Commission and Economic Commission for Europe, *Comparison of Levels of Consumption in Austria and Poland*, 17 June 1968 (Conf. Eur. Stats/WG.22/19).

[47] Economic problems of various kinds appear uppermost in the minds of Eastern Europeans, according to periodic surveys by Radio Free Europe.

leaders among the new elite, in and out of the Party. Second, the East European state cannot capture the national feeling of its people or secure independence in foreign affairs without becoming competitive in world markets. With second-class economies, they are becoming more dependent on the U.S.S.R., in spite of the yearning of the elite for more independence. The leaders are on the defensive in the face of these challenges.

In Czechoslovakia the Communist regime has failed entirely to deal with rising discontent over economic problems. As the people see it, especially the young and the elite, it is the fault of the Party that the economy, while growing, has deteriorated so much. When the Communists took over in 1948, Czechoslovakia was better off than West Germany. Now, industrial output per capita is less than four-fifths and personal consumption less than three-fifths of the West German level—aside from major differences in quality and mix of output. In no other country have the Communists thrown away such opportunities.

In the other countries, mounting discontent with living conditions and the fear of increased dependence on the U.S.S.R. have less immediate political impact. The economic problems of East Germany are quite as serious as those of Czechoslovakia. The division of Germany and the dominant Soviet role in East Germany, handicaps imposed by history, have relieved the East German Communists of some of the responsibility for East German economic problems, and have left little hope of political independence. Nevertheless, the East German leadership feels the pressure of competition with the West. To quote Walter Ulbricht:[48]

> In the conflict with imperialism, in the struggle to secure peace, it becomes more and more important to make full use of the advantages of socialist society in mastering advanced science and and putting it into practice, that is, completing the scientific-technical revolution. . . . The imperialists make strenuous efforts to use science as a source of growing political and military power, a source of growing profits. All the more must the Soviet Union and the other socialist states, among them the GDR, demonstrate that they can fully master the scientific-technical revolution under the advanced production relationships that they have created.

Rising economic pressures on Hungary and Poland also pose problems for the leaders, although they do not seem to represent a present danger to the regimes, for memories of 1956 have been revived by the occupation of Czechoslovakia and are still a restraining influence on political action. In the less developed countries, Bulgaria and Romania, discontent with living conditions is just emerging as a political challenge, and the leaders still have time to try to make their economies competitive, although the long-term outlook is not encouraging.

In response to mounting criticism, all the East European regimes have adopted "economic reforms" in the 1960's, beginning with Ulbricht's announcement of the East German "new economic system of planning and management" in mid-1963. Criticism has focused on mistakes in economic policy and the inefficiencies resulting from bu-

[48] Walter Ulbricht, *Die Konstituierung der staatlichen Organe und Probleme ihrer wissenschaftlichen Arbeitsweise (The Constitution of State Organs and Problems of Making Them Work Scientifically)*, East Berlin, 1967, pp. 5–6.

reaucratic control. The reforms are intended to correct these weaknesses by giving the planning staffs the training and tools needed to support economic policy and by gradually turning over economic decisions to industrial management and replacing the sanctions of plan fulfillment with those of the market—supply and demand, profit and loss.

The leaders and the Party hierarchy have accepted economic reform with major reservations. They see the need for developing stronger, more professional planning and management, but they distrust economists and other experts not only as politically undependable but also as impractical or visionary. The reforms are therefore carefully hedged about to assure political control and to prevent economic disruption. Experts have been given a voice in policy but still do not carry a great deal of weight. They have not persuaded the leaders to adopt a "low pressure" economic policy, to concentrate on "qualitative changes" (in efficiency and product mix) even at the expense of increased output. The leaders still seem to believe in reform *and* rapid growth, a policy that over determines the choices open to planners and management and leaves them to follow the line of least resistance, which has generally been to increase output as the leaders want. The industrial managers have acquired more authority, but mainly in matters that the central bureaucracies never succeed in controlling—the precise composition of output and the wage structure.

Yet there are differences in approach from country to country, and these have some importance—not so much the differences in institutional reforms as those in substantive economic policy. Economic policies differ on such vital questions as how hard to push the economy, how much to reduce the overstaffed economic apparatus, what to do about incompetent Party hacks in planning and management, how much inflation to accept, how fast to close down grossly inefficient enterprises, and whether to risk substantial unemployment. Policy on such questions will largely determine the effect of the present reforms.

Czechoslovakia and Hungary present a contrast in economic policy in spite of marked similarities between the Czech program introduced in 1965 and the more recent Hungarian program. In the words of a recent Czech broadcast, "Hungary talked less but achieved more." [49] Inevitably, since the fall of the Dubček regime, the Czechs have become more critical of Ota Šik's reform program. No less than the Director of the Economic Institute, Karel Kouba, is credited in the same broadcast with the statement that the reform program "did not even exist in a coherent theoretical form," a statement as true as it is politically expedient. In addition, of course, the Novotný regime was less than half-hearted in support of reform, and the Dubček regime was too busy with politics. Moreover, under both regimes, insistence on rapid increases in output, plus the dead weight of the old bureaucracy—still in office—made reform measures inoperative. Unrealistic economic policies contributed to the fall not only of Novotný but also of Dubček.

Hungary, on the other hand, carefully controlled the pressure for increased output and prepared the way for reform measures by up-

[49] BBC, Summary of World Broadcasts, Part 2, Eastern Europe, Second Series, EE/3120/C/5, July 1969.

grading management and cutting back the central economic bureaucracy by 30 to 40 percent. The Hungarians are realists and understand, in the always just phrase of economist Imre Vajda, that "the new system . . . is not inheriting an 'entrepreneur' type," and that a new climate is needed to develop the type.[50] Thus Hungary, moving with all deliberate speed, may yet accomplish something through economic reform. Meanwhile, its political problems are manageable.

The other countries have followed the East German model, which emphasizes the development not of "market forces" but of highly professional planning and management. Reform in these countries has a dual purpose: on the one hand, to raise efficiency and adapt output to the market, and on the other, to increase effective central control. The East Germans have carried out this program with characteristic energy and considerable success, although they have failed to gain ground in the economic competition with West Germany. The German drive is lacking in Bulgaria, Poland, and Romania. Bulgaria, which has limited, and in some ways even reversed, certain reform measures since 1968, and Poland and Romania, which are still experimenting, probably will not have much to show for their efforts at economic reform—nor are they likely to run into serious economic trouble in the near future.

10. The Way Out

But time is not on the side of the East European regimes. They have even less room for maneuver in economic than in political matters. Their stability depends on getting along with the U.S.S.R., on not repudiating the record of the last 20 years, and on not sacrificing the vested interests of the Party and the state bureaucracy. The economic reform movements, therefore, are likely to add to rather than reduce East European frustrations and thus to create additional problems for the leaders. Major changes in economic policies and institutions probably must await basic political changes, in which shifts in the international environment are likely to be the decisive factor. Major changes almost certainly involve much closer political relations with Western Europe, for the sake of political security and economic support. Large-scale economic support is essential to help the East European countries to reintegrate into the world market. With their small, inefficient economies, they could benefit greatly, but the costs of making their economies competitive would be substantial and would have to be underwritten by Western governments and businesses.

Many Eastern Europeans would like to find a way of tapping Western skills and technology on a much greater scale than at present. About one-half of the more than $5 billion worth of machinery and equipment imported from the West in the 1960's has been bought on credit. Net drawings on Western credit for this purpose through 1968 amounted to some $2 billion, a significant addition to domestic resources, especially for Bulgaria and Romania. Indebtedness will increase substantially by the mid-1970's as some of the other countries

[50] Imre Vajda, "Külső egyensúly, neotechnika és gazdasági reform" (External equilibrium, neotechnics and economic reform), *Közgazdasági szemle,* v. 14, no. 6, June 1967, p. 691.

begin to draw more heavily on Western credit. But the share of total investment financed in the West through credit sales will rise quite slowly and will remain very small.

A great deal of effort has gone into promoting cooperative arrangements of various kinds ("joint ventures") with Western businessmen for marketing East European products in the West. These deals, which sometimes involve technical assistance, provide useful training for Eastern Europeans. But they affect a negligible share of East European exports to the West and are not likely to furnish a significant amount of capital to Eastern Europe.

Probably the only way in which Eastern Europe can get access to Western capital on a large scale is through direct investment by Western businesses, which is clearly out of the question under present conditions. Yugoslavia, which has gone much further toward political independence and a free society and economy than any of the East European countries is likely to go in the near future, has obtained substantial backing from the Export-Import Bank and some from the World Bank, but even Yugoslavia has not yet solved the problem of accommodating a substantial amount of Western risk capital. The East European countries likewise would have to win political independence and establish basic freedoms before they could tackle the problem of becoming economically competitive.

SHORT READING LIST ON EASTERN EUROPEAN INDUSTRIAL GROWTH AND INTERNATIONAL COMPARISONS

This list is limited to readings on the topics above, in English, published during the last 10 years. East European as well as Western authors are included.

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APPENDIX A

STATISTICAL TABLES

APPENDIX TABLE 1.—OUTPUT OF SELECTED MATERIALS IN EASTERN EUROPE AND THE EUROPEAN NATO COUNTRIES, 1950 AND 1967

	Eastern Europe			European NATO		
	1950	1967	Percent increase	1950	1967	Percent increase
Hard coal (million metric tons)	104	162	56	449	366	−18
Electric power (billion kilowatt-hours)	44	200	355	213	740	247
Crude steel (million metric tons)	8.6	33.3	287	46	116	152
Cement (million metric tons)	8.4	37.1	342	37	124	235

Source: Statistical yearbooks of countries involved.

APPENDIX TABLE 2.—OUTPUT PER CAPITA OF INDUSTRIAL MATERIALS IN EAST AND WEST EUROPEAN COUNTRIES 1968

(in kilograms [1])

	Bulgaria	Czecho-slovakia	East Germany	Hungary	Poland	Romania	Austria	Belgium	France	Italy	Netherlands	West Germany
Fuels and power:												
Primary energy (standard fuel equivalents)	1,250	4,240	[2] 4,790	1,850	3,800	2,830	NA	1,650	1,620	870	2,240	2,930
Electric power (kilowatt-hours)	1,840	2,880	3,700	1,280	1,720	1,410	3,520	2,760	2,430	1,990	2,640	3,440
Hard coal	50	1,780	[3] 110	410	3,990	[3] 350	2	1,540	830	7	530	1,930
Brown coal and lignite	3,370	5,170	14,460	2,230	840	[3] 370	570	NA	65	35	(4)	1,750
Crude oil	55	[3] 15	[2] 4	180	15	670	373	NA	55	30	170	140
Natural gas (cubic meters) [6]	[3] 40	[3] 70	[2] 8	260	80	[7] 1,110	220	[3] 75	110	200	1,140	230
Ferrous metals:												
Crude steel	180	730	280	280	340	240	480	1,210	420	320	290	[8] 680
Rolled steel	120	520	190	190	230	170	350	[3] 980	[3] 330	[3] 270	[3] 240	[8] 540
Pig iron and ferro-alloys	130	480	140	160	210	150	340	1,080	330	150	220	[8] 500
Nonferrous metals:												
Primary aluminum	0	4	3	6	3	4	12	NA	7	3	[3] 3	[8] 4
Lead	11	1	1	(4)	2	2	1	11	2	1	[5] 1	[8] 2
Refined zinc	9	(4)	1	(4)	6	2	2	25	4	2	3	[8] 2
Refined copper	4	1	2	1	1	[3] 1	2	35	1	(4)	NA	[8] 7
Chemicals:												
Mineral fertilizer (nutrients) [9]	75	35	180	40	40	30	45	85	[5] 90	35	[5] 85	[8] 75
Plastics and resins	[5] 5	[3] 13	[3] 16	[5] 3	6	[3] 6	15	[3] 11	20	25	50	[5] 55
Sulfuric acid	55	65	65	45	40	40	[5] 30	180	65	65	110	[5] 70
Caustic soda	5	13	25	5	9	14	[5] 10	[5] 12	17	16	NA	[8] 25
Synthetic rubber	0	2	7	0	1	3	NA	3	4	2	13	4
Synthetic fibers	(4)	1	2	(4)	1	(4)	(4)	[3] 1	3	4	[3] 4	[8] 6
Cement	420	450	440	270	360	360	620	600	530	560	270	[8] 550

[1] Unless otherwise stated.
[2] 1965.
[3] 1967.
[4] Negligible.
[5] 1966.
[6] Figures for Eastern Europe represent gross production.
[7] Including dry and wet gas from petroleum fields.
[8] Including West Berlin.
[9] NATO and Austrian data are for fertilizer year beginning July 1.

APPENDIX TABLE 3.—*Indexes of consumption of solid fuels in East and West European countries,[a] 1950–67*

[1950=100]

Bulgaria	600	Austria	89
Czechslovakia	194	Belgium	83
East Germany	172	France	101
Hungary	202	West Germany	80
Poland	199	Italy	139
Romania	440	Netherlands	72
		Norway	58
		Sweden	35

[a] Greece is omitted because economic activity in 1950 was at a low level as a result of the civil war.

Source: U.N., ECE, *The General Energy Situation in Europe in 1967 and Early 1968 in the Context of Current World Trends* (ST/ECE/Energy/12) U.N., 1969, Table 5.

APPENDIX TABLE 4.—SHARE OF MAJOR TYPES OF ENERGY IN GROSS CONSUMPTION IN EAST AND WEST EUROPEAN COUNTRIES, 1967

[Percent of total]

	Solid fuels	Liquid fuels	Gaseous fuels	Primary and imported electric power
Bulgaria	75	21	(1)	4
Czechoslovakia	84	11	2	3
East Germany	88	8	(1)	(1)
Hungary	65	23	10	4
Poland	90	7	3	(1)
Romania	20	19	60	0
Austria	28	40	10	22
Belgium	47	51	2	(1)
France	34	50	5	10
West Germany	47	47	2	3
Greece	28	65	(1)	9
Italy	11	66	8	13
Netherlands	23	63	14	0
Norway	4	27	(1)	68
Sweden	5	58	(1)	37

[1] Negligible.

Source: Ibid.

APPENDIX TABLE 5.—GROSS CONSUMPTION PER CAPITA OF MAJOR TYPES OF ENERGY IN EAST AND WEST EUROPEAN COUNTRIES, 1967 (KILOGRAM STANDARD FUEL)

	Total	Solid fuels	Liquid fuels	Gaseous fuels	Primary and imported
Bulgaria	2,890	2,154	619	(1)	117
Czechoslovakia	5,153	4,289	585	114	165
East Germany	5,344	4,937	376	5	26
Hungary	2,546	1,631	573	246	96
Poland	3,652	3,281	250	103	18
Romania	2,309	479	445	1,385	0
Austria	3,252	920	1,291	334	707
Belgium	4,742	2,235	2,414	72	21
France	3,634	1,242	1,858	165	369
West Germany	4,650	2,174	2,211	105	160
Greece	1,140	319	724	(1)	97
Italy	2,436	277	1,637	206	316
Netherlands	4,002	925	2,508	569	0
Norway	7,506	278	2,108	(1)	5,120
Sweden	6,522	322	3,828	(1)	2,372

[1] Negligible.

Source: Ibid.

APPENDIX TABLE 6.—PRODUCTION OF SYNTHETIC FIBERS, SYNTHETIC RUBBER, AND PLASTICS, IN EAST AND WEST EUROPEAN COUNTRIES, 1968

[In thousand metric tons]

	Synthetic fibers	Synthetic rubber	Plastics
Bulgaria	(1)	0	[2] 44
Czechoslovakia	12.7	36	[2] 186
East Germany	25.8	120	[2] 278
Hungary	4.6	0	[2] 33
Poland	43.2	41	[2] 200
Romania	9.3	54	[2] 108
Austria	[2] 2	(1)	106
Belgium	[2] 12	25	[2] 103
France	132	217	990
West Germany	361	229	[3] 3,252
Italy	195	125	1,398
Netherlands	[2] 56	160	652

[1] Negligible.
[2] 1967.
[3] Including data for West Berlin.

Sources: Statistical yearbooks of countries involved.

APPENDIX TABLE 7.—RELATIVE IMPORTANCE OF RAIL TRANSPORT AND TRUCKING IN THE INLAND FREIGHT TRANSPORT OF EAST AND WEST EUROPEAN COUNTRIES, 1965 [1]

[Percent of total traffic [2]]

	Rail transport	Trucking
Bulgaria	69	25
Czechoslovakia	88	2
East Germany	90	5
Hungary	75	12
Poland	91	4
Romania	87	7
Austria	54	39
Belgium	31	42
France	49	27
West Germany	42	22
Italy	26	73
Norway	45	55
Sweden	57	43

[1] Figures for Austria Belgium, Bulgaria, Netherlands, and Sweden are for 1964. Figure for Hungary is for 1966.
[2] Remainder unaccounted for is inland waterways and pipeline.

Source: U.N., ECE, Movements of Energy in Europe and Their Prospects, 1969 (ST/ECE/Energy/9/Rev. 1), p. 30.

APPENDIX TABLE 8.—THE USE OF FUELS IN GENERATING ELECTRIC POWER IN EASTERN AND WESTERN EUROPE, 1955, 1961, 1967

[In percent]

	Share of total coal tonnage to power-plants [1]	Source of power generated				
		Coal	Oil	Other fuels [2]	Nuclear power	Hydroelectric power
Eastern Europe:						
1955	22.2	86	2	6	0	6
1961	27.0	84	2	9	0	5
1967	32.4	79	4	12	0	5
Western Europe:						
1955	20.2	51	3	5	0	41
1961	31.7	48	8	4	0	40
1967	40.3	44	15	5	1	35

[1] Brown coal and black, actual tonnages.
[2] Natural gas and other fuels.

Source: U.N., ECE, The General Energy Situation, p. 23.

APPENDIX TABLE 9.—DELIVERIES OF FINISHED STEEL TO THE MACHINERY AND EQUIPMENT INDUSTRIES IN EAST AND WEST EUROPEAN COUNTRIES, 1966 [1]

[Percent of total tonnage]

	Machinery, except electric	Electric machinery	Ship-building	Railroad equipment	Motor vehicles and aircraft
Hungary	29	15	9	17	29
Poland	51	8	12	14	15
Austria	45	15	3	17	20
Belgium-Luxembourg	31	17	24	21	7
France	17	5	6	12	60
West Germany	23	13	14	3	47
Italy	10	19	18	6	47

[1] Imports are not included in the data, but their exclusion should not seriously affect the results, except for Belgium-Luxembourg.

Source: From absolute data published by U.N. ECE in Quarterly Bulletin of Steel Statistics for Europe, vol. XVII, No. 4, 1966, pp. F1–F27.

APPENDIX TABLE 10.—ALUMINUM AND STEEL CONSUMPTION IN EAST AND WEST EUROPEAN COUNTRIES, 1960 AND 1967 [1]

[Thousand tons]

	1960		1967	
	Aluminum	Steel	Aluminum	Steel
Bulgaria	6	630	25	1,343
Czechoslovakia	[2] 52	[3] 4,436	[4] 97	6,808
East Germany	[5] 59	[3] 3,580	[5] 110	[3] 4,330
Hungary	50	1,217	[5] 63	[6] 1,990
Poland	26	4,188	[2] 92	7,004
Romania	(7)	1,784	(7)	3,995
Austria	[3] 35	1,556	51	1,603
Belgium-Luxembourg	29	3,193	53	4,088
France	197	10,378	290	14,234
West Germany	317	22,244	360	23,407
Italy	117	7,873	201	12,636
Netherlands	[3] 20	2,859	[3] 60	3,698

[1] Primary aluminum and rolled steel.
[2] Production.
[3] Approximate.
[4] 1966.
[5] Rolled.
[6] 1968.
[7] Not available.

Sources: For steel consumption—U.N., ECE, Quarterly Bulletin of Steel Statistics for Europe, vol. XIV, no. 4, 1963, pp. A1–A27, C1–C27; vol. XVIII, no. 4, 1967, pp. A1–A22, C1–C27. For aluminum consumption—statistical yearbooks of countries involved

APPENDIX TABLE 11.—DELIVERIES OF LIGHT AND HEAVY STEEL SHEET TO ELECTRICAL MACHINERY MANUFACTURING IN EAST AND WEST EURBPEAN COUNTRIES, 1967

[Thousand metric tons]

	Heavy steel sheets, plates and universals (3 mm. and over) (1)	Thin steel sheets (under 3 mm.) (2)	Ratio of (1) to (2)
Hungary	8	33	0.24
Poland	17	81	0.21
Belgium-Luxembourg	1	13	0.08
France	11	66	0.17
West Germany	24	274	0.09
Italy	12	285	0.04

Source: U.N. ECE, Quarterly Bulletin of Steel Statistics for Europe, vol. XVIII, no. 4, 1967, pp. F1–F27.

APPENDIX TABLE 12.—DELIVERIES OF STEEL SHEET AND PLATE TO MACHINERY MANUFACTURING, EXCLUDING ELECTRICAL, IN EAST AND WEST EUROPEAN COUNTRIES, 1967

[Thousand metric tons]

	Heavy steel sheets, plates, and universals (3 mm. and over) (1)	Thin steel sheets (under 3 mm.) (2)	Ratio of (1) to (2)
Hungary	39	7	5.6
Poland	294	73	3.2
Austria	29	17	1.7
Belgium-Luxembourg	5	8	0.6
France	63	38	1.6
West Germany	240	87	2.8
Italy	50	16	3.1

Source: Ibid.

APPENDIX TABLE 13.—DELIVERIES OF HOT ROLLED SECTIONS AS A SHARE OF TOTAL DELIVERIES TO PRODUCERS OF MACHINERY AND TRANSPORT EQUIPMENT IN EAST AND WEST EUROPEAN COUNTRIES, 1967

[Quantities in thousands of metric tons]

	Deliveries of hot rolled sections (1)	Total deliveries of steel (2)	(1) as a percent of (2)
Hungary	114	336	34
Poland	487	2,209	22
Austria	34	182	19
Belgium-Luxembourg	7	69	10
France	300	1,595	19
West Germany	350	2,656	13
Italy	109	1,838	6

Source: Ibid.

APPENDIX TABLE 14.—*Average price per kilogram received for machinery exports by selected countries, 1964* [a]

	Dollar per kilogram
CEMA average	1.04
Bulgaria	.65
Czechoslovakia	1.28
East Germany [b]	1.28
Hungary	1.54
Poland	.74
Romania	.62
U.S.S.R.	.93
Western European average	1.92
Austria	1.74
Belgium	1.65
France	1.80
West Germany	1.80
Italy	1.93
Netherlands	2.75
Sweden	2.09
Switzerland [c]	3.65
United States	4.37

[a] For Western countries, exports chiefly to other Western countries; for Communist countries, exports to the Common Market. Western exports exclude boats and aircraft: Communist exports exclude boats, optical lenses, microscopes, cameras, and watches.
[b] Excluding trade between East and West Germany.
[c] Excluding watches.

Source: Miroslav Kolanda, *op. cit.*

APPENDIX TABLE 15.—INDEX OF PRICES PER KILOGRAM RECEIVED FOR MACHINERY BY EAST AND WEST EUROPEAN COUNTRIES, 1962–64

[1961=100]

	1962	1963	1964
CEMA average	104.4	97.1	96.6
Bulgaria	97.8	59.8	40.1
Czechoslovakia	104.0	90.8	91.6
East Germany	108.6	101.4	97.0
Hungary	106.6	95.9	97.0
Poland	96.4	100.5	84.5
Romania	120.4	170.4	136.0
U.S.S.R.	100.2	99.2	126.2
Western European average	99.2	103.0	105.7
Austria	104.9	107.0	114.2
Belgium	101.5	106.9	111.5
France	95.5	99.2	103.8
West Germany	105.8	105.3	105.9
Italy	102.1	109.1	112.0
Netherlands			
Sweden			
Switzerland			
United States		124.2	138.2

Source: Miroslav Kolanda, op. cit.

APPENDIX TABLE 16.—COMPARISON OF INVENTORIES IN HUNGARY AND THE UNITED STATES, 1964

	Inventories as a percent of sales			Inventories as a percent of average monthly sales		
	Materials and supplies	Work in process	Finished goods	Manufacturing industries	Wholesale trade	Retail trade
Hungary	16.1	6.7	10.3	3.97	2.21	2.04
United States	4.8	4.3	4.9	1.69	1.20	1.31

Source: Julia Fogaras-Zala, op. cit., p. 406.

APPENDIX TABLE 17.—CALCULATION OF ADDITIONS TO INVENTORIES AS A SHARE OF GROSS NATIONAL PRODUCT IN EAST EUROPEAN COUNTRIES, 1955–65

	Cumulative indexes of national income at constant prices [1] (1955=100)	Index of total inventories (national income in 1955=100)		Increment in inventories	Increment in inventories as a percent of cumulative indexes	
		1955 [2]	1965 [3]		National income	GNP
Czechoslovakia	1,365	62	108	46	3.4	2.8
East Germany	1,440	[4] 43	101	58	[5] 4.0	3.2
Hungary	1,327	92	154	62	4.7	3.9
Poland	1,452	47	103	56	3.9	3.7

[1] Official data.

[2] Calculated from the estimates for 1965 by the indexes in Appendix Table 11.

[3] Calculated with the share of inventories in GNP in Table 12. Adjusted to a national income basis in 1965 and applied to official index of national income in 1965 (1955=100).

[4] A Polish author observes that in 1956 the level of industrial stocks in Poland was 30 percent higher than in East Germany. Mieczysław Kucharski, "Czy zapasy hamują rozwój?" (Do Stockpiles Slow Down Development?), *Życie Gospodarcze*, (Apr. 17, 1960), p. 4. The East German increase in 1956 was nearly 20 percent, (See Carl-Jürgen Strauss et. al., *op. cit*, and Alfred Teschauer, *Die Materialwirtschaft und die ökonomische Hauptaufgabe* (The Material Economy and the Main Economic Task), East Berlin, 1959, p. 43–44), the Polish increase only about 10 percent (see Krzysztof Porwit, *op. cit.*). The difference between the present estimates is much smaller because of the effect of price changes after 1956, which were larger in East Germany. See [5] below.

[5] The estimated percentage change for East Germany is higher than that shown in the official national accounts. One major difference is that the above percentage is based on estimates of inventories in 1965 producer prices, which for most kinds of industrial goods are 50 to 100 percent above prices in 1963 and before. On the whole, the new prices better reflect East German opportunity costs. The over-all price inflation in national income was much less, and additions to inventories accordingly represent a substantially higher share of national income in 1965 than in 1960 or 1955 prices.

APPENDIX TABLE 18.—COMPARISON OF LABOR PRODUCTIVITY IN AUSTRIA AND HUNGARY, 1965

Branch of industry	Austria (Hungary=100)		
	Austrian prices	Hungarian prices	Average
Mining	249.2	243.6	246.4
Electric energy production	152.9	152.9	152.9
Iron basic industries	105.8	112.8	109.2
Crude petroleum and natural gas production and manufacture of products of petroleum	229.2	220.7	224.9
Manufacture of construction materials	156.8	178.4	167.3
Manufacture of glass and glass products	91.7	91.0	91.4
Manufacture of chemicals and chemical products	114.2	127.4	120.6
Manufacture of pulp, paper, and paperboard	144.9	146.7	145.8
Manufacture of articles of paper and paperboard	84.5	89.4	86.9
Manufacture of wood products	135.7	168.3	151.1
Food industries	80.7	96.4	88.2
Manufacture of leather and leather and fur products	114.7	128.0	121.2
Foundries	151.1	149.6	150.3
Nonferrous metal basic industries	178.8	181.1	179.9
Manufacture of machinery and fabricated structural metal products	125.2	147.5	135.9
Manufacture of transport equipment	112.1	130.7	121.0
Manufacture of simple metal products	159.2	214.7	184.9
Manufacture of electrical machinery, apparatus, appliances, and supplies	151.6	170.4	160.7
Metal processing and machinery industry	137.1	164.3	150.1
Manufacture of textiles	116.6	121.6	119.1
Manufacture of wearing apparel	91.3	95.9	93.6
Total industry	128.0	149.1	138.1
Industry (except mining and manufacture of transport equipment)	118.9	140.2	129.1

Source: U.N. Statistical Commission and Economic Commission for Europe, Conference of European Statisticians Comparison of Industrial Production and Productivity Between Austria and Hungary (Conf. Eur. Stats/WG.21/8), Jan. 29 1969, table 4.

APPENDIX TABLE 19.—COMPARISON OF LABOR PRODUCTIVITY IN FRANCE AND CZECHOSLOVAKIA IN 1962 OBTAINED BY AGGREGATING PRODUCTIVITY INDEXES (WEIGHTED BY NUMBER OF WAGE EARNERS) AND BY AGGREGATING OUTPUT INDEXES (WEIGHTED BY VALUE ADDED)

Title of the group of branches	Labor productivity indexes (France = 100)					
	Computed by aggregating the productivity indexes			Computed by aggregating the output indexes		
	Czechoslovak weights	French weights	Geometric average	Czechoslovak weights	French weights	Geometric average
I. Mining	106.5	106.9	106.7	108.8	108.7	108.7
II. Light manufacturing industries	90.0	95.1	92.5	86.4	90.8	88.6
Food manufacturing	86.0	99.3	92.4	84.6	94.0	89.2
Textiles, wearing apparel, and leather industries	97.0	97.3	97.2	96.6	94.7	95.7
Wood and paper manufacturing	88.6	95.2	91.8	88.0	84.7	86.3
Manufacture of construction materials, glass, and ceramics	75.1	84.7	79.8	70.3	86.6	78.0
III. Heavy manufacturing industries	69.7	67.2	68.4	70.1	68.4	69.2
Chemical and rubber industries	101.9	102.8	102.4	101.8	102.6	102.2
Basic metal industries	72.6	76.2	74.4	75.7	75.7	75.7
Machinery and equipment	61.9	60.6	61.2	61.4	63.7	62.5
IV. Electricity and gas	43.9	47.3	45.6	42.9	46.9	44.9
Total, industry	78.9	82.3	80.6	76.4	78.4	77.4

Source: Conference of European Statisticians and U.N., E.C.E., *Comparison of Levels of Labor Productivity in Industry in Czechoslovakia and France* (Conf. Eur. Stats/WG.21/9) Nov. 17, 1969, table 12.

APPENDIX TABLE 20.—CONSUMPTION OF ELECTRIC POWER IN INDUSTRY COMPARED WITH INDUSTRIAL OUTPUT IN EAST AND WEST EUROPEAN COUNTRIES, 1967

	Consumption of electric power (million kilowatt-hours)[1]	Industrial output (millions dollars)[2]	Kilowatt-hours per dollar of output
Bulgaria	7,798	5,097	1.5
Czechoslovakia	25,182	20,226	1.2
East Germany	37,784	26,047	1.5
Hungary	8,386	8,023	1.0
Poland	33,903	28,175	1.2
Romania	16,270	14,509	1.1
Austria	9,220	5,880	1.6
Belgium	14,885	15,830	.9
France	68,116	67,200	1.0
Sweden	27,998	16,700	1.7
West Germany	105,332	108,200	1.0

[1] From U.N. data, based on country submissions.
[2] East European output is calculated by relationship to West German. The original relationships in 1961, taken from Ernst, are very close to a CEMA estimate for the same year. See Ernst, *op. cit.*, p. 878. They are moved to 1967 by indexes of output, Alton's for Eastern Europe and official for West Germany. Values for West Germany and other Western countries are at official exchange rates.

APPENDIX TABLE 21.—EDUCATION OF GAINFULLY EMPLOYED IN EAST EUROPEAN COUNTRIES

[Percent of total]

Country	Higher education	Secondary education	Other
Czechoslovakia (1960)[1]	7	27	66
East Germany (1967)[2]	3	24	73
Hungary (1967)[3]	5	14	81
Poland (1964)[4]	4	18	78

[1] Czechoslovakia: Jaroslav Berka, "Plánování počtu a kvalifikačního složení pracujících," *Plánované Hospodářství*, no. 4, 1965, p. 94.
[2] East Germany: *Statistisches Jahrbuch der DDR 1968*, p. 74. The number with secondary education is estimated from enrollment figures, pp. 457–459.
[3] Hungary: *Statistical Yearbook of Hungary 1967*, p. 58.
[4] Poland: *Rocznik statystyczny 1968*, p. 71.

APPENDIX TABLE 22.—COMPARATIVE SCHOOL AND UNIVERSITY ENROLLMENT DATA FOR EAST AND WEST EUROPEAN COUNTRIES

	Adjusted school enrollment rating (percentage of school-age population in primary and secondary schools)[1]			Number of students at third level (higher education) per 100,000 inhabitants		
	1950	1955	1964	1950	1955	1964
Bulgaria	63	72	91	381	481	1,260
Czechoslovakia	76	79	86	254	546	1,001
East Germany	84	79	79	162	358	472
Hungary	77	74	80	284	312	503
Poland	70	68	90	473	440	802
Romania	47	50	87	325	448	685
Austria	76	72	69	358	275	681
Belgium	84	91	106	234	426	805
France	78	87	91	334	446	940
West Germany	91	87	88	256	350	455
Italy	53	57	64	310	288	512
Netherlands	85	92	88	603	674	1,209
Norway	77	87	85	231	161	525

[1] Because students outside the ages 5–19, used in the calculation, may be enrolled, percentages (as in the case of Belgium) can exceed 100.

Source: UN Educational, Scientific, and Cultural Organization, *Statistical Yearbook 1968*, pp. 72–74, 165–166.

APPENDIX TABLE 23.—SHARE OF ENGINEERS WITH UNIVERSITY OR EQUIVALENT QUALIFICATIONS IN NONAGRICULTURAL EMPLOYMENT IN EAST AND WEST EUROPEAN COUNTRIES

Country	Reference period	Engineers per thousand employed active persons outside agriculture
Bulgaria	1959	10.3
Czechoslovakia	1959	11.6
East Germany	1959	1.0
Hungary	1959	9.9
Poland	1958	11.6
Romania	1958	17.2
Belgium	1956	3.1
France	1955	6.6
West Germany	1956	4.1
Norway	1955	8.1
Sweden	1955	4.6

Source: U.N., ECE, *Some Factors in Economic Growth in Europe During the 1950's*, Geneva, 1964, ch. V, p. 14.

APPENDIX TABLE 24.—BREAKDOWN OF FIXED CAPITAL STOCK BY SHARES OF MACHINERY AND EQUIPMENT AND SHARES OF BUILDINGS AND STRUCTURES IN EAST AND WEST EUROPEAN COUNTRIES

[Percent of total stock]

	Share of machinery and equipment	Share of buildings and structures, excluding machinery
Czechoslovakia, 1964	50	50
East Germany, 1965	64	36
Hungary, 1962	51	49
Poland, 1967	54	45
Belgium:		
1963	71	29
1952	68	32
1950	[1] 67, 71	33, 29
France:		
1959	70	30
1950	69	31
West Germany:		
1961	71	29
1948, excluding Saar	69	31

[1] Alternative estimates.

The Eastern European data have been adjusted by excluding from "building and structures, including installations" the estimated heavy equipment included. The basic data were taken from the following sources—Czechoslovakia: *Statistical Abstract*, Prague 1968, p. 31, East Germany: *Statistisches Jahrbuch der DDR 1967*, p. 53. Hungary: *A népgazdaság állóezközei, 1959–61* (Fixed Capital in the National People's Economy), 1963, p. 6. Poland: *Rocznik Statystyczny 1968*, p. 181.

The Western European data are from the following sources—Belgium: Fritz Franzmeyer, "Versuch einer Berechung des industriellen Anlagevermögens in Belgien" (Trial Calculation of Industrial Fixed Capital in Belgium) *Vierteljahrshefte zur Wirtschaftsforschung*, no. 1, 1965, 118–19. France: Harry Schimmler "Die Entwicklung des Anlagevermögens und der Produktion in der französischen Industrie, 1950–59," (Development of Fixed Capital and Production in French Industry 1950–59) *Vierteljahrshefte zur Wirtschaftsforschung*, no. 1, 1963, pp. 76–77. West Germany: Rolf Krengel, "Die ersten Ergebnisse der Neuberechnung des industriellen Anlagevermögens für das Gebiet der Bundersepublik auf der Preisbasis 1958" (First Results of the Revaluation of Industrial Fixed Capital for the Federal Republic in 1958 Prices) *Vierteljahrshefte zur Wirtschaftforschung*, no. 3, 1963, 290–291.

APPENDIX B

DERIVATION OF CAPITAL/OUTPUT RATIOS

The capital/output ratios shown in Table 17 are derived from (1) estimates of gross fixed capital in domestic currencies converted to West German marks (DM) by purchasing power ratios for investment goods and construction; and (2) estimates of value added in industry linked to the West German figure by existing estimates of relative levels (Ernst's estimates for East European countries and West Germany in 1961 and U.N. estimates for Western Europe in 1963).

1. Estimates of Fixed Capital

Fixed capital data for the four East European countries included, from statistical yearbooks, were adjusted to exclude from "buildings and installations" the machinery and equipment included. For these adjustments, use was made chiefly of the proportions of construction and machinery and equipment shown in postwar investment data. Fixed capital figures for the four West European countries included were taken from estimates given in the West German economics journal, *Vierteljahrshefte zur Wirtschaftsforschung*.[1] These estimates were made specifically for comparison to the West German estimates of Rolf Krengel, a clear advantage over the original sources, for the present purposes.

The estimates for East European industry, available in 1960 prices, were converted to DM via purchasing power parities originally given in terms of dollars for both the East European currencies and the DM. The purchasing power parities for East European investment goods were obtained by taking the ratio of exports of machinery and equipment in foreign trade prices (converted to accounting dollars) and in domestic prices. This procedure, to which there is no feasible alternative, is usable for measuring the capacity rather than the marketability of the machinery, the desired basis for a comparison of capital stocks, from which "qualitative" differences should if possible be excluded. Even on this basis, as is well known, East European exports to Communist countries are somewhat overpriced, whereas exports to Western markets—and not only to "developed" countries—are very much underpriced.

The most careful Western study of pricing in the Soviet world, Paul Marer's study of Hungarian trade, finds that Hungary's machinery exports to the U.S.S.R. and Poland in 1958–64 were sold at 4.9 and 17.5 percent, respectively, above "world market" prices.[2] In view of the heavy weight of exports to the U.S.S.R. by all these countries, these estimates indicate that their exports to

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[1] Belgium: Fritz Franzmeyer, "Versuch einer Berechnung des industriellen Anlagevermögens in Belgien" (Attempt at Calculating Industrial Fixed Capital in Belgium), *Vierteljahrshefte zur Wirtschaftsforschung*, no. 1, 1965, p. 97ff.

Italy: Fritz Franzmeyer, "Das Anlagevermögen der italienischen Industrie im Jahre 1961" (Fixed Capital in Italian Industry in the Year 1961) *Vierteljahrshefte zur Wirtschaftsforschung*, no. 3, 1965, p. 337ff.

France: Harry Schimmler, "Die Entwicklung des Anlagevermögens und der Produktion in der französischen Industrie" (The Development of Fixed Capital and of Production in French Industry) *Vierteljahrshefte zur Wirtschaftsforschung*, no. 1, 1963, p. 73–78.

West Germany: Rolf Krengel, "Produktionsvolumen und Produktionsfaktoren der Industrie im Gebiet der Bundesrepublik Deutschland" (Volume of Production and Factors of Production in West Germany) *Vierteljahrshefte zur Wirtschaftsforschung*, no. 4, 1965, p. 440ff; Wolfgang Kirner, *Zeitreihen für das Anlagevermögen der Wirtschaftsbereiche in der Bundesrepublik Deutschland* (DIW-Beiträge zur Strukturforschung, Heft 5), West Berlin, 1968, pp. 108–112.

[2] Paul Marer, *Foreign Trade Prices in the Soviet Bloc: A Theoretical and Empirical Study* University Microfilms, 1968, pp. 189–204. Marer continues (pp. 204–28) with a discussion of his results, including a comparison of the results obtained by two Hungarian writers, who found that contract prices for machinery in the trade of the U.S.S.R. and East European countries with one another in 1964 were 26 percent above world market levels. Marer's results appear more acceptable because, as he points out, the "world market prices" they used for comparison were taken from the documentation of importers, whose interest is in getting low price quotations. The comparison therefore exaggerates the difference between machinery prices in the Communist market and on the "world market."

Communist countries were priced at not over 10 percent above "world market prices."

As already noted (Tables 9 and 10 and Appendix Table 14) per kilogram prices of machinery sold to the West average about 50 percent below competitors' prices. Prices measured in terms of capacity should run somewhat more, because old East European designs (and inferior steel) result in heavier machines (Tables 6 and 7 and Appendix Tables 11–13). Differences in per kilogram prices from country to country relate at least in part to differences in this respect. The best single figure for East European machinery exports to the West is probably Marer's estimate for Hungarian exports to Austria—57 percent of world market prices.[3]

The shares of machinery sold in the West ranged in 1961 from only about 7–8 percent for Hungary and 10–11 percent for East Germany to nearly 20 percent for Czechoslovakia and Poland. With these weights and approximate price relatives, the following results are obtained (world market prices = 100):

	Exports to Communist World		Exports to free world		Weighted average price index
	Weight	Price index	Weight	Price index	
Czechoslovakia	80	110	20	57	99
East Germany	90	110	10	57	105
Hungary	93	110	7	57	106
Poland	80	110	20	57	99

These indexes give some idea of the possible range of error involved in using foreign trade/domestic trade ratios as purchasing power ratios for investment goods. Variations in commodity composition, as between exports to the West and to the Communist world, and as between exports and investment, also distort the ratios, to the extent that price relatives vary from product group to product group. Exploratory research indicates that the net price difference for all exports and for investment is small. Here, for example, is a comparison (from data in statistical yearbooks) of the composition of metalworking products exported and invested by East Germany in 1955, using both domestic and foreign trade prices:

	Exports		Investment	
	At domestic prices	At foreign trade prices	At domestic prices	At foreign trade prices[1]
Machinery	46	43	51	48
Transport equipment	28	36	18	23
Electrical and electronic equipment	13	12	22	20
Precision machinery and optics	11	8	6	4
Metal products	2	2	3	3
Total	100	100	100	98

[1] Using the same price relatives as for exports.

The differences in composition and relative prices between exports to the West and exports to the Communist world represent an intractable problem, but one that should not make much difference, given the comparatively small share of exports to the West.

The purchasing power parities for construction are based on two sets of Polish estimates—one comparing construction costs in the East European countries and the U.S.S.R. in 1962, and another comparing Polish and U.S. construction costs in 1959. The latter is linked to the former to obtain estimates in dollars.[4] The CEMA parities used are for industrial construction; the Polish-

[3] Paul Marer, *op. cit.*, p. 197.

[4] Maksymilian Psześnicki, "Porównanie wartości walut krajów RWPG w zakresie robót budowlanych" (Comparative Purchasing Power of CEMA Currencies in Construction), *Inwestycje i Budownictwo*, no. 1, 1964, pp. 14–19 (JPRS 23516). Henryk Hajduk, "Próba Ustalenia 'Parytetu Budowlanego' Złotego do Dolara" (Trial Establishment of 'Construction Parity' of Złoty to American Dollar). *Inwestycje i Budownictwo*, no. 11, 1960, pp. 22–27.

U.S. comparison unfortunately is for all construction. In the case of Poland, the relative prices of residential and other construction do not differ greatly from relative dollar prices, so perhaps this shortcoming as well is not so very serious.

The resulting East European/U.S. price ratios are as follows (dollars per unit domestic currency):

	Investment goods	Construction
Czechoslovakia	0.064	0.147
East Germany	.189	.245
Hungary	.023	.051
Poland	.033	.057

For West Germany, the purchasing power parities used are based on those of Milton Gilbert. For purposes of comparison with Eastern Europe, they are moved to 1961 by implied dollar and DM price changes for the components of investment. The resulting DM-East European currency ratios are used to value fixed capital in DM and East European currencies; the final estimate reflects the geometric means of the ratios between the two sets of values. The DM-East European purchasing power parities are as follows:

	DM per unit of domestic currency	
	Investment goods	Construction
Czechoslovakia	0.283	0.539
East Germany	.84	.95
Hungary	.102	.187
Poland	.146	.209

DM values for West European fixed capital assets are obtained initially for 1955. The fixed capital estimates are first moved to 1955 in domestic currencies by implied price changes for the components of investment. They are then converted, using the geometric means obtained from comparisons carried out with Milton Gilbert's purchasing power equivalents.[5] The results are changed into terms of 1961 prices via West German implied price changes for components of investment.

2. Estimates of Value Added

Estimates of value added in industry (excluding handicrafts) in 1961 West German prices begin with a value for West Germany (including the Saar but not West Berlin) in current prices based on official statistics.

The data used for East European industries are taken directly from Maurice Ernst's estimates linking East European production levels to the West German.[6] And he points out, the relationships among the East European industries are close to those published by the Council for Mutual Economic Assistance for the same year. For the three largest countries, they are likewise close to rough estimates made by the Economic Commission for Europe, also for 1961,[7] and are quite consistent with the relationships calculated by Pryor and Staller[8] (when moved to 1961 with the Alton group's indexes for industry).

The estimates for the other West European countries are linked to West Germany via the U.N. dollar estimates of value added in industry in 1963,[9]

[5] Milton Gilbert and associates, *Comparative National Products and Price Levels*, Paris, 1968, p. 56.

[6] Maurice Ernst, "Postwar Economic Growth in Eastern Europe," *op. cit.*, p. 878, 911–12.

[7] U.N., ECE, *Economic Survey of Europe, 1962*, Part I, Chapter I, p. 3. The divergences from the Ernst and CEMA estimates for Bulgaria, Hungary, and Romania are larger.

[8] Frederic L. Pryor and George J. Staller, "The Dollar Value of the Gross National Products in Eastern Europe, 1955," *Economics of Planning*, no. 1, 1966.

[9] U.N., Department of Economic and Social Affairs, *The Growth of World Industry, 1967 Edition*, New York, 1969. The estimates for East European countries in this publication are so high that they are best ignored as an aberration.

adjusted by reducing the estimate for West Germany to exclude production in handicrafts and output in West Berlin.

3. Accuracy of Estimates

Evidently a good many estimative steps were taken in calculating the capital/output ratios in Table 17 and the estimates of factor productivity in Appendix Table 18. It is unlikely that other students would end up with precisely the same results. The estimates relating output in the various East European countries with output in West Germany are fairly reliable. Employment figures are not entirely comparable, especially given the need to eliminate handicrafts (to the extent that handicrafts are excluded from the production estimates), but the resulting errors should not much affect general conclusions about relative output per worker.

The estimates of fixed capital are obviously the least dependable. For one thing, East European estimates of fixed capital in 1961 are closely related to physical surveys taken in the years immediately preceding. West European estimates reflect mainly calculations from investment series, involving estimates of wartime losses and retirement. Apart from all other considerations, pricing of old plant and equipment (or investments made long since) raises grave problems, which are not likely to be solved uniformly. On the positive side, the author has carried out a perpetual inventory for East German industry, using West German data, which yields quite similar results to those shown in the present study. In any case, the solutions proposed here are not more heroic than those in the familiar Soviet-U.S. comparisons.

LEVELS OF CONSUMPTION IN EASTERN EUROPE

By TERENCE E. BYRNE

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INTRODUCTION

This study deals with consumption in Czechoslovakia, Hungary, and Poland. Many of the observations it contains, of course, are equally applicable to other countries of Eastern Europe. The study initially describes the evolution of the Communist regimes' policy toward personal consumption. These regimes first emphasized socially provided services (especially education and public health) and the supply of food and clothing in adequate quantities. Only later did they begin to see a need for qualitative improvements in food and clothing and a need to increase supplies of consumer durables.

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Recently, after years of neglect and delay, the regimes have decided to invest in more and better housing.

Second, the study summarizes comparisons of per capita consumption in Czechoslovakia, Hungary, and Poland with consumption levels in West Germany and the Soviet Union. The common conclusion is that consumers are significantly better off in Czechoslovakia than in Hungary, Poland, or the Soviet Union, but that even Czechoslovaks are in a very poor position relative to West German consumers. Czechoslovakia, among the more advanced European nations prior to World War II, suffered relatively little damage during the war, and its postwar recovery was rapid. But in the last twenty years the supply of consumer goods and services has grown less rapidly in Czechoslovakia than in any other country under consideration in this paper. Czechoslovakia is still much better off than the Soviet Union, but the same cannot be said for Hungary or Poland. Nevertheless, living conditions have improved greatly in all three countries—Czechoslovakia, Hungary, and Poland—since the mid-1950's.

Finally, this study reviews the accomplishments of Czechoslovakia, Hungary, and Poland in several specific fields of consumption. Diets in these countries are quantitatively adequate and qualitatively better than the Soviet diet, though they are qualitatively inferior to the West German diet. Housing conditions in Czechoslovakia are worse than those in West Germany but better than those in the other Communist countries. Housing conditions are improving more slowly in Czechoslovakia, Hungary, and Poland than in either West Germany or the Soviet Union. Czechoslovakia, Hungary, and Poland are in the same league with the Soviet Union in per capita consumption of clothing. Czechoslovakia is shown to rank ahead of the other Communist countries but well behind West Germany in stocks of consumer durables considered on a per capita basis.

Section I.—Eastern European Policy on Consumption

Eastern European policy on personal consumption, first modeled on Soviet policy of the 1930's and 1940's, has been greatly modified as a result of shifts in the Soviet treatment of consumers, growing prosperity, and Western influence. In the late 1940's the new Eastern European regimes, under Soviet tutelage, began by trying to control consumption through detailed planning and administrative rationing in order to hasten the "building of socialism." Once adequate supplies of basic necessities had been restored, the expansion of heavy industry took precedence over further increases in consumption. The distribution of food and housing was governed by administrative rationing. Prices were relied upon to govern the distribution of meager supplies of clothing and consumer durables, but these prices often were held below equilibrium levels with the result that shortages and queues were commonplace.

The Eastern European regimes maintained their original policy on consumption through the early 1950's, and per capita consumption recovered little beyond prewar levels during this period. The shift in Soviet policy after the death of Stalin and the accompanying unrest in Eastern Europe (evidenced by the East German riots in June 1953

and the disorders in Poland and insurrection in Hungary in the fall of 1956) changed their approach. Soviet support for "peaceful competition" with the West permitted rapid economic growth with steady increases in consumption. Inevitably, the Eastern European regimes began to pay more attention to consumer preferences and to rely more on prices and less on direct rationing. Since 1955, per capita consumption in Eastern Europe has grown as fast as or faster than GNP, though not quite so fast as per capita consumption in Western Europe.

The consequences of rising consumption levels have been far-reaching. Communist doctrine still looks to the development of "socialist man," who works for the good of society rather than for his own private gain. The leaders have not explicitly given up the goal of distributing more and more goods free of charge on the basis of need, but in practice they have been moving closer to the Western European approach to consumption. Both supplies and retail prices are responding to consumer demand, and trade is becoming more efficient.

Medical services and education are essentially free of charge, but the difference between Eastern and Western European practice in these areas is one of degree, not of kind. The chief difference is probably in higher education, which is more widely available in Eastern Europe, not only in general, but specifically to the children of workers. Housing rents are still fixed well below maintenance and amortization costs, though as a corollary the supply of housing has increased less than in Western Europe. The prices of basic foodstuffs and public services also remain relatively low, and prices of good quality clothing and of many consumer durables are extremely high in comparison with Western European prices.

Changes both in pricing practices and in consumption patterns constantly erode the importance of price manipulation as a device for leveling real incomes. Income differentials remain large (except in Czechoslovakia), although the gap between average rural and urban incomes has been greatly reduced and in some countries is now negligible. The urban-rural differential also has been disappearing, if less rapidly, in Western Europe.

The policy of encouraging communal consumption at the expense of private consumption has been abandoned, in practice if not in principle. As recently as the late 1950's, Eastern European leaders were still looking forward to the gradual abandonment of private family meals, the shift of child care and training entirely to nurseries and schools, and the provision of consumer durables chiefly for rent rather than for purchase. However, modern kitchens, household appliances, and automobiles now are offered and promised in rapidly increasing volume to eager consumers. The consumers' ideas of welfare, based on traditional values and strong Western influences, are quite evidently winning the day.

The regimes have given way mainly because it has proved impossible to motivate managers and workers to perform efficiently without appealing to "selfish interests" and making available the goods and services desired by the population. The rebirth and growth of objective economics has obviously had an influence on policy in this area. Economists have provided the rationale and the organizational techniques for harnessing self-interest to the accomplishment of economic

tasks. But the leaders themselves have made the crucial choice—which is to try to compete with the West economically, even at the cost of putting off or giving up the development of "socialist man."

Section II.—General Studies of Per Capita Consumption

It is not entirely clear just how well the regimes of Czechoslovakia, Hungary, and Poland have responded to the needs of their consumers. Prior to World War II, per capita consumption in Czechoslovakia and, to a lesser degree, Hungary apparently compared favorably with that in Western Europe, running well ahead of per capita consumption in Poland or the U.S.S.R. Boundary changes, population shifts, and the uneven impact of wartime killing and devastation render comparisons between prewar and postwar economic statistics and the evaluation of aggregate postwar accomplishments rather tricky. It can safely be said that progress in the consumption field has been quite uneven in Eastern Europe since the war.

Only a few studies have been published that compare levels of consumption among the countries considered in this paper. In one of these, included in a collection that was published earlier by the Joint Economic Committee,[1] Maurice Ernst estimated levels of consumption in a number of Western and Eastern European countries (not including the Soviet Union). Dr. Ernst estimated per capita consumption in Czechoslovakia, Hungary, and Poland to be related to the West German level in selected years as indicated in Table 1. These figures do not include the consumption by households of services that are paid for by government—for example, educational, health, and recreational services. The author suggests that the quantity of these services has increased at least as rapidly in Eastern Europe as in West Germany, and he implies that the quantity of such services per capita in Eastern Europe in the 1960's compares much more favorably to West German standards than does the quantity of privately purchased consumer goods and services. Ernst emphasizes that great changes took place in the Eastern European countries between the prewar and the postwar years in the distribution of consumption among strata or classes of the populace. The relative position of the peasants, he indicates, has improved most and that of unskilled and semiskilled workers next

TABLE 1.—COMPARATIVE LEVELS OF PER CAPITA PERSONAL CONSUMPTION[1]

	Prewar[2]	1950	1955	1960	1964
West Germany	105	100	141	159	[3] 175
Czechoslovakia	100	100	100	100	[3] 100
Hungary	92	69	73	78	84
Poland	47	60	68	67	70

[1] M. Ernst, "Postwar Economic Growth in Eastern Europe," New Directions in the Soviet Economy, pt. IV, p. 887. (Here the base has been adjusted from West Germany to Czechoslovakia.)
[2] 1936 for West Germany, 1937 for Poland and Czechoslovakia, 1938 for Hungary.
[3] Similar results were obtained by the West German writers in comparing consumption in Czechoslovakia, and in West Germany. They found the level in Czechoslovakia in 1965 to be 55 to 60 percent of the West German level; Ernst's figure is 57 percent. Berta Backe-Dietrich and Tatjana Globakar, "Der Lebensstandard in der Tschechoslowakei" (Living Standards in Czechoslovakia), Vierteljahrshefte zur Wirtschaftsforschung, no. 4, 1967, pp. 453–465.

[1] Maurice Ernst, "Postwar Economic Growth in Eastern Europe." *in* U.S. Congress, Joint Economic Committee *New Directions in the Soviet Economy,* Washington, U.S. G.P.O., 1966, pt. IV, pp. 875–916.

most, while the relative positions of skilled workers and of the middle class have deteriorated.

Ernst based his indexes primarily on the evaluation of 1955 consumption in the various countries in West German marks by the application of estimated purchasing power ratios between the mark and each of the other currencies. However, he adjusted the indexes so calculated to take into account the results of calculations based on sectoral quantity indexes and to allow for differences between the West German and Eastern European price structures. Ernst's figures indicate that personal consumption per capita increased between 1950 and 1964 by 20 percent in Czechoslovakia, 47 percent in Hungary, 39 percent in Poland, and 110 percent in West Germany. These figures may be compared with an estimate by David W. Bronson and Barbara S. Severin that per capita consumption (including consumption of socially provided services) in the Soviet Union increased by 82 percent between 1951 and 1965.[2]

T. Kiss, a Hungarian writer, prepared an estimate of relative levels of per capita consumption in most CEMA (Council for Mutual Economic Assistance) countries in 1959. Although his methodology is unknown, his figures have been cited and used in a noteworthy book, *Sopostavlenie urovnei ekonomicheskogo razvitiia sotsialisticheskikh stran*[3] (A Comparison of the Level of Economic Development of Socialist Countries), that was edited by Ia. Ia. Kotkovskii, O. K. Rybakov, and A. P. Strukov. Kotkovskii, Rybakov, and Strukov converted the official value of the Soviet consumption fund[4] into zlotys via a ruble-zloty ratio that they had calculated from the Soviet and Polish prices on a "market basket" selection of consumer goods and then linked this value to Kiss' index of consumption funds in other CEMA countries on the basis of its relation to the Polish consumption fund. (A single ruble-zloty ratio had been obtained by averaging ratios calculated using first Soviet and then Polish quantity weights.) Kotkovskii, Rybakov, and Strukov updated these 1959 estimates to 1963, using official indexes of the consumption funds of the several countries. Their results are shown in Table 2. Kotkovskii and Rybakov also have presented similar, though more rounded, figures for per capita consumption in Eastern Europe during 1963 in a brief journal article.[5]

TABLE 2.—COMPARATIVE LEVELS OF PER CAPITA MATERIAL CONSUMPTION[1]

	1959	1963
Czechoslovakia	100	100
Hungary	78	80
Poland	78	77
U.S.S.R.	71	72

[1] Ia. Ia. Kotkovskii, O. K. Rybakov, and A. P. Strukov (editors), Sopostavlenie urovnei ekonomicheskogo razvitiia sotsialisticheskikh stran, p. 207. (In this presentation, the base has been adjusted to Czechoslovakia from East Germany in 1959 and from the U.S.S.R. in 1963.)

[2] D. W. Bronson and B. S. Severin, "Recent Trends in Consumption and Disposable Money Income in the USSR," *New Directions in the Soviet Economy*, pt. II–B, p. 521. (495–529).

[3] Moscow, Ekonomika, 1965.

[4] In the statistical system of Communist countries, the "consumption fund" (usually calculated on an annual basis) consists of goods and the "material cost" of services made available to the public for private, or personal, and social consumption. Thus clothing would be included at its market value, but dramatic entertainment would be evaluated at the cost of printing tickets, the cost of depreciation on theaters, sets, and other capital, the cost of heating theaters, and so forth.

[5] Ia. Kotkovskii and O. Rybakov, "Tendentsii ekonomicheskogo razvitiia i sotrudnichestva evropeiskikh sotsialisticheskikh stran," *Ekonomicheskie nauki*, no. 2, 1966, p. 95 (92–96).

A study by a West German writer, Berta Dietrich, comparing consumption in West Germany and the Soviet Union provides a link between the estimates of Kiss and those of Ernst. In 1960, according to this study, the quantity of consumption goods—differing little from the "material consumption" of Communist writers—available to a 4-person working class family in the Soviet Union was one-half the quantity available to a similar West German family.[6] This comparison is made using West German price weights. With the CEMA price weights used by Kiss, the difference would be increased by perhaps 10 percent. There is also some difference between relative levels of per capita consumption and relative levels of consumption in worker households. Because of the large number of peasant households in the Soviet Union, which still have somewhat lower than average standards of living, and the larger proportion of high incomes in West Germany (because of the substantial number of well-to-do owners of property), there is a somewhat greater difference between West Germany and the Soviet Union in per capita consumption than in consumption by working class households. Given these considerations, plus the fact that a comparison covering only goods differs slightly from one including services, the results of putting together the Dietrich comparison with Kiss' estimates—showing Czechoslovak consumption 42 percent lower than West German consumption—are roughly consistent with those of Ernst.

Kotkovskii, Rybakov, and Strukov cites indexes of retail sales of consumer goods that were calculated for CEMA countries by two Czechoslovak economists, M. Brdek and I. Holeček. Brdek and Holeček apparently used the prevailing exchange rates for noncommercial transactions to convert the various national figures for retail sales into Czechoslovak crowns, then converted these figures into index numbers based on the Czechoslovak datum for each year. Their findings are shown in Table 3.

TABLE 3.—COMPARATIVE LEVELS OF PER CAPITA RETAIL SALES[1]

	1955	1960	1963
Czechoslovakia	100	100	100
Hungary	68	79	85
Poland	66	71	77
U.S.S.R.	57	63	65

[1] Ia. Ia. Kotkovskii, O. K. Rybakov, and A. P. Strukov (editors.), Sopostavlenie urovnei ekonomicheskogo razvitiia sotsialisticheskikh stran, p. 208.

An index of consumption funds per capita in CEMA countries in 1965 was developed by Ia. Ia. Kotkovskii and published in the Soviet journal *Voprosy ekonomiki.* This index was constructed by calculating value ratios between the ruble and the Polish and Czechoslovak currencies on the basis of the prices of about thirty food and nonfood consumer goods and using these ratios in some incompletely specified manner to evaluate the consumption funds of various countries. For Kotkovskii's findings, see Table 4.

[6] Berta Dietrich, "Der Lebensstandard in der Sowjetunion in Vergleich Lzur Bundesrepublik Deutschland" (Living Standards in the Soviet Union in Comparison with West Germany) *Vierteljahrshefte zur Wirtschaftsforschung,* no. 3, 1962, pp. 249–261.

TABLE 4.—*Comparative levels of per capita material consumption,*[6] *1965*

Czechoslovakia	100
Hungary	80
Poland	70
U.S.S.R.	70

[6] Ia. Ia. Kotkovskii, "Mezhdunarodnye sopostavleniia stoimostnykh pokazatelei," *Voprosy ekonomiki,* no. 8, 1966, pp. 87–88. (Here the base has been shifted to Czechoslovakia, from the U.S.S.R.)

Although the comparisons presented heretofore are marred by a variety of serious shortcomings, the relationships indicated by Tables 1 through 4 are remarkably similar. The five countries are ranked almost without demurral in descending order of per capita well-being as follows: West Germany, Czechoslovakia, Hungary, Poland, U.S.S.R. The most significant inconsistencies among the tables involve the position of Poland. Kotkovskii, Rybakov, and Strukov place Poland on a par with Hungary in 1959 (Table 2), whereas Ernst sees Hungary significantly ahead of Poland in 1960 and in earlier and later years as well (Table 1). There also is apparent disagreement concerning the position of Poland relative to the U.S.S.R. Kotkovskii places these two countries on a par for 1965 (Table 4), but Poland is credited with a significant lead over the U.S.S.R. as recently as 1963 both in the study by Kotkovskii, Rybakov, and Strukov (Table 2) and in that by Brdek and Holeček (Table 3). Further complicating the picture, the Kotkovskii, Rybakov, and Strukov table shows the U.S.S.R. gaining on Poland between 1959 and 1963, but the Brdek and Holeček table shows Poland increasing its lead over the U.S.S.R. during the same period.

SECTION III.—CONSUMPTION OF SELECTED TYPES OF GOODS

Ivan Štrup, a Czechoslovak writer, has argued persuasively that comparison of the physical quantities consumed per capita of a few selected products is of little value in assessing the relative levels of total per capita consumption in defferent countries.[7] He notes that a number of studies have been made in this manner comparing consumption in Czechoslovakia with that in advanced non-Communist countries. These studies, he writes, always show that Czechoslovakia is ahead in some areas and behind in others. The various indicators are neither additive nor comprehensive, so authors of such studies merely guess at their overall significance. The usual conclusion is that Czechoslovakia is "on approximately the same level as the advanced European capitalist countries" in per capita consumption. However, Štrup presents general calculations indicating that "the average overall standard of living" in Czechoslovakia was no more than 38 percent and probably only about 30 percent of that in France in 1964.[8]

[7] I. Štrup, "Comparing the Standard of Living and the Overall Efficiency of Production in the CSSR and France," *Eastern European Economics,* vol. VI, no. 4, 1968 (Summer), pp. 24–43 (From *Politická ekonomie,* no. 2, 1968).

[8] Štrup's estimates of the relative position of Czechoslovakia no doubt are considerably lower than those most observers would anticipate. His study attempts to compare "living standards," which he defines to include personal and social consumption (with allowance for the quality of goods and services) and leisure. The higher of his estimates of the living standards of Czechoslovakia, 38 percent of the French level, was obtained after such adjustments as an 18 percent reduction in the estimate of Czechoslovak housing services to allow for the smaller number of rooms in the average Czechoslovak dwelling

Footnote continued on following page.

Keeping Štrup's warning firmly in mind, it remains worthwhile to review the accomplishments of Czechoslovakia, Hungary, and Poland in specific areas of consumption. In some instances, consumption can be compared directly among these countries and measured against that in West Germany and the Soviet Union.

A. FOODSTUFFS

In the early postwar years, the number one objective in personal consumption apparently was the recovery to prewar levels of food consumption. Although the comparison of prewar and postwar figures for Central and Eastern Europe is complicated by boundary and demographic changes, it seems clear that prewar levels of food consumption generally were regained in Czechoslovakia, Hungary, and Poland during the mid-1950's. Since that time there has been little change in daily per capita food consumption in calories, as is shown in Appendix Table 1, but considerable change has occurred in the composition of diets. There has been a trend toward increased consumption of high quality foods such as meat and fruit and decreased consumption of more prosaic foods such as bread and potatoes. (See Figures 1 and 2.) This trend can be expected to continue, although diets seem to measure up fairly well by Western European standards even now. Qualitative inferiority of diets in the Communist countries is apparent primarily in lower levels of animal protein and vitamin content, lack of variety, and greater reliance on starchy staples.

There is and will continue to be considerable variation in the ranking of Czechoslovakia, Hungary, Poland and the benchmark countries of West Germany and the U.S.S.R. according to their per capita consumption figures for various foods. Diet composition is affected by many factors, including features of climate and soil, levels of personal income, relative prices of foods and of other consumer products, distribution of the population between urban and rural areas, age-sex composition of the population, government policies regarding the organization of and investment in food production and distribution, and government policies concerning food imports and exports. Sometimes government policies affecting food availability are determined by extraneous factors. Thus the Polish government, apparently motivated by desire for convertible foreign exchange, has encouraged the export of meat even to the detriment of Polish diets.

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unit and a reduction of the figure for the overall Czechoslovak living standard by 10 percent to allow for the sacrifice of leisure that necessarily is associated with the participation in the labor force of a larger proportion of the population in Czechoslovakia. The lower of Štrup's estimates of the living standard of Czechoslovakia, about 30 percent or the French level, was reached by incorporating further adjustments for such factors as waiting lists for scarce goods (e.g., the Czechoslovak consumer must pay 20,000 crowns upon placing his name on a waiting list for an automobile and wait from 3 to 5 years for delivery), waiting lines and poor service in retail outlets, and the inferior quality of Czechoslovak consumer services. When the broad range of intangible and unmeasurable factors is taken into consideration, Štrup's estimates may well be relatively accurate, but he includes factors that ordinarily are omitted from studies of relative levels of consumption.

Figure 1

PROPORTION OF CALORIC INTAKE DERIVED FROM MEAT, 1955 and 1966

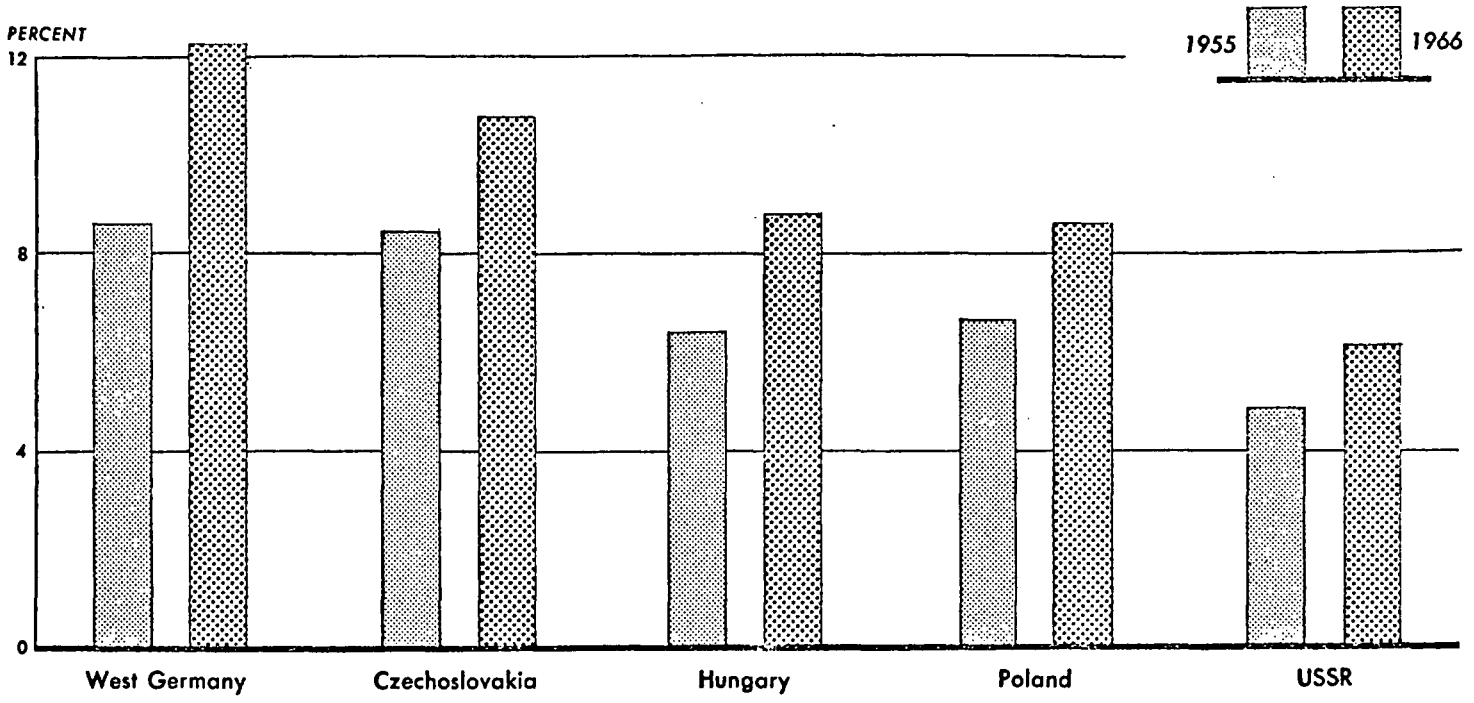

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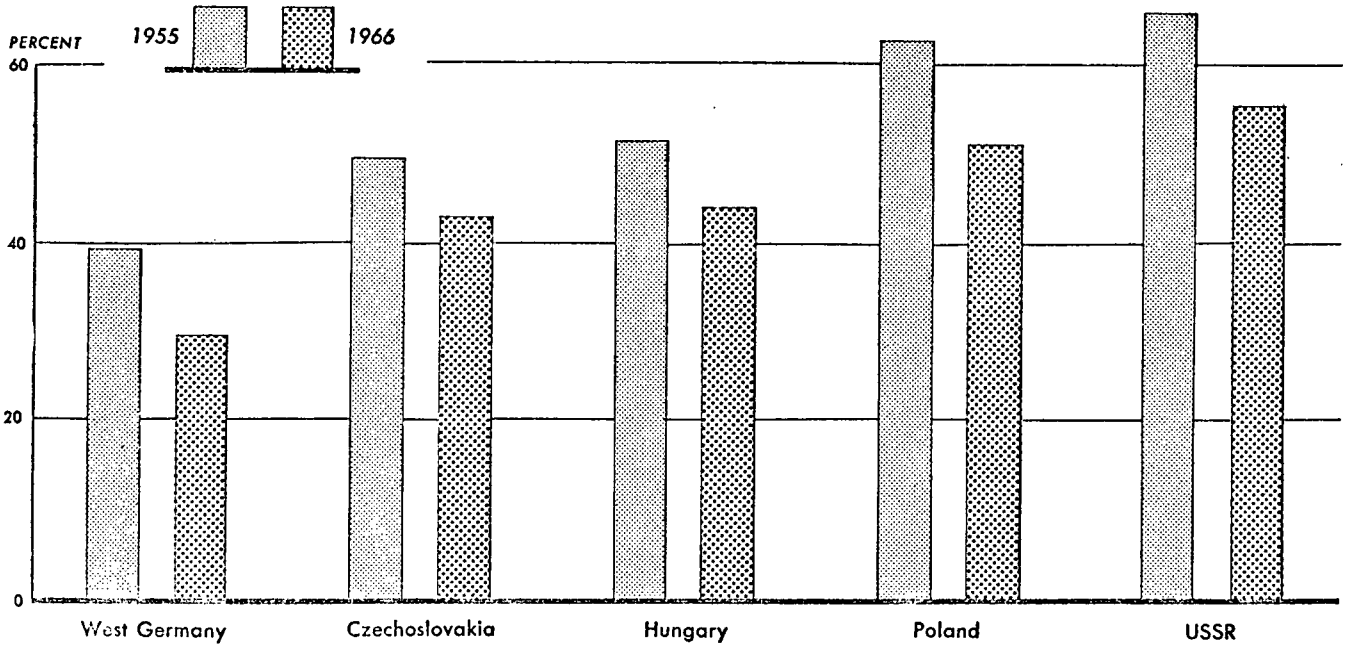
Figure 2

PROPORTION OF CALORIC INTAKE DERIVED FROM POTATOES AND GRAIN
1955 and 1966



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B. HOUSING

Communist governments have been prone to postpone satisfaction of housing needs, giving housing a fairly low priority among consumer goods and services. The low priority of housing may be due to the fact that expansion and improvement of the housing stock require a tremendously large and continuing commitment of resources relative to the short-run payoff in consumer satisfaction. Not only is the construction of dwellings itself an expensive process dependent upon supporting industries that produce construction equipment and materials, but construction must be accompanied by and followed up with a whole host of other services. New houses need to be provided with electricity, sewerage, transportation, retail facilities, police and fire protection, schools, and other ancillary services and facilities. By charging realistic rents and—even more—by encouraging private ownership of housing, the state can pass on the cost to consumers, as the Eastern European regimes are beginning to do—albeit with apparent reluctance, for it means forsaking the goal of free communally supplied housing.

The housing situation in Czechoslovakia at the end of World War II was relatively good. Wartime destruction had been light, and the large German minority had just been compelled to vacate its homes and flee to Germany. The situation was tighter in Hungary and a good deal worse in Poland, which had suffered extensive destruction. Postwar boundary changes and the large number of wartime deaths only partially alleviated the Polish situation. In the succeeding years, Czechoslovakia has built few dwellings, concentrating its economic resources on activties of higher priority to the regime. The dwelling stock has grown little faster than the population—which has grown slowly—and population shifts have brought a shortage of housing in Prague and elsewhere. Hungary first attacked its postwar housing problems by subdividing existing dwelling units, then, like Czechoslovakia, followed a policy of expanding its housing stock little faster than the very slow pace of its population growth. Poland has had to cope not only with extensive wartime destruction of housing but also a more rapidly growing population than that of either Czechoslovakia or Hungary. Nevertheless, dwelling construction proceeded at a slow pace through the early 1950's, then accelerated during the later 1950's and increased a bit more during 1961–1966. The number of dwellings constructed annually in Czechoslovakia and Hungary peaked at modest levels in 1961 and declined somewhat thereafter. Housing conditions now are improving slowly at best in Czechoslovakia, Hungary, and Poland.

In comparison with West Germany, where the housing situation was very bad at the close of World War II because of destruction and a huge influx of refugees and expellees, the three Eastern European countries have posted a dismal record in the area of housing. Even in the Soviet Union, where housing conditions were very bad at the end of the war and where housing construction suffered from extremely low priority well into the 1950's, much more has been done to improve housing in recent years than in Czechoslovakia, Hungary, or Poland. Nevertheless, Soviet housing conditions still are markedly inferior to those in Czechoslovakia, though they appear to approximate housing

conditions in Hungary and Poland. Appendix Tables 2 through 5 show comparative data on housing in the five countries discussed above.

The quality of housing constructed in the Communist countries since World War II is quite low by Western, e.g., West German, standards. The quality of materials and assembly work has been low, and new dwelling units are small, unattractive, and poorly appointed. Many dwellings have been constructed without such amenities as running water, though this has been less common in Czechoslovakia than in the other Communist countries

C. CLOTHING AND SHOES

During the early postwar years, clothing probably was second only to food on the consumer goods priority scale of the Communist regimes of Eastern Europe. However, much greater attention was paid by the regimes and the producers to achievement of plan targets for the quantity of clothing produced than to quality and style. Thus in the late 1950's, inventories of clothing that could not be sold at established prices began to accumulate in the distribution networks. People had been supplied with sufficient unattractive clothing to meet their physical requirements and were unwilling to buy more. They longed for clothing that would be of better quality and more pleasing appearance—and styled according to current Western fashion. Real improvement has been made in all these respects in the past ten years, but much Eastern European clothing still appears shoddy and unattractive in comparison to that available in the West. The clothing produced in Czechoslovakia, Hungary, and Poland is visibly superior to that turned out in the Soviet Union, but the quantity of clothing purchased annually by the Soviet consumer compares very favorably to the quantity purchased by the consumer of Czechoslovakia, Hungary, or Poland. The latter three countries do lead the Soviet Union on a per capita basis in the quantity of woolen cloth made available, but they trail in cotton and in silk-type cloth. (See Appendix Tables 6 through 8.) The position of the Soviet Union in the clothing field is enhanced by the capability of its southern regions to produce cotton. Soviet consumers also enjoy a relatively large supply of shoes (see Appendix Table 9); however, shoes produced in the Soviet Union are of considerably lower quality than those produced elsewhere.

D. DURABLE GOODS

In recent years, the production of consumer durables has expanded rapidly in Czechoslovakia, Hungary, and Poland. Such goods do not lend themselves to socialized consumption. Moreover, Communist leaders may have feared that widespread possession of them would contribute to the *embourgeoisement* of the populace. Nevertheless, the leaders have given way and are even buying Western equipment to produce consumer durables—including automobiles!

Increased production of consumer durables presents difficult practical as well as ideological problems. Like housing, it ties up a large amount of investment. The consumer durables now so much desired—including refrigerators, automatic washing machines, dishwashers, and, above all, automobiles—are complex pieces of equipment, difficult

to produce in good quality at acceptable cost. Production difficulties are increased by the variety of consumer durables demanded. Moreover, the production of these goods does not mean the end of related difficulties. They must be sold, and if they do not satisfy the desires of the general public, it may be difficult to sell all the durables that have been produced at prices that will cover production costs. In addition, resources must be committed to the maintenance of durable goods throughout their product lives. Given continuing need to modernize the product line in response to technological advances and changing consumer demand and the clumsiness of the Communist system in responding to the need for change, expansion of consumer durable goods production can be seen to be a fertile source of problems.

Considering the organizational and technological problems involved and the ideological reluctance of the regimes to permit expanded production of consumer durables, it should not be surprising that experience with these goods in Eastern Europe has left much to be desired. The goods produced tend to be of smaller capacity, less advanced design, and lower reliability than their Western counterparts. The provision of maintenance services has been wholly inadequate. Inventories of unpopular models have accumulated in the distribution network.

The stocks of durables in the hands of Eastern European consumers compare vary unevenly in size on a per capita basis with the West German stocks. (See Appendix Tables 10 through 12.) Czechoslovakia rivals West Germany in the availability of radios and television sets, but Hungary and Poland trail well behind along with the U.S.S.R. West Germany has a huge lead over the Communist countries in stock of automobiles, but this advantage is partly compensated for by larger stocks of motorcycles and motorscooters in the Communist countries. Czechoslovakia lags far behind West Germany in stock of refrigerators but holds a commanding lead over Hungary, Poland, and the U.S.S.R. Czechoslovakia leads West Germany in stock of washing machines, and Hungary and Poland compare favorably with West Germany in this regard. However, it must be remembered that few Eastern European washing machines are of the automatic type. The list could be prolonged, but on the whole it appears that West Germany has a large lead over the Communist countries in stocks of consumer durables on a per capita basis, with Czechoslovakia holding a general advantage over Hungary, Poland, and the U.S.S.R.

E. SERVICES

The statistical indexes for comparing services are rather meager. The Communist countries for the most part lack facilities for servicing consumer durables, especially automobiles. The Eastern European countries generally are better provided with such services than the U.S.S.R., probably because these countries had considerable numbers of trained craftsmen before the war and many of them have stayed on the job. West Germany is much better supplied with such services.

In public services—health, education and culture, sports, and the like—the Communist countries offer as much as or more than West Germany and other Western countries, though under many political

restraints. Relative to population, more doctors and other health personnel are to be found in the Communist countries. Despite a widespread shortage of modern drugs and equipment, the Eastern European doctors undoubtedly give good service.

The main quantitative difference in educational systems is the wider availability of free education in Eastern Europe, including—for more politically reliable people—university level education. West Germany gives at least as much primary and secondary education as the Eastern European countries and the U.S.S.R.

Practically all health and educational services are provided free of charge in Eastern Europe. The choice of education is more limited than in Western Europe, and there is a good deal of evidence of student dissatisfaction, as there is elsewhere. The problems of mass education have been solved nowhere.

STATISTICAL APPENDIX

APPENDIX TABLE 1.—DAILY PER CAPITA FOOD CONSUMPTION IN CALORIES [1]

	1955	1966
West Germany [2]	3,040	2,920
Czechoslovakia	2,900	3,110
Hungary [3]	3,120	3,100
Poland	3,160	[4] 3,250
U.S.S.R.	3,060	3,180

[1] The figures presented in this table are sufficiently accurate to indicate only that caloric intake is relatively stable at comparable levels in the 5 countries.
[2] Data on West German food consumption are for 12 months ending June 30 of stated year.
[3] Hungarian figures include calories from alcoholic beverages.
[4] 1965–67 average.

APPENDIX TABLE 2.—DWELLINGS PER 1,000 INHABITANTS

	End 1960 [1]	End 1967 [1]	Average annual increase, 1961–67 (percent)
West Germany [2]	292	336	2.0
Czechoslovakia	278	299	1.0
Hungary	280	305	1.2
Poland [3]	239	251	.7
U.S.S.R.	235	280	2.5

[1] Data for the Communist countries exclude vacant dwellings.
[2] Includes West Berlin.
[3] Polish data for 1960 are as of Dec. 6, 1960.

APPENDIX TABLE 3.—*Total (useful) floor space per capita at year end, 1967* [a]

	Square meters
West Germany	20
Czechoslovakia	15
Hungary	10
Poland	13
U.S.S.R.	10

[a] Total (useful) floor space differs from the concept of "living space" often referred to in statistical compilations on the Communist countries by its inclusion of such areas as kitchens, bathrooms, and hallways. "Living space" typically constitutes about 70 percent of total (useful) floor space.

APPENDIX TABLE 4.—*Total (useful) floor space per newly constructed dwelling, 1967*

	Square meters
West Germany	81.9
Czechoslovakia	60.8
Hungary	62.2
Poland	51.0
U.S.S.R.	44.5

APPENDIX TABLE 5.—ESTIMATED EQUIPMENT OF DWELLINGS, YEAR-END 1966

[In percent]

	Piped water	Fixed bath or shower	Toilet [1]	Electricity
West Germany	[2] 96.7	49.0	[2] 64.0	([3])
Czechoslovakia	52.3	38.6	35.7	97.4
Hungary	25.4	22.0	24.8	75.1
Poland	39.0	[4] 13.9	[4] 18.9	92.0
U.S.S.R.	[5] 52.0	([3])	([3])	88.0

[1] It is assumed that all dwellings constructed after 1960 have toilet installations.
[2] Equipment inside the building but not necessarily inside the dwelling unit.
[3] Not available.
[4] As of Dec. 6, 1960.
[5] Urban housing as of 1959.

APPENDIX TABLE 6.—RETAIL SALES OF COTTON CLOTH PER CAPITA

[In square meters]

	1955	1960	1965	1966	1967
Czechoslovakia	15.7	19.6	20.2	20.1	19.8
Hungary	([1])	13.3	15.0	15.1	15.3
Poland [2]	13.2	14.3	15.9	15.6	15.6
U.S.S.R. [3]	21.1	22.4	23.3	24.1	24.5

[1] Not available.
[2] Includes "cottonlike" artificial fabrics.
[3] Production plus imports minus exports.

APPENDIX TABLE 7.—RETAIL SALES OF WOOLEN CLOTH PER CAPITA

[In square meters]

	1955	1960	1965	1966	1967
Czechoslovakia	3.9	4.5	4.1	3.9	4.2
Hungary	([1])	2.4	2.7	2.5	2.7
Poland [2]	3.5	3.1	3.2	3.2	3.4
U.S.S.R. [3]	1.7	2.2	2.1	2.2	2.4

[1] Not available.
[2] Includes "wool-like" artificial fabrics.
[3] Production plus imports minus exports.

APPENDIX TABLE 8.—RETAIL SALES OF SILK CLOTH AND SIMILAR SYNTHETIC FABRICS PER CAPITA

[In square meters]

	1955	1960	1965	1966	1967
Czechoslovakia	2.7	3.5	3.8	3.8	3.7
Hungary	([1])	1.4	1.7	1.7	1.7
Poland	.8	1.2	1.4	1.4	1.5
U.S.S.R. [2]	2.2	3.3	3.5	3.7	4.0

[1] Not available.
[2] Production plus imports minus exports.

APPENDIX TABLE 9.—PER CAPITA RETAIL SALES OF SHOES

[In pairs]

	1955	1960	1965	1966	1967
Czechoslovakia	1.3	1.9	2.1	2.0	2.0
Hungary	([1])	1.5	1.9	1.9	1.9
Poland	.9	1.3	1.5	1.6	1.7
U.S.S.R. [2]	1.4	2.1	2.2	2.4	2.6

[1] Not available.
[2] Production plus imports minus exports.

APPENDIX TABLE 10.—STOCK OF RADIO RECEIVERS PER 1,000 INHABITANTS

[Units]

	1955	1960	1965	1966	1967
West Germany	257	285	302	305	310
Czechoslovakia	200	250	333	333	333
Hungary [1]	[2] 188	222	245	244	243
Poland	65	139	165	162	159
U.S.S.R.	66	130	166	171	177

[1] Number of subscribers.
[2] 1956–59 average.

APPENDIX TABLE 11.—STOCK OF TELEVISION RECEIVERS PER 1,000 INHABITANTS

[In units]

	1955	1960	1965	1966	1967
West Germany	10	83	192	213	230
Czechoslovakia	3	62	167	167	200
Hungary [1]	(2)	10	82	98	114
Poland	(2)	19	78	91	104
U.S.S.R.	4	22	68	82	96

[1] Number of subscribers.
[2] Not available.

APPENDIX TABLE 12.—STOCK OF AUTOMOBILES PER 1,000 INHABITANTS

[In units]

	1955	1960	1965	1966	1967
West Germany	33	76	146	160	171
Czechoslovakia	10	18	30	34	36
Hungary	[1] 2	3	10	12	14
Poland	1	4	8	9	11
U.S.S.R.	2	3	4	5	5

[1] 1956–59 average.

APPENDIX TABLE 13.—STOCK OF MOTORCYCLES AND MOTORSCOOTERS PER 1,000 INHABITANTS

	Units				
	1955	1960	1965	1966	1967
West Germany	47	34	12	9	7
Czechoslovakia	33	56	85	91	[1] 94
Hungary	[2] 17	24	39	44	46
Poland	5	32	55	58	55
U.S.S.R.	4	13	24	26	27

[1] 1966 stock plus 1967 sales.
[2] 1956–59 average.

APPENDIX TABLE 14.—STOCK OF HOUSEHOLD REFRIGERATORS PER 1,000 INHABITANTS

	Units						
	1953	1955	1960	1962	1965	1966	1967
West Germany [1]	21	(2)	(2)	167	(2)	(2)	(2)
Czechoslovakia	(2)	8	33	(2)	91	111	125
Hungary	(2)	1	4	(2)	25	36	48
Poland	(2)	0.3	6	(2)	32	42	52
U.S.S.R.	(2)	4	7	(2)	33	40	50

[1] Estimated from the number of refrigerators per 1,000 households on the basis of 3.27 persons per household, the number indicated for 1962 in census data.
[2] Not available.

APPENDIX TABLE 15.—STOCK OF WASHING MACHINES PER 1,000 INHABITANTS

	Units						
	1953	1955	1960	1962	1965	1966	1967
West Germany[1]	28	(2)	(2)	104	(2)	(2)	(2)
Czechoslovakia	(2)	83	167	(2)	200	200	250
Hungary	(2)	16	45	(2)	114	130	143
Poland	(2)	1	62	(2)	146	155	172
U.S.S.R.	(2)	1	10	(2)	61	77	93

[1] Estimated from the number of washing machines per 1,000 households on the basis of 3.27 persons per household, the number indicated in census data for 1962.
[2] Not available.

APPENDIX TABLE 16.—PHYSICIANS PER 10,000 INHABITANTS[1]

[Units]

	1955	1960	1965	1966
West Germany	13.6	13.9	14.5	14.5
Czechoslovakia	14.0	17.5	20.5	21.3
Hungary	14.3	15.7	19.2	19.8
Poland	6.8	9.7	12.6	13.0
U.S.S.R.	15.2	18.0	21.0	21.6

[1] Official figures for West Germany and Hungary; for other countries, official estimate of number of physicians at end of year divided by estimate of midyear population.

APPENDIX TABLE 17.—TELEPHONES PER 10,000 INHABITANTS[1]

[Units]

	1955	1960	1965	1966
West Germany	416	592	846	918
Czechoslavakia	505	742	1,050	1,115
Hungary	187	243	301	313
Poland	124	181	249	264
U.S.S.R.	(2)	[3] 270	330	340

[1] Official estimate of number of telephones at end of year divided by estimate of midyear population.
[2] Not available.
[3] 1962.

APPENDIX TABLE 18.—HOUSEHOLD CONSUMPTION OF ELECTRICITY PER CAPITA

	Kilowatt hours			
	1955	1960	1965	1966
Czechoslovakia	83	109	164	179
Hungary	(1)	55	98	110
Poland	(1)	68	83	91
U.S.S.R.	57	82	114	(1)

[1] Not available.

SOURCES

Data on consumption in the Soviet Union were supplied by Barbara Severin. Her chief sources of information were the following: various editions of the Soviet statistical handbook, *Narodnoe khoziaistvo SSSR;* the 1964 handbook on industry, *Promyshlennost' SSSR;* and the handbooks on trade, *Vneshniaia torgovlia*, for 1918–1966 and for various individual years. Mrs. Severin and Willard S. Smith provided information on housing conditions in all countries, drawing on the following sources: Working Paper No. 216 of the Economic Commission for Europe's Committee on Housing, Building, and Planning, dated 16 April 1968; United Nations, Economic Commission for Europe, *Economic Survey of*

Europe 1967 and *Annual Bulletin of Housing and Building Statistics for Europe 1967.*

For data on food consumption in West Germany, Czechoslovakia, Hungary, and Poland, the principal sources were the following: Organization for Economic Cooperation and Development. *Food Consumption Statistics 1954–1966*; Czechoslovakia: *Statistická ročenka ČSSR 1962 and 1968;* the Hungarian handbooks: *Statistisztikai Evkönyv,* for 1960, 1965, and 1967; *Statisztikai Idöszaki Közlemények; Statistical Yearbook 1964;* and the Polish handbooks: *Rolniczy Rocznik Statystyczny 1945–1965* and *Rocznik Statystyczny 1968.*

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THE PASSENGER CAR INDUSTRIES OF EASTERN EUROPE: A BRIEF SURVEY

By IMOGENE EDWARDS

In contrast to past attitudes, the countries of Eastern Europe no longer regard the expenditure of resources on private passenger cars as a "regrettable necessity." Accordingly, they are now pushing the development of their small domestic automobile industries and making a variety of arrangements that permit the import of cars in increasing numbers. Pressure for this change of policy has built up gradually in the post-war period. Before World War II, personal ownership of cars was not widespread in any European country, East or West. Public transportation, motorcycles and bicycles were the principal means of passenger transport. Beginning around 1950, Western Europe launched into the development of passenger car production on a large scale, and both total output of cars and the numbers of cars owned by the population increased phenomenally. Eastern Europe, in contrast, until very recently paid scant attention to the development of a passenger automobile industry, preferring instead to produce trucks and buses for commercial and industrial use. Moreover, these countries deliberately restricted the private ownership of cars, both by severely limiting their production and import and by fixing exorbitant prices on them.

In the 1960's the East European regimes, like the U.S.S.R., have been forced to provide more consumer goods and services to their people, in order to give effectiveness to their increasing reliance on monetary incentives to spur productivity. Well aware of the way of life in nearby Western Europe, the workers in Eastern Europe have wanted automobiles, and their governments have now decided at last to make them available in much greater quantities than heretofore. In electing to launch itself, however hesitantly, into the automobile age, Eastern Europe has been greatly aided by the fact that the U.S.S.R. has chosen to take the same path, for essentially the same reasons. The U.S.S.R. is now carrying out an ambitious program to quintuple the production of passenger automobiles by 1975, from 280 thousand in 1968 to 1½ million in 1975. The keystone of this program is the huge new plant now being built at Tol'iatti with the assistance of FIAT of Italy.

CURRENT AVAILABILITY OF CARS AND RELATED FACILITIES IN EASTERN EUROPE

Nowhere are the differences in levels of consumption between Eastern and Western Europe more visible than in the ownership of passenger cars. The increase in Western tourism throughout Eastern Europe, promoted by Eastern European governments as a source of foreign exchange, has hastened the awareness of Eastern Europeans of these differences and has intensified an already strong general desire for

car ownership. Production of passenger cars in all of Eastern Europe in 1968 amounted to 2.5 per 1,000 persons. In West Germany, France, Italy, and the U.K., in 1967 production amounted to an average of 32.5 per thousand persons. (See Table 1.) The contrast between East and West in the number of cars in use was almost as great. In 1967, there were 20 cars per thousand persons in Eastern Europe, compared with nearly 185 cars per thousand in the 4 West European countries combined. (See Table 2.) Moreover, a very large share of the total inventory in Eastern Europe consists of government owned cars used primarily for business and official purposes, whereas in Western Europe, most of the cars are in private hands.

TABLE 1.—PASSENGER CARS PRODUCED PER 1,000 PERSONS IN THE POPULATION IN THE U.S.S.R., EASTERN EUROPE, AND SELECTED FREE WORLD COUNTRIES, 1967

	Population (millions)	Production	
		Total (thousands)	Per 1,000 persons
Free world country:			
1. United States	199.1	7,413	37
2. West Germany	59.9	2,296	38
3. France	49.9	1,752	35
4. United Kingdom	55.2	1,552	28
5. Italy	52.4	1,439	27
6. Japan	99.9	1,376	14
7. Canada	20.4	721	35
Communist country:			
1. U.S.S.R	235.6	251	1
2. Czechoslovakia	14.3	112	8
3. East Germany	17.1	112	7
4. Yugoslavia	19.9	48	2
5. Poland	31.9	28	1
6. Bulgaria	8.3	2	(1)
7. Rumania	19.3	(2)	(2)

[1] Less than 1.
[2] Negl.

Sources: Automotive Industries, Mar. 15, 1969, p. 100. World Almanac, 1969.

TABLE 2.—NUMBER OF PASSENGER CARS PER THOUSAND PERSONS IN THE PARKS OF THE EASTERN EUROPEAN COMMUNIST COUNTRIES, THE U.S.S.R., AND SELECTED WESTERN COUNTRIES, 1967

Country	Population (millions)	Registrations [1] (thousands)	Number of cars per 1,000 persons
Communist:			
Bulgaria	8.3	160	19
Czechoslovakia	14.3	520	36
East Germany	17.1	825	48
Hungary	10.2	145	14
Poland	31.9	330	10
Rumania	19.3	50	3
Yugoslavia	19.9	355	17
U.S.S.R	235.6	1,115	5
Western:			
France	49.9	11,500	230
Italy	52.4	7,310	139
Japan	100.0	3,095	31
United Kingdom	55.2	10,425	189
United States	199.1	83,545	419
West Germany	59.9	11,015	184

[1] Rounded to nearest 5,000 registrations; year-end data.

Source: Data are from Automotive Industries, Mar. 15, 1969, p. 111, as reported by Business and Defense Service Administration, U.S. Department of Commerce.

Most of the privately owned cars in Eastern Europe are owned by the professional and governmental elite. The prices for typical cars are very high, ranging from the equivalent of a year's earnings of an average industrial worker in East Germany to the equivalent of nearly

4 years in Hungary. To buy a car analogous in quality to the Volkswagen, the average industrial worker in Bulgaria, Hungary, Rumania, and Poland must work about 10 times as long (up to 40 months) as the average U.S. worker and from five to eight times as long as the average West German worker. (See Table 3.) Moreover, a large down payment is required in all countries of Eastern Europe when placing an order. In Bulgaria, the deposit amounts to one-third of the purchase price and in Rumania to the entire purchase price.

TABLE 3.—COMPARISON OF INDUSTRIAL WAGES AND PRICES[1] OF PASSENGER CARS IN THE EUROPEAN COMMUNIST COUNTRIES AND SELECTED WESTERN COUNTRIES, 1967

Country	Currency	Average monthly industrial wage	Typical models	Prices	Wage equivalent of car price (months)
Eastern Europe:					
Bulgaria	Lev	106	Rila-1400 (Moskvich)	3,900	37
Czechoslovakia	Koruna	1,566	Škoda 1,000 MB	44,000	28
East Germany	Deutsche Mark East	680	Trabant	7,500	11
Hungary	Forint	1,895	Moskvich	76,000	40
Poland	Złoty	2,344	Syrena	72,000	31
Rumania	Leu	1,170	Fiat 850	44,000	38
Yugoslavia	Dinar	629	Zastava-750 (Fiat)	16,000	25
U.S.S.R.	Ruble	112	Moskvich	4,500	40
West:					
France	Franc	584	Renault R-4	5,990	10
Great Britain	Pound	83	Ford Escort	660	8
Italy	Lira	76,128	Fiat 500	494,000	6
United States	Dollar	494	Chevrolet	3,000	6
West Germany	Deutsche Mark	862	Volkswagen 1300	4,530	5

[1] In local currency.

In spite of the high prices and other discouragements to automobile ownership, such as difficulties in maintaining and servicing the cars, consumer demand is very strong, as evidenced by the size of waiting lists for purchase of cars. In East Germany, for example, these lists contain over half a million names. Waiting periods in the various countries currently are from two to four years.

None of the Eastern European countries has adequate numbers of filling stations and repair shops even for the present vehicle park, and chronic shortages of spare parts keep many vehicles out of service for long periods. Moreover, state owned vehicles always take precedence at service facilities, requiring private cars to wait much longer. In Poland, for example, in recent years the average time to obtain repair of an automobile has been about 30 days.

The availability of motor fuel varies widely throughout Eastern Europe. Hungary has only 300 filling stations and Bulgaria only about 50. Filling stations in Poland are said to be about 20 miles apart on the average. Czechoslovakia, among the countries best equipped with automotive services, has nearly 1,100 filling stations at the end of 1968. In Yugoslavia, where the most rapid progress in providing automotive services is being made, Belgrade alone had 107 filling stations in 1968.

Faced with increasing use of automobiles, most of the Eastern European countries are planning or are already engaged in the expansion of repair services, in some cases with Western assistance. In Yugoslavia, centers for servicing Zastavas (Yugoslav Fiats) are being built under a joint venture with FIAT. Rumania is planning large service centers in major cities, whereas Czechoslovakia plans to diffuse many

small repair shops throughout the country. Both Bulgaria and Hungary recently have reported large increases in investment in automotive service facilities.

The highway network in the Eastern European Communist countries consists of about 350,000 miles of roads, excluding urban streets. About 30 percent is paved with concrete, asphalt, or cobblestones; another 30 percent is surfaced with crushed stone or gravel; and the remainder has an earth surface. Most of the network in Eastern Europe consists of only two lanes, and only a few routes are designed for limited access. The condition of the roads varies from country to country, with those in East Germany and in the former German territory of western Poland generally in better condition than those in eastern Poland, Czechoslovakia, and the Balkan countries. With the exception of Yugoslavia, very little new highway construction has taken place in Eastern Europe in recent years, probably reflecting, as in the U.S.S.R., the relatively small number of motor vehicles in these countries. All of the countries, however, have announced plans for rather ambitious improvement of projects, and travelers report much current improvement work.

General Characteristics of the Automobile Industries in Eastern Europe

In 1968 the countries of Eastern Europe produced a total of 350,000 passenger cars. East Germany and Czechoslovakia each produced more than one-third of this total (118,000 for East Germany and 125,500 for Czechoslovakia), Yugoslavia produced about 17 percent (60,000), Poland about 11 percent (40,000), and Rumania and Bulgaria together produced less than 2 percent (7,000). (See Table 4.) Czechoslovakia and what is now East Germany have produced passenger cars, since about 1900. Poland first established passenger car production in 1951, Yugoslavia in 1954, Bulgaria in 1966, and Rumania in 1968. Hungary does not produce passenger cars. A substantial share of the production of Czechoslovakia and East Germany is exported. In 1967, the latest year for which trade data are available, Czechoslovakia exported nearly 56,000 cars (50 percent of production); East Germany exported over 42,000 (38 percent of production). In the same year, Czechoslovakia imported over 22,000 cars and East Germany imported 31,000 cars. Poland exported nearly 5,000 cars and imported over 16,000 in 1967, and Yugoslavia exported nearly 6,000 and imported 52,000. (See Table 5.)

TABLE 4.—PRODUCTION OF PASSENGER CARS IN THE EAST EUROPEAN COMMUNIST COUNTRIES, SELECTED YEARS 1960–68 AND 1970 PLAN

[Thousand units]

	1960	1965	1966	1967	1968	1970 plan
Bulgaria	0	0	(2)	1.8	[1] 5	25
Czechoslovakia	56.2	77.7	92.7	111.7	126	138
East Germany	64.1	102.9	106.5	111.5	[1] 118	150–200
Poland	12.9	26.4	29.2	27.7	40	70
Rumania	0	0	0	(2)	2	[1] 20
Yugoslavia	10.5	35.9	37.7	47.9	59	130
Total	143.7	243.4	266.1	299.8	350	533–583

[1] Estimated.
[2] Negligible.

Source: Data are from the official statistical yearbooks of the individual countries.

TABLE 5.—TRADE IN PASSENGER CARS BY THE EAST EUROPEAN COMMUNIST COUNTRIES, 1960–67

[In units]

	1960		1961		1962		1963		1964		1965		1966		1967	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
Bulgaria	3,286	(1)	4,266	(1)	6,037	(1)	9,966	(1)	6,907	(1)	11,700	(1)	15,804	(1)	20,837	(1)
Czechoslovakia	13,278	30,556	10,889	33,954	12,674	34,741	12,864	37,047	16,497	25,419	15,339	49,195	20,966	51,331	22,468	55,728
East Germany	6,231	11,515	9,377	14,795	7,448	22,876	11,229	29,402	11,130	29,381	20,611	36,448	26,001	37,895	31,289	42,425
Hungary	5,707	(1)	7,870	(1)	17,752	(1)	15,278	(1)	9,702	(1)	11,561	(1)	19,083	(1)	24,900	(1)
Poland	5,824	3,379	7,146	3,011	13,804	2,230	10,833	3,531	6,775	3,706	21,095	4,972	13,724	4,621	16,236	4,886
Rumania	1,186	(1)	1,308	(1)	2,317	(1)	3,934	(1)	8,593	(1)	11,880	(1)	16,107	(1)	17,841	(1)
Yugoslavia	2,959	7	9,110	221	2,895	862	1,057	114	4,859	674	13,049	6,170	20,212	3,618	51,780	5,602

[1] None reported.
Data may include some used cars.

Source: Data are from the official statistical yearbooks of the individual countries.

Seventy percent of Yugoslavia's imports were from Western Europe and the rest from Eastern Europe and the U.S.S.R. Most of the cars imported by Eastern European countries other than Yugoslavia came from other countries of Eastern Europe or from the U.S.S.R. The U.S.S.R. exported nearly 50,000 cars to Eastern Europe in 1967. This trade in passenger cars among the Communist countries and with the Free World makes available a fairly large assortment of cars in each country. The vast majority of the cars in Eastern Europe are of East European or Soviet origin, however; imports of cars from the Free World have been small, primarily because all of the countries have been reluctant to allocate scarce hard currency to their import.

The scale of production in Eastern European automobile plants is extremely small by Western standards and far below that required for efficient operation. The largest factory in Eastern Europe, the Škoda plant at Mladă Boleslav in Czechoslovakia, produced about 124,000 cars in 1968. Next largest are the East German Trabant plant at Zwickau (about 72,000 cars a year), the East German Wartburg plant at Eisenach (about 46,000 a year), and the Crvena Zastava plant in Yugoslavia (more than 50,000 cars a year). Increasing the scale of production in order to raise efficiency and lower unit costs is an important part of the plans for future expansion of the industry in all of the countries.

In the early 1950's, the Council for Mutual Economic Assistance (CEMA) attempted to promote the orderly economic development of the motor vehicle industry of Eastern Europe. The plan provided for a high degree of international specialization in the various models and sizes of vehicles. However, for reasons of national interest and prestige, the producing countries declined to alter their product mix, and by the mid-1950's every one of the Eastern European countries except Bulgaria was producing a 4–5 ton truck, although production did not exceed 10,000 a year in any of the countries. Moreover, two of the less industrialized countries of Eastern Europe—Poland and Yugoslavia—had already started to build passenger cars. Bulgaria and Rumania later followed suit, although for the present they merely assemble cars from imported parts.

With the exception of East Germany and Czechoslovakia, Eastern European car producers depend heavily on Western Europe for technological assistance and product design. In the past several years all of them have signed major agreements with Western European firms to provide such technology. As a result of these and earlier arrangements, Yugoslavia, Bulgaria and Poland are now or soon will be producing cars of Italian design, mostly Fiats, and Rumania and Bulgaria will be producing cars patterned after the French Renault. These agreements provide long-term credits and in some cases stipulate that repayments are to be made through the shipment of parts to the Western firms. Finally, Yugoslavia, Bulgaria and Poland have signed agreements with the U.S.S.R. to produce parts for the Fiat-model cars to be produced beginning in 1970 at the new plant at Tol'iatti. Hungary also is scheduled to produce parts for this car. These various arrangements are bringing a degree of specialization into the development of an automobile industry in Eastern Europe, thus en-

abling the various countries to benefit from economies of scale that otherwise would not be possible.

With few exceptions, the passenger cars produced in Eastern Europe are smaller than any cars produced in the United States before the advent of the Ford Maverick. Most are about the size of the Opel Kadett; some are smaller. (See Table 6 for principal characteristics of Eastern European passenger cars.) Most Eastern European cars are under-powered by Western European standards, perhaps to achieve geater fuel economy and because engine compression ratios tend to be low, reflecting the lower octane rating of Eastern European gasoline. In keeping with their smaller scale of output, the auto parts and assembly plants in Eastern Europe use far fewer automated processes than do Western plants, although some specialized equipment, such as automatic transfer tools for machining engine blocks and the like, have been imported from the Free World. The industries lack the well-organized vendor systems of the West with their specialized facilities and constant stream of innovations. For this and other reasons technological improvements in ignition systems, carburetors, generators, and the like come very slowly.

The Situation in Individual Countries

BULGARIA

Bulgaria's fledgling automobile industry dates from 1966 and now has two assembly plants, one at Lovech and the other at Plovdiv. The Lovech plant currently assembles the Rila-1400 (Soviet Moskvich-408) and also has assembled the Pirin-Fiat (Italian Fiat-850 and 124). The Plovdiv plant assembles the Bulgar-Renault (French Renault-8 and 10) and the Bulgar-Alpine (French Alpine sportscar). The assembly of Bulgar-Renaults was begun in September 1966, and the assembly of Rila–1400's in November of 1966. The assembly of Pirin-Fiat 850's began in mid-1967 and continued in small volume at least through 1968.

Bulgarian cars are assembled from imported, completely knocked down parts, which means that the assembly process includes welding body panels and painting bodies. Certain parts common to all motor vehicles are produced in Bulgaria and supplied to the assembly plants. Among these are batteries, starters and generators, coils, oil filters, jacks, and the like. At present, about 20 percent of the value of the cars is added in Bulgaria mostly in the assembly process, but also through the incorporation of some common parts and accessories of Bulgarian production. As the scale of production is increased, it will become economical for Bulgaria to produce more parts domestically. The agreement with Renault permits Bulgaria's addition to the value of the Bulgar-Renault cars to be increased to 50 percent. The agreement with FIAT permits an increase of Bulgaria's addition to the value of the Pirin-Fiat cars to 40 percent of the total production cost.

Bulgaria's plans for development of the industry envisage the production of about 150,000 cars per year by 1980. About 120,000 of these would come from the Lovech plant and about 30,000 from the Plovdiv

TABLE 6.—PRINCIPAL CHARACTERISTICS OF EASTERN EUROPEAN PASSENGER CARS

Country and model	Number of passengers	Weight (pounds)	Horsepower	Top speed (miles/hour)	Engine displacement (cubic inches)	Compression ratio	Strokes per cycle	Cylinders	Engine position
Bulgaria:									
Rila (Moskvich 408)	4	1,775	50	79	82.8	7.00	4	4	F
Pirin (Fiat 124)	5	1,885	60	90	73.0	8.80	4	4	F
Bulgarrenault (Renault)	4	1,661	41	80	58.3	8.50	4	4	R
Czechoslovakia:									
Škoda 1,000 MB	5	1,575	42	79	60.3	8.30	4	4	R
Tatra 2-603	6	3,344	105	99	150.8	8.20	4	8	R
East Germany:									
Wartburg 353	5	1,985	50	79	60.6	7.50	2	3	F
Trabant 601	4	1,353	26	62	36.6	7.60	2	2	F
Poland:									
Warszawa 203	5	2,911	77	81	129.3	7.5	4	4	F
Syrena 103	4	1,936	30	62	45.4	7.40	2	3	F
Fiat 125 P	5	2,117	90	100	98.1	8.80	4	4	F
Rumania: Dacia (Renault 8)	4	1,661	41	80	58.3	8.50	4	4	R
Yugoslavia: Zastava 750 (Fiat 600)	4	1,275	32	70	46.8	7.50	4	4	R

Note: The Wartburg, Trabant, and Syrena have front wheel drive; other models have rear wheel drive.

plant. Production capacity by the end of 1970 is scheduled to be 25,000 for Lovech and 10,000 for Plovdiv. In 1967, total car registrations amounted to 160,000 or 19 per 1,000 persons. This number should rise rapidly if domestic production expands as scheduled.

Bulgaria plans in 1970 to assemble the more advanced Moskvich 412, to begin production of the Moskvich engine, and gradually to add the production of other parts. By 1971 the assembly of the VAZ–2101 (Soviet version of the Fiat-124) is to be started, a logical development in view of Bulgaria's contract with the U.S.S.R. to supply some of the parts for the VAZ–2101. Also, Bulgaria may be able to purchase under barter arrangements various other parts from Poland, Yugoslavia and Hungary, which have made similar supplier arrangements with the U.S.S.R.

CZECHOSLOVAKIA

Passenger cars have been made in Czechoslovakia since 1898, but, before World War II, in small numbers and with the use of many imported components. In 1939, Czechoslovakia produced only 12,000 cars in five plants, of which Škoda produced nearly half. In 1968 Czechoslovak automobile production had reached 125,500, the largest in Eastern Europe. Plans call for the production of 138,000 cars in 1970 and 160,000 by 1975. Except for the annual production of about one thousand Tatra 603 cars for the government elite, all of Czechoslovakia's 1968 output were Škoda MB 1000's from the plant at Mladá Boleslav.

In the early 1960's, $110 million was invested in expansion of the Mladá Boleslav plant. Equipment was supplied by companies in 14 Western countries. At present the plant produces 400 cars per day on two shifts. Full capacity of 500 cars per day has never been reached because of inadequate supplies of materials such as steel, tires, glass, paints, and adhesives. Largely because of this underutilization of capacity, unit costs are very high. The plant receives a state subsidy on cars exported to Western Europe.

As shown in the following tabulation, net annual additions to the domestic supply of cars have been much less than annual production because exports have exceeded imports by a wide margin.

Year	Production	Exports	Imports	Gross additions to supply
1966	92,700	51,300	21,000	62,400
1967	111,700	55,700	22,500	78,500

Czechoslovak sales officials were to receive about 120,000 cars for sale to private buyers in 1969. More than half probably were imported cars such as Fiats, Renaults, Simcas, British Fords, Soviet Moskviches and Volgas, and East German Trabants and Wartburgs. Czechoslovakia has the second highest number of car registrations in Eastern Europe (520,000 in 1967), about 36 cars per 1,000 persons. According to present plans registrations are to total 50 per 1,000 persons by the end of 1970.

EAST GERMANY

The Soviet Occupation Zone of Germany, now East Germany, contained about one third of Germany's prewar automotive industry. At the end of World War II, the U.S.S.R. dismantled much of the automotive equipment in its zone of occupation and installed it in Soviet motor vehicle plants. In 1949, the joint Soviet-East German corporation, SAG Avtovelo, initiated production of the pre-war BMW sedans at a former BMW plant in Eisenach. When SAG Avtovelo was returned to their control in 1952, the East Germans initially continued production of the BMW at Eisenach. However, beginning in 1963, they established the production of the F–9 and F–8 cars of the prewar Audi firm, a part of the prewar Auto Union combine. The F–9 was produced at Eisenach and has evolved into the present Wartburg. The F–8 was produced at the Audi and Horch facilities in Zwickau, now called VEB Sachsenring, and has evolved into the present Trabant.

The Wartburg is somewhat larger than the Trabant, but both cars are smaller and simpler in design than the BMW's. The Trabant is distinguished from all other cars by the construction of its body, which consists of an inner steel shell covered on the outside with plastic panels. In 1966 the Wartburg factory installed new production equipment made by Renault, which increased its capacity by about 40 percent. However, the Wartburg and Trabant plants are small and inefficient by Western standards. In 1968, about 46,000 Wartburgs were produced at Eisenach and about 72,000 Trabants were produced at Zwickau. East Germany plans to produce 150,000 cars annually by the end of 1970.

East Germany also imports cars, but, as shown in the following tabulation, exports exceed imports.

	Production	Imports	Exports	Gross additions to supply
Year:				
1960	64,000	6,000	12,000	58,000
1965	103,000	21,000	36,000	88,000
1966	106,000	26,000	38,000	94,000
1967	112,000	31,000	42,000	101,000

Wartburgs are exported to all Eastern European countries as well to as many countries of Western Europe and Africa. Imports include largely Moskviches and Volgas from the U.S.S.R., Skodas and Tatras from Czechoslovakia, and, since the beginning of 1968, a few Polish Fiat 125's.

At the end of 1967, there were 825,000 cars in East Germany, about 48 cars per 1,000 persons, the largest number of registrations and the greatest density of automobile ownership in Eastern Europe. East Germany's economic plans anticipate that about one half million new cars will be added to the park during 1966–70. About 100,000 to 150,000 of these cars probably will be imported and the rest will come from domestic production.

POLAND

Poland's passenger car production dates from 1951 when the Soviet "Pobeda" (called "Warszawa" in Poland) was first assembled at a plant in Zeran from parts shipped from the GAZ plant in the U.S.S.R. In 1957, the Syrena, smaller and cheaper than the Warszawa, was added to the production program of the Zeran plant. In 1966, Poland signed a technical assistance agreement with FIAT, providing for licenses, assembly equipment, "knowhow," and initial supplies of parts to produce a modified version of the Fiat–124 (called Fiat–125P) in the Zeran plant. Of the 40,000 cars produced at Zeran in 1968, about 7,000 were Fiats. Poland plans to produce all its own Fiat parts by 1970, except for those few that the U.S.S.R. is to supply under a cooperative agreement.

According to present plans, total production is scheduled to rise to 50,000 in 1969 and to 70,000 in 1970.

PRODUCTION

Model	1968	1969 (plan)	1970 (plan
Warszawa	17,000	17,000	17,000
Syrena	16,000	18,000	18,000
Fiat-125	7,000	15,000	35,000
Total	40,000	50,000	70,000

Poland's long range plans provide for the production of 350,000 cars in 1975, of which about 300,000 will be Fiat models.

At the end of 1967, there were 330,000 automobile registrations in Poland, about 10 for each 1,000 persons. The government is trying to satisfy the strong demand for cars through imports as well as domestic production. Since 1965 yearly imports have been several times greater than exports. (See Table 5.).

RUMANIA

Rumania did not produce passenger cars until 1968. During 1966–67 a plant to produce the Dacia–1100 from Renault parts was built at Pitești with the help of the French company Renault. The plant, named Uzina de Autotourisme, assembled the first Rumanian passenger car in August 1968 and had reached a production level of 1,000 per month by the beginning of 1969. When fully equipped, the plant will be able to produce annually 40,000 passenger cars and 10,000 utility vehicles (panel delivery and pick up vehicles).

The Rumanian-Renault contract, which was signed in September 1966, runs for ten years and is valued at $60 to $70 million. Although the first cars have been assembled from imported, completely-knocked-down, Renault parts, the Pitești plant is supposed to start making some of the parts in 1969. Rumania will repay Renault partially with transmissions produced in a new, specialized plant at Pitești at the rate of 120 per day. Renault is supplying the machinery for this plant. A pilot

assembly line is now producing a few transmissions daily from French parts. Among supplier plants being established in Rumania to support passenger car production are a radiator plant from the U.K., capable of making 285,000 radiators per year, and a tire plant at Popeşti-Leordeni, which opened in 1967 and now produces about a million tires per year.

Rumania has about 2 automobiles per 1,000 persons, the lowest density of all the East European communist countries. However, the supply of cars is increasing rapidly, because of increasing imports. Domestic production is expected to reach 20,000 cars annually by 1970. Unlike other East European countries, Rumania encourages auto tourism and private ownership of cars by establishing automobile clubs and publishing motoring guide books.

YUGOSLAVIA

Automobiles have been produced in Yugoslavia since 1954 when the Crvena Zastava works began the production of Fiats under license. At the present time the product line of Crvena Zastava includes the Fiat 750, (about 50,000 a year) and the Fiat 1300 (about 15,000 a year). Before the end of 1969 the Fiat 124 and Fiat 125 are also to be produced. All of these cars are called Zastavas and they comprise about 90 percent of Yugoslav automobile production. The other 10 percent of output, also produced under license, is shared by the Tomos plant in Koper, which assembles about 2000 of the small French 2CV Citroën cars per year, and the Pretis plant in Sarajevo, which assembles about 4,000 of the West German NSU 1000's per year.

Yugoslavia produced about 60,000 passenger cars in 1968. Some 130,000 cars may be produced in 1970 and as many as 200,000 by the end of 1973. Under an agreement made in February 1968 between the Yugoslav state enterprise Crvena Zastava and the privately owned FIAT firm, FIAT acquired an equity in Crvena Zastava in return for investing $10 million in machinery, working capital, technical information, training, and engineering assistance. The output of Crvena Zastava, with FIAT assistance, is to be increased to 175,000 cars per year. Moreover, during the ten year period, 1968–1978, Crvena Zastava is to produce a total of $50 million worth of parts for Italian FIAT production. This agreement marks the first time that a Western firm has joined in the operation of a Communist enterprise on this kind of profit-sharing basis and was made possible by special Yugoslav legislation passed in 1967.

In addition to the agreement for Crvena Zastava to produce parts for FIAT, other recent agreements for international cooperation will facilitate economies of scale in the Yugoslav automotive industry. The Crvena Zastava plant has agreed to supply certain parts for the production of FIAT cars in Poland, Bulgaria, and the U.S.S.R. Crvena Zastava also has agreements to exchange FIAT parts with factories in India and Egypt. Finally the Tomos plant supplies Citroën with about $1 million worth of Citroën parts per year in partial payment for the asemblies it imports from Citroën.

By the end of 1968, Yugoslavia had about one half million passenger car registrations. New cars added to the supply more than doubled during 1965–67, as shown in the following tabulation:

	Production	Imports	Exports	Gross additions to supply
Year:				
1965	35,900	13,000	6,200	42,700
1967	47,900	50,300	5,600	92,600

The large increase in imports, of which about 70 percent came from Western Europe, resulted not from government policy but from the increased purchasing power of individuals. Stricter controls recently have been placed on the purchase of cars from hard currency areas.

HUNGARY

Hungary produces trucks, buses and tractors but not passenger cars, and has no present plans to produce them. The passenger car park consists of imported cars, mostly from the U.S.S.R. and other Eastern European countries, but also from Western Europe. In 1968, there were about 175,000 cars in the park (about 17 cars for each 1,000 persons) compared with about 18,000 in 1958 (2 per 1,000 persons). Hungary plans to continue the rapid growth of the car park and expects it to number about 200,000 by 1970 and about 700,000 by 1980.

Instead of producing passenger cars in small amounts the Hungarians have chosen to produce a limited assortment of auto parts and accessories in large volume and export these in exchange for passenger cars. In an agreement running through 1975, Hungary will supply the Soviet VAZ plant at Tol'iatti with sets of parts for the VAZ 2101, starting in 1969 and increasing to 300,000 sets per year by 1972. These parts include radios, instruments, head lamps and other electrical equipment, in the production of which Hungary is already relatively efficient. In exchange, Hungary will receive 12,000 VAZ–2101 cars annually. Hungary also has agreements with Poland and with FIAT, British Ford, Renault, and Volkswagen to exchange parts for cars. Hungary plans also to capitalize on the tremendous need for service station and garage equipment in Eastern Europe and the U.S.S.R. Its industry is well adapted to the production of this kind of equipment, especially to many forms of electrical instruments used for tuning engines, testing and charging batteries, etc.

PRODUCTION AND USE OF COMPUTERS IN THE COMMUNIST COUNTRIES OF EASTERN EUROPE

By Robert L. LeBoeuf

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I. Introduction

The application of digital electronic computers in the countries of Eastern Europe was begun long after their use had become commonplace in the industrialized countries of the Free World. Part of the delay resulted from ideological proscriptions against the use of cybernetics—and therefore computers—in economic management prior to the mid-1950's. This constraint has now been abandoned, however, and the Eastern European regimes are eager to use computers in order to increase the speed, quality and efficiency of business data handling, economic planning and industrial process control.

The desire to overcome their inadequacies in computer application as quickly as possible has led several of the countries of Eastern Europe to establish fledgling industries for producing computers (typically with technological assistance from the Free World), and has induced all of them to devote chronically scarce foreign exchange to purchasing computers abroad.

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II. Computer Use Pattern in Eastern Europe

The first computers in Eastern Europe were installed in scientific institutes for use in research and mathematical problem solving. Some of these computers were used to obtain experience in writing operations research programs (linear programming, for example), and for handling business data (accounting, check writing, etc.). As the number of computers in Eastern Europe has grown, the proportion of the total devoted to business and economic data handling has increased sharply. Computers are now to be found in central statistical offices and banks, industrial ministries and large enterprises, railroads, post offices, and state retail trade organizations. The excess capacities of some of these computer installations are made available to organizations that do not have their own computers. Recently a few computer centers have been established in some Eastern European countries exclusively to service enterprises and institutions on a contract basis. The application of computers to industrial process control has been undertaken in a few plants in the industrially more advanced countries.

Figure 1 shows the distribution of computers in the East European countries by sector of end use, and Table 1 summarizes what is known about the allocation of computers in industry. Although there are differences among the countries, the process industries (steel, chemicals, and oil refining) and the electronics industries are generally the most favored.

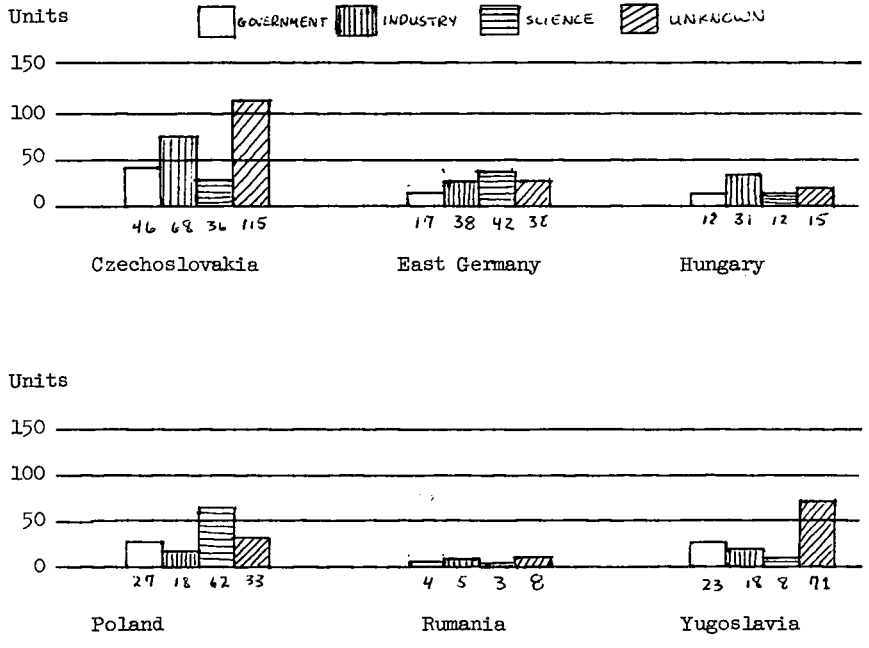

Figure 1.—Eastern Europe: Distribution of Computers, by Sector of End Use, January 1, 1969

TABLE 1.—EASTERN EUROPE: DISTRIBUTION OF COMPUTERS INSTALLED IN INDUSTRY, BY COUNTRY AND BRANCH OF INDUSTRY, JAN. 1, 1969

Branch of industry	Czecho-slovakia	East Germany	Hungary	Poland	Rumania	Yugo-slavia	Total
Metallurgy	15	1	3	3	2		24
Chemicals	3	4	1	1	2		11
Oil refining	1	4					5
Mining	6	4					10
Electronics	21	14	6	5		1	47
Transportation equipment	5	1	2				8
hipbuilding		1		2			3
ther	17	9	3	7	1	1	38
Total	68	38	15	18	5	2	146

III. Inventory and Area of Origin of Computers in Eastern Europe

At the beginning of 1969, the East European countries had nearly 800 computers, compared with over 50,000 in the United States and about 8,000 in Western Europe. The data handling and computational power of all digital computers in Eastern Europe combined is far below that possessed by industrialized Free World countries such as France. Czechoslovakia has about one-third of the computers; Poland and East Germany each have one-fifth; Yugoslavia about one-seventh; and Rumania and Bulgaria together about one-twelfth.

TABLE 2.—EASTERN EUROPE: NUMBER OF COMPUTERS INSTALLED OR ON ORDER, BY AREA OF ORIGIN, JAN. 1, 1969

Area of origin	Country of installation							
	Bulgaria	Czecho-slovakia	East Germany	Hungary	Poland	Rumania	Yugo-slavia	Total
U.S.S.R.	2	80	10	14	7	3	0	116
Eastern Europe	1	50	72	14	103	2	0	242
Free world	24	135	53	42	30	15	120	419
Total	27	265	135	70	140	20	120	777

About one-third of the computers in Eastern Europe are from East European production; about one-seventh came from the U.S.S.R. and the rest were imported from the Free World.

The computers of Free World origin (about 30 percent from the United States) are primarily small-scale and medium-scale machines for data processing, although some of the machines are also suitable for industrial process control. Were it not for U.S. export controls, a considerably larger share of the installed computers in Eastern Europe would be more powerful machines of Free World origin; U.S. export licenses for medium-scale or large-scale models have usually been denied. In recent years, however, with the increasing relaxation of COCOM controls, the East Europeans have been able to acquire all but the largest and most powerful computers that Free World countries other than the U.S. have to offer. The Soviet computers in Eastern Europe are at the low end of the medium-scale in computing power and are not particularly well suited for data processing. The strong

FIGURE 2.—Eastern Europe: Percentage Distribution of Computers Installed or on Order, by Area of Origin, January 1, 1969

preference of Eastern Europe for Free World equipment reflects the generally poor performance of Soviet computers, the difficulty in obtaining service and spare parts, the low reliability, particularly of peripheral equipment, and the inadequate library of standard programs for Soviet machines. The computers produced by the Eastern European countries themselves are primarily small-scale scientific machines with low speeds and small memories. A few small to medium-scale data processing machines of Eastern European origin are also in use.

IV. Computer Production in Eastern Europe

A total of about 250 computers have been built in Eastern Europe since the first experimental models appeared in the late 1950's. Fewer than 50 of these were produced in 1968. This low volume of production reflects not only the difficulties inherent in the production of computers, but also the small technological base of these countries, particularly with respect to the electronics and precision mechanics industries.

Semiconductor technology, the basis for fast, modern computers, lags several years behind the Free World. In East Germany, which has the most advanced electronics industry of all the East European countries, the assortment of transistors produced is small and has contained a few silicon transistors only since 1965. Hungary and Czechoslovakia are only beginning to develop silicon transistor production, while the remaining countries have yet to try. The production of semiconductor integrated circuitry is just begining in Czechoslovakia but is still in the research stage elsewhere in Eastern Europe. Progress in the development of high-speed switching diodes has been slow throughout Eastern Europe.

The primitive condition of the components branch of the electronics industry of Eastern Europe is partly the result of the lack of human and material resources for research and development, and partly the result of Free World restrictions on the export of technology and production equipment to the Communist countries. Moreover, given the small size of each country's market, the production of a broad assortment of semiconductor microcircuits is not economical. The manufacture of dependable magnetic tape drives, fast card punches and readers, and high-speed line printers requires production experience that cannot be obtained in the absence of a mass market. Efforts have been made to expand the size of markets through the establishment by the Council of Mutual Economic Assistance (CEMA) of an international division of responsibility for producing particular components and equipment, but so far with little success.

The development of prototype equipment suitable for large scale production has been hindered further by heavy emphasis on theoretical work at the expense of engineering development, new product planning and process development by hardware-oriented engineers. Fundamental research has always been favored in Communist countries for doctrinaire reasons and because it is generally cheaper than applied research and development. The result is that engineering staffs at existing electronics plants are usually too small to carry out product design and refinement to any extent. Some of the development work has to be assigned to research institutes, which have the necessary expertise but tend to be out of touch with the manufacturer and the market and often fail to achieve practical results.

Currently Poland, East Germany and Czechoslovakia are engaged in small-scale commercial production of computers; Hungary has prototypes being readied for production; Rumania and Bulgaria are making plans to produce foreign computers under license; and Yugoslavia has no announced plans for domestic production of computers. None of the East European countries will be able to produce a broad line of computer equipment in the forseeable future. The industrially more advanced countries (East Germany, Poland, Czechoslovakia, and Hungary) may be able at best to satisfy domestic needs for small or medium-scale computers and to export some to other East European countries and the Soviet Union. All East European countries will have to continue to import large-scale computers from Free World countries.

No Communist country, not even the U.S.S.R., now produces peripheral equipment that can measure up to the quality of that in the Free World. Most of the countries of Eastern Europe prefer for the present to obtain peripheral equipment in the Free World, and some of them have made or are making agreements to produce Western peripheral equipment under license. Because of difficulties with domestic magnetic tape drives in particular, Eastern European computers, except the East German Robotron 300, the Czech Tesla 200 (to be made under license from Bull General Electric of France), and the Czech ZPA–200 and ZPA–600, are not designed to use magnetic tape for external storage. These latter machines are intended to be compatible with Free World computers in the employment of peripheral equipment.

V. Programs for Computerization in Individual Countries

A. BULGARIA

Although it has ambitious plans for the application of computers in the next two decades, Bulgaria presently has only 27 small computers in use. Most of these are used to simulate and study projected *data processing networks* in government administration. At least one computer center has been established to support agricultural planning at the regional level, and the first computer center to be established in industry is now planned for a large chemical plant. Within the next ten years, Bulgaria plans to establish computer networks to assist in operating the industrial supply system and retail trade. A network also is planned for the Ministry of Transportation to be used to control passenger and freight movement and the loading schedules of the railroads. Bulgaria intends to unify all computer networks that process economic data into a national data handling system by 1980. The system would make all pertinent economic data available in a national computer center where it could be used for managing the economy.

Bulgaria's electronics industry is inadequate to support the production of digital computers on a commercial scale. Its production of semiconductors is based on Western technology, but volume and assortment are small, and reliability and performance are generally poor. Meanwhile, the Bulgarians have arranged to import at least 20 Facom 230–30 computers from Fujitsu of Japan over the next few years to serve as the basis for managing internal trade. This arrangement probably involves some Japanese technical training for Bulgarian operators and maintenance personnel and may provide for the Bulgarians to assemble some parts of the computers under Japanese supervision.

B. CZECHOSLOVAKIA

Approximately 265 computers are now installed in Czechoslovakia. The overwhelming majority are used for solving scientific, engineering, and simple management problems. They are located primarily in scientific research institutes and in large industrial organizations. Although only about 20 percent of Czechoslovakia's computers are used for data processing, this share is increasing steadily with the installation of computers in such organizations as the state bank and the ministeries for foreign and domestic trade.

A Computing Research Center is being established in Bratislava by the Czech government and the United Nations Development Program (UNDP). The Center, which will participate in the research program of the Economic Commission for Europe (ECE), will study problems of information storage and retrieval and mathematical methods of economic analysis, including the development and use of economic models for national planning.

A few imported process control computers are in operation in Czechoslovakia's chemical and metallurgical industries. In the future the Czech intend to emphasize the application of computers for both production management and process control in the metallurgical, electric power, cement, paper, and chemical industries.

Czechoslovakia's ability to produce its own digital computers—still well behind that of East Germany and Poland—has suffered severely from lack of good domestic electronic components, from the necessity to import much of the peripheral equipment from the Free World in the face of trade controls, and from a critical shortage of computer scientists. Czechoslovakia has produced some good quality punch card peripherals and a total of 30 small digital computers, but only a few prototype data processing machines. The fact that efforts to develop data processing computers, launched over a decade ago, have yet to yield a machine that can be produced in quantity has led the Czechs recently to obtain a license to make the Bull General Electric Gamma 140/145 computer (renamed the Tesla 200).

The Czechs plan to satisfy their needs for computers over the next several years with a few domestically produced machines, computers produced under license, and with some imports (primarily Soviet Minsk and Ural computers). The effort to produce computers of domestic design probably will be discontinued altogether.

C. EAST GERMANY

Most of East Germany's 135 computers are suitable only for scientific and engineering computations. They are installed primarily in research institutes and the design offices of major industrial enterprises, where, among other things, they are used for research, product design, and some business applications. The electronics and chemical industries have a relatively large number of computers, and the East German railway system is being computerized. The East Germans are now pushing the use of computers for data processing in the hope of increasing the efficiency of management in government and industry. They expect computers to improve the profitability of enterprises, to allow economic planners to make more timely decisions, to reduce the time required for the design of new products, and to speed the introduction of new technology into industry.

East Germany's computer production capability—now second to that of Poland—has been hampered by difficulties in the production of high quality semiconductors and peripheral equipment, such as tape drives, high-speed printers, and fast card punches and readers. At present, East Germany has to import some peripheral equipment from the Free World and from Czechoslovakia. On the other hand, East Germany is probably better supplied with qualified scientists and electronics engineers than any other East European country.

The series production of digital computers was begun in East Germany in 1959 with the manufacture of the small, tube-type ZRA–1 computer, of which about 30 were built. It was followed in the mid-1960's by several fully transistorized models: the Cellatron SER 2, an electronic accounting machine with a limited memory and some provision for mathematical programming; the Cellatron D4A, similar to the SER 2; the Robotron 100, a small punch card computer, roughly equivalent to the IBM 650; and most recently the Robotron 300, a data processing computer similar to the IBM 1410 in capability. Total East German production since 1959 probably has not exceeded 100 computers of all types.

D. HUNGARY

Hungary has ambitious plans for the use of computers in economic management and data processing, but so far has made only a small beginning. Computers are currently in use in the state bank, the central statistical office, the electric power industry, and several research institutes, most of which are associated with the chemical industry.

By the beginning of 1969, Hungary had not yet engaged in the series production of computers. The long-established Hungarian electronics industry has tended to specialize in communications equipment and has also produced a narrow range of consumer entertainment equipment, medical equipment and industrial instruments. Electron tube production has had a long history under the Tungsram label, but only a small assortment of germanium transistors is produced domestically, and the production of silicon transistors was only recently undertaken.

By mid-1969 Hungary was testing two domestically designed prototype computers. One is a small-to-medium-scale model based on silicon transistors and intended for use in process control, data processing and small-volume scientific calculations. The other model, apparently in an earlier stage of testing and development, is designed as a purely scientific computer. The Hungarian technical press has discussed plans for the production of these two machines in series along with punch tape units, on-line typewriter keyboards, and other peripherals, but realization of these plans probably will require extensive Free World assistance.

E. POLAND

Computers in Poland are currently installed in offices of the central computer network (essentially consisting of computer centers which service research and development institutes, state agencies, and industry), universities, chemical and electrical equipment plants, and the state railway system. Plans call for the installation of 251 digital computers during the 1966–70 period, and it seems likely that the plans will be fulfilled. Of the 251 computers, 57 are to be used to expand the national computer network to 27 offices throughout the country, 50 are destined for the Ministry of Heavy Industry, primarily for plant administration, 48 are to be used in the Ministry of Education for teaching purposes and school administration, 18 are to be used by the Ministry of Mining and Power, and the remaining 78 are slated for various other ministries.

Poland's computer production is the largest in Eastern Europe, totalling 150 machines of various types by the end of 1968. Domestic computers, which account for about 75 percent of all computers installed in Poland, have also been exported to Czechoslovakia, East Germany, Hungary, and the U.S.S.R.

Series production of computers began in 1958, and several models, all slow speed machines with small memories best suited to solving the problems of science, have been successfully produced since then. Production of the most recent model, a small-to-medium-scale, transistorized, scientific machine was begun in late 1967. Improved models are now in the design stage, including one intended primarily for

business data processing, and another capable of both scientific calculation and business data processing and using silicon semiconductors.

F. RUMANIA

Computers currently installed in Rumania are located in various government organizations such as the Central Directorate of Statistics, in large industrial enterprises, especially those of the chemical industry, and in some research and educational institutes. The Rumanians plan to provide additional computers to improve the management, organization and planning of the national economy. The first of these computers will be applied to the chemical and machine building industries, the state railway network, power distribution and the management of forest and water resources. Preliminary plans have been made for the integration of these and other computers into a national computer network. Rumania wishes to provide most of the computers for this proposed network from domestic production, but to date has built only laboratory models and has no capability to produce computers on a commercial scale. Extensive preliminary studies have been undertaken to determine the extent of foreign technical assistance needed to establish a domestic computer industry by 1975.

G. YUGOSLAVIA

Yugoslavia has 120 computers installed at present. Many are in industry, but government and commerce also have large shares. Agriculture, forestry, and the craft industries make use of computers as needed, using the several computer service centers that have been established. All of Yugoslavia's computers have come from the Free World, primarily the U.S. and U.K. Enterprises and institutions in Yugoslavia will probably continue to buy Free World computers as foreign exchange availabilities permit. Yugoslavia, like Rumania, has produced a few digital computers under laboratory conditions but has no capability to produce them on a commercial scale. The primitive state of Yugoslavia's electronics industry makes it unlikely that such a capability will be developed soon.

GENERAL NOTE ON DATA SOURCES

Data for this study have been compiled chiefly from numerous Eastern European newspapers, magazines and technical publications. Some data have been found in Free World news media, particularly publications on east-west trade, electronics, and computers.

MILITARY SPENDING IN EASTERN EUROPE

By Robert T. Hinaman and Nancy M. Kling*

Introduction

This study presents a general view of the size, structure, and funding of the defense establishments of the six presently active members of the Warsaw Pact other than the Soviet Union: Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, and Romania. It attempts to give some appreciation of the size and trends of military programs of Eastern Europe.

Because of the different currencies in use and the arbitrarily fixed official exchange rates, no attempt is made to aggregate defense spending by the East European Warsaw Pact countries as a whole. The official budget data provide only an approximate idea of the size and impact of defense activities, but are probably more reliable as indicators of trends over time in defense spending and the relative priority afforded to national security programs in each of the countries.

National Budgets

The budgetary system used by each of the six East European Warsaw Pact nations is similar to that of the U.S.S.R. Total budgetary expenditures are divided among four categories: Financing the National Economy; Social-Cultural Measures; National Defense; and Administration. Funds in the defense category are believed to include direct outlays required to pay military personnel, procure military equipment and supplies, and to maintain equipment and buildings. In some cases expenditures for security forces—which in some countries include border guards and militia—are included within the overt defense budget. Other military-related activities are believed to be financed by budgetary sources other than the defense category. Similarly, the funding of military research and development is believed to be included in the social-cultural account. Investment in military production facilities is believed to be financed outside the defense budget, as in Western nations, and probably is included along with other investment funds, in the national economy account.

A major difficulty, therefore, in assessing the exact magnitude and impact of defense spending in the Warsaw Pact countries is to identify and quantify the defense-related expenditure items that appear in budget categories other than defense. Unfortunately, precise delinea-

*The authors acknowledge important contributory research for this paper by Craig B. Chellis, Sydney H. Jammes, and John W. Kay.

tion is not possible, because the breakdown of the budgets is not detailed enough to allow the separation of all military spending from civilian outlays.

A rough indication of the impact of defense expenditures in the East European Warsaw Pact countries may be obtained by examining the percentages of the total budgets allocated to the overt defense category, although the coverage and inclusiveness of both the total budget and the defense category may vary from country to country or from year to year. The results obtained are not really comparable to the same figures for the Western nations because of the differences in inclusiveness of the total budgets. In the Communist nations a much broader scope of economic activity is financed through the budget—e.g., until recently, most investment in plant, equipment, and inventories.

General Trends in Military Spending

Since 1960 the defense budgets of the East European Warsaw Pact countries have been characterized by a general upward trend with an average yearly increase of around 10 percent. A similar increase is seen in the total state budgets and, as a result, with the exception of East Germany, military spending has accounted for a relatively constant share of the total budget of each country. East Germany's announced defense budget has been increasing as a percentage of its state budget, mainly because it is believed currently to include expenditures not previously part of the defense category of the budget.

Several factors have contributed to the general increase in military spending. First, procurement costs of the newer equipment—more sophisticated missile systems, supersonic aircraft, electronic equipment, and armored vehicles—has added considerably to defense costs. Secondly, as weapon systems become more complex the attendant operation and maintenance costs tend to increase. This involves not only the cost of spare parts and the frequency of repairs, but also the pay and allowances for the more highly trained military personnel required to maintain modern weapon systems.

In addition to more costly weapon systems, the Soviet Union has also increased pressure on other Warsaw Pact members to contribute more heavily to the Warsaw Pact's operations, both physically and economically.

Despite the rising defense budgets, the overall military manpower strength of the East European countries has remained relatively constant during the 1960's. In most of the countries, army ground strength has declined slightly and in several countries the term of conscription has been reduced. The total number of combat aircraft has also been reduced, but in most cases more effective modern aircraft have replaced older obsolete airplanes. Naval strength has increased with a relatively large number of missile-carrying patrol boats currently being added to the fleets. The present strength of the armed forces is shown in Table 1.

TABLE 1.—WARSAW PACT ARMED FORCES (EXCLUDING THE SOVIET UNION)[1]

	Bulgaria	Czecho-slovakia	East Germany	Hungary	Poland	Romania	Total
Total active military manpower (thousand men)	153	225	126	102	274	173	1,053
Army	125	175	85	95	185	150	815
Navy	6	----	16	----	19	8	49
Air Force	22	50	25	7	70	15	189
Border troops and militia (thousand men)	170	40	340	135	45	50	780
Divisions:							
Tank	4	5	2	1	5	2	19
Motorized rifle	8	9	4	5	8	7	41
Major ships:							
Destroyers and destroyer escorts	2	----	4	----	3	----	9
Submarines	2	----	----	----	5	----	7
Osa-class missile patrol boats	----	----	12	----	12	5	29
Combat aircraft	250	600	270	140	750	240	2,250

[1] Institute for Strategic Studies, "The Military Balance 1968–1969," London, 1968, pp. 2–4.

BULGARIA

The defense budget of Bulgaria has fluctuated in absolute terms over the past ten years, but has remained a relatively constant percent of the total budget of the country. The increases in absolute terms during the past two years can be partially attributed to pressures being exerted by the Soviet Union on the member nations of the Warsaw Pact for more assistance in maintaining the forces under the central control of the Pact.

It cannot be ascertained whether or not the announced defense expenditures truly encompass all the expenditures allocated to this sector of the economy, e.g., total spending for defense-related activities might include some of the budget assigned to science. Also, Bulgaria may receive assistance from the Soviet Union in the form of credit for military equipment.

Despite the fluctuations in the defense budget, Bulgarian armed forces have remained reasonably stable during the past five years, ranging from a low of 150,000 men in 1969 to a high of 156,000 men in 1967. The forces are presently estimated to have about 153,000 men: 125,000 in the Army; 6,000 in the Navy, and 22,000 in the Air Force. These troops are supplemented by a 20,000-man paramilitary

TABLE 2.—BULGARIAN STATE BUDGET DEFENSE EXPENDITURES, 1960–69

	Expenditures[1] (million leva)	Share in total budget (percent)
1960 plan	179.0	6.0
1961 plan	206.0	6.2
1962 plan	225.0	6.0
1963 plan	297.0	8.2
1964 plan	260.0	8.9
1965 plan	230.0	7.2
1966 plan	252.0	6.8
1967 plan	247.0	6.1
1968 plan	264.0	6.0
1969 plan	302.5	6.0

[1] Official budget and plan data.

force (including some border troops) and a People's Militia of 150,000.[1]

The Bulgarian Army is composed of eight motorized rifle divisions and four tank divisions, supported by SA–2 Guideline surface-to-air missiles (SAM's). The Navy is equipped with two submarines, two destroyer escorts, about 50 other vessels, and a small Danube flotilla. The Air Force has twelve interceptor squadrons with 250 combat aircraft plus assorted reconnaissance aircraft, transports, and ground support squadrons.[2]

Most of the equipment for these forces probably comes from the Soviet Union and some small arms may be supplied by the other Warsaw Pact nations which are known producers of military equipment; e.g., Czechoslovakia. Other than possibly some small arms, Bulgaria is not known to produce any armaments.

CZECHOSLOVAKIA

Since 1960 the category for defense and internal security in the announced Czech state budget has been on a general increase with the 1969 planned defense expenditure being almost 70 percent higher than the 1960 figure.

Announced expenditures for the social-cultural category, like defense expenditures, are also at their highest level ever. The 1968 announced figure for this account—64.6 billion crowns—is 60 percent higher than the 1960 allocation.[6] Just how much military funding is included in the social-cultural portion of the budget cannot be determined with any real certainty. It is known that these funds support the Czechoslovakian Academy of Sciences and certain ministerial research organizations. Some military research might well be financed through these agencies.

TABLE 3.—CZECHOSLOVAKIAN STATE BUDGET DEFENSE EXPENDITURES,[1] 1960–69

	Expenditures (billion crowns)	Share in total budget (percent)
1960	8.8	8.5
1961	9.5	8.5
1962	10.9	8.8
1963	10.8	9.0
1964	10.2	8.6
1965	10.1	8.3
1966	10.8	7.0
1967	12.4	8.4
1968 plan	12.9	8.9
1969 plan	14.9	9.5

[1] 1960–63: *Statistická ročenka ČSSR 1963;* 1964–67: *Statistická ročenka ČSSR 1968;* 1968–69: Official plan and budget data. These figures include expenditures for security.

It should also be noted that there are, in addition to government research bureaus, several design and development organizations in Czechoslovakia which are considered to be "commercial" or nongovernmental in nature. Some military research might be conducted by these organizations as well, but, the funding would not appear in the defense budget.

[1] Institute for Strategic Studies. *The Military Balance 1968–1969,* London, 1968, p. 2.
[2] Institute for Strategic Studies, *loc. cit.*
[6] *Statistická ročenka ČSSR 1963* and *1968;* official plan and budget data.

Until August 1968 Czechoslovakia maintained one of th most effective military establishments of all the Warsaw Pact nations, ranking with Poland and East Germany in terms of equipment quality and organization. The Czech Army is estimated to have about 175,000 men in five tank divisions, nine motorized rifle divisions and one airborne brigade. The Soviet SA–2 SAM system has also been supplied to the Czech Army by the Soviet Union. A 40,000-man internal security and border guard force complements the Army.

The Czech Air Force is estimated to consist of 50,000 men and 600 combat aircraft of both early and late model design. About 350 transport, training, and general support aircraft, many of Czech design, and 100 helicopters are also in the Czech Air Force inventory.[4]

The figures cited are for pre-invasion military manpower and equipment. They may have changed since August 1968, but at present, no further information is available on current manpower strength or status of troops.

In terms of capabilities, Czechoslovakia reportedly was one of the first Warsaw Pact countries to incorporate in its military establishment some of the latest Soviet changes in tactical organization which increase mobility and firepower and enhance capabilities for conducting tactical nuclear warfare.

Unlike other more Soviet-dependent Pact countries such as Hungary or Bulgaria, Czechoslovakia has equipped and supported much of its military establishment through domestic production. Of all the Pact countries, Czechoslovakia's armaments industry is perhaps the most developed.

The Czechs have been mass producing their own small arms, artillery, and copies of Soviet tanks for some time. Even in the area of sophisticated military aircraft they have initiated native design and production of jet fighters trainers and utility-type aircraft. The Czechs have also received many of the latest model Soviet produced weapons. The present status of indigenous armaments research and production in the wake of the 1968 invasion is uncertain.

EAST GERMANY

The only direct source of financial information on East Germany's military activities is the budget category labeled "defense" which is part of the state budget announced every year. All other indicators of military activity are kept separate from data on other sectors of the economy, and information on military activities is restricted to the highest levels of government. The extent of East Germany's military dependence on the U.S.S.R. is a politically sensitive issue and one which both the Sovet authorities and the East Germans prefer not to illuminate. East German propaganda during the 1960's frequently highlighted, however, the sharp contrast between the large West German defense budget and the small overt East German budget for defense.

It appears that, before 1962, the announced budget figure was used solely for political purposes and was a completely unreliable indicator of East German military spending. Announced defense spending

[4] Institute for Strategic Studies, *op. cit.*, pp. 2–3.

TABLE 4.—EAST GERMAN DEFENSE BUDGET EXPENDITURES, 1960-69

	Expenditures [1] (billion DME)	Share in total budget (percent)
1960 plan	1.0	5.0
1961 plan	1.0	5.0
1962 plan	2.7	5.0
1963 plan	2.8	5.0
1964 plan	2.9	5.0
1965 plan	3.1	5.0
1966 plan	3.2	5.0
1967 plan	3.6	5.0
1968 plan	[2] 5.8	8.7
1969 plan	[2] 6.3	8.5

[1] Official budget data.
[2] These figures include expenditures for security.

amounted to just under 1 billion DME every year from 1956 to 1961. In 1962, the announced defense budget almost tripled, reaching a level of 2.7 billion DME. It is believed that at this point the defense category became a more meaningful indicator of defense activity and probably covered actual expenditures for personnel, imports of military equipment, construction, and conducting exercises and maneuvers.

From 1962 to 1967, East Germany's defense budget grew at an average annual rate of six percent. In 1968 the announced defense budget again rose very sharply to 5.8 billion DME, an increase of 61 percent over the 1967 defense budget and an increase from 5 percent to almost 9 percent of the total state budget. East German Finance Minister Boehm stated that the large increase was necessary because of the "increased tension in the international situation" which he claimed was caused by the continued "expansionist policy" of West Germany. He also accused Bonn of enlarging its army and making domestic preparations for war. A large part of the increase, however, is due to the addition of expenditures for security to the defense category.

The announced 1969 defense budget of 6.3 billion DME—an increase of about 9 percent over 1968—accounted for 8.5 percent of the total state budget. This increase was in line with defense budget increases in the rest of the Warsaw Pact countries.

Present East German forces total some 126,000 men. The army has some 85,000 men with six combat divisions and some air defense missile systems. The Navy has 16,000 men with numerous surface craft including four destroyer escorts. 12 Osa-class missile patrol boats, Hound helicopters, and other small coastal craft. The Air Force has a total strength of 25,000 men with 270 combat aircraft with 18 fighter-interceptor squadrons and some 60 light transports and Hare and Hound helicopters. There are about 20,000 security troops and 70,000 border guards separate from the regular army.[5]

The East German armed forces are almost completely dependent on arms shipments from the U.S.S.R. and there has been very little indigenous weapons production. The Soviets have provided East Germany with many new items of equipment sooner than any other Bloc country and the structure of the Army is patterned after that of the Soviets with high mobility, firepower and flexibility for tactical nuclear warfare. Army ground strength remains low, primarily because of a severe

[5] Institute for Strategic Studies, *op. cit.*, p. 3.

shortage of manpower available for military service. East Germany is the only European Communist country without universal conscription. Accordingly, the Army's small size has been made the subject of propaganda pronouncements intended to reflect unfavorably on the West German armed forces.

Of all the non-Soviet Pact members, East Germany has the largest sumber of Soviet troops permanently stationed in the country, and probably contributes to the support of these troops. East Germany exports some military-related items such as optics and other precision engineering equipment to the U.S.S.R. It is not known to what extent these sales offset East German purchases of military hardware from the U.S.S.R., or if purchases are included with the defense budget.

HUNGARY

Although Hungary's announced defense budget has been growing at a faster rate than most of the East European Communist countries, its share of the total budget has also been declining. It has absorbed about 5 percent of the state budget since 1967, a decline from almost 6 percent in 1965 and 1966, and about 7 percent in 1963 and 1964. During the period 1967–69, Hungary's defense budget has been growing at an average annual rate of almost 15 percent per year.[6]

TABLE 5.—HUNGARIAN STATE BUDGET DEFENSE EXPENDITURES[1] 1960–69

Plan	Expenditures (million forints)	Share in total budget (percent)
1960	3,100	(2)
1961	3,376	4.4
1962	4,913	5.9
1963	6,500	7.3
1964	6,163	6.6
1965	5,757	5.9
1966	5,219	5.5
1967	5,444	5.2
1968	6,439	5.0
1969	7,956	5.1

[1] 1960–65: U.S. Arms Control and Disarmament Agency, Financial and Fiscal Systems of Hungary, Washington, 1968, p. 285: 1966–69: Official plan and budget data.
[2] Not available.

During the early 1960's, Hungary's defense budget more than doubled. After 1963, when the defense budget received its largest share of the state budget, some 7 percent, Hungary's defense spending generally declined until the recent increase in spending beginning in 1967.

The defense budget for 1969, almost 8 billion forints, is the highest level of defense spending thus far for Hungary. This is an increase of 24 percent over the 1968 budget. Hungarian press statements indicate that part of the large increase will be used to increase the pay of conscripts two and one-half times. New equipment will also be purchased for the army and regular army pay will be increased.[7]

The Hungarian armed forces have not fluctuated greatly over the decade of the 1960's. Total regular forces presently have about 100,000 men with 95,000 in the Army and the remainder in the Navy and Air

[6] United States Arms Control and Disarmament Agency, *Financial and Fiscal Systems of Hungary*, Washington, 1968, p. 285.
[7] *Népszabadság*, December 11, 1968.

force. Hungary also maintains about 35,000 border and security troops and has an organized workers' militia of 100,000 men.[8]

Hungary's Army is composed of six divisions and has some SA–2 missiles deployed for air defense. The Air Force has 140 combat aircraft and 20 small transports and helicopters. There is a Danube flotilla with some 15 patrol craft.[9]

Hungary's indigenous production of military material is limited to small arms; the bulk of Hungarian military equipment comes from the Soviet Union. It is not known whether the Soviet equipment is purchased or granted on a military aid basis, but it is likely that a large portion of the equipment is paid for by the Hungarians. If it is purchased, payment is probably financed by the overt defense budget.

The Hungarian state budget probably includes expenditures for the support of Soviet troops stationed in Hungary. The last definitive information on this point was in 1949 regarding the 1946–47 state budget. At that time the outlays for support of Soviet troops was reported to be about 10 percent of the total budget.[10] The size of Hungary's overt defense budget suggests that it is adequate to provide substantial support of Soviet troops in addition to the direct expenditures for Hungary's own armed forces.

POLAND

The Polish defense budget has increased steadily since 1961. The planned defense expenditures for 1969 exceeds that of the previous year by 11 percent, with payments for imported military equipment believed to be largely responsible for the increase. Changes in wages and internal prices may have also had an effect.

TABLE 6.—POLISH STATE BUDGET DEFENSE EXPENDITURES[1] 1961–69

	Expenditures (billion zlotys)	Share in total budget (percent)
1961	17.0	7.3
1962	18.4	7.4
1963	20.7	8.2
1964	21.9	8.0
1965	23.2	8.0
1966	25.2	7.9
1967	26.4	8.2
1968	30.0	9.2
1969 plan	33.3	9.7

[1] Sources of the data are as follows: 1961–68: Concise Statistical Yearbook of Poland, Central Statistical Office, Warsaw, 1968; 1969: Polish Government budget.

Military related spending not included in the announced defense budget may be sizable since the internal security forces are not included in the official figure, and Poland is the only East European country other than Czechoslovakia with a sizable defense industry. Investment expenditures for expanding the defense industry are probably included in the national economy budget.

The Polish armed forces are reportedly the largest and best organized, trained, and equipped of all the non-Soviet Warsaw Pact forces.

[8] Institute for Strategic Studies, *op. cit.*, p. 3.
[9] Institute for Strategic Studies, *op. cit.*, p. 3.
[10] *Gazdaságstatisztikai Tájékoztató*, October 1947, p. 594, and January 1948, p. 56.

Their organization has been patterned closely after the Soviet military and has followed all the current moves toward even more modern concepts. Continued imports of modern Soviet equipment along with weapons from local production has steadily improved firepower and mobility.

The Polish ground forces, with 185,000 men divided into five tank and eight motorized rifle divisions, constitute the basic and by far the largest component of the armed forces. The Polish naval forces are the largest of the non-Soviet Warsaw Pact countries and include three destroyers, at least five submarines, and a small, well equipped naval air arm. The air defense command has 45 interceptor squadrons plus SA–2 SAM's.[11]

Although Polish forces make extensive use of weapons and vehicles of Soviet design, Poland's armaments industry is second only to that of Czechoslovakia among Warsaw Pact countries. Poland produces tanks, artillery, small arms, antitank weapons, ammunition and explosives, chemical warfare equipment, aircraft, electronic and communications equipment, and trucks of both Polish and Soviet designs.

ROMANIA

Despite fluctuations in a total state budget that ranged from a 21 percent increase in 1962 to a 2 percent increase in 1965, Romania's announced defense budget grew constantly throughout the 1960's. It almost doubled in the ten year period. The defense budget, however, received a decreasing portion of the total budget during the period, falling from about 6 percent to about 4 percent, as the total state budget rose from 55.42 billion to 152.62 billion lei, an increase of about 175 percent.[12]

TABLE 7.—ROMANIAN STATE BUDGET DEFENSE EXPENDITURES,[1] 1960-69

	Expenditures (billion lei)	Share in total budget (percent)
1960	3.39	6.1
1961	3.64	5.7
1962	3.92	5.4
1963	4.14	5.3
1964	4.35	5.0
1965	4.73	5.1
1966	4.93	4.7
1967	5.15	4.1
1968 plan	5.19	3.7
1969 plan	6.41	4.2

[1] Anuarul statistic al Republicii Socialiste România, 1968, and report of speech to Central Committee Plenum and Grand National Assembly in connection with presentation of 1969 plan and budget in December 1968.

In addition to the announced defense budget, some military spending may be financed from the unexplained residual of expenditures and from the budget for "Social-Cultural Measures", which includes science. Some expenditures on military-related production facilities may be financed outside the defense budget, but this amount is probably small at present. Expansion of armament production would require a concurrent increase in expenditures.

[11] Institute for Strategic Studies, *op. cit.*, p. 4.
[12] *Anuarul statistic al Republicii Socialiste România, 1968*, Bucharest, 1968.

Romania's military force of 173,000 men is the fourth largest of the Warsaw Pact countries, surpassed by the U.S.S.R., Czechoslovakia, and Poland. This represents a decline, almost entirely in the Army forces, from an estimated 222,000 men in 1964. There has also been a reduction from a 2-year term of service in the Army to a one year term, although the two year term has been maintained for the Navy and the Air Force.

Total Army strength is approximately 150,000 with two tank and seven motorized rifle divisions supported by SA–2 missiles. Naval strength is about 8,000 with about 60 ships including five Osa-class missile patrol boats. Air Force strength is about 15,000 with 18 squadrons of fighters comprising 240 aircraft—the bulk of the combat aircraft.[13]

Romania is looking toward a policy of decreased dependence on the Soviet Union for military equipment. At present Romania only produces small arms but plans have been announced to produce a greater share of her own armament and arms purchases are no longer to be limited to the Soviet Union and other Warsaw Pact countries. In a speech of July 1967, Minister of the Armed Forces Ion Ionita stated that, according to *Party Directive*, "Apart from the perfecting of armaments which Romania is now producing, the country should go over to the development of new types of military technology." Romania's objective appears to be to become as independent as she can without forcing the Soviet's hand and putting herself in the position of another Czechoslovakia.

[13] Institute for Strategic Studies, *op. cit.*, p. 4.

THE DEVELOPMENT OF ENERGY IN EAST EUROPE

By J. G. POLACH

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I. PREFATORY NOTES

This study examines the development of energy in East Europe from 1950 through 1967. Its purpose is to analyze and evaluate the role of energy within the area as a whole and in its component countries, especially with respect to the implications of the development of energy for economic growth, trade, and ultimately economic welfare of the peoples of the area.

The main approach of the study is an analysis of the pattern of energy requirements and supply, their composition, the origin and direction of energy commodity trade, and the structure and adequacy of the energy resource base.

Following these *Prefatory Notes*, this report examines, in its main part, the energy economy of East Europe as a whole. Individual countries are mentioned here only insofar as they are particularly pertinent to the subject matter under discussion. Appendix A contains a selected bibliography on the development of energy in East Europe. Appendix B consists of a statistical presentation of each country's overall energy balance, the distribution of its trade between the Communist countries and other parts of the world,[1] and a table showing exchanges in natural gas.

[1] The author has compiled also detailed matrix-type tables showing imports, exports, and net trade in solid and liquid fuels by individual commodity and its origin and destination. These tables are, unfortunately, too voluminous to be included in a study of the scope of the present one, but can be made available to interested scholars directly by the author.

SYNOPSIS OF FINDINGS

The energy economy of East Europe remains essentially a one-fuel economy, although the conditions vary substantially between the northern and southern parts of the area.

Consumption of inanimate commercial energy in East Europe has been increasing since 1950 though at decreasing rates, while dependence of its economy on energy imports has been steadily rising.

Modifications in the nature of energy requirements, associated with structural changes in the economies of the countries of the area (chiefly connected with an imposed rapid rate of industrialization) and increasing diversion of energy resources to non-energy uses, had, by the early sixties, switched East Europe from an energy-surplus to an energy-deficit area.

East Europe's dependence on the Soviet Union for energy supplies increased considerably during the period in question: in liquid hydrocarbons (on a ton-per-ton basis), from 52 percent in 1955 to 92 percent in 1965; in solid fuels, from 20 to 53 percent during the same period. Completion of trunk pipelines as well as of a uniform power grid aided in this process.

Recent developments seem to contradict earlier indications that the Soviet Union's fuel policy may be deliberately aimed, in light of her own energy requirements, at some relaxation of East Europe's dependence on the Soviet supplies.

East European countries now pay on the average less per unit of imported fuels than they did a few years ago. Nevertheless, the practice of discriminatory pricing against them is still in evidence.

Generation of electricity has been increasing in the area at a faster rate than the world average, but most of it is consigned to industrial uses rather than direct consumption by the population.

Nuclear power has no significance in the present energy balances of East Europe. No concrete evidence is available to suggest that this will change within the next five to ten years.

The high level of per capita energy consumption in some East European countries, and the relatively high growth in per capita energy consumption of the area as a whole, cannot be used for international comparisons of economic welfare without adjustments for inefficient uses of primary energy resources and for substitution of commercial energy for non-commercial energy.

East Europe's energy resource base lacks diversity and depth for supplying adequate quantities of energy in the appropriate mix for the growth of a modern economy. By 1980, further economic development of the area and ultimately the economic welfare of its population may be unconditionally dependent on the Soviet ability to produce sufficient surplus supplies of energy and willingness to make them available to Eastern Europe.

METHODOLOGY AND SOURCES

The method is chiefly statistical. The official records and other publications available in the individual countries of the area and in the Soviet Union serve as the main source of data. The Soviet sources have been found particularly useful because they usually cover the subject

in greater detail than those of the individual countries in East Europe. A selected bibliography of the sources consulted is given in the appendixes.

Data from Soviet and other Eastern European sources were found consistent with similar data available in the West. The principal differences often, though not always, result from variations in statistical coverage, concepts and conversion rates. Yet, several statistical problems have hindered this inquiry. They include changes in coverage during the period in question, insufficient breakdown of composite data, and occasionally wide gaps in information apparently considered sensitive.

For these reasons, whenever it was considered pertinent to compare East European energy developments with those of other regions, recourse was had to data in the United Nations *World Energy Supplies* (hereinafter referred to as U.N. *WES*) and various reports of the committees on fuels and electricity of the United Nations Economic Commission for Europe.

TERRITORIAL COVERAGE

The present study covers Albania, Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, Romania, and Yugoslavia. Yugoslavia has been included because her energy economy has become increasingly linked to that of East Europe and to Soviet energy supplies. Also, Yugoslavia continues to place considerable reliance on fuelwood and noncommercial fuels and thus more closely resembles her Communist neighbors than West European countries.

In addition to East European countries, the paper includes the energy balance sheet and other basic data on energy production, consumption, and trade of the Soviet Union although these data are not further analyzed except when pertinent to the East European situation.

Not much attention is paid in the analysis to Comecon as an entity since within it the Soviet Union completely overwhelms the significance of developments in East Europe. Nevertheless, some data on energy production and consumption in Comecon are provided for the purpose of orientation.

NOTES ON ENERGY RESOURCES

Individual energy resources are not generally equivalent to one another. In order to compare different energy resources it is necessary to express them in a common unit, as if they were mutually substitutable. For the purpose of this study a unit (standard fuel unit) of a theoretical net energy content of 7,000 kilocalories (kcal) per kilogram (or approximately 28 million BTU's per metric ton)—has been adopted. Such a unit roughly corresponds to high quality bituminous coal—in Europe usually referred to as "hard coal."

In practice it usually suffices to carry out an analysis of energy economy on the level of primary commercial energy resources. With respect to Eastern Europe these include: hard (bituminous) coal, anthracite, subbituminous (brown) coal, lignite, peat, crude petroleum, natural gasoline, natural and associated gas, coal-mine gas, and primary power such as hydro- or nuclear-generated electricity. Fuelwood

is still used as commercial fuel in East Europe in addition to non-commercial energy resources, especially agricultural waste, etc.

Availability of energy in Eastern Europe is measured in the present study by output of the primary commercial energy resources plus their net trade and trade in secondary energy sources, such as coke, coal briquettes, refined petroleum fuels and manufactured gas. Total output and net trade then nominally represent the inputs of inanimate energy into the economy and are identified in the study with the total requirements and/or consumption of commercial energy of the entire area or particular country for the respective period. Because of lack of data, this apparent consumption has not been adjusted either for changes in fuel inventories or for bunkers.

CONVERSION FACTORS

Factors for converting individual energy sources into standard fuel units are given in Table 1. They are based on conversion factors used in U.N. *WES*, except when specific information was available about a given national energy resource in East Europe. This latter method applies notably to coal. The calorific values adopted for natural gas are those given in the U.N. Economic Commission for Europe, *Annual bulletin of gas statistics for Europe.*

TABLE 1.—CALORIFIC CONTENT AND CONVERSION FACTORS ADOPTED FOR EAST EUROPEAN ENERGY RESOURCES

Energy resource and origin	Original unit of measurement	Calorific value per unit of measurement (in million kcal)	Conversion factor into one metric ton of standard fuel
Standard fuel	1 ton	7.0	1.00
Hard coal (including patent fuel and anthracite)	do	7.0	1.00
Except as noted for:			
Bulgaria	do	6.5	.929
Romania	do	6.2	.886
Yugoslavia	do	6.2	.886
Brown coal:			
Albania	do	3.5	[1].5
Bulgaria	do	4.5	.643
Czechoslovakia	do	4.2	.6
East Germany	do	2.3	[1].33
Yugoslavia	do	4.0	.571
Lignite:			
Bulgaria	do	2.0	.286
Czechoslovakia	do	2.1	.3
East Germany	do	2.3	[1].33
Poland (including brown coal)	do	2.1	[1].3
Romania (including brown coal)	do	2.3	[1].33
Yugoslavia	do	2.5	.354
All coals (annual averages):			
Hungary:[2]			
1950	1 ton	3.858	0.551
1955	do	3.425	.489
1960	do	3.335	.476
1965	do	3.179	.454
1967	do	3.310	.473

See footnotes at end of table.

TABLE 1—CALORIFIC CONTENT AND CONVERSION FACTORS ADOPTED FOR EAST EUROPEAN ENERGY RESOURCES—Continued

Energy resource and origin	Original unit of measurement	Calorific value per unit of measurement (in million kcal)	Conversion factor into one metric ton of standard fuel
Hard coal coke	1 ton	6.3	[1] .9
Brown coal coke	do	4.7	[1] .67
Hard coal briquettes	do	7.0	[1] 1.0
Lignite and brown coal briquettes	do	4.7	[1] .67
Peat	do	3.5	[1] .5
Fuelwood	1,000 cu. m	2.1	[1] .3
Fuelwood	1 ton	3.5	[1] .5
Charcoal	do	6.72	.96
Crude petroleum	do	9.1	[1] 1.3
Natural gasoline	do	10.5	[1] 1.5
Refined petroleum fuels	do	10.5	[1] 1.5
Natural gas:			
Bulgaria:			
1965	1,000 cu. m	9.3	[1] 1.332
1967	do	9.3	[1] 1.332
Czechoslovakia:			
1950	do	7.8	1.121
1955	do	7.8	1.121
1960	do	7.8	1.115
1965	do	10.0	1.429
1967	do	10.0	1.429
East Germany:			
1960	do	5.8	[4] .829
1965	do	5.8	.829
1967	do	5.8	.829
Hungary:			
1950–1960	do	9.0	1.286
1965	do	7.5	1.066
1967	do	8.6	[4] 1.231
Poland:			
1950–1955	do	8.9	1.271
1960	do	9.0	1.286
1965–1967	do	9.1	[4] 1.300
Romania:			
1950–1967	do	9.5	1.360
Yugoslavia:			
1960	do	10.3	1.475
1965	do	9.7	1.386
1967	do	9.7	1.386
Associated gas: [3]			
Romania: 1950 to 1967	1,000 cu.m	10.6	1.514
Mine-coal gas [3]			
Poland: 1950 to 1967	do	4.0	.571
Manufactured gas: [3] 1950 to 1967	do	4.2	[1] .06

[1] Based on United Nations "World Energy Supplies" because of the lack of national data.
[2] Computed from the total calorific values of annual coal production as given in Hungarian statistical yearbooks and other official sources.
[3] Based on United Nations Economic Commission for Europe, *Annual bulletin of gas statistics*. Values for 1967 are estimated on the basis of the 1966 values.
[4] Due to the lack of specific information for this year, the conversion factor for 1965 was adopted.

Note: Hydro and other primary power (see Table 12).

Hydro-generated electricity is converted on the basis of the average specific rate of fuel consumption (expressed in standard fuel units) per one kilowatt-hour produced in thermal power stations. The various rates, corresponding to different efficiencies in the production of thermal electricity in individual East European countries in selected years, are presented in Table 2.

TABLE 2.—*Specific average consumption rates of fuel* [1] *per kilowatt-hour produced in East Europe, U.S.S.R., and Comecon, 1950–67*

[In kilograms per 1,000 kilowatt-hours or grams per kilowatt-hour [2]]

	1950	1955	1960	1965	1967
East Europe [3]	704	661	548	469	437
Albania	[4] 700	[4] 625	[4] 550	[4] 500	[4] 470
Bulgaria	[4] 650	[4] 615	540	490	450
Czechoslovakia	[4] 650	615	520	456	426
East Germany	[4] 780	739	608	516	472
Hungary	[4] 700	676	583	507	493
Poland	[4] 600	578	484	420	400
Romania	[4] 650	[4] 620	485	400	361
Yugoslavia	[4] 750	[4] 700	656	542	568
Comecon [3]	629	567	492	429	404
Soviet Union	590	523	468	415	394

[1] In standard fuel units of 7,000 kcal. per kilogram.

[2] In general, the quoted specific average fuel consumption rate per kilowatt-hour refers only to consumption in the central power stations under Ministry or Board for Power. The rates in such plants are usually lower than in the industrial powerplants and much lower than in other small plants, such as communal or agricultural power stations. Further, the fuel consumption rates refer to gross output and may be expected to be substantially higher for net (i.e., sent out) output.

[3] Established by dividing the gross production of electricity by the computed sum of fuel consumed by the individual countries in the area.

[4] Author's estimates. In the case of Albania, Bulgarian rates were considered as probably best approximating the Albanian conditions. However, it is possible that the resulting estimates overstate efficiency of the Albanian plants.

Sources: Annual national statistical yearbooks of the individual countries and United Nations, Economic Commission for Europe, *Annual bulletin of electric energy statistics for Europe*, various issues.

UNITS, SYMBOLS, AND ABBREVIATIONS

All measurements are in metric units. One billion equals one thousand million.

Est.	Estimate made in the source.
*	Estimate made by the author.
¶	Sum of the given components only, without any opinion as to the completeness of the data.
kcal	Kilocalorie (approximately 4 British Thermal Units [BTU]). One thousand BTU's equals 252 kcal.
kwh	Kilowatt-hour.
MWh	Megawatt-hour (1,000 kilowatt-hours).
N.A.	Information is not available.
N.Q.	No data given in the source. The relationship between N.A. and N.Q. is an expression of a different degree of incertitude with respect to existence of the data in question.
Negl.	Negligible quantity (less than 0.5 of the unit used).
Rev.	Revision of the data in the original source.
S.F.	Standard fuel of 7,000 kcal per kilogram or 7 million kcal approximately 28 million BTU's) per metric ton.
U.N. *WES*	United Nations, Statistical office, *World Energy Supplies* (Statistical papers, Series J.)

II. CHARACTERISTICS OF THE SUPPLY-DEMAND PATTERN OF ENERGY IN EASTERN EUROPE

ENERGY CONSUMPTION PATTERNS

The supply-demand pattern of energy in Eastern Europe reflects certain tendencies also noticeable in the world energy economy, par-

ticularly a trend of steadily rising consumption of commercial energy. In this respect, and basing our observations for the moment on the United Nations' *World Energy Supplies*, East Europe's consumption of commercial energy has been rising faster than that of the major industrial areas of the West. Over the seventeen years since 1950, the area recorded an average annual rate of gain in consumption of about 5.4 percent compared to from 3.0 to 3.8 percent per annum in other similar areas of the West during the same period. The East European rate also exceeded the world average growth rate of 4.9 percent per annum during these years. As a consequence of the differential growth rates, East Europe's relative share in the world energy consumption increased from 6.2 percent in 1950 to 7.3 in 1967.

In light of the statistical base generated in this paper, the annual increments in East Europe's energy consumption have been only about 5 percent per annum as may be seen from Tables 3 and 4 which present an energy balance sheet for the area as a whole.

TABLE 3.—*East Europe: Energy balance sheet, 1950–67* [1]

[In thousand metric tons of standard fuel [2]]

	Total energy (1)	Solid fuels (2)	Liquid fuels (3)	Gaseous fuels (4)	Power (5)
1950:					
Production [3]	200,930	185,762	7,900	5,108	2,160
Net trade [4]	−22,645	−20,569	−2,114	+121	−83
Consumption [5]	178,285	165,193	5,786	5,229	2,077
1955:					
Production [3]	268,791	237,937	17,078	9,336	4,440
Net trade [4]	−21,006	−15,960	−5,342	+211	+87
Consumption [5]	247,786	221,977	11,737	9,546	4,527
1960:					
Production [3]	319,273	278,880	19,473	13,671	7,249
Net trade [4]	−5,375	−8,756	+3,004	+347	+1
Consumption [5]	313,898	270,124	22,507	14,018	7,250
1965:					
Production [3]	380,048	325,326	23,591	21,897	9,234
Net trade [4]	+16,139	−3,002	+17,504	+455	+1,182
Consumption [5]	396,187	322,324	41,094	22,352	10,415
1967:					
Production [3]	384,694	322,939	25,505	26,042	10,207
Net trade [4]	+24,159	−7,018	+28,619	+1,483	+1,077
Consumption [5]	408,853	315,921	54,124	27,525	11,283

[1] Totals in this table are sums of individual countries data on fuel and power. Due to rounding, detail may not add to total.

[2] Standard fuel of 7 million kilocalories (or approximately 28 million BTUs) per metric ton. Conversion to S.F. units is based on the average physical energy content as given in Table 1. Hydropower was converted to standard fuel on the basis of a specific average consumption rate in thermal power stations, as applicable for the respective country and year. (See Table 2.)

[3] Production includes primary energy resources, that is: hard (bituminous) coal, brown coal, lignite and, where applicable, peat, fuelwood, charcoal and, in case of the Soviet Union, also rock shale; further, crude petroleum and natural gasoline; natural and associated gas, and as indicated in the respective country table, coal-mine gas; plus hydropower. For lack of reliable data, neither estimates of nuclear generated power (given in Table 10), nor energy content of mined nuclear minerals are included. Natural gasoline is expressed in crude petroleum equivalent on the basis of average physical energy content: for crude, 9,100 kilocalories, for natural gasoline, 10,500 kilocalories per kilogram. Natural gas includes associated and coal-mine gas (in case of Poland) on the basis of calorific content of each particular gas which varies with years and from country to country. Insofar as information was available, the totals were adjusted for shipments of energy resources to non-energy uses.

[4] Net trade represents the individual countries' energy trade balance (imports minus exports) with all other countries of East Europe and the world, and includes all exchanges in primary energy resources (as specified in footnote 3, above) and their derivatives (secondary sources), insofar as they are earmarked for energy purposes. The secondary energy sources include in particular: coal briquettes, all kinds of coke, refined petroleum fuels, manufactured gas, and electricity. With the exception of electricity, they were converted into standard fuel on the basis of the factors given in Table 1. Trade in electricity has been dealt with as adding to (subtracting from) the respective domestic hydropower and was converted into standard fuel units as specified in footnote 2, above.

[5] Consumption refers, in effect, only to available supplies of individual fuels and power on the level of primary energy resources which are assumedly reserved for energy uses. The totals have been established as an arithmetic result of production plus net trade. Lack of data on changes in fuel stocks and fuels used for bunkers prevented establishing a more precise energy balance.

TABLE 4.—*East Europe: Energy balance sheet, 1950–67* [1]

[In original units]

	Total energy (thousand metric tons of standard fuel) [2]	Solid fuels (thousand metric tons of standard fuel) [2]	Liquid fuels (thousand metric tons)	Gaseous fuels (million cubic meters)	Power (million kilowatt-hours)
	(1)	(2)	(3)	(4)	(5)
1950:					
Production [3]	200,930	185,762	[6] 6,076	[7] 3,642	3,129
Net trade [4]	−22,645	−20,569	−1,549	+102	−106
Consumption [5]	178,285	165,193	4,527	3,744	3,023
1955:					
Production [3]	268,792	237,937	[6] 13,137	[7] 6,697	6,793
Net trade [4]	−21,006	−15,960	−4,109	+178	+128
Consumption [5]	247,786	221,977	9,028	6,875	6,921
1960:					
Production [3]	319,273	278,880	[6] 14,980	[7] 9,938	12,251
Net trade [4]	−5,375	−8,756	+2,333	+295	+52
Consumption [5]	313,898	270,124	17,313	10,233	12,303
1965:					
Production [3]	380,048	325,326	[6] 18,147	[7] 15,917	18,466
Net trade [4]	+16,139	−3,002	+13,465	+395	+2,283
Consumption [5]	396,187	322,324	31,612	16,308	20,849
1967:					
Production [3]	384,694	322,939	[6] 19,620	[7] 18,917	20,412
Net trade [4]	+24,159	−7,018	+22,014	+1,297	+1,881
Consumption [5]	408,853	315,921	41,634	20,214	22,313

[1–5] See footnotes 1 through 5 to Table 3, as applicable.
[6] Includes natural gasoline in calorific equivalents of crude oil.
[7] Adjusted for shipments to non-energy uses; includes small quantities of coal-mine gas in natural gas equivalents. Calorific value of coal-mine gas equals 4,000 kilocalories per cubic meter (cf. U.N., ECE, *Annual bulletin of gas statistics for Europe*).

A five percent annual growth over a 17 year period would still be impressive if it were not for the fact that this growth is considerably biased by a high rate achieved during the years from 1950 till 1955, when the area's total energy consumption of commercial inanimate energy was increasing by 6.5 percent annually. Since then, a pronounced downward trend may be observed in East Europe's growth rates as they declined to 5.8 percent over the first decade and to 3.9 percent over the first seven years of the second decade, with a particularly strong drop to a mere 1.5 percent between 1965 and 1967. This is the lowest rate recorded among the major regions of the world, whose average—though reduced to 3.5 percent per annum for the period—is still more than double the growth rate of East Europe.

The corresponding relative reduction in inputs of primary resources in the world at large, and in Eastern Europe particularly, reflects several trends with long-run implications.

In this regard, the trend toward a multi-fuel economy is one of the most important facets of the changing patterns of demand and supply. The change is especially being advanced by a process of substitution. Fuels that suit the technological needs of modern economy better, are more thermally efficient, and are economically more advantageous per unit of quantity—to a large degree because of the lower transportation costs—are being substituted for the traditional but less efficient resources such as low-calorific coals, fuelwood and non-commercial energy sources. Since liquid and gaseous fuels are usually more thermally efficient, the cost considerations favor their substitution for solid fuels. Moreover, technological innovations, *e.g.*, the internal combustion engine, increasingly rely on liquid and gaseous hydrocarbons as an exclusive source of energy, thus compounding a purely fuel substitution

effect. This process is best evidenced by the differential growth rates of individual fuels while the increased thermal efficiency of substituted energy inputs works toward a relative decline in total energy requirements.

An examination of Table 5 along with Table 3 indicates that this is clearly the case in East Europe whose relative decline in aggregate consumption of commercial energy has been chiefly due to an absolute decrease in consumption of solid fuels, although the situation varies in individual East European countries. Measured in standard fuel units, consumption in solid fuels dropped from 322 million tons in 1965 to 315 million tons in 1967. This evolution has been mainly related to a decline in total requirements for commercial energy in Eastern Europe's two most industrialized countries, East Germany and Czechoslovakia, and to a lesser degree to similar developments in Hungary and Yugoslavia. (See Table 5.) East Germany and Czechoslovakia plus Poland—the main coal-based economies of the area—remain the biggest consumers of energy in East Europe. However, their share has declined from 80 percent of the area total in 1950 to 70 percent in 1967.

In Albania and especially in Romania the role of coal in the total energy requirements has still been on the rise. (See Table 5.) In Romania, the output of solid fuels rose faster over the entire period than did the output of crude petroleum, and Romania's consumption of solid fuels during 1965–1967 recorded the highest rate of growth—8.8 percent per annum—in the combined area of Eastern Europe and the Soviet Union over the entire period of 17 years. Otherwise, however, it is the consumption of liquid and gaseous fuels that has registered the extremely high growth rates in East Europe (between 10 to 25 percent annually), exceeding by far those for solid fuels. As may be expected, such consistently high growth rates ultimately affected the relative shares of individual fuels in the total energy requirements of East Europe, as indicated in the following tabulation:

Year	Total consumption	Solid fuels	Liquid fuels	Natural gas	Hydropower
1950	100.0	92.7	3.1	2.9	1.2
1960	100.0	86.1	7.1	4.5	2.3
1967	100.0	77.3	13.2	6.7	2.8

These figures clearly show that solid fuels still remain a main source of commercial energy for the area as a whole, whereas their share in the world declined to 37 percent in 1967. Of the hard coal produced in 1967 in East Europe (not including Yugoslavia), 31 percent was delivered to thermal power stations, 25 percent to coke ovens, 14 percent to the domestic sector of the economy, and 30 percent spread among several other sectors, including transportation. The preponderance of coal in East Europe's energy balances varies territorially and is reflected in Figure 1 which summarizes the historical relative shift in the Communist world between solid fuels on the one hand, and liquid and gaseous fuels on the other. Figure 1 is based on data taken from U.N. *WES*, and therefore not strictly comparable with other figures given herein. Nevertheless, it permits a fast orientation as to the direction which the substitution of the respective fuels has taken in individual countries of the Communist world.

TABLE 5.—*East Europe: Trends in annual average rates of growth of production and consumption of primary energy and electricity; by country and selected period*

[In percent, except as otherwise noted]

	East Europe		Albania		Bulgaria		Czechoslovakia		East Germany	
	Production	Consumption	Production	Consumption	Production	Consumption	Production	Consumption	Production	Consumption
Solid fuels: [1]										
1950–67	3.3	3.9	4.2	4.3	5.6	7.0	3.8	3.6	3.0	3.1
1960–67	2.2	1.8	2.0	2.3	3.5	6.7	2.0	2.2	.8	1.1
1965–67	−.5	−1.0	3.9	3.8	(2)	3.4	−2.0	−2.4	−2.0	−1.0
Liquid fuels: [3]										
1950–67	7.1	13.9	12.5	16.3	.....	22	7.0	17.3	.....	41
1960–67	3.9	13.3	4.4	11.4	14.0	25	5.6	14.6	.....	18.8
1965–67	3.8	14.7	9.4	25	47	20	2.1	10.9	29	17.6
Gaseous fuels: [4]										
1950–67	10.2	10.4	.....				26.0	27.5	.....	10.5
1960–67	9.7	10.3	.....				27.0	−1.4	14.6	4.0
1965–67	9.1	11.4	.....		[7] 4.5	[7] 4.5	3.1	16.6	0	0
Primary power: [5]										
1950–67	11.7	12.4	(6)	[7] 137	(6)	12.1	(6)	11.1	(6)	15.2
1960–67	7.6	8.9	(6)	19	(6)	2.6	(6)	13.0	(6)	27.7
1965–67	5.1	3.4	(6)	28	(6)	4.0	(6)	−4.8	(6)	7.7
Total energy:										
1950–67	3.6	5.0	9.3	10.1	6.3	9.2	4.0	4.7	3.1	3.6
1960–67	2.8	3.9	4.4	8.2	4.1	9.9	1.9	3.9	.9	2.0
1965–67	.6	1.5	8.9	17.3	2.2	8.4	−2.1	−1.0	−1.0	−.8
Total electricity:										
1950–67	9.6	(6)	21.0	(6)	18.2	(6)	8.8	(6)	6.8	(6)
1960–67	8.6	(6)	16.2	(6)	16.6	(6)	6.8	(6)	5.8	(6)
1965–67	8.7	(6)	29.0	(6)	15.4	(6)	6.3	(6)	5.4	(6)

	Hungary		Poland		Romania		Yugoslavia		U.S.S.R.	
	Production	Consumption	Production	Consumption	Production	Consumption	Production	Consumption	Production	Consumption
Solid fuels: [1]										
1950–67	3.3	3.8	2.9	4.3	5.1	5.8	3.1	3.6	4.2	3.7
1960–67	.2	.4	3.1	2.8	5.5	6.1	1.2	1.0	2.2	2.0
1965–67	−5.1	−7.0	2.1	.7	8.4	8.8	−7.0	−8.0	2.8	3.1
Liquid fuels: [3]										
1950–67	7.3	14.3	6.2	13.7	5.8	7.5	19.8	13.3	12.7	10.2
1960–67	4.8	10.0	12.8	12.9	2.0	5.8	14.1	17.5	10.0	8.4
1965–67	−3.3	5.0	15.2	14.9	2.5	13.3	7.3	24.0	8.9	8.1
Gaseous fuels: [4]										
1950–67	10.4	11.0	14.4	15.3	11.5	8.8	23.0	23.0	21.0	21.0
1960–67	29.0	23.0	15.4	18.3	10.7	8.3	36.0	36.0	19.5	19.4
1965–67	36.0	31.0	5.8	21.0	9.4	4.8	18.2	18.2	11.0	10.7
Primary power: [5]										
1950–67	(6)	28.0	(6)	7.7	(6)	[8] 9.6	(6)	14.5	12.8	12.6
1960–67	(6)	17.8	(6)	4.6	(6)	[8] 12.8	(6)	9.0	9.9	9.4
1965–67	(6)	25.0	(6)	[7] 2.9	(6)	.....	(6)	7.3	10.0	9.5
Total energy:										
1950–67	4.3	5.9	3.0	4.9	7.9	7.4	5.8	6.4	7.6	6.7
1960–67	2.5	3.9	3.2	3.6	6.5	6.9	4.1	5.1	7.8	6.0
1965–67	−1.0	−.7	2.2	2.6	6.9	7.6	−.2	1.7	6.4	6.1
Total electricity:										
1950–67	8.8	(6)	10.5	(6)	15.6	(6)	12.8	(6)	11.6	(6)
1960–67	7.3	(6)	8.3	(6)	18.3	(6)	11.1	(6)	10.5	(6)
1965–67	5.9	(6)	8.2	(6)	27.0	(6)	9.6	(6)	7.1	(6)

[1] In production data: coals of all kind, peat, fuelwood, charcoal and, in case of the U.S.S.R., also rock shale; in consumption data: all these primary sources plus net trade in their derivatives. All expressed in standard fuel units.

[2] Negligible.

[3] In production data: crude petroleum and natural gasoline; in consumption data: these primary resources plus net trade in refined petroleum fuels. All expressed in calorific equivalents of crude petroleum.

[4] In production data: natural and associated gas and, in case of Poland, coal-mine gas; in consumption data: these primary resources plus net trade in manufactured gas. Data for Romania and East Europe are adjusted for shipments to nonenergy uses.

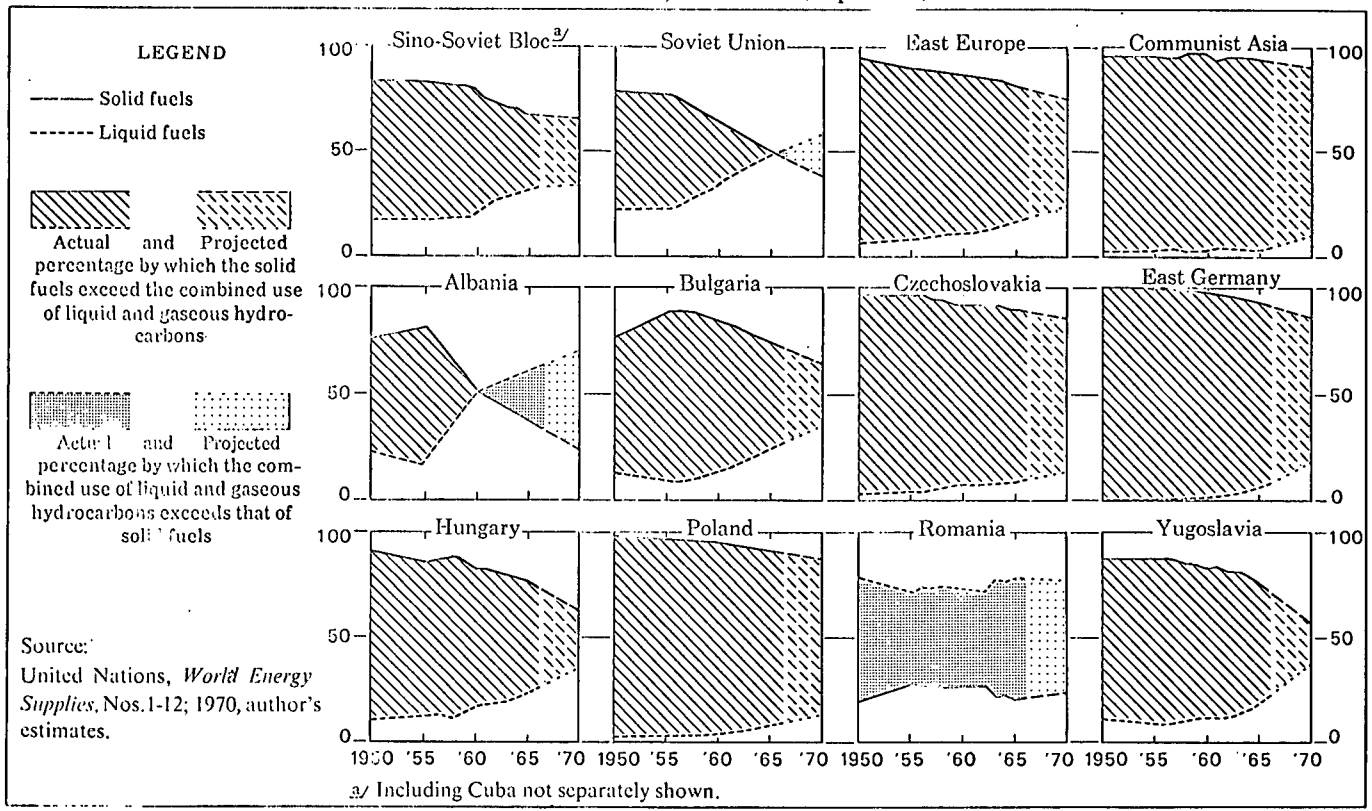
[5] Chiefly hydropower; whether nuclear power is included in the respective national statistics with primary power is not known.

[6] Consumption of primary power refers to indigenous hydropower plus (minus) imported (exported) electricity, whether of thermal or hydro orgin. In view of the fact that data on total electricity present production of both kinds, the effect of trade is seen on consumption of hydro. For other data on electricity see Table 12.

[7] Factor of increase over the entire period; not an annual average.

[8] Refers to 1965 as compared to 1950 and 1960 respectively.

Figure 1. — SINO-SOVIET COUNTRIES: SUBSTITUTION PROCESS OF LIQUID FUELS AND NATURAL GAS FOR SOLID FUELS, 1950-1970 (in percent)



Source:
United Nations, *World Energy Supplies*, Nos. 1-12; 1970, author's estimates.

a/ Including Cuba not separately shown.

An element constraining further growth in coal consumption and favoring fuel substitution is a serious deteriotation in quality of environment in the areas with a high concentration of coal-using industries and thermal power stations. In East Europe a major part of the planned future expansion in power capacity is based on utilization of the locally found low-calorific kinds of coal and lignite. Data available on air and water pollution chiefly due to the rapidly increased use of coal as feedstock in chemical industries and fuel in power stations in Czechoslovakia indicate how critical is this problem as much in terms of the direct economic losses as in terms of the social cost incurred because of deteriorated health, shortened life-span and general discomfort that pollution causes for the population. The Czech data can be considered quite representative for the brown coal districts in Lusatia and near Leipzig in East Germany as well as for the industrial conglomeration on the upper Oder and Vistula in Poland. Moreover, these figures point to the problems Romania and Bulgaria are to encounter in the eighties when their consumption of low-calorific brown coal in central power stations will be at the peak.

In Czechoslovakia, the two regions with the highest air and water pollution due to coal-using industries are Northern Bohemia and the coal-steel district of Ostrava in Northern Moravia.

In Northern Bohemia, an area measuring approximately 2,278 square kilometers (about 879 square miles) and lying at the foothills of the border mountain range (Krušné hory—Erzgebirge), experienced a fall-out of 383 thousand tons of particulate materials during 1963. The sulphur dioxide (SO_2) concentration measured at ground level reached 1.64 milligrams per cubic meter of air. Annual consumption of brown coal in this area is about 16 million tons. The ash content of local brown coal varies from 20 to 40 percent, tar content from 6 to 10 percent, while sulphur presence is between 1.5 and 3.0 percent. By 1980, emission of SO_2 from North Bohemia's central power stations is estimated to reach—without desulphurization—865 thousand tons per year, compared to 431 thousand tons anticipated for 1970.

A good illustration of an increase in air pollution caused by a central power station is the large Polish power plant at Turow, located just across the border from the northernmost tip of Bohemia. As additional capacity was put into operation at Turow, the particulate material fall-out in the adjoining Czech area increased from 100 tons per square kilometer in 1962 to 200 tons in 1965.

As a result of emissions of chemical industries in Northern Bohemia, smog with autumnal morning fog absorbs 50 percent of light and 90 percent of ultraviolet rays, with serious consequences for the health of local population, notably children.

Noxious effects of air pollution and particularly of SO_2 have been notably pronounced on vegetation. Out of North Bohemia's 85,000 hectares (198,000 acres) of spruce forests, 99,000 acres were affected in 1956. By 1960 the noxious effects extended over an area of 136,000 acres, and by 1968 about 37,000 acres of spruce forest had been killed.

In the coal-steel district of Ostrava, an area of about 400 square kilometers (154 square miles), precipitation of particulate materials exceeds now annually 2,000 tons per square kilometer (5,180 tons per

square mile) in some localities (as Třinec). The area's annual average deposit of particulate materials due to coal-burning industries has been presently about 650 tons per square kilometer (1,680 tons per square mile).

Water quality is notably adversely affected by acid mine drainage. This is most serious in the Ostrava region where water salination reaches 10,000 to 15,000 parts per million of a volume unit. In Northern Bohemia polluted water contains, in addition to natrium chloride in quantity of about 1,000 to 2,000 parts per million, also ferrous and alumina chlorides.

In Poland, the salination of the rivers due to the acid mine drainage is equally serious. The concentration of salts in the Rybnik coal basin varies from about 5,000 to 20,000 parts per million.

Obviously, air and water pollution can be substantially decreased, though at the cost of a relatively high investment in desulphurization and other pollution-fighting equipment. At the moment, it seems that in East Europe it is economically cheaper (and probably politically more advantageous) to substitute Soviet crude oil for local coal, although the sulphur content of the Soviet crude is quite high (about 3 percent).

The changing pattern in consumption of liquid hydrocarbons may be summarized as follows. In 1967 the consumption of liquid fuels was 9.4 times above that of 1950, as compared to a 5-fold rise in the use of natural gas in the same time frame. In absolute terms, the largest single consumer of liquid fuels is Romania (with 17.7 percent of the East European total), closely followed by Czechoslovakia (17.5 percent). These two countries and Poland accounted for about 50 percent of all liquid fuel consumed in Eastern Europe in 1967. In relative terms, however, it is in Bulgaria's economy that the liquid hydrocarbons play the greatest role, supplying about 30 percent of all her energy requirements in 1967 (as compared to 6 percent in 1950).

Natural gas is the most significant fuel in Romania, accounting for about 32 percent of her 1967 total energy consumption after adjusting the statistics for non-energy uses. This represents slightly more than 68 percent of Eastern Europe's total natural gas consumption. Two developments may substantially change this situation in the future. First, there are indications that new fields may be brought into production in Hungary and Yugoslavia. Second, it is known that the Soviet Union plans massive shipments of natural gas into Eastern Europe. The impact of these developments on energy consumption may be somewhat lessened, however, because natural gas is rapidly becoming a main feedstock of chemical industries in East Europe. Between 30 and 40 percent of the supplies of natural gas available in Romania in 1967 was reportedly shipped to the chemical industry. In Czechoslovakia and Hungary, future deliveries of natural gas from the U.S.S.R. are to be used predominantly for production of such commodities as fertilizer, carbon black, etc. In principle, all such shipments, as well as those of other mineral fuel resources that are diverted to non-energy uses, should be deducted from available energy supplies. Lack of information prevented the making of such adjustments except in Romania, as noted in her energy balance table (Table A–19, Appendix B).

Percentagewise, the contribution of hydropower—expressed in

standard fuel equivalents—to energy supplies of East Europe is marginal and, in spite of its vigorous rate of growth, its share in total consumption increased only from 1 to 3 percent between 1950 and 1967. This general picture, however, greatly distorts the significance of hydropower in the individual energy economies of East Europe. Disregarding Albania, whose energy resources (except crude petroleum) are of little significance in Eastern Europe, it is in Yugoslavia that hydropower is a most significant economic factor. Hydropower consumption, expressed in standard fuel, reaches 23 percent of total Yugoslav energy consumption and is greater than the combined total of liquid and gaseous hydrocarbons used; it also represents 54 percent of all East European hydropower consumption. In absolute terms, the next two countries are Czechoslovakia and Bulgaria, although, in relative terms, hydropower contribution to total energy consumption of these countries represents, respectively, only 3 and 4 percent of the total. The significance of hydropower changes somewhat when its role in economy is considered in terms of kilowatt-hours in the discussion of electricity further below.

NOTE ON CONSUMPTION OF NON-COMMERCIAL ENERGY

No concrete statistical information is available on the extent to which fuelwood and the so called non-commercial energy resources are still used in East Europe's economies. It is believed, however, that non-commercial resources remain an important element of the area energy balance, particularly in its southern portion. In the early years after World War II, it has been estimated that such energy sources were supplying more than 50 percent of all inanimate energy consumed in Albania and probably also in Bulgaria. Moreover, in Albania, fuelwood alone, when measured in standard fuel units, accounted for more than 50 percent of total commercial energy consumption until the late fifties. Even afterwards it has remained a relatively more important fuel than coal. In Yugoslavia, fuelwood and agricultural waste, especially bagasse, was reported to have supplied 30 percent of all energy inputs in 1965. It seems reasonable to assume that this proportion will not be essentially different in the case of Romania and possibly in that of Poland.

As is pointed out later in the study, it is important to note that an assumption about the contribution of non-commercial resources to a country's energy supply is of considerable significance when interpreting growth of energy consumption and its relation to other economic indicators.

III. Energy Consumption and Economic Growth in East Europe

In principle, we can associate an expansion in energy requirements with economic growth since the input of energy of all kinds (inanimate, animal, and human power) and the output of goods and services are obviously functionally related. An interpretation of this relationship is, however, far from simple. It is made difficult, on the one hand, by an insufficient and imperfect statistical basis—particularly with regard to non-commercial resources and the role animal power plays in

energy economy. On the other hand, it is complicated by the necessity for considering the impact of the structure of an economy on the scope and nature of energy requirements and the changes brought about by the introduction of new technology. The effects of technological innovation do not *necessarily* result in improved efficiency in energy production and consumption, at least not until the period of learning is over (the case of atomic power is an obvious example). In general, however, it is possible to identify technological progress with an increased efficiency in the utilization of energy resources. This, in turn, may be associated with progress in the mechanization and automation of an economy or, in other words, with the replacement of labor with capital equipment which is energy intensive.

Of course, the substitution of commercial for non-commercial resources is also an aspect of the technological progress, but its implications for energy consumption (at least for the part which is statistically recorded) diverge from other aspects of progress. For example, in most cases this substitution will be reflected in a rise in total energy consumption, while technological innovations, often associated with new technical and economic criteria for energy uses, are typified by a decrease in energy requirements per unit of goods and services produced. In some instances, all this may even result in a decline in total consumption of commercial energy, so that the growth rate in energy consumption may be negative under a combined effect of substitution and technological progress. As may be seen from Table 5, this did happen in East Germany and Czechoslovakia as well as in Hungary between 1965 and 1967.

Table 6 presents two series of economic indicators that show, if only in an approximate way, how the scope of energy requirements has been affected by the economic growth and technological developments in East Europe. One is an index of the Communist concept of aggregate national output, here referred to as net material product (NMP), the other is an index of aggregate industrial production (IP). Both series are taken from an official statistical annual published by the USSR Academy of Sciences' Economic Institute of the Socialist Systems. The series are based on the year 1950, except for the NMP series for Bulgaria which is based on 1948, because no Bulgarian NMP series with 1950 as the base year is available. It should also be noted that, although these series are internally consistent and in constant prices, they are not mutually comparable because of the conceptual differences concerning the structure of the NMP and different pricing systems in individual Communist countries. Since in this study energy flows are analyzed with respect to the countries' own indicators of economic performance, it has not been thought necessary to delve into their conceptual mutual variances or those which differentiate them from our concepts of national income analysis.

Three other series, in Table 6, present indices of the total production and consumption of commercial primary energy and the production of all electricity. These series have been derived from data generated during this study. Their base year is 1950.

Table 6.—*Selected economic indicators of East European countries and U.S.S.R., 1955–67 (1950=100* [1])

	1955	1960	1965	1967
Albania:				
Net material product	170	239	317	377
Industrial production	277	603	839	1,060
Total:				
Energy production	179	332	379	445
Energy consumption	179	293	370	510
Electricity production	404	924	1,595	2,643
Bulgaria:				
Net material product	176	278	385	465
Industrial production	190	397	691	879
Total:				
Energy production	132	215	269	282
Energy consumption	132	230	382	447
Electricity production	260	854	1,286	1,710
Czechoslovakia:				
Net material product	147	207	228	273
Industrial production	170	282	364	418
Total:				
Energy production	129	172	205	197
Energy consumption	128	165	213	207
Electricity production	162	260	368	416
East Germany:				
Net material product	172	266	316	347
Industrial production	190	292	390	441
Total:				
Energy production	141	156	174	167
Energy consumption	139	158	187	183
Electricity production	147	207	275	307
Hungary:				
Net material product	136	177	220	255
Industrial production	186	267	385	447
Total:				
Energy production	162	173	208	206
Energy consumption	163	203	268	265
Electricity production	181	254	372	416
Poland:				
Net material product	151	208	280	318
Industrial production	212	338	508	586
Total:				
Energy production	121	132	159	166
Energy consumption	138	175	212	224
Electricity production	188	311	465	544
Romania:				
Net material product	192	268	413	488
Industrial production	202	340	649	821
Total:				
Energy production	179	232	317	362
Energy consumption	157	212	292	338
Electricity production	205	362	815	1,172
Yugoslavia:				
Net Material Product	132	198	284	306
Industrial production	140	262	434	450
Total:				
Energy production	123	197	262	262
Energy consumption	131	238	278	287
Electricity production	182	372	645	777
U.S.S.R.:				
Net material product	171	265	364	420
Industrial production	185	304	458	548
Total:				
Energy production	134	158	183	193
Energy consumption	149	201	268	301
Electricity production	187	302	556	644

[1] Except Bulgaria, which is based on 1948.

ENERGY ELASTICITY COEFFICIENTS

The impact of economic growth on total commercial primary energy requirements is examined by associating the percentage changes in NMP (or IP) with corresponding changes in total commercial energy consumption. The thus established energy elasticity coefficients derived

from Table 6 are shown in Table 7. Considered together with the rates of growth (Table 5) they indicate that the evolution in the consumption of energy with respect to economic growth in Eastern Europe has been rather uneven and, broadly speaking, has followed two divergent paths.

TABLE 7.—*East Europe and U.S.S.R.: Energy elasticity coefficients* [a] *in relation to net material product and industrial product in selected periods*

	Net material product				Industrial product			
	1960/1950	1967/1950	1967/1960	1967/1965	1960/1950	1967/1950	1967/1960	1967/1965
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Albania	1.388	1.480	1.276	2.000	0.384	0.427	0.974	1.462
Bulgaria	.733	.951	1.403	.809	.439	.445	.777	.630
Czechoslovakia	.607	.618	.813	−.150	.357	.336	.521	−.200
East Germany	.349	.332	.484	−.200	.302	.240	.294	−.154
Hungary	1.338	1.065	.705	−.062	.617	.476	.463	−.062
Poland	.694	.569	.528	.429	.315	.255	.384	.400
Rumania	.667	.616	.720	.889	.467	.331	.415	.593
Yugoslavia	1.408	.908	.385	.375	.852	.536	.291	.750
Soviet Union	.612	.628	.847	.800	.495	.449	.625	.600

[a] Energy elasticity coefficient $k=\frac{\frac{\Delta E}{E}}{\frac{\Delta P}{P}}$, where E is energy consumption and P aggregate product (NMP or IP, as the case may be). Ratios computed from rounded intermediate figures, based on data in Table 6.

Following one path are such countries—primarily in the southern part of the area—as Albania, Bulgaria and, recently, Romania, whose energy coefficients in relation to NMP *increase* with economic growth. Consequently, relatively more energy is required as the aggregate output of goods rises. Along the other path may be found a group, centering around the northern countries, wherein the tendency is in the opposite direction and energy coefficients *decrease* with an increasing NMP. In the extreme are Czechoslovakia, East Germany, and Hungary, whose energy coefficients in recent years have been negative, indicating an absolute reduction in total energy requirements though still associated with positive increments in the NMP.

Insofar as Czechoslovakia and East Germany are concerned, this development seems to be primarily an effect of the technological progress which improved the *overall* efficiency in the usage of energy throughout the economy. In the case of Hungary, however, the negative energy coefficient is more clearly associated with the substitution of liquid and gaseous fuels for low-quality coal. Correspondingly, in Czechoslovakia and East Germany, the substitution effect on solid fuels was reflected in their average annual decline of consumption by 2.4 and 1.0 percent respectively during 1965–1967, while in Hungary this attrition rate reached 7 percent per annum. On the other hand, Hungary's utilization of energy still remained relatively inefficient as indicated by its high energy coefficient, obviously related to the previously mentioned use of low quality coals and non-commercial energy. As these are replaced with natural gas and liquid fuels, the coefficient rapidly decreases. The same situation seems to prevail in Yugoslavia, where low quality coal has been replaced with primary power.

The growing energy coefficients in Albania and Bulgaria are primarily associated with a widening impact of an imposed fast pace of industrialization reflected in the replacement of non-commercial with commercial energy resources. Effects of this process are somewhat dampened in Bulgaria where there is, at the same time, at work a powerful substitution process of liquid for solid fuels working toward a relative decrease in energy requirements per unit of output. Still, Bulgaria recorded the area's second highest annual growth rate for consumption of liquid hydrocarbons during 1965–1967, 20 percent per annum as compared to Albania's 25 percent. A reverse trend in the substitution of fuels can be observed in Romania, where consumption of solid fuels rose by 8.8 percent per annum during 1965–1967. This was chiefly due to rapidly rising use of low-grade coal in power generation. In 1967, 66 percent of the total lignite production was delivered to elctric plants; in 1975, such deliveries should reach 83 percent. This development is obviously behind the tendency toward increase in Romania's energy elasticity coefficient.

Results reached in the foregoing analysis generally agree also with an evolution of the energy elasticity coefficients with respect to aggregate industrial output. Clearly, the rising energy coefficients related to IP reflect a widening base of commercial energy consumption associated with expanded industrialization, as for instance, in Albania or Bulgaria. In contrast, rapid technological progress in the utilization of energy in the industrial sectors of East Germany and Czechoslovakia resulted chiefly in a negative coefficient despite a positive change in IP. This is generally in agreement with the findings of the U.S.S.R. Academy of Sciences Institute of the World Socialist Systems which investigated the sources of the 1967 increment in aggregate industrial output. These findings show that the increment was due in East Germany entirely to increased productivity while in Czechoslovakia 85 percent of it could be attributed to productivity increase. In the other East European countries the shares in the 1967 increment of industrial output due to productivity were between 54 and 75 percent.

PER CAPITA ENERGY INDICATORS

The level of per capita energy consumption and the changes in its rates of growth are related to overall economic growth, its structure, and people's living standards in a way similar to that outlined in the discussion of total energy consumption and energy elasticity coefficients.

However, the per capita indicator permits us to separate the effect of the increased input of capital (and thus of technological progress) on total consumption of energy from the impact of population growth. Therefore, per capita energy consumption is often used as a yardstick for comparing the relative stages of economic development, its industrial characteristics, and standards of living. In the early fifties, the annual consumption of 1,500 kilograms (in hard coal equivalents) of primary energy per capita was considered as a dividing line between the developed and underdeveloped countries.[2] Bringing this figure up to date by considering the world average rate of growth of energy consumption since the fifties, the per head consumption of 2,500 kilograms

[2] U.N. WES, no. 1 (1929–1950).

(in standard fuel equivalents) of primary commercial energy can be considered a more realistic present day watershed.

With this criterion as an approximative measurement of economic performance in East Europe, the following comments can be made on the basis of data in Table 8. The area, as a whole, has definitely progressed in its economic development and improved its relative standing in the world in this respect. For example, in 1967, per capita energy consumption in the area exceeded 2,500 kilograms (S.F.) by 33 percent, compared to 12 percent over the previous 1,500 kilogram standard in 1950. Its 1967 level of 3,322 kilograms of standard fuel, was almost double the world's average of 1,732 kilograms.[3] Yet, this comparatively high level of per capita energy consumption in East Europe overstates to a great degree the area's economic development and living standards.

First of all, in three countries, Albania, Romania, and Yugoslavia, per capita consumption had not reached even 40 percent of the world average as of 1967, and in Hungary it barely made it. Second, the high area average is chiefly determined by per capita energy consumption in Czechoslovakia and East Germany. In effect, their 1967 consumption of 5,669 kilograms and 5,631 kilograms respectively—both in standard fuel—assured them third and fourth places in the world in this respect. They follow the United States (with 10,160 kilograms[4] standard fuel) and Canada, and are ahead of all other highly industrialized and developed countries of West Europe. Third, East Germany's, Czechoslovakia's and Poland's economies are still predominantly fueled with coal in contradistinction to Western Europe where the substitution of liquid fuels for coal has already reduced the share of solid fuels in the economy below 50 percent of total consumption.

Wastage of the theoretical energy-content-per-unit-of-quantity of coal is considerably greater than it is in case of liquid fuels. Therefore, per capita energy consumption calculated on the basis of the theoretical heat content of primary energy resources will necessarily be biased in favor of coal-fueled economies because the low efficiency in use of coal inflates their consumption index. The specific average rate of consumption for the generation of one kilowatt-hour of electricity can be used here as an example. As may be seen from Table 2, the highest fuel consumption rates per kilowatt-hour are associated with the use of low-calorific coal—in East Germany, Bulgaria, and Yugoslavia. In contrast, Romania, where natural gas supplies more than 70 percent of the fuel for power stations, records the lowest specific average consumption of kilocalories per kilowatt-hour in East Europe—only 2,527 kcal in 1967. This is lower even than corresponding rates in West Germany (2,625 kcal per kWh) or France (2,559 kcal per kWh). With this it is well to compare the high rates in East Germany (3,304 kcal per kWh) and Czechoslovakia (2,982 kcal per kWh). This and other relatively inefficient direct consumption of coal, still widely used in East Europe (for instance, in railway transportation and domestic heating), undoubtedly contributes to Czechoslovakia's and East Germany's high ranking in the world as well as East Europe's high average of per capita energy consumption.

[3] Based on U.N. *WES*, no.12 (1964–1967), with hydropower adjusted to 0.4 kilograms of hard coal equivalent per 1 kilowatt-hour.
[4] U.N. *WES*, no. 12 (1964–1967).

TABLE 8.—*East Europe and U.S.S.R.: Per capita production of primary energy resources and of total consumption of energy and electricity; by country, 1950–67*

	Midyear population (thousands)	Per capita		
		Production of primary energy resources (kilograms of S.F.)	Consumption of total energy (kilograms of S.F.)	Consumption of electricity (kilowatt-hours)
	(1)	(2)	(3)	(4)
East Europe:				
1950	106,049	1,897	1,682	370
1955	111,879	2,410	2,224	588
1960	116,719	2,764	2,689	894
1965	121,423	3,190	3,263	1,295
1967	123,059	3,207	3,322	1,508
Albania:				
1950	1,219	370	300	*14
1955	1,379	585	476	*49
1960	1,607	933	668	94
1965	1,865	917	728	144
1967	1,965	1,033	951	229
Bulgaria:				
1950	7,251	688	734	90
1955	7,499	883	938	217
1960	7,867	1,367	1,557	473
1965	8,201	1,635	2,465	1,024
1967	8,310	1,685	2,857	1,346
Czechoslovakia:				
1950	12,389	2,928	3,137	613
1955	13,093	3,580	3,820	966
1960	13,654	4,568	4,715	1,520
1965	14,159	5,251	5,846	2,107
1967	14,305	4,973	5,669	2,403
East Germany:				
1950	18,368	2,461	2,725	925
1955	17,945	3,553	3,905	1,349
1960	17,241	4,119	4,636	2,038
1965	17,020	4,607	5,469	2,721
1967	17,082	4,412	5,361	2,983
Hungary:				
1950	9,341	928	1,037	262
1955	9,838	1,424	1,606	477
1960	9,984	1,500	1,969	669
1965	10,148	1,774	2,558	1,026
1967	10,217	1,746	2,507	1,184
Poland:				
1950	24,824	3,286	2,134	311
1955	27,281	3,624	2,688	544
1960	29,561	3,682	3,130	823
1965	31,496	4,115	3,568	1,119
1967	31,944	4,239	3,700	1,335
Romania:				
1950	16,311	956	725	106
1955	17,325	1,620	1,079	204
1960	18,403	1,985	1,367	340
1965	19,027	2,590	1,816	710
1967	19,287	2,940	2,076	939
Yugoslavia:				
1950	16,346	521	569	125
1955	17,519	603	695	206
1960	18,402	913	1,028	398
1965	19,507	1,148	1,326	680
1967	19,949	1,119	1,341	794
Soviet Union:				
1950	178,500	1,785	1,811	443
1955	194,400	2,531	2,481	766
1960	212,300	3,375	3,054	1,205
1965	229,300	4,363	3,773	1,918
1967	234,400	4,844	4,151	2,170

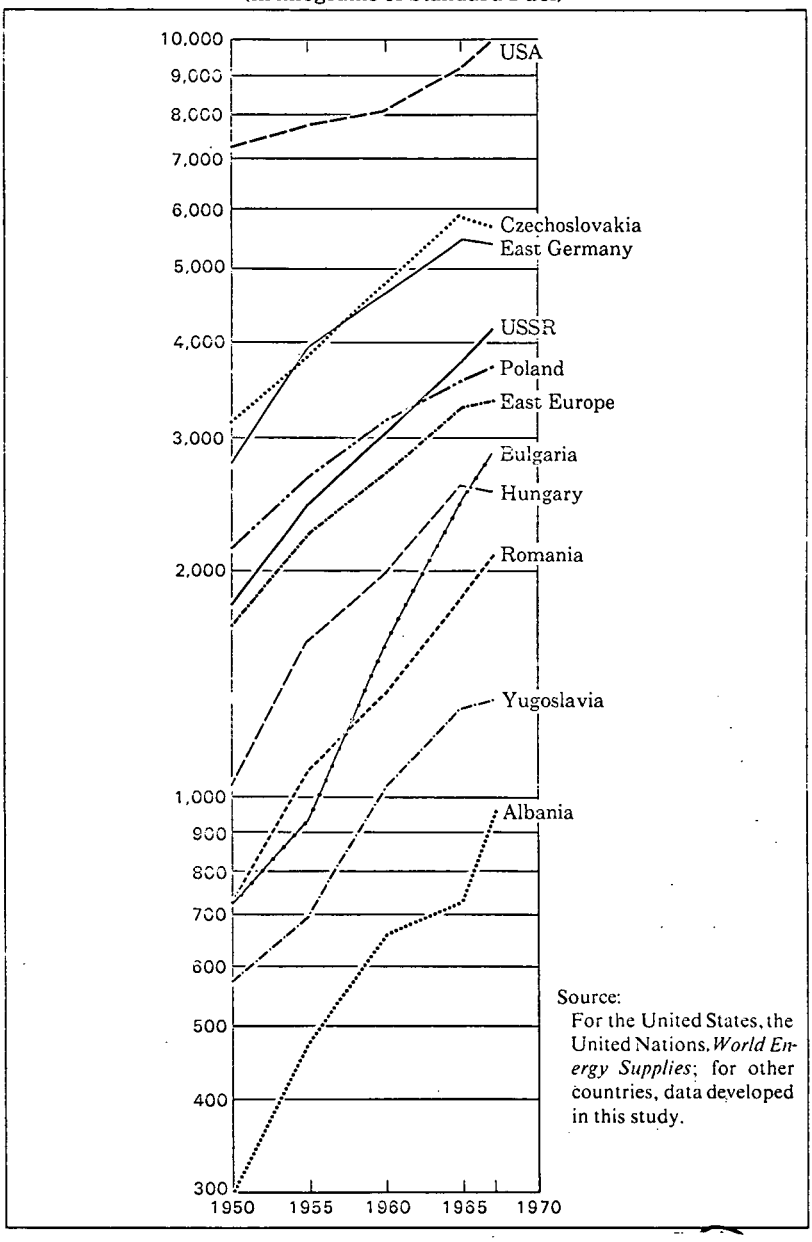
In all other respects, evolution in per capita energy consumption growth rates in Eastern Europe closely parallels the previously analyzed pattern of energy elasticity coefficients, and explanatory factors mentioned in the preceding section apply here as well. For instance, there is a pronounced drop in per capita consumption growth between 1965 and 1967 when its annual increment in Eastern Europe was a mere 0.9 percent, compared to the world's average of 3.0 percent. This obviously can be related to greater thermal efficiency and substitution of liquid for solid fuels in total energy consumption. Collaterally, the high growth rates in the southern countries of East Europe are associated with the substitution of commercial for non-commercial energy. Of course, both per capita energy consumption and energy elasticity coefficients somewhat overstate economic growth and its significance for the improvement of living standards because both are based on the theoretical heat content of primary resources and do not consider wastage. Per capita consumption of electricity is free of this bias. The role of electricity in the economy is discussed in chapter V. The growth in per capita consumption of electricity in Eastern Europe is illustrated in Figure 2.

TABLE 9.—*East Europe and U.S.S.R.: Average annual rates of growth of per capita production of primary energy resources and of consumption of total energy and electricity in selected periods*

	1950–60 (1950=100)			1950–67 (1950=100)			1960–67 (1960=100)			1965–67 (1965=100)		
	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)
East Europe	3.8	4.8	9.2	3.1	4.1	8.6	2.1	3.1	7.8	0.3	0.9	7.9
Albania	9.7	8.3	21.0	6.5	7.0	17.9	1.5	5.2	13.6	11.1	14.3	7.6
Bulgaria	7.1	7.8	18.0	5.4	8.3	17.2	3.0	9.1	16.1	1.5	7.6	14.7
Czechoslovakia	4.5	4.2	9.5	3.1	3.5	8.4	1.2	2.7	6.8	−2.7	−1.5	6.7
East Germany	5.3	5.5	8.3	3.5	5.2	7.1	1.0	2.1	5.6	−2.1	−2.0	9.3
Hungary	4.9	6.6	9.8	3.8	5.3	9.3	3.4	3.5	8.5	−.8	−2.0	7.4
Poland	1.1	3.9	10.2	1.5	3.3	8.9	1.6	2.4	7.1	1.5	1.8	9.2
Romania	7.6	6.5	12.4	6.8	6.4	13.7	5.8	6.2	15.6	1.8	6.9	15.0
Yugoslavia	5.8	6.1	12.3	4.6	5.2	11.5	2.9	3.9	10.4	−1.3	.5	8.0
Soviet Union	6.6	5.3	10.5	6.0	5.0	9.8	5.3	4.5	8.8	5.4	4.9	6.3

(A)—Per capita production of primary energy resources.
(B)—Per capita consumption of total energy.
(C)—Per capita consumption of electricity.

Figure 2.—PER CAPITA CONSUMPTION OF ENERGY IN EAST EUROPEAN COUNTRIES, THE SOVIET UNION AND THE UNITED STATES, 1950-1967
(in kilograms of Standard Fuel)



Source:
For the United States, the United Nations, *World Energy Supplies*; for other countries, data developed in this study.

IV. Conditions of Indigenous Energy Supply

Output of Primary Commercial Energy

Commercial energy resources produced in East Europe have been predominantly solid fuels, and more particularly, coal which has been the mainstay of the area energy economy since the 19th Century. The present rapid industrialization of the southern East European countries still depends to a great deal on coal because, in Communist economic development theories, it is the generation of power and the operation of heavy industries which determine the pace of economic development. These economic sectors are traditional consumers of large quantities of coal.

The position of coal in East Europe's energy supplies is practically identical with that of total solid fuels. The significance of fuelwood—at least that which is statistically recorded—has been strongly reduced, as its relative share in East Europe's total energy supply decreased from 3.5 percent in 1950 to 1.5 in 1967. In the interim, as may be seen from Table 10, the output of coal (hard coal, brown coal, and lignite) increased from 303.5 million tons to 586.3 million tons, or an average 4 percent annually. Yet this growth overstates the true significance of coal's contribution to East Europe's indigenous energy supplies because the fastest growing components in coal production have been the low-calorific kinds of coal.

Thus while hard coal output increased annually at an average rate of 2.7 percent over the entire period, that of brown coal rose by 4 percent, and lignite, at 11.1 percent. The heat value of lignite is usually less than 2,500 kcal per kilogram, and of brown coal, is under 4,000 kcal per kilogram. Hard coal calorific value also varies greatly and is rarely equal to 7,000 kcal per kilogram. Consequently, the variance in the growth rates among the different types of coal has affected the theoretical heat value of the total output and modified the apparent economic significance of the aggregate rate of growth of coal production.

Thus, when expressed in terms of tons of standard fuel, output of coal equaled 59 percent of the production on a ton-per-ton basis in 1950. By 1967, this percentage had dropped to 54 percent. The greatest disparity between output expressed simply in tons versus theoretical heat value expressed in standard fuel exists in the countries where lignite and brown coal production grew most rapidly, that is, in Bulgaria and Romania. In these two countries total coal production expressed in standard fuel equivalents represented 58 and 72 percent, respectively, of the total tonnage produced in 1950, but only 39 and 59 percent in 1967. In other countries, the decline in the physical energy content of mined tonnage was less severe: between 5 and 12 percent. In East Germany there was practically no change, as almost all output has consisted of brown coal throughout the period. But as this is low-quality coal (see Table 1), East Germany's entire production of 242.0 million tons in 1967 was equivalent only to about 73 million tons in standard fuel units.

Poland and Czechoslovakia have remained the main suppliers of hard coal (and hard-coal coke) in Eastern Europe. Together they produced between 91 and 93 percent of the area's total hard coal output, with Poland alone accounting for 75 to 76 percent. East Germany remains the greatest producer of brown coal in the world, yet her share in the area declined from 72 to 65 percent of the total brown coal output

TABLE 10.—*East Europe and Comecon: Production of primary energy resources, 1950–67; by kind and country*

	Solid fuels							Liquid fuels (in thousands of metric tons)		Gaseous fuels—Natural and associated gas [d] (in millions of cubic meters)		Primary power (in millions of kilowatt-hours)	
	Hard (bituminous) coal, including anthracite [a]	Brown (subbituminous) coal [a]	Lignite [a]	Peat [a]	Fuelwood [b] (in millions of cubic meters)	Charcoal	Rockshale [c]	Crude petroleum	Natural gasoline	Total	Associated gas	Hydropower	Nuclear power, geothermal energy, and other
	(in thousands of metric tons)					(in thousands of metric tons)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
East Europe total:													
1950	103,606	191,392	8,470	*650	23,644	35	.....	6,027	43	3,804	1,327	3,129	.....
1955	125,297	277,009	16,645	651	20,788	24	.....	13,058	69	7,314	2,237	6,793	.....
1960	142,554	331,391	27,168	113	20,039	20	.....	14,920	52	12,422	3,673	12,251	.....
1965	161,048	386,650	47,328	78	18,750	22	.....	18,100	60	21,085	4,461	18,466	.....
1967	164,059	372,030	50,180	41	18,914	17	.....	19,498	105	26,033	4,708	20,412	[1] 390
Albania:													
1950	.....	41	.....	.....	856	.....	.....	132	(2)	(2)	(2)	3	.....
1955	.....	195	.....	.....	1,407	.....	.....	208	(2)	(2)	(2)	27	.....
1960	.....	291	.....	.....	1,141	.....	.....	728	(2)	(2)	(2)	121	.....
1965	.....	[4] 332	.....	.....	[4] 1,172	.....	.....	[4] 821	(2)	(2)	(2)	250	.....
1967	.....	[4] 414	.....	.....	[4] 1,172	.....	.....	[4] 983	(2)	(2)	(2)	[1] 410	.....
Bulgaria:													
1950	157	4,670	1,101	.....	4,315	35	.....	(5)	(2)	.....	(2)	306	(6)
1955	293	7,052	2,706	.....	2,711	24	.....	150	(2)	.....	(2)	648	(6)
1960	570	11,221	5,356	.....	3,076	20	.....	200	(2)	.....	(2)	1,886	(6)
1965	814	10,514	14,926	.....	2,779	22	.....	229	(2)	73	(2)	2,000	(6)
1967	765	9,216	18,848	.....	2,833	17	.....	499	(2)	329	(2)	2,022	(6)
Czechoslovakia:													
1950	17,356	26,406	1,105	.....	2,983	.....	.....	64	(2)	19	(2)	875	.....
1955	20,643	38,716	2,035	.....	2,899	.....	.....	107	(2)	173	(2)	1,930	.....
1960	26,214	55,475	2,928	.....	1,682	.....	.....	137	(2)	1,294	(2)	2,495	.....
1965	27,624	69,042	4,174	.....	1,811	.....	.....	192	(2)	851	(2)	4,456	.....
1967	25,946	67,181	4,182	.....	1,663	.....	.....	200	(2)	904	(2)	3,717	.....
East Germany:													
1950	2,805	137,050	.....	.....	3,777	.....	.....	(7)	(2)	.....	(2)	*200	.....
1955	2,682	200,612	.....	.....	1,776	.....	.....	(7)	(2)	.....	(2)	500	.....
1960	2,721	225,465	.....	.....	822	.....	.....	(7)	(2)	[15] 50	(2)	617	.....
1965	2,212	[9] 250,839	.....	.....	710	.....	.....	60	(2)	[10] 130	(2)	785	.....
1967	1,789	242,027	.....	.....	775	.....	.....	100	(2)	*130	(2)	1,060	* [1] 390
Hungary:													
1950	1,400	10,837	1,031	.....	465	.....	.....	512	26	379	(2)	*30	.....
1955	2,692	16,249	3,375	.....	673	.....	.....	1,601	46	545	(2)	46	.....
1960	2,847	19,447	4,230	.....	727	.....	.....	1,217	27	342	(2)	94	.....
1965	4,362	22,190	4,885	.....	[11] 452	.....	.....	1,803	21	1,108	(2)	73	.....
1967	4,053	19,591	3,385	.....	712	.....	.....	1,686	63	2,045	(2)	80	.....

Poland:													
1950	78,001	4,835		*650	3,647			162	15	149	34	[13] 371	
1955	94,500	6,045		651	3,554			180	20	393	40	709	
1960	104,438	9,327		113	4,100			194	19	541	50	657	
1965	118,831	22,626		78	4,480			339	24	1,312	47	912	
1967	123,881	23,922		41	4,453			450	24	1,470	50	992	
Romania:													
1950	2,733	349	772		[13] 5,081			5,047	(2)	3,243	1,293	169	(14)
1955	3,353	458	2,141		[13] 5,313			10,555	(2)	6,169	2,197	323	(14)
1960	4,481	537	2,853		[13] 6,013			11,500	(2)	10,142	3,623	397	(14)
1965	6,036	598	5,064		[13] 4,492			12,571	(2)	17,281	4,414	1,005	(14)
1967	6,716	656	7,230		[13] 5,003			13,206	(2)	20,694	4,658	1,476	(14)
Yugoslavia:													
1950	1,154	7,203	4,461		2,520			110	2	14	(2)	1,175	
1955	1,134	7,682	6,388		2,455			257	3	34	(2)	2,610	
1960	1,283	9,628	11,801		2,478			944	6	53	(2)	5,984	
1965	1,169	10,509	18,279		2,854			2,063	15	330	(2)	8,985	
1967	909	9,023	16,535		2,303			2,374	18	461	(2)	10,655	
European Comecon:													
1950	287,677	260,011	4,007	36,649	125,267	35	4,716	43,663	41	9,551	3,090	14,642	
1955	400,778	383,766	10,257	51,427	138,733	24	10,793	83,386	66	16,261	5,320	27,320	
1960	516,196	459,733	15,367	53,738	124,457	20	14,147	161,107	46	57,702	11,379	57,059	
1956	587,760	525,659	29,049	45,878	119,241	22	21,259	258,104	45	148,421	20,944	90,765	[1] 350
1967	614,536	506,408	33,645	60,241	111,586	17	21,601	304,209	87	183,017	23,566	107,918	[1] 2,490
Soviet Union:													
1950	185,225	75,864		35,999	104,999		4,716	37,878	(2)	5,761	1,763	12,691	
1955	276,615	114,644		50,776	121,807		10,793	70,793	(2)	8,981	3,083	23,164	
1960	374,925	138,261		53,625	108,037		14,147	147,859	(2)	45,333	7,706	50,913	
1965	427,881	149,850		45,800	104,517		21,259	242,888	(2)	127,666	16,483	81,434	[1] 350
1967	451,386	143,815		60,200	96,147		21,601	288,068	(2)	157,445	18,858	98,571	[1] 2,100

[a] Coals and peat: In principle, all data on coals refer to net production but the concept varies in East European countries and also within the countries over the period in question. Most significant changes occurred in reporting net production of hard coal in Czechoslovakia and recently in Bulgarian statistics. In Bulgaria, net production of hard coal and anthracite in 1967 was about 60 percent of the gross quoted here. However, comparable figures are not available for the years before 1965, when net production of hard coal and anthracite was about 68 percent of the here given total. In case of Czechoslovakia, the 1 net-production series which is available over the entire period was adopted. Classification of coals also varies; for instance, most of hard coal output in Rumania has been clasified in other sources as brown coal. Here, the respective country's official reports have been accepted. Greatest difference in tonnage between gross and net production exists in Bulgaria and Rumania with respect to brown coal and lignite; the net series are quoted here. Peat data indicate only production for fuel.

[b] Fuelwood: Refers chiefly to a centrally administered and recorded production. Only in case of Poland, branches, stumps, etc., are also reported and included here.

[c] Rock shale: Included among solid fuels following the Soviet practice which is pertient here for the Comecon figures.

[d] Natural gas. Includes also a small but growing quantity of gas from coal mines in case of Poland (and possibly Czechoslovakia).

[1] East Europe, East Germany, Comecon, and Soviet Union: Estimates of nuclear power produced in East Germany's AKW-1, and Soviet Union's Beloiarsk-1 and Novo-Voronezh-1 stations.

[2] N.Q.

[3] Albania: All production flared.

[4] Albania: Estimated on the basis of the officially reported growth rates; absolute figures not available. In case of fuelwood, for lack of any information, an average production for the past 10 years was adopted.

[5] Bulgaria: No production before 1954.

[6] Bulgaria: Some electricity produced by windmills. Records not available.

[7] No record before 1964.

[9] Rev.

[10] East Germany: Based on the figures of the *Petroleum Press Service* (London).

[11] Hungary: No production figures available. Established as a residual after imports were deducted from the reported domestic consumption. Data in metric tons were converted into cubic meters on the basis of the estimated calorific value used in Table 1, above.

[12] Estimated.

[13] Romania: Production figures not available. Data represent fuel wood transported by railways. Tons converted to cubic meters in the same way as under Hungary, see item 11, above.

[14] Romania: Some geothermal energy produced. Records incomplete.

[15] East Germany: Adopted from U.N. *WES*, no. 5 (1957–1960). These figures fit the historical series better than later data.

during the 1950–1967 period. Nevertheless, Poland together with Czechoslovakia, whose brown coal output reached 67.2 million tons in 1967, accounted for 86 percent of the area total in 1950 and 83 percent in 1967. The fastest growth in brown coal production has been recorded in Poland: from 4.8 million to 23.9 million tons between 1950 and 1967. A major part of this output is used in thermal electric plants. Most of East Germany's output of brown coal, aside from that used in power stations, is processed into brown coal briquettes (BKB) and exported, mainly to West Germany.

The ranking of lignite producers has changed substantially during the period studied. In 1950, Yugoslavia was first, with a production of 4.5 million tons that represented 52 percent of the area total. Next came Czechoslovakia, Bulgaria, and Hungary, whose relative shares were almost identical, each accounting for about 12 to 13 percent of the total output. In the intervening period, Bulgaria's production outpaced everybody else's, increasing 18 times and exceeding 18.8 million tons by 1967. As a consequence, her share of output is now 37 percent, while that of Yugoslavia, whose output sharply decreased between 1966 and 1967, went down to 33 percent. It may be noted that these two southern countries and Romania—with a share of 15 percent—accounted for 85 percent of total lignite production of the area in 1967.

As can be seen from Figure 3 and Table 10, coal production (of all three kinds) experienced its greatest expansion during the first five-year period, when hard coal output rose by 3.9 percent per year, that of brown coal by 7.9 percent, and of lignite by 14.8 percent annually. These high rates were related to plans for increasing thermal electricity production based on low-calorific coals. Yet, as these plans progressed, it became obvious that the resulting cost of production may be forbidding unless open-pit and fully mechanized mining is possible. In Bulgaria, for example, the cost per ton is as high as $19.00. In addition, the associated social cost in terms of severe air and water pollution represents a definite constraint on any further expansion, particularly if such production is heavily concentrated. These factors have brought about a decline in the production of brown coal in East Germany, Czechoslovakia, and Yugoslavia.

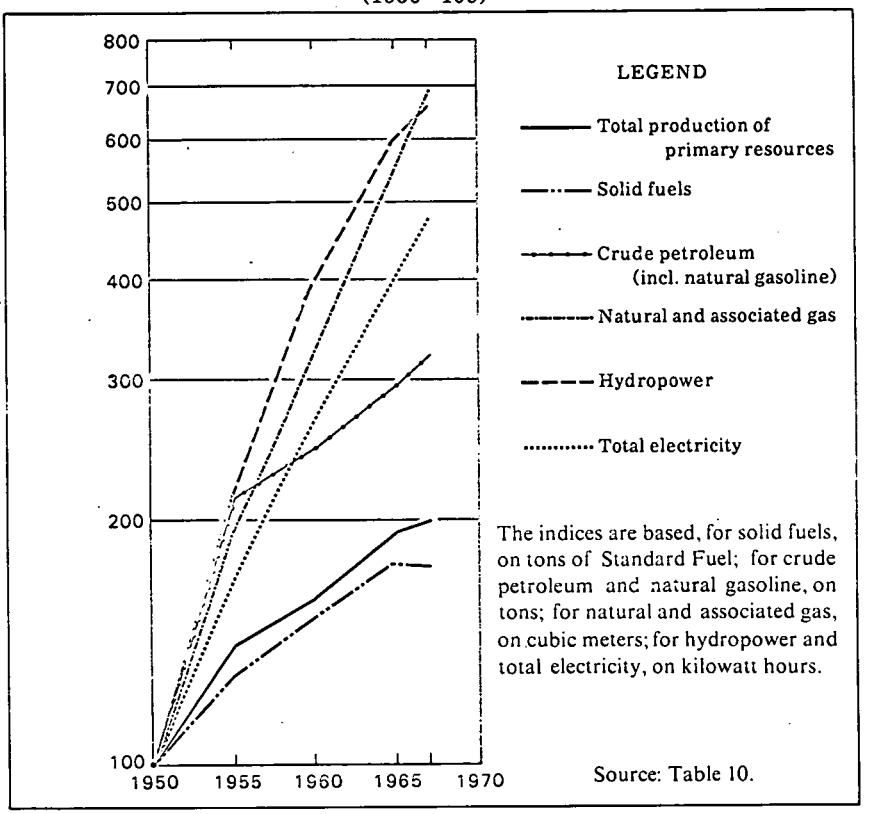
The relative scarcity and narrow scope of other primary indigenous energy resources have foreclosed the possibility that substitutable domestic sources of energy could make big inroads in the total energy supplies of East Europe despite the unfavorable cost structure in coal production. Thus, despite the quite vigorous growth of the production of natural gas, of the harnessing of hydro-energy and, though to a lesser degree, of crude petroleum production (see Table 10 and Figure 3), their combined share in the total output of East Europe's indigenous supplies of primary energy rose only from 6 percent in 1950 to 16 percent in 1967. The figures quoted below illustrate in greater detail the percentage shift among individual primary energy resources in the total supplies during this period.

	1950	1960	1967
Total output of energy	100.0	100.0	100.0
Solid fuels	92.5	87.3	83.9
(Of which fuelwood)	(3.5)	(1.7)	(1.5)
Crude petroleum	3.9	6.1	6.6
Primary gases [1]	2.5	4.3	6.8
Primary power	1.0	2.3	2.7

[1] Primary gas supplies available for energy uses only. The share of all primary gas (not adjusted) in total energy production would be as follows: 1950—2.6 percent, 1960—5.3 percent, and 1967—9.9 percent (of a somewhat larger total).

(Source: Table 3).

Figure 3. — EAST EUROPE: INDICES OF PRODUCTION OF PRIMARY ENERGY RESOURCES (BY KIND) AND ELECTRICITY, 1950-1967
(1950=100)



The most vigorous rate of growth among indigenous fuels has been recorded in the unadjusted production of natural (including associated) gas: 12 percent over the entire period of 17 years. During the first five-year period, only lignite output grew faster than that of natural gas. The main producer of natural and associated gas is Romania, now the fourth largest producer of natural gas in the world. Her combined output of primary gases reached 20 billion cubic meters in 1967—that is, more than a 6-fold rise above the 1950 output. Romania's production, unadjusted for non-energy uses, now represents 80 percent of the total output in East Europe. Hungary's share is 7.8 percent, and Poland's 5.6 percent, so that the three countries together supply 93 percent of all natural and associated gas in the area. New discoveries of gas in Hungary and Yugoslavia will possibly reduce the role of Romania's gas; but it seems unlikely that her position of leading producer will be affected, at least not in the short run. Some potential for associated gas exists also in Albania, but thus far all the output has been flared. The East European reserve situation in natural gas is depicted in Table 11 and discussed further below.

TABLE 11.—*East Europe: Reserves of energy resources, by country and kind*

	Coal [1]		Brown coal and lignite [1]		Crude petroleum [1a]			Natural gas [2]			Hydro-energy, technical potential [3]
	Proven and probable	Recoverable	Proven and probable	Recoverable	Proven reserves,[4] Jan. 1, 1968	Anticipated life of proven reserves, in years	Estimated trends, recent activities, and changes in reserves	Proven reserves [4]	Anticipated life of proven reserves, in years	Estimated trends, recent activities, and changes in reserves	
East Europe	152.42–162.32	(5)	126.3–138.4	(5)	237.1–250.2	12.1–12.8	Slightly rising reserves	424.0–550.0	19.5		146.4
Albania			(6)	(5)	2.7– 15.8	3–15	Conflicting reports; some indicating early exhaustion, other sufficient reserves for many years. Trend: Uncertain.	0.6– 9.0	90.0	In 1965 reported production of condensate: 50,000,000 cubic meters, almost all flared. Gas has high sulfur content. Trend: Uncertain. Estimates of reserve vary greatly.	5.0
Bulgaria	.05	(5)	4.2	1.4	7.1	13.8	New fields not yet fully evaluated; oil strikes near Gorni Dubnik, old fields at Dolni Dubnik, to produce 900,000 tons in 1970. Oil strikes reported offshore near Varna. In 1968 reserves evaluated at 10,000,000 tons. New outlook uncertain; indications exist that reserves were overstated.	25.0– 30.0	86.2	Main field at Chiren to produce 700,000,000 cubic meters by 1970. New fields discovered at Staro Oriakhovo. Only 25 percent of natural gas produced is actually utilized. Reserves: Stationary.	11.0
Czechoslovakia	15.4– 16.4	6.0	12.5– 17.0	(5)	1.9	10.2	Progressive depletion of old fields, new discoveries though commercially insignificant, near Kremnice. Trend in reserves: Declining.	15.0	15.0	Old fields are being rapidly depleted, no significant new discoveries. Trend in reserves: Declining.	12.0
East Germany	.2	(5)	49.0	25.2	1.0	12.5	Extensive exploration activities; no significant findings. Reserves: Stationary.	5.0	42.0	Data on reserves questionable. Situation uncertain.	2.0
Hungary	0.4– 0.5	(5)	2.6– 3.2	(5)	21.8	11.9	Discoveries of considerable deposits near Szeged and in the Tisza River Basin. Possible reserves estimated in hundreds of million tons. Trend in reserves: Strongly rising. Proven reserves	24.0– 50.0	15.4	Recently strongly rising production to reach 5,000,000,000 by 1975. Largest reserves of natural gas (24,000,000,000) at Hajduszoboszlo, Babocsa, and Nagykanizsa. Condensate gas near Szeged	7.4

							possibly 25,000,000 tons as of Jan. 1, 1969.			in Algyo and Tape fields. Proven reserves of natural gas at Bajcsa (Zala county) estimated at 5,000,000,000 to 10,000,000,000 cubic meters. Total possible reserves at 112,000,000,000 cubic meters. Total proven reserves Jan. 1, 1969, probably at 50,000,000,000 cubic meters.	
Poland	110.0–135.0	66.0	33.0–40.0	1.0	3.6	7.6	"Exploratory offensive" in Carpathian foothills, Sudeten, Polish plains. No significant findings. Situation stationary.	5.0–46.0	29.3	Exploratory offensive in oil extends to gas also. Discoveries at Lubac zow Krotoszyn, Bochnia, Tarnow.	16.0
Romania	.07	.05	3.9	1.1	158.6	11.4	Reports of exploratory activities. No new discoveries. Trends in reserves: Stationary.	200.0–246.0	12.5	Drilling for oil and gas reported to 19,686 feet; natural gas reserves chiefly in central Romania and Transylvania where there are 15 main gasfields. Trend in reserves: Rising.	27.0
Yugoslavia	.20	.02	21.1	(5)	40.4	16.2	Offshore exploration in Istrian waters, near Dugi Otok (Dalmatian Coast), and Zadar. New oil strikes in Drava Basin, at Jagnjedovac, and Sandrovac. Trends in reserves: Strongly rising. Possibly 45,000,000 tons as of Jan. 1, 1969. Expected total production: 3,500,000 tons in 1970.	24.0–100.0	39.7	Gas produced in oilfield of Croatia. Possible reserves 100,000,000,000 cubic meters; largest field at Janja Lipa and Nova Gradiška. New find (1969) in Macedonia. By 1970, natural gas production: about 1,600,000,000 cubic meters.	[7] 66.6

[1] In billions of metric tons.
[1a] In millions of metric tons.
[2] In billions of cubic meters.
[3] As estimated by Popov; see *Sources* below. In billion kilowatt-hours per annum.
[4] The lower limit usually indicate reported "proven reserves"; the upper limit all reserves, proven and probable, and in some cases probably also possible reserves. Estimates in barrels were converted into tons uniformly at the rate of 7 barrels per metric ton.
[5] Not available.
[6] Negligible.
[7] Economically harnessable potential.

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East Europe's total production of crude petroleum and natural gasoline reached about 19.6 million tons, representing less than one percent of the world total output in 1967. There is very little hope for any substantive improvement in this respect, except in Yugoslavia. Romanian production, although it doubled during the first five years of the period, is now practically stabilized, increasing at about one percent per annum, notwithstanding the fact that more than one-third of all industrial investment in the country was directed toward oil prospecting and exploration between 1953 and 1958. Romania still remains the largest crude petroleum producer in East Europe. Her share in the area total was about 68 percent in 1967, as compared to 84 percent in 1950. Yugoslavia's production currently accounts for only 12 percent of the area total, but has been growing fast during the last seven years, increasing from about 1 million tons in 1960 to 2.3 million in 1967 and to 2.45 million tons in 1968. Moreover, the offshore discoveries along the Istrian and the Dalmatian coast, especially near Dugi Otok, as well as successful prospecting for oil in the old established oil-bearing strata in Slovenia and Croatia, have given rise to hopes that Yugoslavia's output could reach six million tons before 1980.

The situation appears somewhat more uncertain in Hungary whose crude output has recently declined, but new hopes have been raised by the already-mentioned discovery of new fields in the southern part of the country, near Szeged. Estimates of the reserves of these deposits, plus those in the old established fields in the west and southwest of the country (see Table 11) lend some substance to such expectations. In contrast, Bulgaria's hopes to see her oil production rise to 3 million tons by 1975 (from its present output of some 500 thousand tons) seem to have been based on gross over-estimates of the potential of strikes near Gorni Dŭbnik and offshore in the Black Sea. An anticipated increase in Bulgaria's crude production in 1968 failed to materialize and the actual output was smaller than that of 1967. As of now, a combined total of the relative shares of Romania (68 percent), Yugoslavia (12 percent), Hungary (6 percent) and Albania (5 percent), represents 90 percent of the crude petroleum and natural gasoline output of the area.

Hydropower plays the smallest role among the East European primary energy resources (its role with respect to the total generation of *electricity* is discussed in Chapter V). By 1967 its share in the total of the area's production of primary energy, expressed in standard fuel, amounted to 2.8 percent as compared to 1.1 in 1950. However, the growth rate of hydropower over the entire period—11.7 percent—was second only to that of natural gas. This high growth rate is chiefly a reflection of the expansion of hydropower in Yugoslavia which accounts for more than 50 percent of the total in East Europe. It is also in Yugoslavia that hydropower contributes a relatively high share of the total indigenous primary energy supply (27 percent in 1967 compared to 10 percent in 1950). In Albania's total production of primary energy, hydropower accounts for 9.5 percent; while in Bulgaria, where its share is actually receding, it was 6.6 percent in 1967 compared to

9.5 percent in 1960. In all other countries of Eastern Europe, the hydropower contribution to indigenous supplies of primary energy is under the area average, and in some of them, such as East Germany and Hungary, it is insignificant.

THE ENERGY RESOURCE BASE

Production figures of individual primary sources of commercial energy and their relative shares in the total indigenous energy supplies of the area reflect quite well the one-fuel characteristics of East Europe's energy resource base, which consists predominantly of coal. Estimates of East European reserves in mineral fuels and hydroenergy are summarized in Table 11. The value of reserve estimates depends not only on the degree of certainty with which a physical presence of energy minerals has been established, but also on the technical and economic criteria used for evaluating their economic competitiveness with the same kind of minerals from other deposits or with substitutable resources of any origin. In the Communist system, reserves are evaluated chiefly on the basis of the degree of certainty with which their geological existence has been established. Their capacity to support planned industrial development is also evaluated, and some technological factors for their production considered; but the evaluation is made, quite naturally, without any regard to the competitive prices prevailing on the (free) market for substitutable fuels.

In comparison with similar evaluations in the West, the Communist estimates of their reserves tend to overstate their economic relevance.

This difference is well reflected in the Communist evaluation of coal resources in East Europe. If their own estimates are taken at face value, it would appear that the area as a whole does not need to worry. Among their reserves, however, they may include deposits to a depth of 1,200 meters (3,600 feet) and even more. Such reserves in hard coal as well as in brown coal and lignite should suffice for several hundred years at the 1967 rate of production, provided there is a perfectly working system for balancing out local shortages with overall surpluses, chiefly coming from Poland and possibly Czechoslovakia.

Yet, if we take into consideration an evaluation of "recoverable" reserves, prepared by a highly professional West German source,[5] the situation looks substantially different, particularly in the brown coal-lignite category. For instance, according to this source, "recoverable" reserves of East Germany's total brown coal deposits amount to half of a Russian energy expert's [6] "measured and probable" reserves, and would be totally exhausted in less than one hundred years. Similarly the Polish deposits would be gone in about fifty years, Bulgaria's in seventy years—all at the average rate of 1965–1976 production. Considering the probability that brown coal and lignite production will expand and remain the main fuel source of thermal power plants in East Europe, the situation may become critical with respect to coal

[5] The Ruhr professional association of coal producers (Unternehmensverband Ruhrbergbau) in their publication *Kohlenwirtschaft der Welt in Zahlen.* (See *Sources to* Table 11.)
[6] Ivan Vasil'evich Popov. (See bibliography.)

even within this century. This, in effect, has been admitted by East German economic experts who at the end of the fifties warned that recoverable brown coal deposits may be completely exhausted around 1990.

East European reserves in crude petroleum (see Table 11), are insignificant on the world level and insufficient to support the expanding demand for liquid fuels in the area. This is chiefly due to the fact that Romania's reserves are practically stationary and do not permit any sudden or large expansion of production, in spite of the earlier mentioned investments in prospecting for new fields.

As Table 11 shows, it is only in Yugoslavia and Hungary that recent endeavors in oil prospecting have led to more promising results, significant at least within the framework of East European references. The most favorable estimate, putting their combined reserves at about 70–80 million tons, still looks negligible in the context of the world's proven reserves of over 60 billion tons; but even reserves of that size would make a considerable difference to their own energy supplies. In other countries of East Europe, crude petroleum reserves are minuscule, all the announcements of the respective countries about rich oil strikes notwithstanding.

In natural gas, the situation looks somewhat better for the East European economy, not only because of Romania's reserves, but also because of rising reserves in Hungary and Yugoslavia. Their estimated natural gas deposits may add as much as 200 billion cubic meters of natural gas to East Europe's reserves. Nevertheless, even if all these resources are successfully developed, the increased demand for natural gas, particularly as a feedstock for the chemical industry, may exceed their adequacy. This opinion seems to be shared in East Europe in view of the recent reports anticipating the imports of about 20 billion cubic meters of Soviet natural gas in 1980.

Theoretically, the hydropower potential in East Europe looks better than that of her other primary energy resources. As is indicated in Table 11, hydro-energy, when fully harnessed, could contribute 146 billion kilowatt-hours annually. This would result in saving about 60 million tons of coal (in standard fuel units) annually. Moreover, availability of hydropower capacity in an integrated network would permit further savings in fuel consumption by making thermal powerplant operation more efficient.

About 45 percent of all of the East European hydroenergy potential is concentrated in Yugoslavia and another 27 percent is located in Romania. The high level of investment needed for the full harnessing of hydro-energy in those two countries will constrain its development unless it is undertaken as a joint venture of all East European countries.

In a way, East Europe's position in reserves of energy resources may be relatively the strongest in uranium and thorium. Although nothing about the extent of their deposits has been published, the Soviet Union announced in 1955 that shipments of uranium from East Germany, Czechoslovakia, and Romania greatly contributed to the successful completion of her atomic energy programs. The existence of significant

deposits of high-grade pitch-blende in the area stretching from Lower Saxony to Northern Bohemia has been known for a long time. Uranium is also found in Romania's carbonaceous deposits. In Hungary thorium is present in the lignite fields and the Research Institute at Debrecen is investigating the possibilities for its economic extraction.

If the reports concerning Czechoslovakia's reserves and published during the Dubček era are true, they could have world-wide significance. Reportedly, Czechoslovakia's annual shipments of U302 to the Soviet Union were recently in the order of 10,000 tons. In comparison, at the end of 1967 the United States capacity to produce U302 stood at 12,000 tons annually.

The fundamental question in this connection, of course, is whether East Europe will be permitted to use those resources to its own benefit—an issue about which more is said in Chapter VI.

V. Survey of Electricity

Economic planning in the Soviet Union was, in effect, started with the first program for the electrification of Russia (the GOELRO plan) in 1920. Following Lenin's pronouncement, electricity was seen as a device for the restructuring of the backward Russian economy into a modern industrial machine to become ultimately a political instrument for the transformation of a traditional society into a communist system. For this reason, production of electricity has always commanded the highest attention in allocation of resources in all Communist countries.

Notwithstanding this ideological connotation, it is quite clear that electricity is basic to modern economy, for

> . . . without electricity there would be no modern communications, no television, no electronics, no electro-process industries. . . . high use of electrical energy is in large part responsible for our high standard of living and advanced level of industrialization.[7]

Power generation in East Europe continues, of course, to be viewed in the ideological terms outlined by Lenin. Accordingly, electricity production has been considered a key economic sector which is to prepare the "material-technical" base for the new social system. It therefore receives a very high priority in industrial investment. Table 12 presents the results of the Communist countries' concentrated drive toward "full electrification" which has been considered since Lenin's time an indispensable instrument for the ultimate "victory of Communism."

The data in Table 12 clearly show that the area as a whole recorded a high rate of growth. Its production increased by more than 10 percent per annum—compared to the world average of 7.5 percent—as the area total output of electricity rose from 46.5 billion kWh in 1950 to 123.1 billion kWh in 1960. In the subsequent period of seven years, however, the growth slowed down to 8.6 percent annually, as the total output reached 219.7 billion kWh in 1967.

[7] U.S. Federal Power Commission, *National power survey*, 1964, p. 9.

TABLE 12.—*East Europe and European Comecon: Electricity production, supply, distribution by sector of economy, and per capita consumption; by country, 1950–67*

[In millions of kilowatt-hours, except as otherwise indicated]

Area or country and year	Production	Net domestic supply	Distribution								Per capita consumption (kilowatt-hours)
			Households	Commerce, services, trade, etc. (nonresidential use)	Public administration (including public light)	Industry	Agriculture	Electric traction (railroads), streetcars, trolleybuses	Other use	Statistical discrepancy	
East Europe:											
1950	46,507	39,203	(1)	(1)		(1)	(1)	(1)	(1)	12	370
1955	77,769	65,734	5,106	6,316		51,625	1,152	1,434	100		588
1960	123,507	104,370	9,037	10,113		79,285	2,811	2,923	203		894
1965	186,100	157,252	15,849	15,046		116,478	4,345	5,234	302	−2	1,295
1967	[2] 219,711	185,630	19,682	17,461		136,948	4,792	6,298	442	−5	1,508
Albania: [3]											
1950	21	[4] 17	(1)	(1)		(1)	(1)	(1)	(1)		[4] 14
1955	85	[4] 68	[4] 5	[4] 10		[4] 50	[4] 2	[4] 1			[4] 49
1960	194	151	[4] 10	[4] 20		[4] 114	[4] 4	[4] 3			94
1965	335	268	[4] 22	[4] 35		[4] 200	[4] 6	[4] 5			144
1967	[4] 555	[4] 450	[4] 35	[4] 50		[4] 350	[4] 10	[4] 5			229
Bulgaria: [5]											
1950	797	[4] 650	([4] 82)	([4] 129)		([4] 422)	([4] 4)	([4] 13)			90
1955	2,073	1,628	206	245		1,055	70	52			217
1960	4,657	3,718	530	437		2,491	164	96			473
1965	10,248	8,398	1,180	955		5,555	455	253			1,024
1967	13,631	11,186	1,609	877	66	7,798	492	335		−9	1,346
Czechoslovakia:											
1950	9,280	[4] 7,600	(1)	(1)		(1)	(1)	(1)	(1)	(1)	[1] 613
1955	15,013	12,646	([4] 800)	([4] 1,148)		10,355	(212)	131			966
1960	24,450	20,748	1,412	2,510		15,499	459	869			1,520
1965	34,190	29,838	[6] 2,326	2,873		21,830	1,072	1,737			2,107
1967	38,622	34,374	2,739	3,326		25,182	1,221	1,906			2,403
East Germany:											
1950	19,466	[4] 17,000	(1)	(1)		(1)	(1)	(1)	(1)	(1)	925
1955	28,695	24,719	[4] (2,100)	[4] (2,450)		18,966	[4] (525)	578	[4] (100)		1,349
1960	40,305	35,138	2,823	2,926		27,063	1,351	772	203		2,038
1965	53,611	46,319	4,803	4,050		34,778	1,349	1,037	302		2,721
1967	[2] 59,686	50,948	5,495	4,830		37,784	1,240	1,157	442		2,983
Hungary:											
1950	3,001	[4] 2,450	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	262
1955	5,428	4,690	286	275	170	3,689	[4] 48	222			477
1960	7,617	6,685	554	355	190	5,176	85	326			669
1965	11,177	10,409	991	1,098	160	7,461	277	424		−2	1,026
1967	12,490	12,094	1,268	1,419	204	8,386	360	460		3	1,184
Poland:											
1950	9,421	[4] 7,716	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	[4] 311
1955	17,751	14,843	[4] (1,000)	[4] (1,212)	[4] (50)	12,009	[4] (250)	322			[4] 544
1960	29,307	24,334	2,004	1,477	740	18,829	600	684			823
1965	43,801	35,261	2,623	1,958	1,073	27,307	832	1,468			1,119
1967	51,257	42,639	3,189	2,449	1,275	32,677	1,028	2,021			1,335

Rumania:											
1950	2,113	1,723	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	106
1955	4,340	3,534	195	194	151	2,877	45	71			204
1960	7,650	6,265	433	430	347	4,868	104	83			340
1965	17,215	13,501	1,028	756	579	10,735	271	132			710
1967	24,769	18,106	1,449	820	700	14,588	352	197			939
Yugoslavia: [8]											
1950	2,408	[4] 2,047	[4] (205)	[4] (165)	[4] (90)	[4] (1,540)	[4] (3)	[4] (35)		[4] (12)	125
1955	4,384	3,606	514	189	222	2,624	([4]) ([7])	57			206
1960	8,962	7,331	1,271	343	338	5,245	44	90			398
1965	15,523	13,258	2,876	731	778	8,612	83	178			680
1967	18,701	15,833	3,898	757	688	10,183	89	217		1	794
European Comecon:											
1950	135,300	116,100		(1)		(1)	(1)	(1)	(1)	(1)	435
1955	243,500	211,100		35,800		161,651	5,050	8,476	100		735
1960	406,300	352,700		56,500		262,726	12,763	20,530	203		1,141
1965	[9] 676,900	583,400		89,100		426,666	25,256	42,151	302		1,771
1967	[9] 788,200	677,900		105,300		492,015	30,293	49,876	442		2,021
Soviet Union: [10]											
1950	91,200	79,000		14,500		59,300	1,500	3,700			443
1955	170,200	149,000		25,300		112,700	3,900	7,100			766
1960	292,300	255,800		39,300		188,800	10,000	17,700			1,205
1965	[11] 506,700	439,700		62,600		319,000	21,000	37,100			1,918
1967	[11] 587,700	508,600		73,600		365,600	25,600	43,800			2,170

[1] Not available.

[2] *East Europe and East Germany.*—Presumably includes estimated 390,000,000 kilowatt-hours of nuclear-generated power.

[3] Estimates of production are based on the officially published growth rates; absolute figures are not available. Estimates of the distribution pattern follow approximately those of Bulgaria and Yugoslavia under the assumption that the conditions in Albania approximate those in these 2 countries. It is acknowledged that this procedure may have resulted in a considerable error, particularly with respect to electricity uses in the sectors of household and agriculture. However, in the context of East Europe and Comecon, such an error is insignificant.

[4] *Author's estimates.*—These generally follow historical trends and patterns; special cases are explained below.

[5] The 1950 distribution estimates follow percentagewise the officially available distribution pattern for 1952, when gross output was 1,352,000,000 and net domestic supply 1,059,000,000 kilowatt-hours.

[6] Revised.

[7] Negligible.

[8] The 1950 distribution estimates follow percentagewise the officially available distribution pattern for 1951, when gross production was 2,550,000,000 and net domestic supply 2,170,000,000 kilowatt-hours.

[9] *Comecon.*—Presumably includes estimated 350,000,000 and 2,490,000,000 kilowatt-hours of nuclear-generated energy, respectively, for 1965 and 1967.

[10] Net domestic supply was computed on the basis of percentages giving internal consumption and network losses of electric powerplants of general (social) utilization. Such plants produce now from about 90 to 94 percent of the total Soviet power output. The distributive share of households, commerce, public administration, etc., is a residual obtained by subtracting the share of agriculture from the figure given in the Soviet source for "Other uses."

[11] *Soviet Union.*—Presumably includes estimated 350,000,000 and 2,100,000,000 kilowatt-hours of nuclear-generated power, respectively, in 1965 and 1967.

General Remarks

Comecon comprises here its European members only, that is, East Europe minus Albania and Yugoslavia plus the Soviet Union.

Production refers to gross output of all power stations including, specifically in case of Bulgaria and Poland, small plants which are outside the centrally administered network or industrial power production. In Bulgaria some small plants may be powered by wind. Nuclear power is now produced in East Germany (since 1966) and the U.S.S.R. (since 1964–65) and is presumably included in the reported gross totals.

Net domestic supply is a residual, obtained after subtracting internal consumption of electricity by the producing plants, network losses, and adjustments for net trade. However, the conceptual delineation of internal consumption and network losses differs among East European countries. Thus, in the Soviet Union, the given data refer only to internal consumption and losses in the powerplants of general (social) utilization. Efficiency in other, smaller plants may be expected to be relatively lower and, therefore, the overall net supply would be somewhat overstated.

Distribution.—Definitions of the individual categories differ among East European countries. An effort was made to reconcile the respective data in accordance with a classification used by the Economic Commission for Europe. Nevertheless, there probably still is a considerable degree of overlapping between the individual categories. To illustrate: electricity used for light in the agricultural settlement is included in some instances in the household sector, in others, with agricultural consumption; power used for transportation, when used for urban traffic, is sometimes included with communal (public or private) services; and so on.

Figures in parentheses represent—mostly estimated—breakdown of more comprehensive data into individual uses of electricity for which separate data are not available.

As in other energy sectors, the growth rates vary locationally more or less in conformity with each country's stage of economic development, and with presence of fuels because East Europe's electricity is about ninety percent of thermal origin. The least industrialized, southern countries, Albania, Bulgaria, Romania, and Yugoslavia—in that order—recorded the highest growth rates over the 17-year period, ranging from a 13 percent annual increment for Yugoslavia to one of 21 percent for Albania. As a result of the differential geographical growth trends (see Table 9) there has been a substantial shift in the relative shares of individual countries in the total power production of the area. East Germany, which is among the major world producers of electricity, is also the largest producer of power in East Europe; Poland is the second largest and Czechoslovakia the third. In spite of the fact that their shares in the area total dropped from 41.8, 20.3 and 20.0 percent, respectively, in 1950 to 27.2, 23.3 and 17.6 percent in 1967, their combined total of produced electricity still represented more than two-thirds of East Europe's total in 1967.

Hydropower generation increased at a somewhat faster rate than total power generation, as may be seen from Table 5 and Figure 3. It accounts now for about 9 to 10 percent (depending on hydrological conditions) of the total electricity production. This is a definite improvement over 1950, when its relative share in total electricity output stood at 6.7 percent, but it is still far below the world average of approximately 27 percent (in 1965).

Individually, the East European countries ranked in the following order in 1967 with respect to the share of hydroelectricity in their total power production:

	Percent
Albania	73.9
Yugoslavia	57.0
Bulgaria	14.8
Czechoslovakia	9.6
Romania	6.0
Poland	1.9
East Germany	1.8
Hungary	0.7
East Europe average	9.3
U.S.S.R.	15.1

In the future, the hydro projects under construction and in planning will further strengthen the position of the southern states. For example, the completion of a joint venture located at the Iron Gate on the Danube between Yugoslavia and Romania will add 10,500 million kwh to each of these two country's annual output.

The area's total installed capacity stood at 38,653 megawatts in 1965 and approximately 46,000 megawatts in 1967. Out of the 1965 total, 32,800 megawatts was thermal, including small Diesel plants for peaking purposes, and 5,854 megawatts was hydropower capacity. At the end of 1967, approximately 41,700 megawatts was part of a Comecon integrated network linking the six East European Comecon members with the grid of the Soviet Union. This is discussed in greater detail in Chapter VII.

Electricity has now become a necessary element as much for modern communication and industrial process as for use of labor-saving devices in households. Consequently, the distribution pattern of electricity, the

absolute level, and changes in per capita electricity consumption reflect the relative stage of industrial development of the country in question and of the living standards of its population.

The distribution of electricity among economic sectors in individual countries of East Europe is shown in Table 13. It clearly brings out that electricity is used predominantly for industrial manufacturing—on the average more than 70 percent of the net domestic power supply is reserved for this purpose. In contrast, a rather low share of electricity is allocated to household uses. In East Europe as a whole, it is under 10 percent of the total supply and very probably even much less than that because the area average is greatly distorted by an extremely high percentage ascribed to household uses in Yugoslavia and, to a degree, also in Bulgaria. This is due to the fact that in these two countries, as well as in Hungary, electricity used by small craftsmen or for "public needs" may be included with the household sector. In the U.S.S.R., the household usage of electricity is not shown separately but merged with the sectors including public administration, services, and trade. Interestingly enough, their combined distributive share in the total declined over the years, although this reduction seems to have been compensated by an increase in the agricultural sector.

TABLE 13.—*East Europe and European Comecon: Percentage distribution of the net supply of electricity by sector of economy, 1950–67*

Area or country and year	Households [1]	Commerce, services, trade, etc. (nonresidential use) and public administration	Industry	Agriculture	Electric traction (railroads, streetcars, trolleybuses)	Other uses and/or statistical discrepancies
East Europe:						
1950	[2]	[2]	[2]	[2]	[2]	[2]
1955	7.8	9.6	78.5	1.8	2.2	0.2
1960	8.7	9.7	76.0	2.7	2.8	.2
1965	10.1	9.6	74.1	2.8	3.3	.2
1967	10.6	9.4	73.8	2.6	3.4	.2
Albania:						
1950	[2]	[2]	[2]	[2]	[2]	[2]
1955	7.4	14.7	73.5	2.9	1.5	
1960	6.6	13.2	75.5	2.6	2.0	
1965	8.2	13.1	74.6	2.2	1.9	
1967	7.8	11.1	77.8	2.2	1.1	
Bulgaria:						
1950	[3] 12.6	[3] 19.8	[3] 64.9	[3] .6	[3] 2.0	
1955	12.7	15.1	64.8	4.3	3.2	
1960	14.3	11.8	67.0	4.4	2.6	
1965	14.1	11.4	66.1	5.4	3.0	
1967	14.4	8.4	69.7	4.4	3.0	−.1
Czechoslovakia:						
1950	[2]	[2]	[2]	[2]	[2]	[2]
1955	[3] 6.3	9.1	81.9	[3] 1.7	1.0	
1960	6.8	12.1	74.7	2.2	4.2	
1965	7.8	9.6	73.2	3.6	5.8	
1967	8.0	9.7	73.3	3.6	5.5	
East Germany:						
1950	[2]	[2]	[2]	[2]	[2]	[2]
1955	[3] 8.5	9.9	76.7	[3] 2.1	2.3	[3] 0.4
1960	8.0	8.3	77.0	3.8	2.2	.6
1965	10.4	8.7	75.1	2.9	2.2	.7
1967	10.8	9.5	74.2	2.4	2.3	.9
Hungary:						
1950	[2]	[2]	[2]	[2]	[2]	[2]
1955	6.1	9.5	78.7	1.0	4.7	
1960	8.3	8.2	77.4	1.3	4.9	.1
1965	9.5	12.1	71.7	2.7	4.1	.1
1967	10.5	13.4	69.3	3.0	3.8	

See footnotes at end of table, p. 386.

TABLE 13.—*East Europe and European Comecon: Percentage distribution of the net supply of electricity by sector of economy, 1950–67*—Continued

Area or country and year	Households [1]	Commerce, services, trade, etc. (nonresidential use) and public administration	Industry	Agriculture	Electric traction (railroads, streetcars, trolleybuses)	Other uses and/or statistical discrepancies
Poland:						
1950	(2)	(2)	(2)	(2)	(2)	(2)
1955	[3] 6.7	8.5	80.9	[3] 1.7	2.2	
1960	8.2	9.1	77.4	2.5	2.8	
1965	7.4	8.6	77.4	2.4	4.2	
1967	7.5	8.7	76.6	2.4	4.7	
Romania:						
1950	(2)	(2)	(2)	(2)	(2)	(2)
1955	5.5	9.8	81.4	1.3	2.0	
1960	6.9	12.4	77.7	1.7	1.3	
1965	7.6	9.9	79.5	2.0	1.0	
1967	8.0	8.4	80.6	1.9	1.1	
Yugoslavia:						
1950	[3] 10.0	[3] 12.5	[3] 75.2	[3] .1	[3] 1.7	[3] 0.6
1955	14.3	11.4	72.8	[3] 0	1.6	
1960	17.3	9.3	71.5	.6	1.2	
1965	21.7	11.4	64.9	.6	1.3	
1967	24.6	9.1	64.3	.6	1.4	
European Comecon:						
1950		(2)	(2)	(2)	(2)	(2)
1955		17.0	76.6	2.4	4.0	
1960		16.0	74.5	3.6	5.8	.1
1965		15.3	73.1	4.3	7.2	.1
1967		15.5	72.6	4.5	7.4	.1
U.S.S.R.:						
1950		18.4	75.1	1.9	4.7	
1955		17.0	75.6	2.6	4.8	
1960		15.4	73.8	3.9	6.9	
1965		14.2	72.5	4.8	8.4	
1967		14.5	71.9	5.0	8.6	
United States: [4] 1965	24.0	18.8	50.1	3.6	.5	3.0

[1] In Bulgaria and particularly Yugoslavia, the "household" uses include electricity used by small tradesmen and craftsmen working in their homes and, in Bulgaria, also any other use which serves "population needs." This may include, for instance, public lighting of streets.

[2] Not available.

[3] Author's estimates. These generally follow the historical trends and patterns; special cases are explained below.

[4] U.S. percentage distribution, based on a total supply of 1,064,700,000,000 kilowatt-hours, has been added for comparison only.

NOTE.—Due to rounding, detail may not add to totals.

Source: Table 12.

The relative low household use of electricity—as noted above, less than one-tenth of the total supply—in Eastern Europe is in striking contrast with the pattern prevailing in the United States. Here, about one-fourth of the net supply of electricity was used in households in 1965 as shown in Table 13. This fact tells a great deal about the comparative standards of living.

Per capita electricity consumption also reflects the pattern of industrialization and its regional differences in East Europe. The largest annual average increments were recorded in the southern countries of the area where industrial development started, in effect, only in the fifties. Thus in Albania the average annual increment was 17.9 percent; in Bulgaria, 17.2; in Romania, 13.7 and in Yugoslavia, 11.5 percent over the entire period from 1950 to 1967. In spite of this vigorous growth, however, per capita consumption of electricity in these countries—with exception of Bulgaria—has not yet reached the world average of 1,131 kWh per annum in 1967. At the other extreme are Czecho-

slovakia with 2,403 kWh and East Germany with 2,983 kWh per capita consumption in 1967. Their rates of growth, 8.4 and 7.1 percent per annum respectively, from 1950 to 1967, approach more closely similar increases in other industrial countries of the world.

VI. Outlook for Nuclear Power in East Europe

At present, nuclear power is of no practical importance in East Europe. The only nuclear power station in operation is located in Rheinsberg, near Berlin, in East Germany. It is equipped with a Soviet delivered, pressurized, light-water cooled and moderated prototype reactor of the Novo-Voronezh type I with a 70 electrical megawatt (MWe) capacity. Construction of this station, named AKW–1, required ten years, even with Soviet assistance. The Soviet Union also provided enriched fuels needed for its operation. AKW–1 has been in operation since May 9, 1966, although with frequent interruptions, and its contribution in terms of kilowatt-hours was only 215 million during its first year of operation, from May 9, 1966 to May 1, 1967.

In addition to the East German nuclear power plant, another station, named A–1, of 150 MWe capacity, with a heavy-water-moderated, gas-cooled reactor, fuelled with natural uranium, is being built at Jaslovské Bohunice in Czechoslovakia. Although the reactor was manufactured by Czechoslovakian industries, it was reportedly done so with Soviet assistance, but ambiguous statements on both sides make it impossible to determine the true scope and full technical character of this assistance. The station has now been under construction for about 13 years and there is only a remote chance that it may become operational before the end of 1970.

These two stations represent the only results of the ambitious plans announced in the mid-fifties, when the East European countries anticipated having about 7,000 MWe nuclear capacity in operation by 1970. Moreover, in view of the changed political climate in Czechoslovakia one may even ask whether the A–1 may not become a casualty of the 1968 Soviet-Czechoslovakian discord. This would parallel the Soviet failure to provide promised aid in nuclear power development to Hungary after the 1956 revolt.

Limited access of East European scientists to Western nuclear information has made the development of nuclear power in East Europe dependent primarily on Soviet assistance. To date this assistance has, itself, been extremely limited. The endless delays in the completion of the Czechoslovakian A–1 nuclear station suggest that the slow pace of Soviet aid may be deliberate. Such a conclusion would be consistent with Soviet procrastination concerning a Hungarian initiative in the Comecon to build nuclear plants as joint ventures by neighboring East European countries.

Whether this Soviet attitude will change if and when the Non-Proliferation Treaty enters into force remains to be seen. Currently, it seems that the dominant objective of the USSR nuclear policy is not to permit any further development of nuclear power in the proximity of her borders. Nuclear power, even if used for genuinely peaceful purposes, represents a potential source of plutonium and thus of atomic weaponry. A heavy-water-moderated reactor of the type Czechoslovakia is

building, and Romania seems to be interested in buying, is among the most powerful convertors of uranium to plutonium. This may explain not only the difficulties Czechoslovakia has encountered in trying to complete her A–1, but also her sudden about-face in 1967 when she was reported as considering a Soviet light-water reactor instead. During 1968, however, Czechoslovakia renewed its inquiries about purchasing a heavy-water reactor, this time in Canada with whose experts the Czechs had held preliminary discussions prior to the Soviet invasion of their country. This was followed by a new reversal in the post-invasion days when it was announced that it was the Soviet Union that was to deliver her light-water reactor, for the Czech second nuclear power plant. It came, therefore, as a surprise, when in a very recent statement to the Canadian press the Czechoslovak Trade Commissioner declared that Czechoslovakia is still in the market for a Canadian heavy-water reactor and other nuclear equipment, provided the price is right.

Of course, whether these, and similar Romanian, plans will be realized depends first of all on the Soviet nuclear strategy which seems to follow two basic policy objectives with respect to East Europe. One is to safeguard the Soviet strategic interests in the proximity of their borders; the other, to maintain the technological leadership and control in this area. Basing the East European nuclear power programs on the Soviet light-water reactors and the Soviet-delivered enriched fuels, obviously serves this purpose while the direct control over East Europe's atomic energy policy is exercised as much in the area of research and development as in the field of nuclear power, through both the Comecon's 15th Permanent Commission on Peaceful Uses of Atomic Energy and the 16th Permanent Commission on Cooperation in Scientific and Technological Research. Both of these commissions are under close control of a Soviet Chairman and Secretariat located in Moscow. It was under the nominal authority of the 15th Permanent Commission that the Soviet Union concluded bilaterial nuclear power agreements with individual countries of East Europe. These agreements, outlining the Comecon committee approved nuclear power program of the respective country which the Soviet Union is willing to support, preserves for the U.S.S.R. a great deal of control and access to information obtained from the operation of any station built under such a program.

The agreement which the U.S.S.R. concluded with East Germany in 1965, involving construction of the second East German nuclear power station in Lubmin on the Baltic shores, initiated what can be considered as the "second generation" nuclear power program in East Europe. In 1966, similar agreements were concluded with Hungary, Bulgaria, and Czechoslovakia. In agreements with the first two, the Soviet Union promised to deliver two pressurized water reactors (PWRs), each of 400–440 MWe capacity of the improved Novo-Voronezh Type II design. It may be worth mentioning here that this type of reactor has not yet been made operational within the Soviet Union itself, though it is reported that two reactors of this class are now built in the Kola Peninsula. The Soviet promised aid to East Germany is somewhat more nebulous, but probably involves a pressurized light-water reactor of about 500 MWe capacity. Under the agreement with Czechoslovakia, concluded before the 1968 political events, the Soviet Union undertook to assist in building another heavy water reactor of about 300 MWe.

Reportedly, all the nuclear stations under these bilateral agreements were to be operational by 1975. Their locations, characteristics, and other details are summarized in Table 14. It is also of interest that in the spring of 1968 the chairman of the Comecon's 15th Committee estimated the contribution of nuclear power in individual European members of Comecon as follows: by 1980, nuclear power will provide 30–45 percent of all the increment in total electricity production in Bulgaria; in Romania, this percentage will be 30–32 percent; in Hungary 25–35 percent; in East Germany 20–25 percent; and in Czechoslovakia between 10 and 12 percent. The low Czechoslovak share would appear to indicate that the Soviets have had second thoughts about the desirability of nuclear energy in Czechoslovakia, although they originally promised to support it.

As of 1969, the only positive news about progress toward the stated nuclear power goals were reports about preparatory groundwork being undertaken on the sites designated for the nuclear power plants in East Germany and Hungary. Nevertheless, there seems to be only a slim chance, in light of the past record of the Soviet aid, that these stations will become operational by 1975 as planned, since it takes a much longer time to put a nuclear power plant into operation in East Europe than the usual five years needed in the West. Also, there are technical problems to be solved, notably in Hungary and Bulgaria, before a Soviet reactor can even be delivered. For example, Soviet reactor vessels are designed exclusively for railway transportation and would therefore encounter difficulties caused by the differences in railway gauges (between the U.S.S.R. and East Europe), in bridge construction, etc. Furthermore, the Soviet Union has a commercial interest in exporting crude petroleum, the denial of which represents a more powerful instrument of political control over East Europe's economies than a delay or denial of a few nuclear stations whose contribution to electricity would be rather marginal for some time. Finally, nuclear generated electricity can hardly compete with power which the power-deficit countries such as Czechoslovakia or Hungary can now get through the interconnected Comecon power grid. In 1967, according to Soviet foreign trade statistics, the price for one kilowatt-hour delivered to Czechoslovakia's and Hungary's grids was 0.926 and 1.053 kopecks respectively, while the production cost alone of a nuclear generated kilowatt-hour in the Novo-Voronezh station (Type I) was quoted to be 1.15 kopecks. The cost of nuclear power from the Czechoslovak station will undoubtedly be even higher, for the capital cost of the station now exceeds 1,000 dollars per 1 kWe of capacity.

An interesting initiative is being persistently pursued by Romania which has been trying for the past few years to arrange for the purchase of a heavy-water-moderated reactor in the West, most recently from Canada. In seeking nuclear technical aid from the United States, Alexandru Birladeanu, then a Member of the Romanian Permanent Presidium and President of the Romanian National Council for Scientific Research, stressed that Soviet aid will also be sought for the venture. Up to now, however, the Romanian initiative has not yielded any practical results.

Nevertheless, Romania's new ten-year economic plan, covering the 1971–1980 period, considers an installed nuclear capacity of 1,800 to 2,400 MWe, to be constructed during the forthcoming decade, essential

TABLE 14.—*East Europe's nuclear power plans*

Country	Capacity [1] installed before 1970 [2]	Capacity [1] to be installed after 1970 [2]	Total capacity [1] to be operational		Remarks
			1975	1980	
Albania	None	No plans announced	None	None	
Bulgaria	None	(1) Kozlodui and in "southeast" near Turkish border.[3] (2) Not given (3) VVR-2, 1 or 2 400-440 MW (4) Enriched (1.5-2 percent) U, H_2O, H_2O. (5) 1973, 1974	800-880	1,200	Bilateral agreement with the U.S.S.R. signed in Sofia July 15, 1966; Soviet assistance is presumably along the same lines as for Hungary. Originally, the delivery of reactors was for 1974 and 1975; reportedly the dates were advanced by 1 year.
Czechoslovakia	(1) Jaslovské Bohunice (2) A-1 (3) 150 MW (125 net) (4) Natural uranium, D_2O, CO_2. (5) 1968 (1969)	(1) Jaslovské Bohunice (2) A-2 (3) 300 MW (4) Natural uranium, D_2O, CO_2 (5) 1975	450		Work on A-2 to start in 1969 with Soviet cooperation under agreement signed in 1966. Organic cooling under study.[4]
		(1) Not given (2) A-3 (3) 500 MW (4) Natural uranium, D_2O, CO_2 (5) 1975	(500) [5]		Instead of A-3 based on natural uranium, buying a VVR from the Soviet Union is being considered.
		5 additional A-stations to be ready by 1980, when total capacity of all 8 stations is to be 2,000 MW.[6]		2,000	No location, nor type of additional station given.
East Germany	(1) Rheinsberg (2) AKW-1 (2) 70 MW (265 Mth) (4) VVR, enriched uranium (1-2 percent), H_2O, H_2O. (5) May 9, 1966	(1) Lubmin, northeast of Griefswald (2) KKW-Nord (3) 700 MW (or 500 MW) (4) VVR, enriched uranium, H_2O, H_2O. (5) 1974	570 (770) [5]		First mentioned as AKW-2 of 500 MW. Groundwork on KKW-Nord reported started; it is to be built in partnership with U.S.S.R. under an agreement signed July 14, 1965; runs until 1980. U.S.S.R. is to deliver the VVR's and other equipment.
		(1) Ostsee (2) AKW-3 (and AKW-4?) (3) 800 MW (possibly 2×400 MW) (4) VVR-2, enriched uranium, H_2O, H_2O. (5) Early 1970's	(800) [5]		Originally reported as 1 plant later believed to be abandoned in favor of AKW-2. Other information indicates that 2 plants may be involved with reactors to be delivered by the U.S.S.R.
		More VVR stations, 2,000 MW		2,000	The target capacity (in Soviet VVR's) to be built under the partnership agreement up to 1980.

Hungary	None	(1) Paks (2) Not given (3) VVR-2, 1 or 2 400-440 MW (4) Enriched uranium, H_2O, H_2O (5) 1973, 1974	800-880	Not known known (880+?).	Bilateral agreement with the U.S.S.R. signed in Moscow, July 5, 1966. Reportedly the U.S.S.R. is to deliver the reactors and the entire steam-supply system; turbines and generators are to be supplied by Hungary. Location of the second nuclear plant not yet determined but probably on the Tisza river.[7]
Poland	None	No definite plans	None		
		(1) 1 station tentatively considered, possibly Wybrzez, east of Warsaw. (3) 300 MW (4) Natural uranium (5) Early 1970's	(300) [5]		Possibly an early version of an 800 MW.
		(1) 1 station, location possibly Wybrzez (3) 800 MW (4) Natural uranium (5) Early 1980's		(800) [8]	Possibly replaces the previous 300-MW proposal. The 800-MW could be compatible with the Government's reported policy not to construct any atomic energy plants in Poland before 1980.
Romania	None	(1) Not known (2) Not announced (3) Presumably CANDU or other heavy water reactor 500-600 MW. (4) Natural uranium, D_2O, D_2O	(600) [5]	1,800-2,400	Interested in buying in West. Offer made by Siemens-Socia-Swedish interests consortium. Similar offer made by the British in 1966. "First" nuclear power station expected to be "operative" about 1970.[9] 1980 planned capacity is mentioned in Romania's new 10-year economic plan.
Yugoslavia	None	(1) Videm (2) Not known (3) 340-500 MW. (4) Originally a Swedish PHWR considered; now type undecided. (5) Not known.	(0)	(500+?)	A study of a power reactor initiated by Energoprojekt Beograd, May 1968.
Total, Eastern Europe.	220 MW	12 stations (maximum)	2,620-4,880	7,200 [10]	

[1] In electrical megawatts (MWe).

[2] (1) Location. (2) Name of station. (3) Type, capacity. (4) Fuel, moderator, coolant. (5) Criticality date. CANDU—Canadian heavy water reactor; PHWR—pressurized heavy water reactor; VVR—Soviet designation for pressurized water reactor (PWR).

[3] Recently, however, it was reported that both reactors will be located at Kozlodui on the D anube. Anticipated start of operation for the first reactor was postponed beyond 1975.

[4] As the delay in the completion of A-1 continues, there is no sign that work on A-2 is to start in the near future. There is a distinct possibility that the entire program based on natural uranium reactors will be abandoned.

[5] Included only in the upper limit of the area estimated total for 1975.

[6] This target will most probably be missed by a wide margin.

[7] Recently it has been reported that both reactors are to be on the Danube at Paks. Some preparatory groundwork is reportedly in progress.

[8] Not included in any total.

[9] On July 8, 1968, Alexandru Birladeanu, then member of the Romanian Permanent Presidium and President of the Romanian National Council for Scientific Research, stated that his country plans to build its first atomic power plant by 1973, updating the earlier claim, made by Horia Hulubei, president of Romania's Nuclear Energy Committee.

[10] At least.

Source; J. G. Polach, "Nuclear Power in East Europe," *East Europe*, v. 17, no. 5, May 1968, p. 10. Revised.

to her energy economy, since a pronounced fall in the production of her oil and also of natural gas is anticipated in the eighties. Nuclear research and development must, therefore, advance considerably to permit the industry to gain the necessary technical know-how in order that the most advanced reactors can be built after 1980. Large nuclear plants are expected, then, to carry a major portion of the energy load.

In Yugoslavia the study of the first nuclear power station with a capacity of 340 to 500 MWe, to be located near Videm on the Sava river, has already been initiated but opinions about the outlook for nuclear power in that country vary. The Yugoslav Federal Atomic Commission suggested in its new program of nuclear studies that nuclear power can be expected to be economically competitive in Slovenia and Macedonia by 1975. However, the Yugoslav State Power Board believes that hydropower will remain cheaper than nuclear generated electricity until 1985.

As mentioned before, Czechoslovakia's hopes for early, economically competitive nuclear power have suffered the greatest setback. Her A–1 is still under construction, and by now it is obvious that the Government pledge to have the plant in operation by 1969 has not been kept. In fact, a new deadline has now been mentioned for the completion of A–1: 1972, that is, sixteen years after construction started. With this delay, a plan for 2,000 MWe nuclear capacity installed by 1980 cannot be considered realistic.

This sporadic record of East European progress in nuclear power, along with the military risks which any nuclear power program inherently represents, suggests that the area's announced nuclear power plans have little chance to be fully executed. It is more probable that continuation of the slow pace of Soviet aid will cause a considerable retardation in the development of nuclear power in East Europe so that by 1975 it may not even reach 1,000 MWe capacity. Our estimates in this respect, presented in Table 15, indicate that only under the remote possibility of accelerated Soviet aid could nuclear capacity in Eastern Europe reach 2,000 MWe by 1975. By then, the world's total nuclear capacity will probably be in the neighborhood of 100,000–120,000 MWe.

TABLE 15.—*East Europe: Estimates of nuclear power capacity in operation in 1975*

[In electrical megawatts]

	Anticipated capacity	Possible capacity with increased Soviet aid
Albania	0	0
Bulgaria	[1] 0	0
Czechoslovakia	[2] 150	[3] 450
East Germany	[3] 550	[3] 800
Hungary	[1] 0	[4] 400
Poland	[5] 0	[5] 0
Romania	[1] 0	[4] 500
Yugoslavia	[1] 0	[4] 300
Total, East Europe	700	[6] 1,250–2,400

[1] With some construction work already started.
[2] Possibility of a total abandonment of the program based on heavy water-moderated systems not excluded.
[3] Probably the additional reactor still under construction.
[4] Probably still under construction and in case of Romania and Yugoslavia under the assumption that such reactors are not under control of the Western interests.
[5] No plans for nuclear powerplant before 1980.
[6] In the lower limit, only estimates for Czechoslovakia and East Germany are included.

VII. Role of Trade in East Europe's Energy Economy

THE TRADE PATTERN IN ENERGY

The pattern of trade in energy commodities underwent considerable modifications in East Europe between 1950 and 1967, as much from the point of its composition as of its direction. These changes have been brought about by a number of interacting factors of varying significance. Some of them have been related to the area energy resource base, discussed previously. A few others can be associated with the changing pattern in energy requirements brought about by a rapid, but geographically unevenly distributed, pace of industrial and technological progress. Still others are due to ideological restrictions that determine the formulation of East Europe's trade policies and foreclose for her the least-cost alternative of choosing energy supplies available outside the bloc.

Ultimately, however, the volume and direction of energy trade have been predominantly affected by the introduction of pipeline networks and a united power grid. These lowered the transfer cost of energy thus expanding the potential area of energy supplies, and their diversification. They also advanced the substitution of one fuel for another in a move toward a multi-fuel economy.

In this context the fuel substitution process can be also usefully viewed as another aspect of the changes in the composition and direction of energy trade brought about by new energy surplus-deficit patterns. These problems may be best inquired into within three broad chronological periods: 1950–1955; 1956–1962, and from 1962 to the present.

The first period, that is from 1950 until 1955, was marked by a sizable surplus—as measured by net trade—of commercial energy in East Europe. In 1950, this surplus was more than 22 million tons of Standard Fuel, that is approximately 11 percent of the area's total indigenous supplies. A flow of East European energy surplus was then chiefly directed, on the one hand, toward equalizing the growing energy imbalances within the area and, on the other hand, toward the Soviet Union which during this period recorded a net energy deficit of a scope not easy to establish due to contradictory data. Net trade (Table A25) indicates that the total Soviet energy deficit in 1950 might have been in the order of 10 million tons (of standard fuel).

The influx of East European conventional energy supplies paralleled a similar flow of uranium into the Soviet Union, and was of particular significance to the Soviet Union's energy policy. These shipments made it possible to divert scarce human, technical, and financial resources to other national priorities, of which achieving the status of a nuclear and thermonuclear power was obviously the top requirement, rather than to employ them for a more rapid development of the already well known deposits of petroleum in the Volga region.

In 1955, East Europe still recorded a substantial surplus of energy, which was reflected in her net exports of 21 million tons of standard fuel. The surplus, of which, consisted primarily of solid fuels, gross exports reached 34 million tons (in standard fuel units), and of liquid hydrocarbons—chiefly in the form of refined products—registering 7.4 million tons. (See Table 16.) The 1955 position of the

TABLE 16.—*East Europe: Origin and destination of trade in solid fuels, crude petroleum, and refined fuels, by world area and selected years*

[In thousand tons]

	Solid fuels [1]			Crude petroleum and refined fuels					
				Total			Refined fuels		
	1955	1960	1965	1955	1960	1965	1955	1960	1965
Total trade:									
Imports from area	18,349	21,960	31,364	4,136	10,630	24,965	1,747	3,702	4,916
Exports to area	34,309	30,717	34,366	7,409	7,750	10,448	6,961	7,341	9,318
Net trade with the area (positive data: net imports; negative data: net exports)	−15,960	−8,756	−3,002	−3,273	+2,880	+14,517	−5,214	−3,639	−4,402
East Europe: [2]									
Imports from area	13,259	11,103.5	13,270	1,110	840	969	695	638	816
Exports to area	13,110	11,043	13,061	832	704	882	584	501	729
Net trade with the area (positive data: net imports; negative data: net exports)	+149	+61	+209	+277	+136	+87	+110	+137	+87
Soviet Union:									
Imports from area	3,641	9,901	16,691	2,153	9,414	22,933	516	2,907	4,030
Exports to area	8,627	5,149	7,112	3,670	3,036	1,630	3,551	2,873	1,630
Net trade with the area (positive data: net imports; negative data: net exports)	−4,986	+4,752	+9,579	−1,517	+6,378	+21,303	−3,035	+34	+2,400
Other Communist countries: [3]									
Imports from area					14			14	
Exports to area		2	13	27	340	1,212	27	319	856
Net trade with the area (positive data: net imports; negative data: net exports)		−2	−13	−27	−326	−1,212	−27	−305	−856
Other world: [4]									
Imports from area	1,445	948	1,387	872	363	1,060	536	142	70
Exports to area	12,570	14,518	14,179	2,880	3,671	6,763	2,799	3,649	6,142
Net trade with the area (positive data: net imports; negative data: net exports)	−11,125	−13,570	−12,792	−2,008	−3,308	−5,703	−2,263	−3,507	−6,072
Of which West Europe:									
Imports from area	935	621	456	179	52	70	165	52	69
Exports to area	10,772	12,946	13,701	2,109	2,603	3,271	2,044	2,582	3,130
Net trade with the area (positive data: net imports; negative data: net exports)	−9,837	−12,325	−13,245	−1,930	−2,551	−3,201	−1,879	−2,530	−3,061

[1] In standard fuel units.

[2] A net balance in intra-East European trade is due to the usual difficulties in reconciling trade figures among several countries, chiefly caused by the time lag between the dispatch and receipt of shipments, change of weight during transportation, differences in reporting procedures and classification, and unaccounted for discrepancies in the original sources.

[3] Communist Asia and Cuba.

[4] Contains statistical discrepancy which accounts for the difference between the sum of components and the total.

U.S.S.R. in East Europe's trade is interesting. By then she had achieved a small energy surplus on the world level, but was in deficit with East Europe on whose surplus she relied for filling in her needs for solid fuels and, to an even greater extent, for liquid fuels. About 50 percent of total gross East European liquid fuel exports was shipped to the Soviet Union in 1955.

TABLE 17.—*East Europe: Relative shares of net trade in consumption or production of total commercial energy and of liquid fuels, 1950 and 1967*

[In percent]

	Total energy		Liquid fuels	
	1950	1967	1950	1967
A. Relative shares of net imports in consumption:				
Bulgaria	6	42	100	91
Czechoslovakia	7	12	87	97
East Germany	10	18	(1)	98
Hungary	10	30	(2)	60
Poland	(2)	(2)	74	92
Yugoslavia	8	17	80	48
Total, East Europe	(2)	6	(2)	53
B. Relative shares of net exports in indigenous production:				
Albania	19	8	51	14
Hungary	(3)	(3)	16	(3)
Poland	35	13	(3)	(3)
Romania	4 23	4 15	57	44
Total, East Europe	11	(3)	27	(3)

[1] Not applicable.
[2] Trade resulted in net exports.
[3] Trade resulted in net imports.
[4] Based on output adjusted for non-energy uses.

Source: Tables on energy balances of individual countries (Appendix B).

By 1960, a fundamental change was clearly discernible in the East European energy surplus-deficit position. Her overall energy balance, though, still showed a net surplus in the order of about 5.3 million tons of Standard Fuel (see Table 3) chiefly because of Polish coal exports. However, the changing character of the area economies produced a shift in the energy trade from solid to liquid fuels the gross imports of which—measured on an actual weight basis—reached 10 million tons (see Table 18) in 1960.

In terms of the territorial origin of supplies and destination of shipments, the intra-area trade in solid fuels declined in its relative significance. Its share of imports dropped from 72 percent in 1955 to 51 percent in 1960, although in absolute terms this drop amounted only to 2 million tons. This development was accompanied by a territorial shift in trade toward the Soviet Union and Western Europe. On the one hand, East Europe's imports of solid fuels from the Soviet Union rose by 172 percent between 1955 and 1960; on the other hand, Western Europe enhanced its position as a major market for East European surpluses of solid fuels, absorbing about 42 percent of them by 1960. Conversely East Europe's imports of solid fuels from West Europe became almost negligible by 1960.

Liquid fuels accounted for an increasing share of East Europe's total import of fuels, and the shift in their geographic pattern was even more pronounced. Thus, while the share of intra-area exchanges of

TABLE 18.—*Volume and geographic distribution of East Europe's gross imports and exports of solid and liquid fuels, 1955, 1960, and 1965; by area of origin and destination*

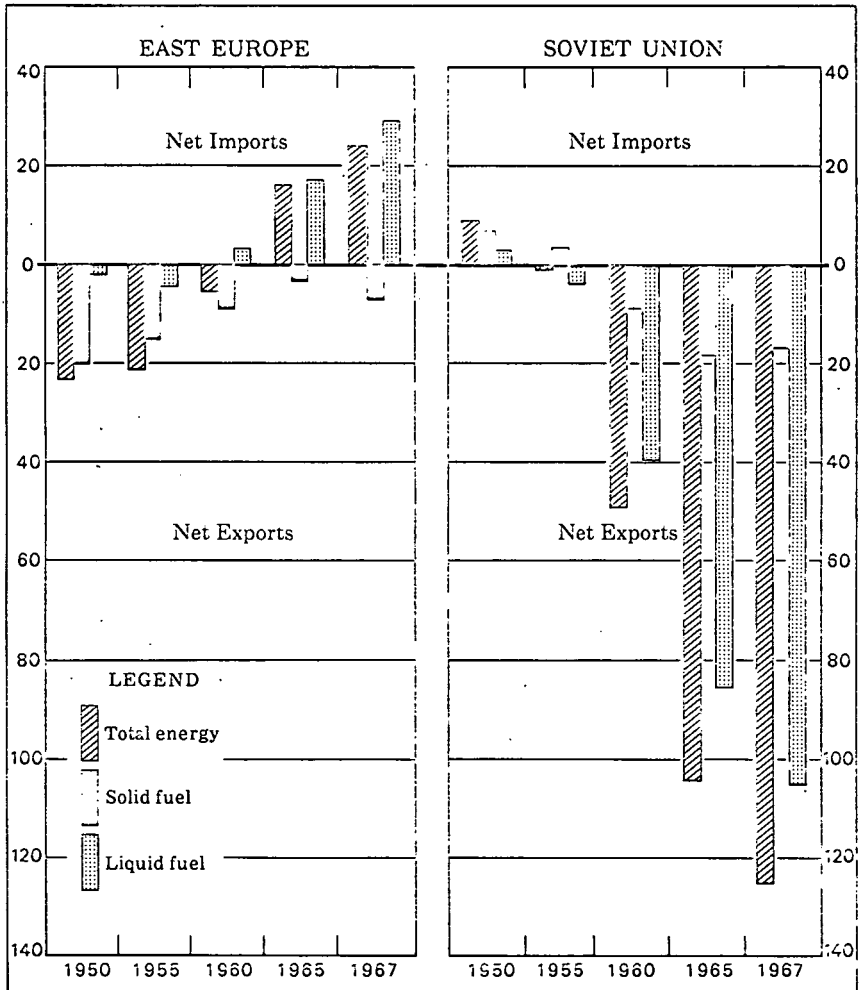
East Europe's trade with listed area	Solid fuels (million tons of hard coal equivalent)			Liquid fuels (million tons)					
				Total			Refined fuels		
	1955	1960	1965	1955	1960	1965	1955	1960	1965
Total (in weight units):									
Imports	18.3	22.0	31.4	4.1	10.6	25.0	1.7	3.7	4.9
Exports	34.3	30.7	34.4	7.4	7.7	10.4	7.0	7.3	9.3
Areas (in percentages):									
East Europe (intra-area):									
Imports	72.3	50.6	42.3	26.8	7.9	3.9	39.8	17.2	16 6
Exports	38.2	35.9	38.0	11.2	9.1	8.4	8.4	6.8	7.8
Soviet Union:									
Imports	19.8	45.1	53.2	52.1	88.6	91.9	29.5	78.5	82.0
Exports	25.1	16.8	20.7	49.5	39.2	15.6	51.0	39.1	17.5
Other Communist countries: [1]									
Imports		(2)	(2)		0.1			0.4	
Exports		(2)	(2)	.4	4.4	11.6	.4	4.3	9.2
Other world: [3]									
Imports	7.8	4.3	4.4	21.1	3.4	4.2	30.7	3.8	1.4
Exports, of which	36.6	47.3	41.3	38.9	47.4	64.7	40.2	49.7	65.9
West Europe:									
Imports	5.1	2 8	1.5	4.3	.5	.3	9.4	1.4	1.4
Exports	31.4	42.1	39.9	28.5	33.6	31.3	29.4	35.1	33.6

[1] Communist Asia (Outer Mongolia, North Korea, North Vietnam, and Mainland China) and Cuba.
[2] Negligible.
[3] Contains statistical discrepancy which accounts for the difference between the sum of components and the total.

liquid fuels decreased to less than ten percent of the area's gross trade by 1960, imports of such fuels from the Soviet Union more than quadrupled. As a result, the relative share of Soviet deliveries in the total rose to 89 percent. On the side of exports, the trade in liquid fuels paralleled—generally speaking—the trend noticed in solid fuels. Between 1955 and 1960, the share of liquid fuels flowing toward the U.S.S.R. decreased from 50 to 39 percent of East Europe's total liquid fuel exports, while exports to Western Europe and the rest of the noncommunist world increased accordingly.

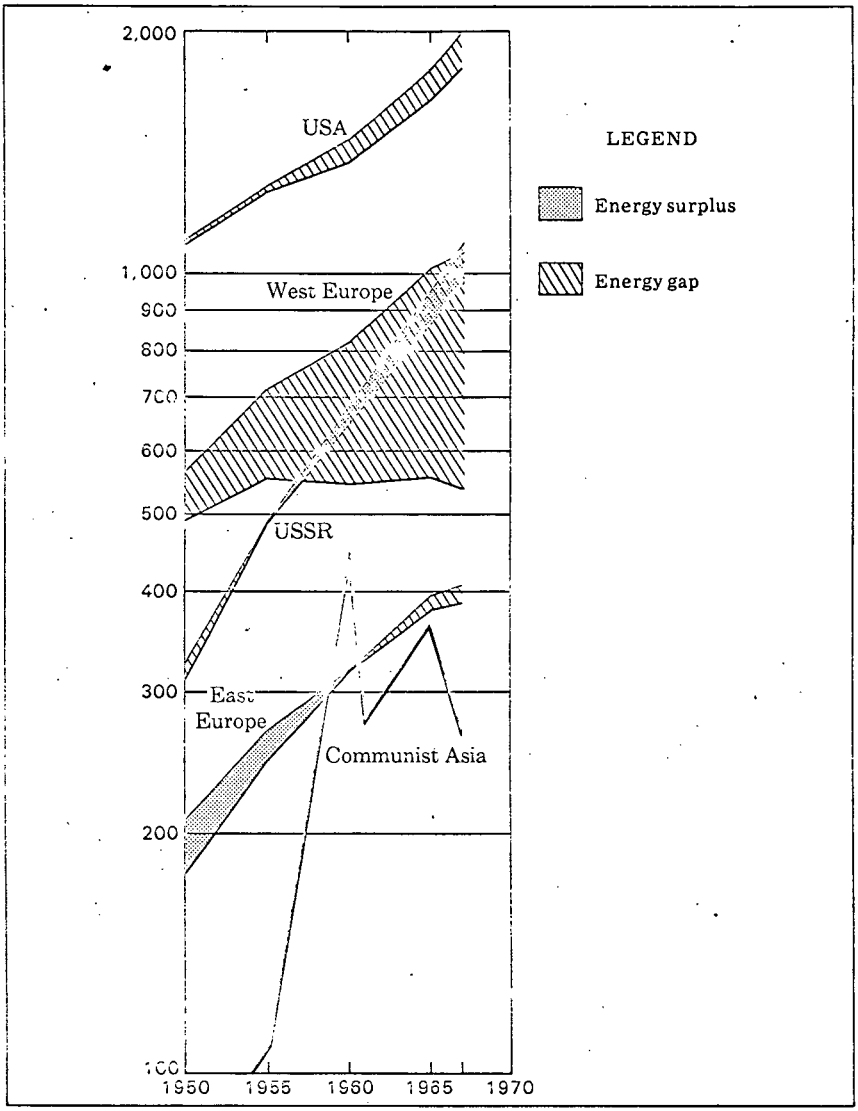
Continuation of these trends resulted finally, in 1962, in a complete reversal in the East European energy situation. Until then, the area had been a traditional exporter, though on a decreasing scale, notably of solid fuels. By 1961, however, its energy surplus (in net trade terms) was only slightly over 1 million tons of hard coal equivalent; and while exports of solid fuels—namely coal from Poland and coke from Czechoslovakia—were declining, the area's net imports of liquid fuels were augmenting rapidly: from 500,000 tons (in crude petroleum equivalents) in 1959 to approximately 3.3 million tons in 1961 and more than 5.6 million tons in 1962. By then the solid fuel net exports amounted to only 3.9 million tons. The result was an overall net energy gap of approximately 3.4 million tons in hard coal equivalents. The fact that a substantial quantity of coal was also diverted, as feedstock, to chemical industries further aggravated the supply situation in energy resources. The shift of East Europe from a surplus to a deficit energy area is depicted in Figures 4 and 5. Both figures illustrate the way in which the energy surplus of East Europe coincided in time and shifted with a reverse development in the Soviet Union.

Figure 4. — EAST EUROPE AND THE SOVIET UNION: NET TRADE IN TOTAL ENERGY, SOLID FUELS AND LIQUID FUELS, 1950-1967
(in million tons of Standard Fuel)



Source: Data developed in this study.

Figure 5. — TOTAL PRODUCTION AND CONSUMPTION OF ENERGY IN THE UNITED STATES, THE COMMUNIST AREAS AND WESTERN EUROPE, 1950-1967 (in million tons of Standard Fuel)



GENERAL NOTES TO FIGURE 5

Energy gap is the excess of total consumption of primary energy resources above their domestic production.

Energy surplus is the excess of domestically produced primary resources above their total consumption.

Because of the small difference between domestic production and total consumption in Communist Asia (+2 million tons in 1950, —4 million tons in 1960, and negligible in 1967) the gap or surplus cannot be graphically represented.

Due to the variations in concepts in the below cited sources, data for the United States, West Europe, and Communist Asia are not strictly comparable with those for other areas.

GENERAL NOTES TO FIGURE 5—Continued

Sources: For East Europe and the Soviet Union: data developed in this study; for the United States, West Europe, and Communist Asia: United Nations. *World energy supplies* (Nos. 1–12). Since UN *WES* data for West Europe include also Yugoslavia (here included in East Europe), the necessary adjustments for both areas were made on the basis of J. G. Polach, "The energy gap in the Communist world," *East Europe*, v. 18, no. 4, April 1969, p. 19–26.

In the next five years, from 1962–1967, the net energy gap of East Europe grew from 3.4 million tons to 24.2 million tons (as measured in standard fuel equivalents). By 1970 the Soviet Union alone expects that her energy shipments to the European Comecon members (that is, excluding Yugoslavia and Albania) will be in the order of 77 million tons of standard fuel equivalents. Although these imports from the USSR will be partly offset by East Europe's energy exports—chiefly to West Europe and Japan—it seems reasonable to estimate, on the basis of known trends and expected developments, that between 1967 and the end of 1970 East Europe's energy gap may easily increase to over 50 million tons of standard fuel. Thus, the energy situation in East Europe will have changed from a one-million-ton energy surplus to a 50-million-ton energy gap in about 9 years.

As indicated, the major role in this development was played by the liquid fuels whose net imports rose from 2.9 to 14.5 million tons (in crude petroleum calorific equivalents) between 1960 and 1965, reaching 22 million tons in 1967. The extent of Soviet dominance over the flow of liquid hydrocarbon into East Europe can be seen in the fact that almost 92 percent of all liquid fuels in 1965 came from the Soviet Union. By that time the intra-area shipments had sunk to 4 percent, while the remaining supplies came from such countries as Egypt, Syria, and Iran. In 1967, Soviet deliveries of crude petroleum and products (in calorific equivalents of crude) reached 28.7 million tons.

As already noted in the analysis of energy consumption, the role of energy trade in the whole economy varies from country to country. Table 17 summarizes the situation, depicting the relative role of total energy imports and of those of liquid fuels with respect to consumption, and also showing the reversed role of exports of these commodities with regard to domestically produced supplies in the individual countries of East Europe. As can be seen, East Europe as a whole still depends for only 6 percent of her total energy consumption on outside energy resources, although imports do supply more than 50 percent of the area's liquid fuel requirements. The highest degree of dependence on energy imports occurs in the economies of Bulgaria and Hungary where 42 and 30 percent, respectively, of the total commercial primary energy consumption in 1967 was furnished from abroad. In Bulgaria the share of imports in energy consumption grew from 7 percent in 1950 to 42 percent in 1967. This fact points out the degree to which the previously noted rapid growth of Bulgarian energy consumption and related economic growth is contingent on deliveries from abroad.

PRICES IN THE TRADE OF ENERGY IN EAST EUROPE

Communist economic theories and policies preclude taking the price of a commodity in individual countries of East Europe as an indicator of its relative scarcity, or considering it in international exchanges as an instrument for equalizing the comparative cost advantages among

the trading partners. In Communist international trade, at least within their own orbit, commodity prices are "contracted" on the basis of the bilateral agreements which set up a system of barter quotas for the specific commodities. The contracted prices should, in principle, take into consideration world prices, but in practice they reflect objectives more of political nature than of purely economic relevance.

Table 19 presents a review of the average value per unit computed on the basis of the reported total quantity and value of the particular energy commodity traded by the U.S.S.R. Two things are worth noting in Table 19: first, that all countries of East Europe except Yugoslavia pay higher prices for their fuel imports from the Soviet Union than the average the Soviet Union receives from her exports elsewhere; second, that the prices East European countries pay for Soviet crude oil and, to a degree also for coal, are at present not completely out of line with the average prices Western Europe pays for these fuels from all sources. Thus, the recent price of crude, F.O.B. Genoa, Italy, varied from 9.05 to 16.25 dollars per ton depending on whether it was coming from Libya or Venezuela respectively, with the prices for the Middle East and Saharian crude in between. In Rotterdam, the corresponding price range was from 10.10 to 17.75 dollars with Libya and Venezuela again as the extreme cases. Soviet prices of approximately 11.9 to 16.1 dollars per ton of Soviet crude oil, F.O.B. U.S.S.R. borders, prevailing in 1967, were generally within the above-listed range.

The proximity of Yugoslavia to the Middle East and Libya is probably one of the reasons why she is able to obtain Soviet fuels for the lowest price—often below the world average—although political considerations cannot be excluded here as influencing Soviet policy, either. The fact remains that Yugoslavia's dependence on supplies of energy from the Soviet Union and other East European countries increased markedly between 1955 and 1965. In former years, only 24 percent of Yugoslavia's solid fuel imports and 35 percent of her imports of liquid hydrocarbons were coming from East Europe and the Soviet Union; by 1965, these relative shares rose to 75 percent and 54 percent respectively, the bulk supplied by the Soviet Union.

In general there has been a noticeable trend, at least during the last two years for which data are available toward lower contract prices for the Soviet delivered fuels. Undoubtedly, this reflects the effects of the pipelines on the unit transfer cost of liquid fuels, although some realignment in coal prices has also taken place. Yet, there is one striking development in the opposite direction which deserves mentioning since it casts a light on Soviet business acumen—the socialist trading partners notwithstanding.

As may be noticed from Table 19 the contract price for deliveries of Soviet natural gas to Poland held stable from 1950 through 1965 at about 6.9 rubles ($7.67) per 1,000 cubic meters. This corresponds to about 22 kopecks, or approximately 24 cents, per one million BTUs—a rather favorable price considering the cost of Soviet crude and fuel oil for which the Poles were paying about 17 rubles ($18.89) plus per ton at that time. However, in 1967, when the network of pipelines for deliveries of natural gas to Poland and Czechoslovakia was completed—and Soviet exports to these countries, chiefly to Poland, rose to 1,300 million cubic meters—the contract price for Soviet natural

TABLE 19.—*Soviet contract prices* [1] *for fuels in foreign trade in selected years*

[Prices in rubles per ton of coal, crude, or fuel oil, or per 1,000 cu.m. of natural gas]

	Imports				Exports			
	Coal	Crude	Fuel oil	Natural gas	Coal	Crude	Fuel oil	Natural gas
1950								
World average [2]	8.93	18.27			8.9	21.66	10.00	6.75
Bulgaria								
Czechoslovakia						23.88		
East Germany						17.99		
Hungary								
Poland	8.97					13.96		6.75
Romania								
Yugoslavia								
1955								
World average [2]	12.20	16.87	10.06		12.45	19.89	10.73	6.75
Bulgaria	[3] 8.64	[4] 17.50					16.84	
Czechoslovakia		[5] 13.94				23.53		
East Germany					13.02	19.68		
Hungary	8.98					15.77		
Poland	12.50					17.74	10.00	6.75
Romania			10.06					
Yugoslavia					12.34	15.64		
1960								
World average [2]	14.25	16.47	15.09		12.99	13.92	9.85	6.87
Bulgaria	[3] 11.65	[4] 16.87			10.00		10.52	
Czechoslovakia		[5] 13.95			14.15	20.64		
East Germany					14.00	17.71		
Hungary					13.80	20.10	17.46	
Poland	14.47				14.79	21.55	16.44	6.87
Romania			15.09		15.28			
Yugoslavia					9.20	14.94	14.07	
1965								
World average [2]	14.14		14.86		11.95	12.68	9.19	6.87
Bulgaria	[3] 12.04				11.74	16.12	10.21	
Czechoslovakia					{[6] 12.56 / [7] 12.34}	18.06		
East Germany					12.86	15.32		
Hungary					12.73	19.91	15.77	
Poland	14.26				14.05	17.11	17.03	6.87
Romania			14.86		13.90			
Yugoslavia					8.02	10.62	8.54	
1967								
World average [2]	13.8		11.40		10.46	11.86	9.45	14.02
Bulgaria						12.98	11.86	
Czechoslovakia					10.97	15.37		14.75
East Germany					12.21	13.45		
Hungary					12.33	15.27	12.93	
Poland	13.8				12.56	14.61	14.55	13.83
Romania			14.28		12.47			
Yugoslavia					7.96	10.80	8.77	

[1] "Contract prices" refer, in exports from the U.S.S.R., to f.o.b. price Soviet port or Soviet border crossing point on land; in imports by the U.S.S.R., to f.o.b. price foreign port or border crossing point of the country of consignor. Values originally in foreign currencies were converted (in the official source) to rubles at the rate of exchange established on January 1, 1961 (0.90 ruble per $1.00).

[2] Average unit value received (paid) as on the basis of a given total volume of exports (imports) of the commodity, and the corresponding total value received (paid) for it.

[3] Imports from China (Mainland).

[4] Imports from Austria.

[5] Imports from Albania.

[6] Average value per unit of all coal exports, including hard coal, anthracite, and patent fuel.

[7] Coal only.

Source: U.S.S.R., Ministerstvo vneshnei torgovli, *Vneshniaia torgovlia Soiuza SSR*, various years.

gas was suddenly raised to 14.80 rubles ($16.44) for 1,000 cubic meters, F.O.B. Soviet-Czechoslovak border, and to 13.80 rubles ($15.33) for the same quantity shipped to Poland. Of course, this makes the case for competitive nuclear energy in East Europe much more favorable than before. It also serves as a warning to these countries that once their economies are tied to a fixed system of pipeline networks, without any alternative choice, they become a captive market for Soviet energy shipments. Since their basic energy resource—coal production—is not sufficiently flexible to give them much bargaining power, they have to pay the price they are asked to "contract".

In justice to the Soviet natural gas export policy, its pricing is not out of line with practices followed in Western Europe where the price for natural gas is aligned to the nearest competitive fuel rather than to the true production cost. Nevertheless, it is worth noting that in pursuing this policy the Soviets do not seem to be influenced by any feelings of "socialist" solidarity. When negotiating natural gas exports to Austria, they ultimately agreed on a price, F.O.B. Czechoslovak-Austrian border, of about 43.3 cents (39 kopecks) per one million BTUs, which is about 8 kopecks lower than the Czechs are asked to pay at their frontier a few hundred miles further to the east. The Soviet discriminatory price policy has been even more evident in recent negotiations about large-scale deliveries of natural gas to West Europe, particularly West Germany, France, and Italy. It was reported that the price for which the Soviets are willing to sell natural gas to West Germany, F.O.B. Bavarian border, is about 32.8¢ per million BTUs. This is substantially less than what Czechoslovakia (or even Austria) pays for Soviet natural gas. Again, as in the case of crude, Soviet fuel exports to East Europe are used to a degree to subsidize the Soviet thrust toward the Western markets.

Of course, the pricing policy noted here is not entirely a one-way street. At least in some cases, the Soviet Union also pays somewhat higher prices for fuels imported from East Europe than would correspond to world average. Particular attention should be given to Polish export prices for coal and import prices for crude, because they seem to cast some light on the relation of export-import prices in U.S.S.R.'s energy trade. In 1950 a low price for coal imported from Poland appears to be related to a low cost of the Soviet crude exported to Poland. Later, as Polish prices for coal shipped to the Soviet Union increased, so did Soviet crude oil prices. It is also worth noting that while Polish coal cost the Soviet Union about $15.70 per ton in 1960, the Poles were selling coal to Italy for a computed average price of about $8.00 per ton.

The Soviets also differentiate among their East European customers in prices they charge for their electricity. In 1965, the computed average cost of one kilowatt-hour delivered to Czechoslovakia was 0.903 kopecks, to Hungary 1.062 kopecks, and to Poland 1.087 kopecks, or between 10 and 12.1 dollars per 1,000 kWh. This pricing policy has not changed in more recent times. In 1967, for example, the respective prices were 0.926, 1.053, and 1.112 kopecks, or between 10.3 and 12.4 dollars.

To conclude, it is worth noticing that during 1968, the export (F.O.B.) prices of Soviet mineral fuels showed a rising tendency,

although of different degree. A detailed breakdown by country is not yet available, but the overall figures on trade by commodity clearly point out that the Soviet Union was earning, on the average, more per unit of exported fuels in 1968 than in 1967. The highest relative increase—5.1 percent above the 1967 level—was recorded in the export price of coal (including anthracite), which reached 10.99 rubles per ton in 1968. The second highest annual relative increase—4.7 percent above that of 1967—was recorded by fuel oil, whose export price rose to 9.88 rubles per metric ton in 1968. The average crude oil export price in 1968 was 12.13 rubles per metric ton, that is, a rise of 2.3 percent over 1967. On the other hand, the natural gas export price in 1968 remained virtually unchanged, 14.05 per 1,000 cubic meters as compared to 14.02 rubles in 1967, while that of electricity declined from 10.64 rubles in 1967 to 10.42 rubles per 1,000 kwh in 1968.

On the import side, the Soviet Union had to pay slightly more, on the average, for her coal imports but substantially less for fuel oil in 1968. The computed over-all average F.O.B. import price of coal, excluding anthracite, rose 1.2 percent above that in 1967, as one ton of imported coal cost the USSR 13.96 rubles in 1968. In contrast, fuel oil import prices declined markedly to 10.73 rubles per ton in 1968, that is, a decline of 5.9 percent from the 1967 price.

The range between the coal export and import prices in Soviet trade reflects some of the peculiarities of bilateral barter trade, mentioned above, and very probably also the fact that Polish coal, which represents the bulk of Soviet coal imports is, in general, of higher calorific value than the exported Soviet coal. Some light is cast on the movements of prices of energy commodities in Soviet trade by the below offered review of the unit value indices (based on the Laspeyrean formula) with 1967=100.

1968	Coal and anthracite	Coal (only)	Crude oil	Fuel oil	Natural gas	Electricity
Exports	98.80	100.20	102.29	103.84	100.15	98.01
Imports	(1)	101.70	(1)	94.11	(1)	(1)

[1] Not available.

From these figures it is obvious that a diverging movement between the export and import prices in fuel oil brought about, for the Soviet Union, considerably improved terms of trade in this commodity, although it does not explain its international crosshaul. Furthermore, not until the trade breakdown by country becomes available, can it be explored whether the afore-noted rise in Soviet export prices of mineral fuels in 1968 is chiefly reflected in yet another aspect of price discrimination practiced by the Soviet Union in her exports to Eastern Europe.

CHANGES IN TRANSPORTATION AND EAST EUROPE'S ENERGY TRADE

The pace of fuel substitution quickened and the volume of trade increased—as might be observed from Tables 3 and 4 with the introduction of pipelines and a uniform grid for the transfer of liquid fuels and electricity among the Comecon members in the early sixties.

In this respect the construction of the "Druzhba" (Friendship) pipeline network for crude oil has played a particularly significant role. Through a southern branch it connects the Soviet oil fields in the Volga region with Czechoslovakia and Hungary, while its northern branch delivers crude petroleum to Poland and East Germany. It was started as a cooperative venture in 1958, pursuant to a decision to harmonize economic policies, notably in the energy field. The first part of "Druzhba" started its operation in 1962 with deliveries of crude to Czechoslovakia. Delays in construction and lack of pumping stations were so serious that an annual capacity of 20 million tons was attained only by degrees. In 1965, shipments of crude through "Druzhba" amounted to 13 million tons; in 1966, to 16 million; and in 1967, to 18 million tons.

In view of the fast rising demand for liquid fuels and Soviet promises to double crude deliveries by 1970—by then, crude exports to the four above mentioned countries are scheduled to reach 45 million tons—it has been necessary to enlarge the present network. In 1967, it was decided to construct a second "Druzhba," paralleling the main line on Soviet territory and then turning south to Czechoslovakia and Hungary at the Mozyr pumping station. According to a Petroleum Press Service (London) dispatch it should be fully completed during the coming five year plan (1971–1975) and should have an annual potential capacity of 80 million tons of crude. Its diameter is 1200 millimeters (47.2 inches). In preparation for the pipeline, construction of a new branch has already been started from Brody (in Ukraine) to Czechoslovakia, and an extension has been added at the other end connecting the oil field in the central Tatar Republic with the main line. In the meantime, the northern part of the existing "Druzhba" network has been enlarged by the addition of 300 kilometers of pipe from Schwedt to Leuna in East Germany.

Bulgaria, which is outside the main stream of the "Druzhba" network is to have its own network for Soviet oil. A 300-mile pipeline from a Black Sea port would deliver oil to Karavana (in Bulgaria) from where it would be transshipped to the refinery at Pleven. Russian deliveries of crude petroleum are anticipated to reach about 10 million tons by 1975. This figure excludes petroleum products which, however, represent a declining share of total petroleum imports as the two Bulgarian refineries (at Pleven and Burgas) are increasing their output.

By 1975, Bulgaria plans to have a refining capacity of 260,000 barrels daily (b/d), that is about 190,000 b/d more than today. Similarly, in order to meet the increased Soviet crude petroleum deliveries, Hungary is planning to have on stream by 1975 a new refinery at Tiszapolgár with a refining throughput of 100,000 b/d, while its existing refinery at Szazhalombatta is to raise its capacity to 60,000 b/d by 1970 and to 120,000 b/d by 1975. Poland will expand her big refinery on the "Druzhba" line at Plock, north of Warsaw, bringing its capacity to 180,000 b/d by 1975 compared to its present capacity of 80,000 b/d. Two smaller refineries are to be built, one at Blachownia Śląnska and the other on the Baltic coast. Consequently, Poland's total refining capacity should reach 230,000 b/d by 1975. Yugoslavia's planned expansion of her refining capacity by 1972 is about 80,000 b/d, bringing her total refining capacity on stream from the present 172,000 b/d to 250,000 b/d.

The gas trunk pipelines have now also become an important conduit for Soviet energy supplies to Eastern Europe. In 1967, a pipeline connecting the gas fields in West Ukraine with the Polish Silesian industrial center was put into operation; and imports of natural gas, which were about 390 million cu. m. in 1965, went up to 1,025 million cu. m. in 1967.

In July 1968 the new gas line network "Bratstvo" (Brotherhood) which connects Western Ukraine with Czechoslovakia and Austria, was finished. It is to be extended to Hungary.

In the first year of operation, natural gas deliveries to Czechoslovakia amounted to approximately 300 million cu. m.; but by 1970 they should reach 1 billion cubic meters, and 4 billion cu. m. before 1975. By then the pipeline facilities would have to be substantially enlarged, since the existing network has a capacity of no more than one billion cubic meters per year.

In May 1969, the Soviet Union signed a protocol agreeing in principle on natural gas deliveries to East Germany. Since work on the pipeline is supposed to start in 1972 as a joint undertaking of both governments, the deliveries—the volume of which is to be determined later—may be expected to begin in the mid-seventies.

A recent announcement indicates that Bulgaria is to join the importers of Soviet gas. For this purpose a gas pipeline, 600 kilometers in length, will be built from Izmal in Ukraine through Romania to the Bulgarian border from where the gas will be transshipped to Sofia. This network is expected to be in operation by 1973. By 1975 Bulgaria should import about 3 billion cubic meters of natural gas from the USSR. Thus with the Czechoslovak and Polish imports—the latter probably reaching 7.8 thousand million cubic meters by then. Soviet deliveries of natural gas to Eastern Europe will, by 1975, probably exceed in calorific value the anticipated imports of the Soviet solid fuels.

Comecon's uniform power grid "Mir" (Peace) parallels the network of crude and natural gas pipelines, except that it can carry power exchanges in both directions. "Mir" integrates the networks of the European Comecon members with that of Western Soviet Union, notably Ukraine. At the end of 1967, after the completion of transmission lines across the Danube, linking Romania and Bulgaria, the total capacity of the power grid was 41,700 megawatts. The grid's central dispatching office is in Prague, but the pivotal center actually interconnecting the participating networks is under complete physical control of the Soviet Union, located at Mukachevo near the Czechoslovak border.

The uniform power grid was, in fact, the first instrument of Comecon's efforts to harmonize energy policies among its members as the very foundation for improving their cooperation in economic planning and socialist division of labor. Among the economic benefits of "Mir" deserving particular mentioning is the reduction of reserve ratio requirements. In turn, "Mir" permits construction of large generating plants. This is of special significance for nuclear power programs. In the same context, the inter-tie permits a larger degree of geographic concentration near sources of fuels.

Effects of "Mir" have already been reflected in the lower cost of transferred electricity, as discussed above. Collaterally, the volume of

power exchange has also been growing. From approximately 708 million kWh exchanged among Comecon members in 1956, electricity exchanges through the "Mir" system reached 5,900 thousand kWh ten years later and about 8,700 million kWh in 1967. Exchanges of electric energy across frontiers are thus developing twice as fast as consumption itself.

In addition to Comecon electricity exchanges, which are subject to particular bilateral agreements, individual East European countries are interconnected with third countries. Czechoslovakia and Hungary have electricity exchange agreements with Austria; Yugoslavia is connected with Bulgaria and is also a member of the SUDEL grid, connecting her with other countries of Southern Europe.

A TURN IN SOVIET ENERGY TRADE POLICY

During 1967 there were several indications that the Soviet Union might have decided to permit the East European countries to obtain part of their energy requirements in liquid and gaseous fuels outside the Bloc. This seemed to fit at least two discernible elements in Soviet national fuel policy considerations. First, it was becoming increasingly difficult for the Soviet Union to spare large quantities of crude oil and products for trade with Western or uncommitted nations without neglecting urgent requirements inside the U.S.S.R. or other parts of the Soviet Bloc. Second, the Soviet Union obviously needed time for the development of the huge reserves of mineral fuels in new regions, notably Western Siberia. And it had become known during a discussion in the U.S.S.R. Academy of Sciences concerning the natural resource situation in these regions that Soviet economic planners were thinking in terms of 15 to 20 years as being necessary for preparing the mineral riches of these regions for full exploitation.

Thus, there was little occasion for surprise when Romania opened negotiations for crude deliveries by the nationalized oil companies of the Middle East. In 1967, she imported about 850 thousand tons of crude petroleum from Iran's NIOC (National Iranian Oil Company). Under a new barter agreement concluded between Romania and NIOC in the summer of 1969, Romania is to take from NIOC 5 million tons of crude during 1970–1973. In addition to this, another 2.5 million tons of crude remain still to be shipped by NIOC under the old agreement which was to run through 1970, but the deliveries on which were delayed because of the Suez closure. Romania also negotiated with state oil companies in Saudi Arabia, Algeria, Libya, and even Venezuela, contracting with Algeria for a regular delivery of one million tons of crude annually, beginning in 1969. According to an agreement in principle, the Venezuelan state oil company, Corporación Venezolana del Petróleo (CVP), is to deliver to Romania over a period of ten years 11 million tons of crude. The effect of the higher price of the Venezuelan crude plus the cost of the long haul will probably be offset by a barter agreement under which Romania will provide equipment and services for the development of Venezuelan oil fields.

In 1968, Czechoslovakia concluded what at that time seemed a definite commercial agreement with Iran according to which the NIOC was to ship about a million tons of crude in exchange for Czech in-

dustrial goods and credit. In addition to that, it has been reported that Czechoslovakia was close to concluding an agreement with Algeria for substantial deliveries of natural gas to be transported by pipeline from the Yugoslav coast through Hungary to Czechoslovakia. Hungary too, has announced plans to import about a million tons of crude annually from a non-Soviet source, presumably Iran, while Poland entertained the same idea with respect to supplies for her new refinery at Gdańsk.

There has been a considerable switch in Yugoslav imports of crude petroleum between 1965 and 1967. Although Yugoslavia has been always drawing a substantial part of her crude petroleum supplies from outside of the Communist bloc (in 1965 about 52.7 percent of total imports of 1,107 thousand tons), in 1967 this percentage went up to 73.5 percent of the total crude imports of 2,546.6 thousand tons. The Soviet Union's share in the total, although increasing in absolute terms to 675 thousand tons (as compared to 528 thousand tons in 1965), declined relatively from 47.7 percent in 1965 to only 26.5 percent in 1967. On the other hand, imports from the Middle East alone rose to 45.5 percent and those from Africa (including Libya) to 26.1 percent of the 1967 total. In 1968, Yugoslavia further strengthened her ties with the Middle East by concluding an agreement with her largest single supplier in this area, the British Petroleum Company (BP). Under the new agreement, British Petroleum will deliver to the Yugoslav state company, Naftagas, 6 million tons of crude over a period of ten years. The deal has been supported with a loan of $10 million extended to Naftagas by British Petroleum and an associated London bank.

In view of the rising demand for liquid fuels, all present import arrangements do not suffice to cover Yugoslav energy requirements. In effect, crude petroleum imports reached 3.5 million tons in 1968 and are estimated to be on the order of 5 million tons in 1969. In addition to the BP agreement, Yugoslavia is now reported ready to import substantial quantity of crude petroleum from the Iranian NIOC under a barter arrangement.

It seems, however, that because of the Czech-Soviet crisis of 1968, the Soviets have had serious second thoughts about the advisability of letting East European countries get the fuels their economies so badly need from sources beyond the direct control of the Soviet Union. One indication of the change in the Soviet attitude was the Soviet reaction when Hungary announced her intention to negotiate with Iran. The Soviet Union, then came out with a flat statement that she would supply all the required Hungarian imports of liquid fuels. This was followed with an announcement that the Soviet Union will double her original commitments of oil deliveries to Czechoslovakia, Hungary, East Germany, and Poland for the last two years remaining under the present agreements. Their combined annual total in 1969 and 1970 is now to be 45 million tons of crude petroleum. It must be assumed that the Soviet Union has shifted some of its national priorities in order to be able to deliver on her promises, since her output of crude petroleum has been lagging behind the targets set in perspective planning.

This has been well reflected in statements made by the Soviet Minister of Oil Industry, Valentin Shashin, during a press conference at the beginning of 1969, when he acknowledged that it was unlikely that the over-all Sovieth oil exports would grow much in the immediate

future. Nevertheless, exports to East Europe will continue to grow, as Shashin confirmed, and this prospect, in connection with the expanding Soviet domestic demand for liquid fuels, will mean that less crude will be available for export to the rest of the world.

In fact, East Europe's insistent demands on the USSR's energy surplus, especially on its liquid fuels, come at a most inopportune moment. For, in mid-1969, the relative growth of the Soviet oil output was at its lowest—between 5 and 6 percent—since World War II, compared to a 7-percent increment in 1968 and a 9-percent one in 1966 and 1967. The declining trend is reflected in the planned output for 1975, now estimated to reach 460 million tons, while the 1980 goal—previously set at 600 to 620 million tons of crude petroleum—was scaled down to 550 to 600 million tons.

In 1969 it also appeared that the U.S.S.R. may be initiating a new policy with respect to the energy surplus available in the Middle East in an effort to counter the impact which the decreasing tendency in the availability of her domestic crude may have on her ties with East Europe. During the summer months of this year, arrangements were completed between the governments of the U.S.S.R. and Iraq implementing their original agreement of December 1967. Pursuant to these arrangements, the Soviet Union will aid—with credits, equipment and technical expertise—the Iraq National Oil Company (INOC) in the development of the rich North Rumaila and Al-Halfaya oil fields. According to a separate long-term economic and technical cooperation agreement with Iraq, the Soviet credits will be repaid in crude deliveries which are envisaged to be in the order of 5 million tons a year in the first stage of development of North Rumaila. The U.S.S.R. may buy additional quantities of crude from the INOC.

In this way, the Soviet Union has gained control over a sizable quantity of crude which may be then used directly or indirectly for exports, especially to East Europe. A thought along this line has been recently expressed over the Moscow radio with respect to natural gas which the U.S.S.R. is to import from Iran. As reported in the *Oil and Gas Journal* of September 1969, the U.S.S.R. is planning to feed the Iranian gas to household and industrial customers in the Caucasus republics and export the surplus appearing on the national level to East Europe. Moreover, the Soviet arrangements with the Thyssen Company of West Germany and similar arrangements recently reached with Swedish firms guarantee the Soviet Union deliveries of seamless pipe for pipelines in the future. These, it may be assumed, will advance the practical exploitation of natural gas and oil deposits in Western Siberia and lessen—in the long run—the U.S.S.R. dependence of her fuel policy toward East Europe on the outside surplus.

Yet, some vacillation in the Soviet policy toward available oil supplies outside the Bloc may possibly be discerned in the most recent dispatches about the initiatives of two Eastern European countries to get crude oil from the Middle East. Thus, during the closing weeks of 1969, the Czechoslovak high level delegation was reported to have concluded a new (?) barter agreement with the Iranian government for the delivery of 80,000 b/d (i.e., 4,000,000 tons annually) of crude oil for five years. Under the agreement, Czechoslovakia has reportedly extended a $200 million credit to Iran for purchasing Czechoslovak

industrial and agricultural equipment. Also, the Czechs initiated talks for closer economic cooperation with Iran, notably in the field of oil exploration, power station construction, pipelines, etc.

Hungary, too, seems to have been given, after all, the green light for her originally planned import of crude oil from the Middle East. Thus, it has been recently reported that she agreed to extend a $15-million credit to Iraq for the purchase of her industrial goods in exchange for crude deliveries in, as yet, unspecified quantities. The relatively small credit, however, indicates that this trade will be on a substantially smaller scale than that between Iran and Czechoslovakia. Hungary obviously intends to supplement Iraqi oil with imports from Syria with which she has just concluded a three-year agreement providing for crude oil deliveries still in unstated quantities. Syria and Egypt are also known to be suppliers of relatively small quantities of crude petroleum to East Germany.

To interpret the ramifications of these events, one must keep in mind that such inter-governmental barter agreements depend in practice on the still-to-be-negotiated implementing protocols, specifying the annual quantities and prices for the goods to be exchanged. Sometimes it takes considerable time before the implementing agreements are concluded and enter into force. It is, therefore, too early to say whether the Czech and Hungarian initiatives really signal a definite departure from the course of the Soviet oil policy described above and whether East European countries are to be given free hand in negotiating oil deliveries from outside of the Bloc on their own, at least as long as the oil is to come from an area close to the Soviet control. There is, of course, a definite possibility—and one is tempted to classify it as a more probable alternative—that the two agreements are only two links in the Soviet-designed policy for the controlled development of oil in the Middle East and its flow toward East Europe.

To this purpose may well serve also the projected 550-mile pipeline which is to carry Mideast crude oil from a Yugoslav port to the communist countries of Central Europe. This project has been on the books for some time but has been reactivated only recently when a definite agreement was reached on the allocation of its estimated cost of $90 million among the partners in this joint venture. The pipeline will start at the Yugoslav Adriatic port of Bakar, near Rijeka, and while one branch will run eastward to Yugoslav refineries, the other will head north to Újudvar in Hungary, Bratislava in Czechoslovakia and Blachownia Śląska in Poland. Its anticipated 22 million tons of annual capacity will be shared as follows: Yugoslavia will take about 10 million, Poland 6 million, Czechoslovakia 5 million and Hungary 1 million tons of crude annually. The first section of the pipeline from Bakar to the refinery at Sisak in Yugoslvia is to be on stream by 1973. With no word about a time schedule for the far larger remaining portion of this pipeline, one may legitimately assume that it will hardly be in operation before the second half of the seventies. Of course, by then the Mideast oil may be urgently needed to complement the Soviet crude deliveries to prevent East Europe's energy gap from reaching critical proportions.

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VIII. Concluding Remarks and Outlook

The foregoing analysis suggests some long-run implications for the Soviet energy policy. A few hypothetical interpretations of this situation are summarized below, followed by an estimate of the future energy needs of Eastern Europe in 1980. The basic premise of our interpretation is an assumption that in spite of the declining growth rate in total energy requirements, the demand for energy in excess of the domestic ability to supply it will persist in East Europe, because (1) the area economy is becoming increasingly dependent on liquid and gaseous fuels, (2) the area's energy resource base is particularly inadequate in these fuels, which forecloses any possibility of raising output to an equilibrium level, and (3) for strategic reasons, the Soviet Union will not effectively aid a large-scale development of nuclear power which otherwise could alleviate the area's impending energy crisis.

As a consequence, energy imports on an increasing scale will be necessary for further economic growth of the area and for the improvement of living standards of its population. This was fully acknowledged by the heads of Comecon members' economic planning agencies during the 1967 session. They agreed that the pivotal requirement for economic development and effective planning in the area is the assurance of an adequate and regular supply of energy resources. A tentative Soviet suggestion that joint development of fuel resources in Mongolia may be an answer to this problem can be taken as an indication of a strain which Eastern Europe's energy requirements exercise on the Soviets' own supplies. Nevertheless, in the short run and in spite of objections often heard in 1966, the Soviet Union is ready to rearrange her priorities to meet energy demand of East Europe, once there is a danger that East European initiative to get the needed fuels from outside the bloc may threaten the bloc's political cohesion. This is what has prompted the agreement to double the Soviet oil exports to East Europe in 1969 and 1970, the promise to ship to Czechoslovakia annually 20 million tons of crude by 1975, the long-term assurance given to East Germany about oil deliveries up to 1984, and the concurrent promises to deliver natural gas and electricity to East Europe.

The key questions then are: How large will the East European energy deficit be in the long run, say by 1980? And will the U.S.S.R. be capable of filling the gap and willing to do so?

A tentative answer to this problem is based on Table 20. The fundamental assumptions for the estimates in Table 20 are as follows: (1) the population of the area will reach 144.3 million by 1980; (2) the growth rate of per capita consumption of energy will be 1.8 [8] percent per annum over the entire fifteen-year period from 1965 to 1980, resulting in a 1980 per capita consumption of about 4,300 kilograms of standard fuel and the area's total consumption of primary commercial inanimate energy of 620 million tons of S.F., and (3) the relative geographic distribution of this total and of hydropower will follow patterns similar to those prevailing in 1950 and 1967.

[8] This seems to be the minimal rate—in view of the area's stage of economic development—which would be needed to prevent economic decay. Clearly, an assumption of any higher rate of growth in per capita energy consumption would further aggravate the energy imbalances in Eastern Europe.

TABLE 20.—*East Europe: Estimated consumption of primary commercial energy and its relative distribution by country in 1980*

[Quantity in million tons of standard fuel]

	Geographic distribution of total consumption [1] (percent)	Consumption of primary energy					
		Total [2] (quantity)	Mineral fuels				Hydroenergy [7] (quantity)
			Total [3] (quantity)	Coal [4] (quantity)	Liquid fuels and natural gas		
					(percent of col. 3) [5]	(quantity) [6]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
East Europe	100.0	620.0	599.7	347.7	42	252.0	20.3
Albania	.7	4.3	3.7	.8	[8] 79	2.9	.6
Bulgaria	7.0	43.4	41.4	17.0	59	24.4	2.0
Czechoslovakia	17.0	[9] 105.4	103.4	66.2	36	37.2	2.0
East Germany	19.0	117.8	117.1	77.3	34	39.8	.7
Hungary	7.5	46.5	46.3	19.0	59	27.3	.2
Poland	27.3	169.3	168.2	122.7	27	45.5	1.1
Romania	13.0	[10] 80.6	76.1	25.1	67	51.0	4.5
Yugoslavia	8.5	52.7	43.5	19.6	[8] 55	23.9	9.2

[1] Estimated on the basis of the differences in the trends of growth rates of individual countries in 1950 and 1967.
[2] The total for East Europe was established on the assumption that the area population will reach 144,300,000 and the per capita energy consumption will be approximately 4,300 kilograms S.F. This total was distributed in accordance with percentages in col. 1.
[3] Established as the difference between col. 2 minus col. 7.
[4] Established as the difference between col. 3 minus col. 6.
[5] Percentage shares are those announced by Comecon for its members; Albania's and Yugoslavia's shares are author's estimates; East Europe's share has been computed from the sum of individual countries' shares.
[6] Computed from col. 3 by using the percentages in col. 5.
[7] Based on the assumption that hydropower (including small quantity of nuclear generated power) will amount to about 10 percent (55,000,000,000 kWh) of total electricity. Assumed specific average fuel consumption rate: 0.370 kg/kWh.
[8] Author's estimate.
[9] Czechoslovakia's own estimate: 120,000,000 tons S.F.
[10] Romania's own estimate: 71,000,000 to 76,000,000 tons S.F. for 1975.

On the production side, coal output in standard fuel is estimated to grow to 340–350 million tons; this represents an increase of approximately 1 percent per annum in total tonnage over 15 years. Crude petroleum and natural gas production has been estimated rather generously to reach respectively 45 and 65 million tons in S.F. by 1980, and hydropower to reach about 20 million tons in S.F.

The resulting difference between the estimated total energy requirements and indigenous production of commercial energy would be about 150 to 165 million tons of standard fuel of which crude oil alone may account for about 130 million in S.F. (100 million tons of crude). If the Soviet Union is to deliver this quantity to East Europe, shipments would represent approximately 16 to 18 percent of her total crude petroleum production planned for 1980. It is doubtful that the Soviet Union could then still have enough crude left for export after meeting the needs of her own economy.

One way out would be to permit liberalization of trade and let East Europe obtain her energy supplies, or at least a major part of them, on the world market. Such course is not without grave risks. The simple necessity of paying for the huge energy imports mentioned above would force the East European countries to open their borders more freely to the influx of foreign businessmen and align their export industries in accordance with the demand on the world markets rather than with their politically motivated targets. Monetary repercussions

of such a policy (the question of convertibility) also would not be negligible. All this, we may anticipate, would ultimately lead to a shift in political and social attitudes in East Europe.

Of course, the U.S.S.R. may attempt—at least as an interim alternative before the Siberian gas and oil fields are fully developed—to enlarge her hold on the fuel surplus of the Middle East, in a manner similar to the arrangements with Iraq and Iran. In this way, the U.S.S.R. would maintain control over fuel exports to East Europe without any need to curtail Soviet domestic demand or exports to the West. This policy course may work toward a greater Soviet interest in the stability in the Middle East, although it may also upset the Western strategic interests associated with the Middle East oil.

Still another possibility open to the U.S.S.R. is to modify her atomic energy policy and embark on an effective program of assistance to develop nuclear power on a large scale throughout East Europe. This would free fuels, needed for generating power, for use in other sectors of the economy. Adopting such an alternative would seem to hinge on (1) the ratification of the Non-Proliferation Treaty or a much closer integration with the U.S.S.R. to prevent the nuclear war potential of East Europe from becoming a threat to the Soviet national interests; and (2) the Soviet industrial capability to deliver the necessary reactors and other nuclear hardware, including enriched fuels and their reprocessing, which a large scale nuclear power program would entail. Up to now, Soviet nuclear power aid has been rather ineffective and its results negligible.

By 1980 the energy situation in East Europe will become critical. By then the Soviet Union must make a choice among the available strategies to cope with Eastern Europe's energy requirements and the Soviet national objectives. Neither of the alternatives considered seems to be free of serious risks either for their political systems or for the welfare of the population of the area.

APPENDIX A

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APPENDIX B

STATISTICAL DATA FOR INDIVIDUAL COUNTRIES

List of Tables

Headnotes to Tables on "Energy Balance Sheets"

(1) Figures in column (1) are sums of columns (2) through (5), converted to standard fuel of 7 million kilocalories (approximately 28 million BTUs) per metric ton. Conversion to S.F. units is based on the average physical energy content as given in Table 1 (p. 352). Hydropower was converted to standard fuel on

the basis of a specific average consumption rate in thermal power stations, as applicable for the respective country and year (see Table 2, p. 354).

(²) Production includes primary energy resources, that is: hard (bituminous) coal, brown coal, lignite and, where applicable, peat, fuelwood, charcoal and, in case of the Soviet Union, also rock shale; further, crude petroleum and natural gasoline; natural and associated gas, and as indicated in the respective country table, coal-mine gas; plus hydropower. For lack of reliable data, neither estimates of nuclear generated power (given in Table 10), nor energy content of mined nuclear minerals were included. Natural gasoline is expressed in crude petroleum equivalent on the basis of average physical energy content (for crude, 9,100 kilocalories; for natural gasoline, 10,500 kilocalories) per kilogram. Natural gas includes associated and coal-mine gas (in case of Poland) on the basis of calorific content of each particular gas which varies with years and from country to country. Insofar as information was available, the totals were adjusted for shipments of energy resources to non-energy uses. This and other minor changes in production of available primary energy resources are noted on the respective national tables.

(³) Net trade represents the individual countries' energy trade balance (imports minus exports) with all other countries of East Europe and the world, and includes all exchanges in primary energy resources (as specified in (²) above) and their derivatives (secondary sources), insofar as they are earmarked for energy purposes. The secondary energy sources include in particular: coal briquettes, all kinds of coke, refined petroleum fuels, manufactured gas plus electricity. With the exception of electricity, they were converted into standard fuel on the basis of the factors given in Table 1. Trade in electricity has been dealt with as adding to (subtracting from) the respective domestic hydropower and was converted into standard fuel units as specified in (¹) above. Positive data: net imports; negative data: net exports.

(⁴) Consumption refers, in effect, only to available supplies of individual fuels and power on the level of primary energy resources which are assumedly reserved for energy uses. The totals have been established as an arithmetic result of production plus net trade. Lack of data on changes in fuel stocks and fuels used for bunkers prevented establishing a more precise energy balance.

Headnotes to Tables on "Origin and Destination of Trade"

Methodological headnote: Tables on "Origin and destination of trade" are summarizations of detailed matrix tables, not published in this study for lack of space. (See note (¹), p. 349). The primary source in the compilation of matrix tables for each country was the pertinent statistical publication of the country involved. However, due to frequent lack of detail in the primary source, other statistical sources (those of the trading partners, or international) were also used. This procedure often resulted in discrepancies of statistical origin which were dealt with in two ways:

1. When the reason for the discrepancy could be identified and reconciled or allocated in part or entirely among its components on the basis of ascertainable criteria (historical trade patterns, etc.), this was done. This allocation accounts for any differences that might exist between data in these tables and those in the sources.

2. Discrepancies that could not be allocated, were left as in the sources. This accounts for differences between totals and sums of components that might occur in the tables in this study.

Imports—Country's imports from the area in stub.

Exports—Country's exports to the area in stub.

Net trade—Country's net trade with the area in stub (positive data: net imports; negative data: net exports).

(¹) In standard fuel units.

(²) Communist Asia (Mainland China, Mongolia, North Korea, North Vietnam) and Cuba.

TABLE A–1.—*Albania: Energy balance sheet, 1950–67*

[In thousand tons of standard fuel]

Year	Total energy [1] (1)	Solid fuels (2)	Liquid fuels (3)	Gaseous fuels (4)	Power (5)
1950					
Production [2]	451	277	172		2
Net trade [3]	−85	+2	−87		
Consumption [4]	366	279	85		2
1955					
Production [2]	807	520	270		17
Net trade [3]	−151	+4	−155		
Consumption [4]	656	524	116		17
1960					
Production [2]	1,500	488	946		67
Net trade [3]	−426	+3	−429		
Consumption [4]	1,074	491	517		67
1965					
Production [2]	1,710	518	1,067		125
Net trade [3]	−352	+16	−368		
Consumption [4]	1,358	534	699		125
1967					
Production [2]	2,030	559	1,278		193
Net trade [3]	−162	+16	−178		
Consumption [4]	1,868	575	1,100		193

(1) to (4) see Headnotes, p. 417.

TABLE A–2.—*Albania: Energy balance sheet, 1950–67*

[In original units]

Year	Total energy [1] (in thousand metric tons of S.F.) (1)	Solid fuels (in thousand metric tons of S.F.) (2)	Liquid fuels (in thousand metric tons) (3)	Gaseous fuels (in million cubic meters) (4)	Power (in million kWh) (5)
1950					
Production [2]	451	277	132		3
Net trade [3]	−85	+2	−67		
Consumption [4]	366	279	65		3
1955					
Production [2]	807	520	208		27
Net trade [3]	−151	+4	−119		
Consumption [4]	656	524	89		27
1960					
Production [2]	1,500	488	728		121
Net trade [3]	−426	+3	−330		
Consumption [4]	1,074	491	398		121
1965					
Production [2]	1,710	518	821		250
Net trade [3]	−352	+16	−283		
Consumption [4]	1,358	534	538		250
1967					
Production [2]	2,030	559	983		410
Net trade [3]	−162	+16	−137		
Consumption [4]	1,868	575	864		410

(1)–(4) see Headnotes, p. 417.

TABLE A–3.—*Albania: Origin and destination of trade in solid fuels, crude petroleum, and refined fuels, by world area and selected years*

[In thousands of tons]

World area	Solid fuels [1]			Crude petroleum and refined fuels: Total			Crude petroleum and refined fuels: Refined fuels		
	1955	1960	1965	1955	1960	1965	1955	1960	1965
Total trade:									
Imports	4	7.5	16	4	(2)	1	4	(2)	1
Exports		5		124	330	284		1	
Net trade	4	2.5	16	−120	−330	−283	4	−1	1
East Europe:									
Imports	4	7.5	16	(2)		1	(2)		1
Exports		5		5	158	109		1	
Net trade	4	2.5	16	−5	−158	−108	(2)	−1	1
Soviet Union:									
Imports				4	(2)		4	(2)	
Exports				119	151				
Net trade				−115	−151		4	(2)	
Other Communist countries: [3]									
Imports									
Exports					21	140			
Net trade					−21	−140			
Other world:									
Imports									
Exports						35			
Net trade						−35			
Of which West Europe:									
Imports									
Exports									
Net trade									

(1) and (2)—see Headnotes, p. 418.
[3] Negligible.

TABLE A–4.—*Bulgaria: Energy balance sheet, 1950–67*

[In thousand tons of standard fuel]

Year	Total energy [1] (1)	Solid fuels (2)	Liquid fuels (3)	Gaseous fuels (4)	Power (5)
1950					
Production [2]	4,992	4,793			199
Net trade [3]	+327	+16	+311		
Consumption [4]	5,319	4,809	311		199
1955					
Production [2]	6,618	6,024	195		399
Net trade [3]	+416	+38	+355		+23
Consumption [4]	7,034	6,062	550		422
1960					
Production [2]	10,758	9,480	260		1,018
Net trade [3]	+1,490	+263	+1,212		+15
Consumption [4]	12,248	9,743	1,472		1,034
1965					
Production [2]	[5] 13,163	[5] 11,797	298	88	980
Net trade [3]	+7,052	+2,491	+4,569		−8
Consumption [4]	20,215	14,288	4,867	88	972
1967					
Production [2]	[5] 13,728	[5] 11,775	649	394	910
Net trade [3]	+10,016	+3,520	+6,441		+541
Consumption [4]	23,744	15,295	7,090	394	964

(1)–(4) See Headnotes, p. 417.
(5) Contains adjusted figure (net output) for hard coal and anthracite (excludes wastage).

TABLE A–5.—*Bulgaria: Energy balance sheet, 1950–67*

[In original units]

Year	Total energy [1] (in thousand metric tons of S.F.) (1)	Solid fuels (in thousand metric tons of S.F.) (2)	Liquid fuels (in thousand metric tons) (3)	Gaseous fuels (in million cubic meters) (4)	Power (in million kWh) (5)
1950					
Production [2]	4,992	4,793	...	...	306
Net trade [3]	+327	+16	+239	...	...
Consumption [4]	5,319	4,809	+239	...	306
1955					
Production [2]	6,618	6,024	150	...	648
Net trade [3]	+416	+38	+273	...	+38
Consumption [4]	7,034	6,062	423	...	686
1960					
Production [2]	10,578	9,480	200	...	1,886
Net trade [3]	+1,490	+263	+932	...	+28
Consumption [4]	12,248	9,743	1,132	...	1,914
1965					
Production [2]	[5] 13,163	[5] 11,797	229	73	2,000
Net trade [3]	+7,052	+2,491	+3,515	...	−17
Consumption [4]	20,215	14,288	3,744	73	1,983
1967					
Production [2]	[5] 13,728	[5] 11,775	499	329	2,022
Net trade [3]	+10,016	+3,520	+4,955	...	+121
Consumption [4]	23,744	15,295	5,454	329	2,143

([1])–([4]) see Headnotes, p. 417.
[5] Contains adjusted figure (net output) for hard coal and anthracite (excludes wastage).

TABLE A–6.—*Bulgaria: Origin and destination of trade in solid fuels, crude petroleum and refined fuels, by world area and selected years*

[In thousands of tons]

World area	Solid fuels [1]			Crude petroleum and refined fuels					
				Total			Refined fuels		
	1955	1960	1965	1955	1960	1965	1955	1960	1965
Total trade:									
Imports	49	319	2,491	337	891	3,523	337	868	1,321
Exports	11	57	...	116	100	70	...	20	70
Net trade	38	263	2,491	221	791	3,453	337	848	1,251
East Europe:									
Imports	33	200	151	209	106	16	209	82	16
Exports	11	57	...	115	46	1	...	...	1
Net trade	22	143	151	94	60	15	209	82	15
Soviet Union:									
Imports	16	119	2,242	103	762	3,456	103	762	1,256
Exports	...	...	...	...	12	...	...	...	...
Net trade	16	119	2,242	103	750	3,456	103	762	1,256
Other Communist countries: [2]									
Imports	...	...	...	...	14	...	...	14	...
Exports	...	...	...	...	...	...	...	...	...
Net trade	...	...	...	...	14	...	...	14	...
Other World:									
Imports	...	...	98	25	9	49	25	10	49
Exports	...	...	...	1	42	69	...	20	69
Net trade	...	...	98	24	−33	−20	25	−10	−20
Of which Western world:									
Imports	...	...	...	22	7	...	22	7	...
Exports	...	...	...	1	22	29	...	...	29
Net trade	...	...	...	21	−15	−29	22	7	−29

([1]) and ([2])—see Headnotes, p. 418.

TABLE A–7.—*Czechoslovakia: Energy balance sheet, 1950–67*

[In thousand tons of standard fuel]

Year	Total energy [1] (1)	Solid fuels (2)	Liquid fuels (3)	Gaseous fuels (4)	Power (5)
1950					
Production [2]	36,198	35,525	83	21	569
Net trade [3]	+2,661	+2,110	+551	N.A.	N.A.
Consumption [4]	38,859	37,635	634	21	569
1955					
Production [2]	46,874	45,353	139	194	1,187
Net trade [3]	+3,145	+1,913	+1,313	+Negl.	−81
Consumption [4]	50,019	47,266	1,452	195	1,106
1960					
Production [2]	62,371	59,453	178	1,443	1,297
Net trade [3]	+2,007	−1,328	+3,474	----------	−139
Consumption [4]	64,378	58,125	3,652	1,443	1,158
1965					
Production [2]	74,343	70,845	250	1,216	2,032
Net trade [3]	+8,431	+286	+7,535	+12	+598
Consumption [4]	82,774	71,131	7,784	1,228	2,630
1967					
Production [2]	71,143	68,008	260	1,292	1,583
Net trade [3]	+9,947	−263	+9,262	[5] +303	+645
Consumption [4]	81,090	67,745	9,522	1,595	2,228

([1])–([4]) see Headnotes, p. 417.

([5]) For conversion into standard fuel, the calorific value of 8,000 kilocalories per cu. meter, applicable to natural gas from the Dashava gas fields (Ukraine), was adopted. Cf. U.N. Economic Commission for Europe *Annual bulletin of gas statistics for Europe* (1965), pp. 98–99. Basic data taken from trading partner's (Soviet Union) trade statistics.

TABLE A–8.—*Czechoslovakia: Energy balance sheet, 1950–67*

[In original units]

Year	Total energy [1] (in thousand metric tons of S.F.) (1)	Solid fuels (in thousand metric tons of S.F.) (2)	Liquid fuels (in thousand metric tons) (3)	Gaseous fuels (in million cubic meters) (4)	Power (in million kWh) (5)
1950:					
Production [2]	36,198	35,525	64	19	875
Net trade [3]	+2,661	+2,110	+424	N.A.	N.A.
Consumption [4]	38,859	37,635	488	19	875
1955:					
Production [2]	46,874	45,353	107	173	1,930
Net trade [3]	+3,145	+1,913	+1,010	Negl.	−131
Consumption [4]	50,019	47,266	1,117	173	1,799
1960:					
Production [2]	62,371	59,453	137	1,294	2,495
Net trade [3]	+2,007	−1,328	+2,672	----------	−268
Consumption [4]	64,378	58,125	2,809	1,294	2,227
1965:					
Production [2]	74,343	70,845	+192	851	4,456
Net trade [3]	+8,431	+286	+5,796	+9	+1,311
Consumption [4]	82,774	71,131	5,988	860	5,767
1967:					
Production [2]	71,143	68,008	+200	904	3,717
Net trade [3]	+9,947	−263	+7,125	[5] +265	+1,514
Consumption [4]	81,090	67,745	7,325	1,169	5,231

([1])–([4]) see Headnotes, p. 417.

[5] Data taken from exporting country's (Soviet Union) trade statistics.

TABLE A–9.—*Czechoslovakia: Origin and destination of trade in solid fuels, crude petroleum, and refined fuels, by world area and selected years*

[In thousand tons]

World area	Solid fuels [1]			Crude petroleum and refined fuels					
				Total			Refined fuels		
	1955	1960	1965	1955	1960	1965	1955	1960	1965
Total trade:									
Imports	4,252	2,924	5,149	1,019	2,790	6,640	574	430	500
Exports	2,339	4,251	4,863	84	160	804	84	160	760
Net trade	1,913	−1,327	286	935	2,630	5,836	490	270	−260
East Europe:									
Imports	4,335	1,883	2,241	267	151	106	30	150	106
Exports	1,368	2,695	3,223	35	55	194	35	55	150
Net trade	2,967	−812	−982	232	96	−88	−5	95	−44
Soviet Union:									
Imports	15	1,031	2,908	381	2,637	6,355	177	277	392
Exports									
Net trade	15	1,031	2,908	381	2,637	6,355	177	277	392
Other Communist countries: [2]									
Imports									
Exports									
Net trade									
Other World:									
Imports		10		371	2	179	367	2	76
Exports	971	1,556	1,640	49	105	610	49	105	610
Net trade	−971	−1,546	−1,640	322	−103	−431	318	−103	−534
Of which Western World:									
Imports		1		42	2	63	38	2	63
Exports	952	1,503	1,637	5	100	335	5	100	335
Net trade	−952	−1,502	−1,637	37.5	−99	−272	33	−99	−272

(1) and (2)—see Headnotes, p. 418.

TABLE A–10.—*East Germany: Energy balance sheet, 1950–67*

[In thousand tons of standard fuel]

Year	Total energy [1] (1)	Solid fuels (2)	Liquid fuels (3)	Gaseous fuels (4)	Power (5)
1950:					
Production [2]	45,209	45,053			156
Net trade [3]	+4,852	+5,074	[6] −170	[5] +33	−85
Consumption [4]	50,061	50,127	[6] −170	33	71
1955:					
Production [2]	63,767	63,398			369
Net trade [3]	+6,309	+6,145	+118	[5] +52	−6
Consumption [4]	70,076	69,543	118	52	363
1960:					
Production [2]	71,023	70,607		41	375
Net trade [3]	+8,903	+6,964	+2,125	[5] +72	−258
Consumption [4]	79,926	77,571	2,125	113	117
1965:					
Production [2]	78,406	77,815	78	108	405
Net trade [3]	+14,668	+9,533	+5,080	[5] +9	+46
Consumption [4]	93,074	87,348	5,158	117	451
1967:					
Production [2]	75,368	74,630	130	108	500
Net trade [3]	+16,214	+9,230	+6,997	[5] +9	−22
Consumption [4]	91,582	83,860	7,127	117	478

(1)-(4) see Headnotes, p. 417.
[5] Converted from manufactured gas of 4,200 kcal per cu. meter into natural gas equivalent by using the U.N. *World energy supply* average calorific factor for natural gas (9,324 kcal per cu. m.).
[6] Chiefly of synthetic origin from coal.

TABLE A–11.—*East Germany: Energy balance sheet, 1950–67*

[In original units]

Year	Total energy [1] (In thousand metric tons of S.F.) (1)	Solid fuels (2)	Liquid fuels (in thousand metric tons) (3)	Gaseous fuels (in million cubic meters) (4)	Power (in million kWh) (5)
1950					
Production [2]	45,209	45,053			200
Net trade [3]	+4,852	+5,074	[6]−131	[5]+25	−109
Consumption [4]	50,061	50,127	[6]−131	+25	91
1955					
Production [2]	63,767	63,398			500
Net trade [3]	+6,309	+6,145	+91	[5]+39	−8
Consumption [4]	70,076	69,543	+91	+39	492
1960					
Production [2]	71,023	70,607		50	617
Net trade [3]	+8,903	+6,964	+1,635	[5]+54	−424
Consumption [4]	79,926	77,571	+1,635	104	193
1965					
Production [2]	78,406	77,815	60	130	785
Net trade [3]	+14,668	+9,533	+3,908	[5]+7	+89
Consumption [4]	93,074	87,348	4,968	137	874
1967					
Production [2]	75,368	74,630	100	130	1,060
Net trade [3]	+16,214	+9,230	+5,382	[5]+7	−47
Consumption [4]	91,582	83,860	5,482	137	1,013

[1]–[4] See Headnotes, p. 417. [5] and [6] see notes [5] and [6] to table A–10.

TABLE A–12.—*East Germany: Origin and destination of trade in solid fuels, crude petroleum, and refined fuels, by world area and selected years*

[In thousand tons]

World area	Solid fuels [1]			Crude petroleum and refined fuels					
				Total			Refined fuels		
	1955	1960	1965	1955	1960	1965	1955	1960	1965
Total trade:									
Imports	9,940	11,995	13,925	683	2,415	5,612	1	474	480
Exports	3,795	5,031	4,392	484	739	1,540	484	739	1,540
Net trade	6,145	6,964	9,533	200	1,676	4,072	−483	−265	−1,060
East Europe:									
Imports	6,794	5,685	6,229	29	101	113		1	4
Exports	306	1,397	1,521	56	50	115	56	50	115
Net trade	6,488	4,288	4,708	−27	51	−2	−56	−49	−111
Soviet Union:									
Imports	2,707	6,000	7,210	653	2,173	5,384	NQ	393	476
Exports				198	207	250	198	207	250
Net trade	2,707	6,000	7,210	455	1,966	5,134	−198	186	226
Other Communist countries: [2]									
Import									
Exports									
Net trade									
Other world:									
Imports	509	435	486	1	141	115	1	80	
Exports	3,489	3,634	2,871	230	482	1,175	230	482	1,175
Net trade	−2,980	−3,199	−2,385	−228	−341	−1,060	−229	−402	−1,175
Of which Western world:									
Imports	50	435	340	1	[3]		1	[3]	
Exports	2,735	3,076	2,764	229	481	876	229	481	876
Net trade	−2,226	−2,641	−2,424	−228	−480	−876	−228	−481	−876

[1] and [2]—See Headnotes, p. 418.
[3] Negligible.

TABLE A–13.—*Hungary: Energy balance sheet, 1950–67*

[In thousand tons of standard fuel]

Year	Total energy [1] (1)	Solid fuels (2)	Liquid fuels (3)	Gaseous fuels (4)	Power (5)
1950:					
Production [2]	8,664	7,451	[5] 705	487	21
Net trade [3]	+1,020	+1,132	−112	----------	([6])
Consumption [4]	9,684	8,583	[5] 593	487	21
1955:					
Production [2]	14,005	11,123	[5] 2,150	701	31
Net trade [3]	+1,791	+1,641	−18	----------	+168
Consumption [4]	15,796	12,764	[5] 2,132	701	199
1960:					
Production [2]	14,974	12,856	[5] 1,622	440	55
Net trade [3]	+4,689	+2,808	+1,316	+253	+312
Consumption [4]	19,663	15,664	[5] 2,938	693	367
1965:					
Production [2]	18,007	14,414	[5] 2,375	1,181	37
Net trade [3]	+7,952	+4,184	+2,842	+272	+654
Consumption [4]	25,959	18,598	[5] 5,217	1,453	691
1967:					
Production [2]	17,835	12,992	[5] 2,287	2,517	39
Net trade [3]	+7,778	+3,112	+3,455	+272	+939
Consumption [4]	25,613	16,104	[5] 5,742	2,789	979

([1])-([4]) See Headnotes, p. 417.
[5] Includes natural gasoline in calorific equivalents of crude petroleum.
[6] Not available.

TABLE A–14.—*Hungary: Energy balance sheet, 1950–67*

[In original units]

Year	Total energy [1] (in thousand metric tons of S.F.) (1)	Solid fuels (in thousand metric tons of S.F.) (2)	Liquid fuels (in thousand metric tons) (3)	Gaseous fuels (in million cubic meters) (4)	Power (in million kWh) (5)
1950					
Production [2]	8,664	7,451	[5] 542	379	30
Net trade [3]	+1,020	+1,132	−86	----------	([6])
Consumption [4]	9,684	8,583	[5] 456	379	30
1955					
Production [2]	14,005	11,123	[5] 1,654	545	46
Net trade [3]	+1,791	1,641	−14	----------	+248
Consumption [4]	15,796	12,764	[5] 1,640	545	294
1960					
Production [2]	14,974	12,856	[5] 1,248	342	94
Net trade [3]	+4,689	+2,808	+1,012	+186	+536
Consumption [4]	19,663	15,664	[5] 2,260	528	630
1965					
Production [2]	18,007	14,414	[5] 1,827	1,108	73
Net trade [3]	+7,952	+4,184	+2,186	+200	+1,290
Consumption [4]	25,959	18,598	[5] 4,013	1,308	1,363
1967					
Production [2]	17,835	12,992	[5] 1,759	2,045	80
Net trade [3]	+7,778	+3,112	+2,658	+200	+1,905
Consumption [4]	25,613	16,104	[5] 4,417	2,245	1,985

([1]) to ([4]) see Headnotes, p. 417.
[5] Includes natural gasoline in calorific equivalents of crude petroleum.
[6] Not available.

TABLE A–15.—*Hungary: Origin and destination of trade in solid fuels, crude petroleum, and refined fuels, by world area and selected years*

[In thousand tons]

World area	Solid fuels [1]			Crude petroleum and refined fuels					
				Total			Refined fuels		
	1955	1960	1965	1955	1960	1965	1955	1960	1965
Total trade:									
Imports	2,184	2,839	4,266	338	1,557	2,678	106	101	428
Exports	543	31	82	340	486	484	184	486	484
Net trade	1,641	2,808	4,184	−2	1,071	2,194	−78	−385	−56
East Europe:									
Imports	1,550	2,104	2,635	86	56	51	52	.....	7
Exports	490	.....	.....	155	123	128	63	123	128
Net trade	1,059	2,104	2,635	−69	−67	−77	−11	−123	−121
Soviet Union:									
Imports	366	732	1,593	198	1,478	2,505	.....	78	418
Exports	26	28	.....	46	17	18	46	17	18
Net trade	340	704	1,593	152	1,461	2,487	−46	61	400
Other Communist countries: [2]									
Imports									
Exports									
Net trade									
Other World:									
Imports	268	3	38	54	23	122	54	23	3
Exports	26	3	82	139	347	338	75	347	338
Net trade	242	.....	−44	−85	−324	−215	−21	−324	−335
Of which Western World:									
Imports	266	3	.....	24	16	1	24	16	.....
Exports	25	3	82	139	347	322	75	347	322
Net trade	241	.....	−82	−115	−331	−321	−51	−331	−322

(1) and (2)—see Headnotes, p. 418.

TABLE A–16.—*Poland: Energy balance sheet, 1950–67*

[In thousand tons of standard fuel]

Year	Total energy [1]	Solid fuels	Liquid fuels	Gaseous fuels	Power
	(1)	(2)	(3)	(4)	(5)
1950					
Production [2]	81,518	80,873	[5] 233	[6] 189	223
Net trade [3]	−28,543	−29,301	+669	[7] +88	+2
Consumption [4]	52,975	51,572	[5] 902	277	224
1955					
Production [2]	98,879	97,705	[5] 264	[6] 499	410
Net trade [3]	−25,535	−27,282	+1,556	[7] +159	+33
Consumption [4]	73,344	70,423	[5] 1,820	658	443
1960					
Production [2]	108,844	107,543	[5] 281	[6] 702	318
Net trade [3]	−16,310	−19,848	+3,171	[7] +275	+146
Consumption [4]	92,534	87,695	[5] 3,398	977	464
1965					
Production [2]	129,617	127,002	[5] 477	[6] 1,755	383
Net trade [3]	−17,247	−23,034	+5,543	[7] +434	−190
Consumption [4]	112,370	103,968	[5] 6,020	2,189	193
1967					
Production [2]	135,417	132,414	[5] 621	[6] 1,985	397
Net trade [3]	−17,239	−25,870	+7,331	[7] +1,171	+129
Consumption [4]	118,178	106,544	[5] 7,952	3,156	526

(1) to (4) see Headnotes, p. 417.
(5) Includes natural gasoline in calorific equivalents of crude petroleum.
(6) Includes small quantities of mine gas in natural gas equivalents.
(7) For conversion of Soviet natural gas shipments, see table A–7, note (4). 1950 trade data taken from Soviet source (sole supplier).

TABLE A–17.—*Poland: Energy balance sheet, 1950–67*

[In original units]

Year	Total energy [1] (in thousand metric tons of S.F.) (1)	Solid fuels (in thousand metric tons of S.F.) (2)	Liquid fuels (in thousand metric tons) (3)	Gaseous fuels (in million cubic meters) (4)	Power (in million kWh) (5)
1950:					
Production [2]	81,518	80,873	[5] 179	[6] 149	371
Net trade [3]	−28,543	−29,301	+515	[7] +77	+3
Consumption [4]	52,975	51,572	[5] 694	226	374
1955:					
Production [2]	98,879	97,705	[5] 203	[6] 393	709
Net trade [3]	−25,535	−27,282	+1,197	+139	+58
Consumption [4]	73,344	70,423	[5] 1,400	532	767
1960:					
Production [2]	108,844	107,543	[5] 216	[6] 546	657
Net trade [3]	−16,310	−19,848	+2,398	+241	+301
Consumption [4]	92,534	87,695	[5] 2,614	787	958
1965:					
Production [2]	129,617	127,002	[5] 367	[6] 1,350	912
Net trade [3]	−17,247	−23,034	+4,264	+379	−453
Consumption [4]	112,370	103,968	[5] 4,631	1,729	459
1967:					
Production [2]	135,417	132,414	[5] 478	[6] 1,527	992
Net trade [3]	−17,239	−25,870	+5,639	+1,025	+323
Consumption [4]	118,178	106,544	[5] 6,117	2,552	1,315

([1])–([4]) see Headnotes, p. 417.
([5]) Includes natural gasoline in calorific equivalents of crude petroleum.
([6]) Includes small quantities of mine gas in natural gas equivalents.
([7]) Trade data taken from Soviet source (sole supplier).

TABLE A–18.—*Poland: Origin and destination of trade in solid fuels, crude petroleum, and refined fuels, by world area and selected years*

[In thousand tons]

World area	Solid fuels [1] 1955	Solid fuels [1] 1960	Solid fuels [1] 1965	Crude petroleum and refined fuels: Total 1955	Total 1960	Total 1965	Refined fuels 1955	Refined fuels 1960	Refined fuels 1965
Total trade:									
Imports	132	1,186	1,673	1,235	2,383	5,236	690	1,669	2,020
Exports	27,414	21,034	24,707	125	210	900	125	210	900
Net trade	−27,282	−19,848	−23,034	1,110	2,173	4,336	565	1,459	1,120
East Europe:									
Imports	111	593	728	513	365	561	400	365	561
Exports	10,883	6,796	8,235		3	8		3	8
Net trade	−10,772	−6,203	−7,507	513	362	553	400	362	553
Soviet Union:									
Imports	21	490	944	637	2,016	4,663	225	1,302	1,447
Exports	8,601	5,121	7,112		2			2	
Net trade	−8,580	−4,631	−6,168	637	2,014	4,663	225	1,300	1,447
Other Communist countries: [2]									
Imports									
Exports		2	13	27	7	6	27	7	6
Net trade		−2	−13	−27	−7	−6	−27	−7	−6
Other World:									
Imports		104		85	2	12	65	2	12
Exports	7,930	9,115	9,347	98	198	927	98	198	927
Net trade	−7,930	−9,011	−9,347	−13	−196	−915	−33	−196	−915
Of which Western World:									
Imports		101		75	2	2	65	2	2
Exports	6,943	8,147	9,046	98	187	927	98	187	927
Net trade	−6,943	−8,045	−9,046	−23	−186	−925	−33	−186	−925

([1]) and ([2])—see Headnotes, p. 418.

TABLE A–19.—*Romania: Energy balance sheet, 1950–67*

[In thousand tons of standard fuel]

Year	Total energy [1] (1)	Solid fuels (2)	Liquid fuels (3)	Gaseous fuels (4)	Power (5)
1950					
Production [2]	[5] 15,376	4,315	6,561	[5] 4,390	110
Net trade [3]	−3,550	+200	−3,750		
Consumption [4]	[5] 11,826	4,515	2,811	[5] 4,390	110
1955					
Production [2]	[5] 27,232	5,421	13,721	[5] 7,890	200
Net trade [3]	−8,545	+605	−9,130		−20
Consumption [4]	[5] 18,687	6,026	4,592	[5] 7,890	180
1960					
Production [2]	[5] 33,001	6,891	14,950	[5] 10,967	193
Net trade [3]	−7,846	+906	−8,485	−253	−14
Consumption [4]	[5] 25,155	7,797	6,465	[5] 10,714	179
1965					
Production [2]	[5] 42,398	8,562	16,342	[5] 17,092	402
Net trade [3]	−7,837	+1,434	−8,867	−272	−132
Consumption [4]	[5] 34,561	9,996	7,475	[5] 16,820	270
1967					
Production [2]	[5] 46,860	10,051	17,168	[5] 19,108	533
Net trade [3]	−6,827	+1,770	−7,575	−272	−749
Consumption [4]	[5] 40,033	11,821	9,593	[5] 18,836	−217

([1])—([4]) See Headnotes, p. 417.

([5]) Production and consumption adjusted by subtracting reported non-energy use of natural gas (as feedstock in chemical industry). Estimated adjustment (in percent of total supply): 1950—5 percent, 1955—10 percent; 1960—25 percent; 1965—30 percent; 1967 (based on the reported range 30–40 percent)—35 percent. Based on U.N. ECE *Report on the symposium on natural gas* (1968).

TABLE A–20.—*Romania: Energy balance sheet, 1950–67*

[In original units]

Year	Total energy [1] (in thousand metric tons of S.F.) (1)	Solid fuels (in thousand metric tons of S.F.) (2)	Liquid fuels (in thousand metric tons) (3)	Gaseous fuels (in million cubic meters) (4)	Power (in million kWh) (5)
1950:					
Production [2]	[5] 15,596 [6] −220	4,315	5,047	[5] 3,243 [6] −162	169
Net trade [3]	−3,550	+200	−2,885		
Consumption [4]	11,826	4,515	2,162	3,081	169
1955:					
Production [2]	[5] 28,071 [6] −839	5,421	10,555	[5] 6,169 [6] −617	323
Net trade [3]	−8,545	+605	−7,023		−33
Consumption [4]	18,687	6,026	3,532	5,552	290
1960:					
Production [2]	[5] 36,386 [6] −3,385	6,891	11,500	[5] 10,142 [6] −2,489	397
Net trade [3]	−7,846	+906	−6,527	−186	−28
Consumption [4]	25,155	7,797	4,973	7,467	369
1965:					
Production [2]	[5] 49,489 [6] −7,091	8,562	12,571	[5] 17,281 [6] −5,214	1,005
Net trade [3]	−7,837	+1,434	−6,821	−200	−331
Consumption [4]	34,561	9,996	5,750	11,867	+674
1967:					
Production [2]	[5] 56,615 [6] −9,755	10,051	13,206	[5] 20,694 [6] −7,173	1,476
Net trade [3]	−6,827	+1,770	−5,827	−200	−2,076
Consumption [4]	40,033	11,821	7,379	13,321	−600

([1])–([4]) see Headnotes, p. 417.

([5]) Production unadjusted for nonenergy uses of natural gas.

([6]) Estimated shipments of natural gas to nonenergy uses (cf. note ([5]), Table A–19).

TABLE A–21.—*Romania: Origin and destination of trade in solid fuels, crude petroleum, and refined fuels, by world area and selected years*

[In thousands of tons]

World area	Solid fuels [1]			Crude petroleum and refined fuels					
				Total			Refined fuels		
	1955	1960	1965	1955	1960	1965	1955	1960	1965
Total trade:									
Imports	677	1,030	1,543	2			(3)		
Exports	72	124	109	6,096	5,657	5,999	6,044	5,657	5,342
Net trade	605	906	1,434	−6,094	−5,657	−5,999	−6,044	−5,657	−5,342
East Europe:									
Imports	285	512	583	2			(3)		
Exports	36	86	41	464	268	303	428	268	303
Net trade	249	427	542	−462	−268	−303	−428	−268	−303
Soviet Union:									
Imports	392	515	738						
Exports				3,307	2,647	1,360	3,307	2,647	1,360
Net trade	392	515	738	−3,307	−2,647	−1,360	−3,307	−2,647	−1,360
Other Communist countries: [2]									
Imports									
Exports				312	1,066		312		850
Net trade				−312	−1,066		−312		−850
Other world:									
Imports		2	222						
Exports	35	40	68	2,325	2,430	3,270	2,309	2,430	2,829
Net trade	−35	−38	154	−2,325	−2,430	−3,270	−2,309	−2,430	−2,829
Of which Western World:									
Imports			88						
Exports	(3)	40	(3)	1,606	1,401	468	1,606	1,401	468
Net trade	(3)	−40	88	−1,606	−1,401	−468	−1,606	−1,401	−468

(1) and (2)—see Headnotes, p. 418.
[3] Negligible.

TABLE A–22.—*Yugoslavia: Energy balance sheet, 1950–67*

[In thousand tons of standard fuel]

Year	Total energy [1]	Solid fuels	Liquid fuels	Gaseous fuels	Power
	(1)	(2)	(3)	(4)	(5)
1950					
Production [2]	8,523	7,475	[4] 146	21	881
Net trade [3]	+773	+198	+575		
Consumption [4]	9,296	7,673	[4] 720	21	881
1955					
Production [2]	10,662	8,394	[4] 339	50	1,879
Net trade [3]	+1,564	+976	+619		−31
Consumption [4]	12,226	9,370	[4] 957	50	1,848
1960					
Production [2]	16,801	11,562	[4] 1,236	78	3,925
Net trade [3]	+2,118	+1,476	+703		−61
Consumption [4]	18,920	13,038	[4] 1,940	78	3,864
1965					
Production [2]	22,404	14,373	[4] 2,704	457	4,870
Net trade [3]	+3,472	+2,088	+1,170		+214
Consumption [4]	25,876	16,461	[4] 3,874	457	5,083
1967					
Production [2]	22,313	12,510	[4] 3,113	638	6,052
Net trade [3]	+4,432	+1,467	+2,885		+80
Consumption [4]	26,745	13,977	[4] 5,998	638	6,132

(1)–(4) see Headnotes, p. 417.
[4] Includes natural gasoline in calorific equivalents of crude petroleum.

TABLE A–23.—*Yugoslavia: Energy balance sheet, 1950–67*

[In original units]

Year	Total energy [1] (in thousand metric tons of S.F.) (1)	Solid fuels (in thousand metric tons of S.F.) (2)	Liquid fuels (in thousand metric tons) (3)	Gaseous fuels (in million cubic meters) (4)	Power (in million kWh) (5)
1950					
Production [2]	8,523	7,475	[5] 112	14	1,175
Net trade [3]	+773	+198	+442		
Consumption [4]	9,296	7,673	[5] 554	14	1,175
1955					
Production [2]	10,622	8,394	[5] 260	34	2,610
Net trade [3]	+1,564	+976	+476		−44
Consumption [4]	12,226	9,370	[5] 736	34	2,566
1960					
Production [2]	16,801	11,562	[5] 951	53	5,984
Net trade [3]	+2,118	+1,476	+541		−93
Consumption [4]	18,920	13,038	[5] 1,492	53	5,891
1965					
Production [2]	22,404	14,373	[5] 2,080	330	8,985
Net trade [3]	+3,472	+2,088	+900		+394
Consumption [4]	25,876	16,461	[5] 2,980	330	9,379
1967					
Production [2]	22,313	12,510	[5] 2,395	461	10,655
Net trade [3]	+4,432	+1,467	+2,219		+141
Consumption [4]	26,745	13,977	4,614	461	10,796

([1])-([4]) see Headnotes, p. 417.
([5]) Includes natural gasoline in calorific equivalents of crude petroleum.

TABLE A–24.—*Yugoslavia: Origin and destination of trade in solid fuels, crude petroleum, and refined fuels, by world area and selected years*

[In thousand tons]

World area	Solid fuels [1]			Crude petroleum and refined fuels: Total			Refined fuels		
	1955	1960	1965	1955	1960	1965	1955	1960	1965
Total trade:									
Imports	1,110	1,659	2,301	518	595	1,274	35	160	167
Exports	134	183	213	40	68	367	40	68	222
Net trade	976	1,476	2,088	477	527	908	−6	92	−55
East Europe:									
Imports	147	119	687	4	60	121	4	40	121
Exports	15	7	41	2	1	24	2	1	24
Net trade	132	112	647	1	60	97	1	39	97
Soviet Union:									
Imports	124	1,014	1,056	178	348	570	7	95	42
Exports				([3])		2	([3])		2
Net trade	124	1,014	1,056	177	348	568	7	95	40
Other Communist countries: [2]									
Imports									
Exports									
Net trade									
Other World:									
Imports	839	526	558	336	186	583	24	25	4
Exports	119	176	172	38	67	340	38	67	196
Net trade	720	350	386	298	119	243	−14	−42	−192
Of which Western world:									
Imports	62	84	28	15	25	4	15	25	4
Exports	117	177	172	32	64	314	32	64	172
Net trade	−55	−93	−144	−17	−39	−310	−17	−39	−168

([1]) and ([1])—see Headnotes, p. 418.
[2] Negligible.

TABLE A–25.—*Soviet Union: Energy balance sheet, 1950–67*

[In thousand tons of standard fuel]

Year	Total energy [1] (1)	Solid fuels (2)	Liquid fuels (3)	Gaseous fuels (4)	Power (5)
1950:					
Production [1]	313,800	249,700	[5] 49,270	7,300	7,500
Net trade [3]	+9,500	+7,339	+2,258	−88	.....
Consumption [4]	323,300	257,039	51,528	7,212	7,500
1955:					
Production [2]	482,800	367,300	[5] 92,040	11,400	12,100
Net trade [3]	−400	+3,729	−3,962	−158.5	−1
Consumption [4]	482,400	371,029	88,078	11,242	12,099
1960:					
Production [2]	697,500	427,000	[5] 192,270	54,400	23,800
Net trade [3]	−49,200	−9,368	−39,705	−162	−14
Consumption [4]	648,300	417,632	152,565	54,238	23,786
1965:					
Production [2]	969,800	470,400	[5] 315,770	149,800	33,800
Net trade [3]	−104,700	−18,630	−84,843	−447	−747
Consumption [4]	865,100	451,700	230,927	149,353	33,053
1967:					
Production [2]	1,098,000	497,300	[5] 374,530	187,400	38,800
Net trade [3]	−125,000	−17,338	−104,879	−1,510	−1,238
Consumption [4]	973,000	479,962	269,651	185,900	37,562

([1])–([4]) see Headnotes, p. 417. Total rounded to 100,000.
([5]) Converted to crude petroleum equivalents of 9,100 kcal/kg, comparable to those used for other countries; for Soviet equivalents see note ([4]), table A–27.

TABLE A–26.—*Soviet Union: Energy balance sheet, 1950–67*

[In original units]

Year	Total energy [1] (in thousand metric tons of S.F.) (1)	Solid fuels (in thousand metric tons of S.F.) (2)	Liquid fuels (in thousand metric tons) (3)	Gaseous fuels (in million cubic meters) (4)	Power (in million kwh) (5)
1950					
Production [2]	313,800	249,700	37,900	5,761	12,691
Net trade [3]	+9,500	+7,339	+1,737	−77	([4])
Consumption [4]	323,300	257,039	39,637	5,684	12,691
1955					
Production [2]	482,800	367,300	70,800	8,981	23,164
Net trade [3]	−400	+3,729	−3,048	−139	−2
Consumption [4]	482,400	371,029	67,752	8,842	23,162
1960					
Production [2]	697,500	427,000	147,900	45,333	50,913
Net trade [3]	−49,200	−9,368.5	−30,542	−242	−30
Consumption [4]	648,300	417,632	117,358	45,091	50,883
1965					
Production [2]	969,800	470,400	242,900	127,666	81,434
Net trade [3]	−104,700	−18,630	−65,264	−392	−1,800
Consumption [4]	865,100	451,770	177,636	127,274	79,634
1967					
Production [2]	1,098,000	497,300	288,100	157,445	98,571
Net trade [3]	−125,000	−17,338	−80,676	−1,322	−3,141
Consumption [4]	973,000	479,962	207,424	156,123	95,430

([1]) to ([3]) see Headnotes, p. 417. Total rounded to 100,000.
[4] Not available.

TABLE A-27.—*Soviet Union: Energy balance sheet, 1950–67*

[In original units]

	Total energy [1]	Solid fuels	Liquid fuels	Gaseous fuels	Power
	(in thousand metric tons of S.F.)		(in thousand metric tons)	(in million cubic meters)	(in million kw.-hr.)
	(1)	(2)	(3)	(4)	(5)
1950:					
Production [2]	[5] 318,700	249,700	[5] 37,900	5,761	12,691
Net trade [3]	+9,800	+7,339	+1,737	−77	([6])
Consumption [4]	328,500	257,000	39,600	5,684	12,691
1955:					
Production [2]	[5] 492,000	367,300	[5] 70,800	8,981	23,164
Net trade [3]	−900	+3,729	−3,048	−139	−2
Consumption [4]	491,100	371,000	67,800	8,842	23,162
1960:					
Production [2]	[5] 716,600	427,000	[5] 147,900	45,333	50,913
Net trade [3]	−53,300	−9,368	−30,542	−242	−30
Consumption [4]	663,300	417,600	117,400	45,091	50,883
1965:					
Production [2]	[5] 1,000,400	470,400	[5] 242,900	127,663	81,434
Net trade [3]	−113,000	−18,630	−65,264	−392	−1,800
Consumption [4]	887,400	451,800	177,600	127,274	79,634
1967:					
Production [2]	[5] 1,135,400	497,300	[5] 288,100	157,445	98,571
Net trade [3]	−135,400	−17,338	−80,676	−1,322	−3,141
Consumption [4]	1,000,000	480,000	207,400	156,123	95,430

([1])-([4]) see Headnotes, p.417. Total rounded to 100,000.

([5]) Liquid fuels converted into standard fuel units on the basis of the assumed Soviet calorific value of crude (10,000 kcal/kg), resulting in total energy production (in S.F. units) larger than that given in tables A–25 and A–26. See note ([5]), Table A–25. Totals of consumption, solid fuels and liquid fuels rounded to 100,000 tons to correspond with Soviet figures on production given in million tons.

[6] Not available.

TABLE A-28.—*Soviet Union: Origin and destination of trade in solid fuels, crude petroleum, and refined fuels, by world area and selected years*

[In thousand tons]

World area	Solid fuels [1]			Crude petroleum and refined fuels					
				Total			Refined fuels		
	1955	1960	1965	1955	1960	1965	1955	1960	1965
Total trade:									
Imports	9,068	5,368	7,315	4,162	4,036	1,667	3,587	2,870	1,667
Exports	5,789	14,736	25,944	7,809	32,727	64,020	4,893	14,902	20,588
Net trade	3,279	−9,368	−18,629	−3,647	−28,690	−62,353	−1,306	−12,032	−18,921
East Europe:									
Imports	8,516	5,168	7,114	3,659	3,033	1,628	3,552	2,870	1,628
Exports	3,910	10,256	17,565	2,382	9,537	23,263	524	2,946	4,378
Net trade	4,606	−5,088	−10,451	1,277	−6,504	−21,635	3,028	−76	−2,750
Other Communist countries: [2]									
Imports	520	200	201						
Exports	196	64	164	1,681	5,228	5,353	1,304	2,988	1,798
Net trade	324	136	37	−1,681	−5,228	−5,353	−1,304	−2,988	−1,798
Other world:									
Imports	32			503	1,003	39	35		39
Exports	1,683	4,416	8,215	3,746	17,961	35,404	3,065	8,969	14,412
Net trade	−1,651	−4,416	−8,215	−3,243	−16,958	−35,365	−3,030	−8,969	−14,373
Of which Western World:									
Imports				467	1,003				
Exports	1,601	3,813	6,428	2,245	14,405	23,796	1,934	7,389	9,718
Net trade	−1,601	−3,813	−6,428	−1,778	−13,402	−23,796	−1,934	−7,389	−9,718

([1]) and ([2])—see Headnotes, p. 418.

TABLE A-29.—*East Europe: Trade in natural gas by country, 1950–67*

[In million cubic meters]

Year	Soviet Union's exports [1] to			Romania's exports to Hungary [2]	Total trade in natural gas
	Czechoslovakia	Poland	East Europe		
1950		77	77	(3)	77
1955		139	139	(3)	139
1960		242	242	186	428
1965		392	392	200	592
1967	265	1,025	1,291	[4] 200	[4] 1,491

[1] Soviet data. In energy balance sheets for Poland, Polish data are used.
[2] Hungarian data.
[3] Not available.
[4] Estimated by author.

Source: Statistical yearbooks of countries involved. See App. A.

INDUSTRIAL STRUCTURE, GROWTH, AND PRODUCTIVITY IN EASTERN EUROPE

By LASZLO CZIRJAK*

CONTENTS

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I. Introduction

In this paper we shall consider the developing industrial specialization in Eastern Europe, estimate the rates of growth and structure of industry by using adjusted weights which reflect factor cost, and discuss the trends in factor productivities.

Economic growth is accompanied by structural changes, particularly by increasing specialization within industry. An investigation to determine the types of specializations that have occurred has special significance in countries where the drive for industrialization is politically motivated, as in Eastern Europe.

In the case of the economies of Eastern Europe, particular care is required in making comparisons because of the following considerations:

1. Government dictated prices, which are not adequate indicators of costs of production;
2. The uneven incidence of the so-called turnover tax and accounting profits;
3. Undervaluation of fixed capital; and
4. Failure to make an explicit charge for capital as a factor of production.

Accordingly, independent calculations of industrial production indexes for the countries of Eastern Europe require ways of coping with the price abnormalities that tend to vitiate indexes constructed with market price weights. There is now forthright recognition in Eastern Europe that analysis of economic structure and growth requires prices that stand in reasonable correspondence to cost. The lack of an interest charge on capital alone would complicate analysis. This practical consideration has led Yugoslavia as early as 1953,[1] and Hungary in 1963, to introduce interest charges on fixed and working capital assets. The economic recession in the early 1960's in Czechoslovakia and East Germany provided further pressure for reforms, despite powerful political opposition.

II. Summary

Our findings are shown essentially in the tables of this paper. (See Tables in Contents.) Here we present only a few highlights.

Judged by the percentage that industrial employment represents in the total employment in the economy, East Germany and Czechoslovakia are the most industrialized countries of Eastern Europe (Table 1), but the postwar period witnesses a very rapid industrial growth in

[1] See Svetozar Pejovich, *The Market-Planned Economy of Yugoslavia*, Minneapolis, University of Minnesota Press, 1966, pp. 29–30.

the remaining countries of the area. From 1948 to 1967, Bulgarian industry's share in total employment in the economy rose from 7.9 to 28.2 percent; similarly Yugoslavia's industry share rose from 9.3 percent in 1952 to 19.6 percent in 1967. The gap between the more and the less industrialized countries has narrowed sharply between 1950 and 1967. East Germany and Czechoslovakia in 1967 had 41 and 38 percent of the labor force in industry; for the other countries the shares ranged from 20 percent (Yugoslavia and Rumania) to as high as 34 percent (Hungary). Estimates of per capita of population levels of industrial production (Table 2) show ranks roughly corresponding to those based on employment.

TABLE 1.—*Industrial employment as a percentage of the total labor force in Eastern Europe*

	1938	1950	1955	1960	1967
Bulgaria	[1] 8.2	[2] 7.9	12.9	21.9	28.2
Czechoslovakia	30.9	31.9	31.0	36.1	38.0
East Germany	[3]	[4] 34.5	37.6	41.3	41.1
Hungary	18.3	19.7	26.2	29.4	33.6
Poland	[3]	18.5	21.2	23.2	24.8
Rumania	[5] 7.5	12.0	13.1	15.1	20.0
Yugoslavia	[3]	[4] 9.3	12.1	15.6	19.6

[1] 1934.
[2] 1948.
[3] Not available.
[4] 1952.
[5] 1930.

Sources: See App. B.

TABLE 2.—*Comparisons of the per capita level of industrial production, selected years, 1955–67*

[Czechoslovakia=100]

	Bulgaria	Czechoslovakia	East Germany	Hungary	Poland	Rumania
Pryor-Staller, 1955	26	100	99	64	52	34
M. Ernst, 1961	30	100	100	49	55	36
U.N., 1963	52	100	126	61	60	34
Z. Román, 1964	39	100	103	58	51	32
Projected for 1967:						
Pryor-Staller	54	100	96	66	52	54
M. Ernst	48	100	99	55	59	52
U.N	67	100	116	62	61	41
Z. Román	47	100	111	57	52	37

Sources: See footnotes 2 to 5, below.

In the rate of growth of industrial production comparisons, the less developed countries lead (Table 3); Bulgaria, Rumania, and Yugoslavia are at the top. There was a marked decline in the rate of growth of industrial production for all the countries of Eastern Europe in the postwar period, while growth rates for Western European countries have been steadier (Table 4). The slowdown in the industrially more advanced countries in Eastern Europe apparently is related to a greater concern for efficiency in contrast to earlier emphasis on rapid expansion of gross output, even at the cost of waste of resources.

East-West branch level comparisons for the 1960–1967 period are readily made in industries where there is homogeneity of output. Elec-

TABLE 3.—*Average annual rates of growth of industrial output, 1950–68* [1]

	Large-scale industry		
	1950–67	1950–60	1960–68
Bulgaria	12.4	12.7	11.9
Czechoslovakia	6.6	8.0	4.4
East Germany	6.7	9.1	3.7
Hungary	8.5	9.8	6.8
Poland	7.4	8.2	6.9
Rumania	10.5	9.8	11.5
Yugoslavia	8.8	9.2	7.9

[1] Instead of 1950, 1948 was used as the base year for Czechoslovakia, and 1949 as the base year for Hungary.

Sources and methods: See App. A.

TABLE 4.—*Rates of growth of industrial output, Eastern Europe and Western countries, 1960–68 and 1969*

	1960–68	[1] 1969
Bulgaria	11.9	11.6
Czechoslovakia	4.4	5.0
East Germany	3.7	7.0
Hungary	6.8	6.0
Poland	6.9	8.3
Rumania	11.5	10.8
Yugoslavia	7.9	8.0
Unweighted average	7.6	8.1
Austria	4.2	9.8
Belgium	4.8	11.7
Canada	6.4	5.3
France	4.9	[2]
Germany	4.9	13.5
Italy	7.6	8.1
Japan	13.2	16.8
Netherlands	6.5	11.3
Norway	5.5	4.9
Portugal	5.1	9.6
Sweden	6.1	6.0
Switzerland	3.3	10.5
United Kingdom	2.5	4.2
United States	5.3	5.2
Unweighted average	5.7	9.0

[1] Official planned figures in Eastern Europe. Average for May 1968–June 1969; actual performance for the Western countries, as shown in OECD, *Main Economic Indicators*, June 1969.
[2] Not available.

tric power production in Eastern Europe shows the highest rates of growth in Bulgaria, Rumania, and Yugoslavia. Yet, in this basic industry, regarded as crucial for the success of their drives for rapid industrialization, the remaining countries show only modest growth rates, much below the unweighted average of Western countries. (See Table 12.)

In the chemicals industry, East Germany leads in the East European field, with some 10 percent of total industrial employment represented by it and with a favorable rate of growth vis-à-vis the West. The rate of increase of food processing in the more agricultural countries of Eastern Europe is higher than rates for the West, but Czechoslovakia and East Germany fall below all of 15 Western countries in this industry.

Industrial employment over the postwar period rose at the highest rate in Bulgaria and at the lowest in East Germany. Labor shortages were already experienced in Czechoslovakia and East Germany in the

1950's, and Hungary began to feel them in the 1960's. On the other hand, declining rates of growth of industrial employment in Poland and Yugoslavia reflect reduced employment opportunities; the labor resources of both countries, evident in the high shares of agriculture in the total employment, are great enough to allow more rapid industrial growth.

The average annual rate of growth of capital inputs over the postwar period in Eastern Europe seems to have been highest in Bulgaria, 11.8 percent (but this figure, based on official data given in unspecified prices, may be questionable); in Czechoslovakia this rate was 6.3 percent. East Germany and Czechoslovakia in the 1960–1967 period are also at the low end of the scale, 6.4 and 6.7 percent, respectively (Table 5).

The rate of growth of labor productivity (Table 6) over the 1950–1967 period was lowest in Hungary among the Eastern European countries, but Hungary's revolution contributed to the poor showing during the 1950's. In the 1960's Hungary's performance improved markedly.

TABLE 5.—*Growth rates of major inputs: Labor and capital, selected periods, 1950–67* [1]

	Bulgaria	Czechoslovakia	East Germany	Hungary	Poland	Rumania	Yugoslavia
Labor input:							
1950–67	7.0	3.1	0.7	5.5	3.8	5.1	6.3
1950–60	8.3	3.6	1.8	7.4	4.1	4.8	9.2
1960–67	5.1	2.2	−0.2	2.7	3.4	5.5	3.0
Capital input:							
1950–67	11.8	6.3	(2)	7.7	(2)	(2)	(2)
1950–60	12.6	6.0	(2)	7.8	(2)	(2)	(2)
1960–67	14.3	6.7	6.4	7.5	6.9	10.7	(2)
Combined (labor and capital inputs):							
1950–67	8.5	4.5	(2)	6.5	(2)	(2)	(2)
1950–60	8.5	4.6	(2)	7.6	(2)	(2)	(2)
1960–67	8.4	4.3	1.6	4.8	4.8	7.7	(2)

[1] The initial year for the periods differs for some countries from 1950, as follows: Czechoslovakia, 1948; East Germany, 1955; Hungary, 1949; Yugoslavia, 1952. For Bulgaria, the capital input begins with 1952.
[2] Not available.

Sources: See App. B.

TABLE 6.—*Growth rates of industrial output per unit of labor, capital, and combined inputs, selected years, 1950–67* [1]

	Bulgaria	Czechoslovakia	East Germany	Hungary	Poland	Rumania	Yugoslavia
Output per unit of labor:							
1950–67	5.1	3.4	4.2	2.8	3.5	5.1	4.3
1950–60	4.1	4.2	5.0	2.2	4.0	4.7	3.6
1960–67	6.6	2.1	3.6	3.8	2.7	5.6	5.0
Output per unit of capital:							
1950–67	.6	.3	(2)	.8	(2)	(2)	(2)
1950–60	2.5	1.7	(2)	1.9	(2)	(2)	(2)
1960–67	−2.0	−2.3	−2.5	−.9	−.5	.7	(2)
Output per unit of combined inputs:							
1950–67	3.6	2.0	(2)	1.9	(2)	(2)	(2)
1950–60	3.9	3.2	(2)	2.1	(2)	(2)	(2)
1960–67	3.3	0	1.8	1.7	1.3	3.3	(2)

[1] The initial year for the periods differs for some countries from 1950, as follows: Czechoslovakia, 1948; East Germany, 1955; Hungary, 1949; Yugoslavia, 1952. For Bulgaria, the capital input begins with 1952.
[2] Not available.

Industrial output per unit of capital input shows a positive rate of increase for most countries up to 1960; thereafter the rates become negative, almost everywhere, and particularly in heavy industry, mining, and power in the more industrialized countries—Czechoslovakia, East Germany, and Hungary. This is an apparent sign of capital substitution for labor, among other things.

III. Industrialization in Eastern Europe

International differences in the definition of statistical concepts make comparisons among countries hazardous. While a fairly reliable result may be obtained for time series, the outcome of structural comparisons of different countries is less dependable. Yet, there is a more promising basis for international comparisons among countries in a limited geographical area, such as the area of the Comecon market of Eastern Europe.

Changes over time in the quality of industrial products result in biases in indexes, especially in pre-war to post-war comparisons in Eastern Europe, where the decline in quality biases the index of production upward. On the other hand a steady improvement in quality in the Western countries results in a downward bias in their indexes. Accordingly, in East-West comparisons quality considerations are significant. Quality changes within the Soviet sphere probably are similar among the countries because of similar systems, and hence comparisons within the area are not so hazardous as they might otherwise be.

Table 1 shows the relative rankings of the countries in terms of percentages of labor force engaged in industry. East Germany comes first, followed by Czechoslovakia and Hungary. Poland, Rumania, and Yugoslavia are the least industrialized according to this criterion.

Frederic L. Pryor and George J. Staller [2] in 1965 and Maurice Ernst [3] in 1966 have published rankings of these countries based on measures of industrial output per capita. Their approaches are in terms of dollar value comparisons with Western countries. Their results are shown in Table 2, together with data published by United Nations [4] and estimates by Zoltán Román,[5] a Hungarian economist. We have projected these estimates to 1967 on the basis of output indexes and have shown them in comparison to Czechoslovakia as 100. If we neglect the markedly extreme items, that is, the apparently very low East German figure by Pryor-Staller, the Rumanian estimate by Román, and the very high Bulgarian figure in the U.N. estimate, the general impression about the ranks is similar to that based on the industrial employment figures. (See Table 1.)

A. Industrial output indexes

In the present study the definition of industry follows the concept generally used in the East European countries, that is, it includes min-

[2] Frederic L. Pryor and George J. Staller, "The Dollar Values of the Gross National Products in Eastern Europe, 1955," *Economics of Planning*, vol. 6, no. 1, 1966, pp. 1–26.

[3] Maurice Ernst, "Postwar Economic Growth in Eastern Europe." *In* U.S. Congress, Joint Economic Committee, *New Directions in the Soviet Economy*. Washington, U.S. Govt. Printing Office, 1966. Part IV, pp. 873–916.

[4] United Nations, Statistical Office. *The Growth of World Industry*, 1967 ed. Vol. I: *General Industrial Statistics, 1953–1966*. New York, 1969, pp. 286 and 302.

[5] Zoltán Román. "A magyar ipar nemzetközi összehasonlítások tükrében" (Hungarian Industry in the Light of International Comparisons). *Statisztikai szemle* (Statistical Review), vol. 45, no. 12, Dec. 1967, pp. 1191–1208.

ing, smelting, and public utility industries in addition to manufacturing. Our estimated industrial production indexes are based on output series, usually in physical quantities as shown in the original prewar and post-war publications. Only where these original sources were lacking were figures taken from the more recently published sources since the reliability of statistical data published retroactively after the socialization of the economies may be questioned. Quantitative data in general are subject to less distortion than other official aggregative statistical measures, and they were accordingly used as our starting point. Official indexes either were unavailable or were published without adequate indication of methodology, price regimens, and other bases for judging the reliability of the measures. In any event, an independent check seemed warranted.

The quality of industrial production declined in Eastern Europe after World War II, among other reasons, because of increasing proportions of low grade material inputs. Such quality depreciation implies an upward bias in indexes based on output series in physical quantities. The extent of this bias is indicated in a Hungarian publication that states that it was about 15 percent from 1938 to 1955.[6]

The independent indexes that form the basis for this study are essentially quantity indexes aggregated by prices at lower levels and by value added weights at higher levels. A desirable method to evaluate changes over time more realistically would be to use more commodity series than are usually used even in the West, in effect, decomposing the officially given output series. Unfortunately, adequately detailed statistical material is usually lacking for these countries. Some 800 to 1000 series, the usual coverage in Western measures, would probably provide a realistic appraisal of growth over time. Only in the case of Hungary was this much information available for calculating index numbers of industrial production at the time we calculated them.

The present task would have been impossible except for the indexes published as the *Occasional Papers of the Research Project on National Income in East Central Europe* at Columbia University or available there in manuscript. International comparisons are feasible since the methodology used is consistent for all the countries. Briefly, all were derived from quantity series aggregated by the application of 1956 weights, except for East Germany and Rumania, for which later years' weights were used. (For detailed discussion see Appendix A.) The Yugoslav official index of industrial production was accepted for the present analysis.

Table 3 shows the summary result of the findings. Bulgaria and Rumania achieved the highest rates of growth. Yugoslavia ranks third, and East Germany and Czechoslovakia are at the bottom of the rankings for 1950–67.

B. GROWTH RATES AS COMPARED WITH THOSE OF THE WEST

Prior to 1960, industrial output generally increased more rapidly in Eastern Europe than in the West. During the 1960's a significant

[6] Hungary, Központi statisztikai hivatal. *Áralakulás Magyarországon 1938-ban és 1949–1955-ben* (Price Trends in Hungary in 1938 and in 1949–1955). (Statisztikai időszaki közlemények [Periodic Statistical Publications], vol. I). Budapest, 1957, p. 70.

slackening in the growth rates occurred in almost all of these countries, including the less industrialized. Table 4 shows the calculated average annual compound rates of increase in industrial production for all the Eastern European countries and the United States during the period of 1960–1968.

In comparison with earlier periods,[7] the figures in Table 4 indicate a marked slowdown in the rates of growth of industrial production in Eastern Europe while the rates for Western nations have been relatively steady. The two most industrialized countries in the East, Czechoslovakia and East Germany, experienced a lower rate of growth than any of the Western nations except the United Kingdom, Austria, and Switzerland. The three less developed countries, Bulgaria, Rumania, and Yugoslavia, had high rates but did not reach the level of Japan, an industrially advanced country. Hungary and Poland show a rather modest rate of growth, lagging behind that achieved by Italy, which may be considered a reasonable counterpart for the sake of comparison. The 1969 figures in Table 4, being planned (East) or for May 1968–June 1969 (West), only suggest possible trends for the current year.

IV. Major Inputs and Factor Productivities

A. INDUSTRIAL EMPLOYMENT

That inconsistencies exist among countries in the definition and measurement of employment is very clear, but it is impossible to state just how much these discrepancies would affect the results of productivity measurements. The consequences of such inconsistencies, however, are not likely to seriously affect our analysis of the sources of growth.

The series used here represent comprehensive coverage of the total of workers and employees. Seasonal fluctuations are negligible, and fluctuations in the rates of participation of women in the labor force probably would not affect the results significantly. These rates are already high enough to suggest stability in the series.

There is, however, a certain time lag here between the more developed countries, where labor shortages exist, and the less developed ones, where this has not been a pressing factor. In all these countries the so-called "workers at home" category is relatively insignificant, and the trend in the branch employment series would not be affected by their exclusion. For the productivity measurements we have used two series: (1) manual workers (excluding apprentices), to approximate the concept of hours worked, and (2) total employment in industry, i.e. including the white collar category. For comparisons, in general, employment series were used.

The average annual rate of growth of total employment shown in Table 5 for the period of 1950–1967 was highest in Bulgaria and lowest in East Germany. It appears that labor shortages were already felt in Czechoslovakia and in East Germany as early as the 1950's, while Hungary began to experience this difficulty during the period of 1960–1967. For Poland and Yugoslavia the declining rates do not indicate labor shortage so much as they reflect reduced employment opportunities.

[7] See Ernst, *op. cit.*, pp. 883–884.

B. CAPITAL

Official data on the value of fixed capital in mining, manufacturing, and public utilities is available in these countries for various periods, but the distribution by industrial branches is given mostly for the 1960's. Estimates of the value of inventories are available in scattered form for the branches and sometimes only for the national economy as a whole. The preparation of capital-output ratios on a comparable basis for the countries of Eastern Europe during the 1950's is thus ruled out for the present, at least as regards industrial branch detail.

It was possible, however, to construct indexes of industrial capital inputs, excluding working capital. The rates of growth based on these series are shown in Table 5. Over the entire period of 1948–1967, Czechoslovakia shows an average annual compound rate of growth of 6.3 percent; Hungary for the period of 1949–1967 shows a 7.7 percent increase, and Bulgaria, for 1952–1967, 11.8 percent.

C. OUTPUT PER UNIT OF LABOR INPUT

Our estimates of the rates of growth of industrial output per unit of labor input are shown in Table 6. The calculations are based on our indexes of production divided by the indexes of labor input. Bulgaria, Yugoslavia, and East Germany rank at the top for the period as a whole, while Hungary shows the lowest rate. The two sub-periods show a far different picture for Hungary; the rate for the entire period reflects the low rates for 1949–1960. The industrial drive was pushed with a small regard for costs in the early fifties, and productivity was adversely affected. During 1960–1967, however, Hungary's rate exceeds that of Czechoslovakia and Poland and is at about the same level as that of East Germany.

D. OUTPUT PER UNIT OF CAPITAL INPUT

Our estimates of rates of growth of output per unit of capital input are also shown on Table 6. These rates increased until 1960; thereafter the rates become negative almost everywhere, and particularly in heavy industry, mining, and power in the more industrialized countries—Czechoslovakia, East Germany, and Hungary. This is an apparent sign of capital substitution for labor, among other things.

E. TRENDS IN FACTOR PRODUCTIVITY; EFFICIENCY MEASUREMENTS

Labor is quantitatively the largest input; consequently, the change in labor productivity over a period of time is a basic measure. Output-labor ratios were more adequate measures of changing efficiency when capital was quantitatively less important than it has since become. Increasingly in recent years, investigators have sought to estimate productivity changes in terms of combined labor and capital inputs. Here the shortcomings of the price system as a guide to resource costs in the Eastern European countries pose a special problem in an attempt to relate trends in output to trends in major inputs. In order to combine the index of services of labor and capital into a single index of com-

bined inputs, we used wages and salaries as the weight for labor, and for capital, as a practical choice, we assumed a rate of 10 percent of its full initial cost to arrive at the weight.

The rates of growth of the index of output per unit of total inputs (obtained by dividing the output index by the index of combined labor and capital inputs) are also shown in Table 6 for such periods as capital data permitted. Implicit in the difference between the rate for combined inputs and the output rate is the rate for the changes caused by the increase of scientific, technological and managerial knowledge, economies and diseconomies of scale, and all other contributing influences not reflected in our input measures. A too rapid growth may entail the employment of inadequately trained personnel, internal maladjustments not ironed out, and excessive costs and perhaps poor design of hastily provided structures and equipment. The real restraint on growth, however, is likely to be the supply of capital. The declining productivities observed for Eastern Europe reflect these considerations.

F. THE RESIDUAL OR TECHNOLOGICAL FACTOR

The "residual" increment of output not explained by labor and capital inputs can be regarded as the result of the so-called technical and organizational progress. In Table 7 we show the rates of growth in industrial output, and the combined labor and capital inputs. By subtraction we get residuals that reflect other causes of growth than labor and capital as such. Finally we show the ratios between annual average rates of growth of the residual and the rates of growth of output. The highest ratio of residual rate to output rate appears for East Germany during the period of 1960–1967; Rumania, Bulgaria, and Hungary come next; and Czechoslovakia and Poland follow.

TABLE 7.—*Ratios of the residual in the growth rate to the rate of growth of output, selected years, 1950–67* [1]

	Bulgaria	Czecho-slovakia	East Germany	Hungary	Poland	Rumania
A. Output:						
1950–67	12.4	6.6	6.7	8.5	7.4	10.5
1950–60	12.7	8.0	9.1	9.8	8.2	9.8
1960–67	12.0	4.3	3.4	6.6	6.2	11.4
B. Combined labor and capital inputs:						
1950–67	8.5	4.5	(4)	6.5	(4)	(4)
1950–60	8.5	4.6	(4)	7.6	(4)	(4)
1960–67	8.4	4.3	1.6	4.8	4.8	7.7
C. Residual: [2]						
1950–67	3.9	2.1	(4)	2.0	(4)	(4)
1950–60	4.2	3.4	(4)	2.2	(4)	(4)
1960–67	3.6	0.0	1.8	1.8	1.4	3.7
D. Ratio: [3]						
1950–67	31.4	31.8	(4)	23.5	(4)	(4)
1950–60	33.0	42.5	(4)	22.4	(4)	(4)
1960–67	30.0	0.0	52.9	27.3	22.6	32.5

[1] The initial year for the periods differs for some countries from 1950, as follows: Czechoslovakia—1948, East Germany—1955, Hungary—1949. For Bulgaria, the capital input begins with 1952. Items A, B, and C are average annual compound growth rates.
[2] Row C=row A−row B.
[3] Row C divided by row A (in percent).
[4] Not available.

Sources: See Tables 3 and 5.

V. Branch Specializations in Industry

In this section we shall attempt to show the developing industrial specialization, using employment to indicate the structure of industry by branches. Next we shall show the growth rates for industrial output, labor, capital, and combined inputs by branches of industry. East-West comparisons will be made in the few industries where homogeneity exists. Factor productivities will be investigated on the basis of output per unit of labor input, capital, and of combined labor and capital input.

We encountered problems in the matter of consistent branch definitions among countries. Thus we were unable to separate mining products and fuels from smelting in Bulgaria, Poland, and Yugoslavia, and we restricted our investigation to a combined mining and fuel sector (excluding extraction) on the one hand, and separate ferrous and non-ferrous metallurgy (including ore mining) on the other. For the sake of a more comprehensive analysis we divide industry into three groups as follows:

1. Mining, Power, and Heavy Industry;
2. Lumber, Paper, and Light Industries;
3. Food Processing and Tobacco Manufacturing.

Group 1 includes 6 branches, group 2 contains 6 branches plus a catch-all "others," and group 3 corresponds to the exact western classification of this activity.

Although the time periods in this investigation differ (the starting years vary), inter-country comparisons are still possible. Productivity measurements by country are based on consistent periods, and they are separately calculated and compared. For example, in the case of East Germany where figures for industrial employment by branches have been available only since 1955, the output data calculated for the *same* period were used to arrive at the output per unit of labor input.

A. Industrial Structure

Industrial specialization in Eastern Europe can be shown on the basis of the distribution of employment by branches of industry. Official data in market prices cannot be used to show reliable relative sizes of branches because of the price abnormalities (turnover tax and subsidies).

Our findings in Table 8 show similar structures of industry in the more industrialized countries on the one hand, and in Rumania and Yugoslavia on the other. Bulgaria seems to be the only country which shows a different structural pattern characterized by the high share of industrial employment in the light industries, food, and tobacco.

Branch specialization disclosed by this table includes the following:

TABLE 8.—*Employment by branches of industry, selected years, 1950–67*

[Percent of total]

	Bulgaria			Czechoslovakia			East Germany			Hungary			Poland			Rumania			Yugoslavia	
	1950	1960	1967	1950	1960	1967	1955	1960	1967	1950	1960	1967	1950	1960	1967	1950	1960	1967	1960	1967
1. Electric power	1.6	1.6	1.5	1.8	1.8	1.8	2.2	2.3	2.5	2.8	3.0	2.7	2.9	2.2	2.2	1.4	1.4	2.2	2.6	2.5
2. Mining and smelting	9.4	10.9	11.6	20.5	20.5	19.7	12.3	12.2	12.5	18.9	18.7	16.0	19.3	17.7	16.2	15.9	15.8	13.9	17.6	15.2
3. Machinery	16.0	16.7	21.7	30.0	36.4	38.2	33.1	34.7	37.4	29.2	29.6	31.5	17.5	24.8	29.1	23.9	25.2	26.7	24.8	26.1
Machinery (except electrical)	....	....	....	....	....	....	11.9	12.6	14.5	6.4	6.9	7.6	6.2	7.6	9.1	....	....	....	18.7	19.3
Transport equipment	....	....	....	....	....	....	8.2	8.0	6.8	11.2	8.7	8.3	5.1	7.1	8.2	....	....	....	1.8	1.4
Electrical engineering	....	....	....	....	....	....	6.8	7.6	8.8	5.2	6.6	8.1	2.0	4.0	5.0	....	....	....	4.3	5.4
Precision engineering	....	....	....	....	....	....	3.3	3.4	4.0	1.5	2.6	3.1				....	....	....	....	....
Fabricated metal products	....	....	....	....	....	....	2.9	3.1	3.3	4.9	4.8	4.4	4.2	6.0	6.7	....	....	....	....	....
4. Chemicals and rubber	2.6	3.4	4.2	4.0	4.4	4.7	9.7	9.7	10.4	4.6	5.3	6.5	5.7	6.0	6.5	3.1	4.7	6.5	4.6	6.0
5. Building materials	4.0	4.3	4.6	4.6	4.6	4.4	3.1	3.4	3.2	6.8	5.7	5.3	5.5	6.0	5.1	6.6	6.1	5.5	5.5	5.1
6. *Subtotal, 1 to 5, heavy industry*	*33.6*	*36.9*	*43.6*	*60.9*	*67.7*	*68.8*	*60.4*	*62.3*	*66.0*	*62.3*	*62.3*	*62.0*	*50.9*	*56.7*	*59.1*	*50.9*	*53.2*	*54.8*	*55.1*	*54.9*
7. Lumber and wood products	17.9	10.4	7.9	6.0	5.3	4.7	5.7	5.5	5.1	2.2	3.4	3.8	6.4	5.4	5.0	7.3	9.9	9.7	11.1	10.0
8. Paper and allied products	.9	.9	1.0	1.6	1.5	1.4	2.3	2.2	2.1	1.0	.8	.9	2.0	1.5	1.4	1.1	1.0	1.4	1.3	1.9
9. Textiles	16.1	12.7	9.5	9.5	7.6	6.9	13.1	11.9	9.8	14.2	10.2	9.9	16.8	12.4	11.0	14.3	12.3	11.4	14.1	16.6
10. Other light industry	14.6	22.3	21.3	12.4	10.3	10.9	11.0	10.5	9.7	7.8	12.8	13.3	13.0	11.8	11.8	14.3	13.8	13.3	7.4	6.2
11. Food processing and tobacco	16.9	16.8	16.7	9.6	7.6	7.3	7.5	7.6	7.3	12.5	10.5	10.1	10.9	12.2	11.7	12.1	9.8	9.4	11.0	10.4

Sources: See App.B.

The heavy industry sector is dominant in Czechoslovakia, East Germany, and Hungary (in descending order of size of sector). The structure of employment within heavy industry in Rumania and Yugoslavia is closely similar to that in Hungary and Poland, but significant differences are evident for other countries.

The unusually high share of total industrial employment in Czechoslovak mining and smelting (primary metal) industries is reflected in her extremely high per capita steel production. East Germany and Bulgaria are lowest in the shares for this sector over the indicated years.

Czechoslovakia and East Germany show almost the same level of employment in machinery for the period. Hungary's percentage is almost constant (around 32 percent for 1967), while Poland's share rose sharply by 1967 (up to 29 percent). Bulgaria is catching up (22 percent), and the other less industrialized countries of Yugoslavia and Rumania have shares in the 26–27 percent range. Country differences are more apparent in the chemical industry. East Germany dominates the field, with over 10 percent of her total industrial employment in chemicals. Hungary, Poland, and Rumania have about 6.5 percent of their industrial employment in chemicals and rubber, and Bulgaria ranks last (4 percent in 1967).

Czechoslovakia ranks first in the heavy industry group as a whole, 1950–1967. Lumber and wood products (in group 2) rank high in Rumania and Yugoslavia; Hungary, naturally, has the smallest employment share in the group. Paper industries are about evenly distributed, representing between 1 to 2 percent of industrial employment. Textiles show an opposite trend in two less developed countries: in Bulgaria (during 1950–1967) there was a decrease to 9.5 percent, and in Yugoslavia (during 1960–1969) an increase to 16.6 percent. The food industry (including tobacco manufacturing) has the highest share in Bulgaria and the lowest in the two most industrialized countries, Czechoslovakia and East Germany.

The details of specialization in the machinery industries are of special interest: East Germany shows the highest, and an increasing concentration of, employment in the machinery (except electrical) subgroup and in electrical engineering. Hungary shows a more or less balanced distribution in almost all of the sub-groups; precision engineering is the smallest among them, but it is increasing rapidly. Hungarian fabricated metal product industries are also small in magnitude, and the trend here is decreasing. Armament industries are usually included here, if any. East Germany and Hungary show a very low concentration of employment in this industry. Hungary's share in the transportation equipment sub-group (see the breakdown of "Machinery" in the table) declined from 11.2 to 8.3 percent (during 1950–1967). Hungary has a surprisingly high concentration (8.1 percent in 1967) in electrical engineering (a part of machinery), a share comparable only to that of East Germany (8.8 percent). Poland shows a higher and increasing share of industrial employment in machinery (except electrical) and in transportation equipment, and her share in the fabricated metal industries is substantially higher than in the other countries. (See Table 8, breakdown of "Machinery.")

B. THE RATES OF GROWTH OF INDUSTRIAL OUTPUT

The average annual rates of growth of industrial output by branches of industry are shown in Table 9 for the whole period (up to 1967). The rates of growth in power generating industry, especially in Bulgaria, Rumania, and Yugoslavia are very high. While electric power still shows an increasing trend in Rumania, it declines in the others. (See Tables 10 and 11 and the comparisons with Western countries in Table 12.) Rumanian crude oil production had reached a high rate early and is now showing a lower rate of growth.

Taking into consideration the two sub-periods (Tables 10 and 11), a decreasing rate of growth is observable, particularly in Czechoslovakia, East Germany, and Hungary. This slowdown is due to their efficiency drive in the mining industries, which led to closing of inefficient and marginal shafts. The decline in the rate of growth is sharpest in East Germany (a major world producer in brown coal) and in Hungary (due to closing of small lignite mines as a part of her reform program).

TABLE 9.—*Growth rates of industrial output and major inputs by branches, 1948–67 (average annual compound rates)*

[I=1948–67, II=1949–67, III=1950–67, IV=1952–67, V=1955–67]

	Industrial output						
	Bulgaria III	Czechoslovakia I	East Germany III	Hungary II	Poland III	Rumania III	Yugoslavia III
1. Mining, power, and heavy industry:							
Electric power	18.2	9.0	6.7	9.3	10.5	15.6	12.8
Mining, including fuels	11.2	4.7	2.8	4.1	3.2	6.3	6.6
Primary metal industries	(1)	7.2	7.6	6.8	(1)	13.9	(1)
Ferrous metals	11.4	.....	9.2	.....	8.7	.....	11.3
Nonferrous metals	16.9	.....	(1)	.....	7.3	.....	8.0
Machinery and transport equipment	18.5	6.5	9.6	8.2	12.7	15.6	11.0
Chemicals and rubber	18.1	10.5	9.0	18.6	10.6	18.7	14.8
Building materials	11.0	11.1	6.4	8.7	7.8	11.2	6.6
Subtotal, group 1	16.2	6.8	7.3	8.6	8.1	14.6	9.9
2. Lumber, paper, and light industry:							
Lumber and wood products	3.7	10.1	4.9	10.7	8.7	3.2	5.5
Paper and allied products	10.5	4.2	5.4	8.3	5.6	9.6	14.2
Textile mill products	7.8	3.0	5.5	5.4	4.9	6.3	6.5
Leather and fur processing	9.5	3.3	6.3	2.7	10.5	6.7	6.0
Apparel and related products	6.5	8.0	7.1	12.3	5.1	10.7	(1)
Printing	4.0	3.5	3.0	7.1	(1)	3.5	(1)
Glass, ceramics, and others	11.3	5.5	3.7	8.4	5.4	9.6	(1)
Subtotal, group 2	6.5	4.7	5.3	7.6	6.1	6.0	6.8
3. Food processing and tobacco	9.1	4.6	4.8	9.7	6.2	8.9	9.6
Breakdown of machinery and equipment:							
Machinery, except electrical	.....		8.4	8.3	.....		
Transport equipment	.....		7.5	5.9	.....		
Electrical engineering	.....		12.4	12.2	.....		
Precision engineering	.....		3.6	16.5	.....		
Fabricated metal products	.....		10.8	5.5	.....		

See footnote at end of table.

TABLE 9.—*Growth rates of industrial output and major inputs by branches, 1948–67*—Continued

	Labor input						
	Bulgaria	Czechoslovakia	East Germany	Hungary	Poland	Rumania	Yugoslavia
	III	I	V	II	III	III	IV
1. Mining, power, and heavy industry:							
Electric power	6.8	3.7	1.3	7.3	2.0	8.0	4.2
Mining, including fuels	4.7	1.7	−.3	4.4	2.6	2.8	3.0
Primary metal industries	(1)	4.1	2.3	3.8	(1)	5.7	(1)
Ferrous metals	12.4				3.1		5.4
Nonferrous metals	12.5				2.7		3.3
Machinery and transport equipment	8.9	4.7	1.7	6.2	7.0	5.6	8.7
Chemicals and rubber	10.1	3.5	1.2	7.0	4.6	9.7	10.4
Building materials	8.0	2.4	.8	4.8	3.4	4.0	4.3
Subtotal, group 1	8.6	3.9	1.4	5.4	4.7	5.6	6.3
2. Lumber, paper, and light industry:							
Lumber and wood products	2.9	1.8	−.2	8.9	2.4	6.9	5.2
Paper and allied products	7.7	2.6	−.2	4.4	1.9	6.9	9.0
Textile mill products	3.7	.6	1.2	3.6	1.1	3.7	6.9
Leather and fur processing	4.7	1.6	−.3	8.8	3.3	2.9	6.7
Apparel and related products	7.6	1.6	−.4	8.0	1.7	6.3	(1)
Printing	2.3	2.3	−1.1	1.7	(1)	4.1	(1)
Glass, ceramics, and others	12.0	2.1	−.1	22.0	6.6	4.9	(1)
Subtotal, group 2	5.6	1.4	−.9	6.1	3.1	4.9	6.4
3. Food processing and tobacco	6.9	1.9	.5	4.9	4.3	3.5	6.1
Breakdown of machinery and equipment:							
Machinery, except electrical			2.4	6.7	6.2		
Transport equipment			−.9	3.5	6.7		
Electrical engineering			2.8	8.2	9.6		
Precision engineering			2.2	12.3			
Fabricated metal products			1.7	6.2	6.6		

	Capital input			Combined labor and capital inputs		
	Bulgaria	Czechoslovakia	Hungary	Bulgaria	Czechoslovakia	Hungary
	IV	I	V	IV	I	V
1. Mining, power, and heavy industry:						
Electric power	11.8	8.3	8.1	9.8	7.5	6.7
Mining, including fuels	20.6	6.6	11.7	9.5	3.7	4.8
Primary metal industries	(1)	9.3	7.9	(1)	6.8	1.3
Ferrous metals	44.9			30.2		
Nonferrous metals	17.1			13.7		
Machinery and transport equipment	14.3	6.7	7.5	9.7	5.3	4.2
Chemicals and rubber	16.8	9.6	12.5	12.7	6.7	9.5
Building materials	17.4	3.5	8.9	9.6	4.9	4.2
Subtotal, group 1	16.6	3.0	9.2	10.8	5.6	5.0
2. Lumber, paper, and light industry:						
Lumber and wood products	8.6	5.7	9.6	3.7	2.7	5.8
Paper and allied products	20.0	5.5	8.0	11.6	4.2	5.8
Textile mill products	7.3	2.0	5.1	4.5	1.2	2.8
Leather and fur processing	7.1	1.8	6.9	5.0	1.6	3.2
Apparel and related products	18.9	3.2	8.9	(1)	1.8	6.3
Printing	6.3	5.1	7.0	3.3	3.0	3.7
Glass, ceramics, and others	11.7	3.1	8.5	10.6	2.6	3.7
Subtotal, group 2	8.0	3.0	6.3	5.3	2.0	4.0
3. Food processing and tobacco	6.5	2.8	2.4	6.8	2.3	2.5
Breakdown of machinery and equipment:						
Machinery, except electrical			7.1			5.4
Transport equipment			5.9			2.5
Electrical engineering			12.8			8.4
Precision engineering			12.1			5.9
Fabricated metal products			3.8			1.2

[1] Not available.

Sources and methods: See App. A and B.

TABLE 10.—*Growth rates of industrial output and major inputs by branches, 1948—1960 (average annual compound rates)*

[I=1948–60, II=1949–60, III=1950–60, IV=1952–60, V=1955–60]

	Industrial output						
	Bulgaria III	Czechoslovakia I	East Germany III	Hungary II	Poland III	Rumania III	Yugoslavia III
1. Mining, power, and heavy industry:							
Electric power	19.3	10.2	7.5	10.6	12.0	13.7	14.0
Mining, including fuels	11.4	6.5	4.7	6.2	3.3	6.8	7.8
Primary metal industries	(1)	9.1	11.6	8.1	(1)	14.7	(1)
Ferrous metals	18.1				10.4		16.3
Nonferrous metals	23.0				8.1		8.7
Machinery and transport equipment	19.4	8.8	12.9	11.1	15.9	8.1	13.5
Chemicals and rubber	18.3	9.0	10.0	16.6	12.5	17.1	15.0
Building materials	11.0	12.3	9.2	11.4	11.5	10.8	7.6
Subtotal, group 1	17.1	5.7	9.8	11.9	9.3	12.9	11.6
2. Lumber, paper, and light industry:							
Lumber and wood products	5.4	8.9	8.2	12.7	8.9	1.6	3.7
Paper and allied products	9.2	4.7	6.9	7.5	6.4	5.1	12.3
Textile mill products	10.1	4.1	8.0	5.7	5.3	5.3	5.8
Leather and fur processing	9.9	3.3	8.2	2.4	14.2	5.8	4.8
Apparel and related products	7.9	10.8	9.4	17.5	4.0	9.2	(1)
Printing	1.5	3.5	4.9	7.2	(1)	1.3	(1)
Glass, ceramics, and others	13.6	5.6	5.1	11.0	7.5	10.5	(1)
Subtotal, group 2	7.9	4.9	7.6	9.5	6.5	4.6	5.1
3. Food processing and tobacco	9.4	2.9	7.3	9.8	6.2	9.5	8.9
Breakdown of machinery and equipment:							
Machinery, except electrical			12.1	13.9			
Transport equipment			11.3	6.6			
Electrical engineering			17.6	15.6			
Precision engineering			5.5	22.2			
Fabricated metal products			13.5	7.8			

	Labor input					
	Bulgaria III	Czechoslovakia I	Hungary II	Poland III	Rumania III	Yugoslavia IV
1. Mining, power, and heavy industry:						
Electric power	8.8	4.2	6.5	1.3	4.6	5.9
Mining, including fuels	5.4	2.7	7.4	3.4	3.5	5.6
Primary metal industries	(1)	4.7	4.7	(1)	6.0	(1)
Ferrous metals	26.4			2.5		8.5
Nonferrous metals	18.4			2.9		4.1
Machinery and transport equipment	8.8	5.9	7.9	7.8	5.4	13.4
Chemicals and rubber	11.2	3.8	7.9	4.6	9.2	13.8
Building materials	9.3	3.0	6.9	5.2	4.1	6.8
Subtotal, group 1	9.4	4.7	7.3	5.2	5.3	9.5
2. Lumber, paper, and light industry:						
Lumber and wood products	2.6	2.5	12.1	2.3	8.1	8.7
Paper and allied products	8.3	3.3	3.8	1.4	4.0	9.1
Textile mill products	5.8	.5	4.6	.9	3.3	8.4
Leather and fur processing	4.2	1.1	12.6	4.3	2.3	7.7
Apparel and related products	11.8	1.7	10.1	.5	5.6	(1)
Printing	1.2	1.3	1.4	(1)	5.5	(1)
Glass, ceramics, and others	16.0	2.1	35.6	7.6	5.4	(1)
Subtotal, group 2	3.2	3.9	8.1	3.6	4.8	8.5
3. Food processing and tobacco	8.3	2.2	6.8	5.3	2.7	9.9
Breakdown of machinery and equipment:						
Machinery, except electrical			8.3	6.3		
Transport equipment			7.0	7.6		
Electrical engineering			9.8	11.7		
Precision engineering			16.9			
Fabricated metal products			9.4	7.9		

See footnote at end of table.

TABLE 10.—*Growth rates of industrial output and major inputs by branches, 1948–60*—Continued

	Capital input			Combined labor and capital inputs		
	Bulgaria	Czecho-slovakia	Hungary	Bulgaria	Czecho-slovakia	Hungary
	IV	I	V	IV	I	V
1. Mining, power, and heavy industry:						
Electric power	13.7	8.7	7.8	10.5	7.8	7.4
Mining, including fuels	19.7	7.5	14.5	7.9	4.5	6.3
Primary metal industries	(1)	9.3	6.3	(1)	6.9	5.4
Ferrous metals	57.4			33.1		
Nonferrous metals	21.9			7.9		
Machinery and transport equipment	10.8	6.3	6.6	9.1	5.9	3.8
Chemicals and rubber	14.5	9.8	10.9	11.3	6.6	9.2
Building materials	12.1	8.9	7.2	10.5	5.2	3.4
Subtotal, group 1	16.8	7.9	8.6	10.7	6.0	5.0
2. Lumber, paper, and light industry:						
Lumber and wood products	9.5	6.6	9.3	3.1	3.2	7.1
Paper and allied products	14.1	5.6	6.8	9.4	4.5	4.7
Textile mill products	5.9	3.9	2.8	5.6	.9	2.6
Leather and fur processing	5.3	1.9	8.5	4.2	1.3	2.7
Apparel and related products	22.8	1.1	10.7	6.2	1.7	9.8
Printing	8.4	5.7	6.1	2.4	2.4	4.8
Glass, ceramics, and others	12.0	2.1	−1.8	10.4	2.1	3.3
Subtotal, group 2	8.1	2.7	4.4	6.2	1.9	4.5
3. Food processing and tobacco	6.1	2.3	5.2	7.3	2.2	1.7
Breakdown of machinery and equipment:						
Machinery, except electrical			6.3			4.5
Transport equipment			5.8			2.3
Electrical engineering			13.7			9.8
Precision engineering			12.5			5.4
Fabricated metal products			.3			.0

[1] Not available.

Sources and methods: See App. A and B.

TABLE 11.—*Growth rates of industrial output and major inputs by branches, 1960–67 (average annual compound rates)*

[All countries, 1960–67]

	Industrial output							Labor input						
	Bulgaria	Czechoslovakia	East Germany	Hungary	Poland	Rumania	Yugoslavia	Bulgaria	Czechoslovakia	East Germany	Hungary	Poland	Rumania	Yugoslavia
1. Mining, power, and heavy industry:														
Electric power	16.6	6.7	5.6	7.3	8.3	18.3	11.0	3.9	2.8	0.9	1.1	3.2	12.2	2.4
Mining, including fuels	11.1	1.8	.2	.8	3.2	5.4	4.9	3.7	−.1	−.6	−.2	1.3	1.8	−.4
Primary metal industries	(1)	4.0	2.2	4.9	(1)	12.8	(1)	(1)	2.4	.9	1.0	(1)	5.2	(1)
Ferrous metals	22.3				6.5		4.5	17.0				3.9		2.1
Nonferrous metals	8.7				6.4		7.0	4.7				2.5		2.4
Machinery and transport equipment	17.2	.5	3.6	4.0	8.4	12.2	7.5	8.1	2.6	.9	3.6	5.8	6.4	3.5
Chemicals and rubber	17.6	8.1	7.6	21.8	7.5	20.9	14.6	8.5	3.1	.8	5.7	4.6	10.4	6.7
Building materials	10.9	9.1	2.5	4.7	3.7	11.7	5.2	6.1	1.4	−1.0	1.6	1.0	3.8	1.5
Subtotal, group 1	15.0	2.9	3.9	6.6	6.4	12.9	7.6	7.6	2.4	.6	2.6	4.0	6.0	2.7
2. Lumber, paper, and light industry:														
Lumber and wood products	1.4	12.3	.3	7.5	8.5	5.5	8.0	1.0	.6	−1.2	4.1	2.4	5.3	1.3
Paper and allied products	12.3	2.6	3.1	11.6	4.5	16.5	17.0	6.8	1.3	−1.3	5.4	2.6	11.1	7.9
Textile mill products	4.6	1.1	2.2	4.9	4.5	7.1	7.6	.8	.8	−3.0	2.2	1.7	4.4	5.1
Leather and fur processing	8.9	3.3	3.7	3.2	5.4	7.9	7.6	5.4	2.4	−1.0	3.1	1.9	3.5	5.6
Apparel and related products	4.7	2.3	3.8	4.7	6.4	12.8	(1)	9.1	1.3	−2.2	3.5	3.4	7.4	(1)
Printing	7.6	3.4	.3	7.0	(1)	6.8	(1)	4.0	4.2	−1.6	2.2	(1)	2.1	(1)
Glass, ceramics, and others	8.0	3.6	1.7	4.5	4.8	8.3	(1)	6.5	1.7	−.1	2.9	5.2	4.2	(1)
Subtotal, group 2	4.7	4.6	2.1	5.5	5.5	8.1	8.3	3.1	1.3	−1.9	3.0	2.5	5.1	4.0
3. Food processing and tobacco	8.6	2.2	1.3	9.4	6.1	8.0	10.7	5.0	1.5	−.7	2.1	2.8	4.8	1.9
Breakdown of machinery and equipment:														
Machinery, except electrical			3.0	−.1						1.7	4.1	6.0		
Transport equipment			2.3	4.8						−2.6	1.9	5.6		
Electrical engineering			5.4	7.0						1.9	5.8	6.8		
Precision engineering			1.0	8.2						2.2	5.3			
Fabricated metal products			6.9	2.1						.8	1.2	4.9		

TABLE 11.—*Growth rates of industrial output and major inputs by branches, 1960–67 (average annual compound rates)*—Continued

	Capital input					Combined labor and capital inputs				
	Bulgaria	Czecho-slovakia	East Germany	Hungary	Poland	Bulgaria	Czecho-slovakia	East Germany	Hungary	Poland
1. Mining, power, and heavy industry:										
Electric power	9.6	7.6	7.7	8.4	8.6	8.8	7.0	6.3	6.2	7.5
Mining, including fuels	21.7	5.0	8.5	9.7	6.5	11.9	2.4	4.1	3.7	3.6
Primary metal industries	(1)	9.3	6.9	9.1	(1)	(1)	6.7	3.2	5.2	(1)
Ferrous metals	31.9				7.6	26.5				5.7
Nonferrous metals	11.8				6.3	8.0				6.4
Machinery and transport equipment	15.3	9.0	6.8	8.1	8.0	10.5	4.3	1.9	4.4	6.4
Chemicals and rubber	19.5	9.1	6.0	13.8	9.3	12.1	7.0	3.2	9.2	6.9
Building materials	14.3	7.4	7.5	10.1	5.4	8.4	4.5	2.0	4.7	3.2
Subtotal, group 1	16.3	7.8	7.2	9.5	7.5	10.9	5.1	3.0	5.1	5.4
2. Lumber, paper, and light industry:										
Lumber and wood products	7.6	4.3	4.7	9.9	5.1	2.0	1.5	−.2	4.8	3.1
Paper and allied products	21.9	5.4	4.5	8.9	5.6	14.8	3.6	.8	6.6	4.0
Textile mill products	8.9	2.6	2.9	6.8	2.9	3.1	1.4	−1.8	3.0	2.0
Leather and fur processing	12.0	1.6	2.0	5.7	5.5	6.2	2.1	−.6	3.5	2.5
Apparel and related products	20.4	4.5	4.5	7.6	6.6	(1)	1.9	−2.0	3.8	3.7
Printing	5.7	1.5	5.4	7.6	(1)	4.5	4.1	−.3	2.9	(1)
Glass, ceramics, and others	12.5	4.9	7.8	16.5	9.0	10.9	3.1	1.8	3.4	6.3
Subtotal, group 2	10.3	3.5	4.1	7.7	4.7	4.0	2.1	−.8	3.7	3.1
3. Food processing and tobacco	8.8	3.6	2.4	4.5	5.3	6.1	2.5	.4	3.0	3.8
Breakdown of machinery and equipment:										
Machinery, except electrical			6.1	7.5	7.9			2.4	6.0	6.6
Transport equipment			6.8	6.0	7.3			1.8	2.6	6.1
Electrical engineering			8.5	12.2	4.6			3.0	7.4	7.7
Precision engineering			6.5	11.7				2.6	6.2	
Fabricated metal products			7.0	6.4	7.6			1.8	2.3	5.6

(1) Not available.

Sources and methods: See App. and B.

A high rate of growth is stressed in Eastern Europe in the machinery and transportation equipment industry, which is considered the backbone of the industrialization programs. Table 9 (for the period as a whole) shows that the rate of growth exceeded 10 percent in Bulgaria, Rumania, Poland, and Yugloslavia; Czechoslovakia had the lowest increase. In the two sub-periods (shown on Tables 10 and 11), the rate for machinery output declined in the Eastern European countries, and particularly in Czechoslovakia; Rumania was an exception.

For East Germany and Hungary, the two countries for which detailed investigations were possible, a decline (see "Breakdown of machinery" in Tables 10 and 11) is evident primarily in the rate of growth in the transport equipment and precision engineering industries (in East Germany) and in the machinery (except electrical) industry and fabricated metal products (in Hungary). For Western comparisons see Table 12.

TABLE 12.—*East-West comparisons: growth rates of industrial output, selected countries, 1960–1967 (average annual compound rates)*

	Electricity and gas	Chemicals and rubber	Food and tobacco	Machinery (except electrical)	Transport equipment
Bulgaria	16.6	17.6	8.6	(1)	(1)
Czechoslovakia	6.7	8.1	2.2	(1)	(1)
East Germany	5.6	7.6	1.3	3.0	2.3
Hungary	7.3	21.8	9.4	−.1	4.8
Poland	8.3	7.5	6.1	(1)	(1)
Rumania	18.3	20.9	8.0	(1)	(1)
Yugoslavia	11.0	14.6	10.7	(1)	(1)
Unweighted averages	10.4	14.0	6.6	(1.5)	(3.5)
Austria	6.9	8.1	4.1	3.4	−5.2
Belgium	7.0	6.3	3.9	8.5	8.6
Canada	9.1	6.0	4.7	9.7	11.1
France	7.2	9.2	(1)	(1)	4.7
Germany	6.9	10.2	4.1	1.6	2.7
Italy	7.3	12.6	3.5	5.6	8.7
Japan	10.9	15.2	5.6	14.4	21.1
Netherlands	12.6	11.3	2.3	(1)	(1)
Norway	6.4	10.5	4.4	5.8	5.5
Portugal	9.1	4.5	4.4	(1)	(1)
Spain	11.8	12.6	7.4	(1)	(1)
Sweden	(1)	10.9	3.7	(1)	(1)
Switzerland	5.7	7.4	4.9	(1)	(1)
United Kingdom	5.1	4.9	2.1	(1)	−.2
United States	7.5	7.4	3.0	7.8	6.4
Unweighted averages	8.1	9.1	4.2	7.1	6.3

[1] Not available.

Sources and methods: See App. A and B.

For the period as a whole, East Germany and Hungary show similar patterns, particularly in the electrical engineering industries. In addition, Hungary showed a high rate of growth in precision engineering; East Germany, however, achieved a higher rate of increase in fabricated metal products.

Chemicals and rubber is one of the fastest growing industries, with emphasis on new products. Rumania and Hungary achieved the highest rates of growth in this industry during the period as a whole and

particularly during the 1960's.[8] East Germany achieved the smallest rate of growth in chemicals, but she had an unusually large share of her total employment (see Table 8) in this branch. See also the East-West comparisons for chemicals (Table 12).

Building materials industry shows about the same average rate of growth in all countries. The rate of growth in this industry declined, however, between the sub-periods in Czechoslovakia, East Germany, Hungary, Poland, and Yugoslavia. (See Tables 10 and 11.)

An erratic trend is observable in the lumber and wood products industry. The average annual rate of growth for the period as a whole is highest in Czechoslovakia and Hungary, and the lowest in Rumania and Bulgaria.

The rates of growth in the paper and allied products industry shown by Yugoslavia, Bulgaria, and Rumania are very high; their forestry resources are ample.

Hungary, Yugoslavia, Bulgaria, and Rumania show high rates of growth in the food processing industry in the fifties and much reduced rates in the sixties. (See Table 12 for comparisons with Western countries.)

Group 1 (mining, power, and heavy) industries show a much higher rate of growth than was achieved in group 2 (lumber, paper, and light industry) in most of the countries. Group 3 (food processing and tobacco industry) exhibits growth rates between those for groups 1 and 2.

C. GROWTH RATES OF MAJOR INPUTS

Table 9 also shows labor input (for all the seven countries), capital input, and combined labor and capital input for selected countries for the period as a whole. Tables 10 and 11 show the same for the two sub-periods. Taken together, these tables make possible comparisons among countries as regards branches of industry. For example, Bulgaria shows the highest rate of growth in labor input in almost all of the group 1 industries (including the total for group 1); Rumania leads in electric power; Yugoslavia in chemicals. We leave it to the reader to follow the developments in groups 2 and 3 industries by branches and countries.

East Germany had a declining rate of growth in seven industries. This decline is evidently due to a serious labor shortage. Similar shortages of labor are noticed also in Czechoslovakia and in Hungary during the period of 1960–1967.

One observation concerning specialization in the machinery industries is warranted. Despite East Germany's low rate of growth of labor input (1.7 percent), relatively high rates of growth of output were realized in the electrical and machinery industries.

Capital input rates are higher in Bulgaria than in Czechoslovakia and Hungary in almost all branches of industry, and the same is true

[8] Rumania has huge oil and natural gas reserves, plus salt as basic materials. Hungary's highly developed pharmaceutical manufacturing, representing roughly one-fifth of the value of the output in chemicals, substantiates these findings (See Hungary, Központi statisztikai hivatal. *Statisztikai évkönyv 1967* [*Statistical Yearbook*], Budapest. 1967, p. 114). Drugs are exported mainly to the U.S.S.R. (60 percent of total) and the rest is distributed almost evenly between other Eastern European countries and the West (See László Bontó, "Vegyiparunk fejlesztésének irányai (Development Trends in our Chemical Industry)". *Közgazdasági szemle* (*Economic Review*), vol. 15, no. 5, May 1968, p. 538 (535–546).

for rates of combined labor and capital during the period as a whole (see Table 9) and during the first sub-period (see Table 10). For 1960–1967, however, (see Table 11) some changes can be observed, but the general picture remains about the same.

D. PRODUCTIVITY MEASURES

The rate of growth of labor input shown on Table 13 is by far the highest in the major period (generally 1948–1967) in Bulgaria and Rumania for group 1 (mining, power, and heavy industries), as a whole. These countries also rank highest for the rate of growth of total industrial output. The rate for Hungarian labor productivity achieved in chemicals was exceptional (11.2 percent, 1955–1967). In group 2 (lumber, paper, and light industries) East Germany and Czechoslovakia rank first, and Hungary is first in rate of growth of labor productivity in group 3.

Taking into consideration the two sub-periods shown in Table 14 and 15, the situation changes only slightly, and for the most part only in group 2, where the recent growth rate of labor productivity of Yugoslavia was highest in 1960–1967. Yugoslavia also ranked first in this period in rate of growth of labor productivity in food processing and tobacco.

Output per unit of capital input and combined inputs (shown also on Tables 13 through 15) is available only for three countries, namely, Bulgaria, Czechoslovakia, and Hungary. While economic progress can be analyzed on the basis of an observed rapid growth in labor productivity, no such generalization can be made here, and thus, due to our limited data, we provide the findings without further detailed comments.

TABLE 13.—*Growth rates of output per unit of labor, capital, and combined labor and capital inputs, by branches, 1948–67 (average annual compound rates)*

[I=1948–67, II=1949–67, III=1950 67, IV=1952–67, V=1955–67]

	Output per unit of labor							Output per unit of capital			Output per unit of combined inputs		
	Bulgaria	Czechoslovakia	East Germany	Hungary	Poland	Rumania	Yugoslavia	Bulgaria	Czechoslovakia	Hungary	Bulgaria	Czechoslovakia	Hungary
	III	I	V	V	III	III	IV	III	I	V	III	I	V
1. Mining, power, and heavy industry:													
Electric power	10.7	5.1	4.5	2.5	8.3	7.1	9.1	7.1	0.7	−0.9	7.6	1.4	0.4
Mining, including fuels	6.2	3.0	1.3	.2	.6	3.4	4.7	−6.1	−1.8	−10.0	1.6	.9	−3.2
Primary metal industries	(1)	2.9	1.4	2.6	(1)	7.8	(1)	(1)	−2.0	−2.7	(1)	.3	.8
Ferrous metals	4.2				5.5		6.0	8.8			−2.1		
Nonferrous metals	3.9				4.5		4.9	1.7			2.8		
Machinery and transport equipment	8.8	1.8	4.4	1.1	5.4	9.3	3.4	5.3	−.1	−2.8	8.1	1.2	.3
Chemicals and rubber	8.2	6.7	6.6	11.2	5.7	8.2	6.0	2.9	.9	5.3	4.8	3.5	8.2
Building materials	2.8	8.5	3.7	3.9	4.2	7.0	3.3	3.8	2.6	−3.0	1.2	5.9	1.5
Subtotal, group 1	6.9	2.8	4.0	3.2	3.1	6.9	4.6	1.5	−1.0	−2.8	4.7	1.1	1.1
2. Lumber, paper, and light industry:													
Lumber and wood products	1.7	8.2	3.1	3.6	6.2	−3.6	3.5	−3.7	5.7	−.5	1.0	7.3	2.9
Paper and allied products	4.5	1.6	4.3	4.9	3.6	2.6	6.9	−4.5	−1.3	1.7	−1.0	.1	3.9
Textile mill products	4.0	2.4	2.6	1.7	3.7	2.5	2.2	1.3	1.0	−.5	3.1	1.8	3.6
Leather and fur processing	4.6	1.7	5.5	−1.5	6.9	3.6	2.8	2.3	1.4	−4.2	4.3	1.6	−.6
Apparel and related products	(1)	6.5	6.5	2.1	3.4	4.1	(1)	(1)	4.8	−2.3	(1)	6.3	.2
Printing	1.6	1.1	2.7	4.8	(1)	−5.9	(1)	−2.2	−1.5	1.0	.7	.4	4.3
Glass, ceramics, and others	2.0	3.4	2.6	1.4	−1.2	4.5	(1)	−2.8	2.3	−3.4	.6	.3	1.3
Subtotal, group 2	.9	3.2	4.6	2.3	2.9	1.0	2.9	−1.4	1.7	−.4	1.2	2.7	1.8
3. Food processing and tobacco	2.0	2.7	1.4	5.9	1.8	5.2	5.6	2.5	.8	2.4	2.2	2.2	2.3

[1] Not available.

TABLE 14.—*Growth rates of output per unit of labor, capital, and combined labor and capital inputs, by branches, 1948–60 (average annual compound rates)*

[I=1948–60, II=1949–60, III=1950–60, IV=1952–60, V=1955–60]

	Output per unit of labor						Output per unit of capital			Output per unit of combined inputs		
	Bulgaria III	Czechoslovakia I	Hungary V	Poland III	Rumania III	Yugoslavia IV	Bulgaria III	Czechoslovakia I	Hungary V	Bulgaria III	Czechoslovakia I	Hungary V
1. Mining, power, and heavy industry:												
Electric power	9.7	5.9	0.6	10.6	8.7	9.6	7.7	1.5	−0.7	8.0	2.3	−0.3
Mining, including fuels	5.6	3.6	−3.7	−.1	3.2	4.0	−3.7	−1.0	−11.7	3.3	1.8	−3.6
Primary metal industries	(1)	4.2	4.5	(1)	8.2	(1)	(1)	−.2	−.8	(1)	2.1	2.3
Ferrous metals	3.9			7.7		9.2	−9.4			−1.3		
Nonferrous metals	3.9			5.0		5.3	4.9			4.3		
Machinery and transport equipment	9.8	2.8	2.0	7.5	12.1	3.1	8.0	2.4	−1.2	−1.9	2.7	1.4
Chemicals and rubber	6.4	7.8	5.9	7.6	7.2	4.8	6.1	2.0	2.8	6.3	5.1	4.5
Building materials	1.6	9.0	4.7	6.0	6.5	2.7	−4.3	2.8	0	.5	6.7	3.7
Subtotal, group 1	6.9	4.2	3.4	3.9	7.2	4.5	3.3	1.2	−2.8	5.6	3.0	.7
2. Lumber, paper, and light industry:												
Lumber and wood products	2.7	6.3	4.2	6.4	−6.4	.8	−2.0	2.1	2.0	2.2	5.5	4.0
Paper and allied products	.8	1.4	3.5	4.9	1.1	6.4	−1.8	−1.8	.6	−.2	.3	2.6
Textile mill products	4.1	3.6	.3	4.3	2.4	2.0	5.1	2.4	.1	4.3	3.1	.3
Leather and fur processing	5.5	2.1	3.8	9.4	3.1	3.6	6.0	1.3	−6.6	5.5	1.9	−1.1
Apparel and related products	(1)	9.9	3.5	3.7	3.4	(1)	(1)	10.6	−1.7	(1)	10.0	−.8
Printing	.3	2.2	4.9	(1)	−4.2	(1)	−5.2	−2.2	3.4	−1.0	1.0	4.7
Glass, ceramics, and others	3.2	4.4	1.7	−2.0	4.9	(1)	3.3	4.4	7.7	2.9	4.4	1.8
Subtotal, group 2	.5	3.4	2.2	2.8	−.3	1.9	1.4	4.5	1.9	1.6	3.0	2.0
3. Food processing and tobacco	1.0	3.8	4.2	.9	6.6	3.1	4.4	3.7	−.9	2.0	3.8	2.5

[1] Not available.

TABLE 15.—*Growth rates of output per unit of labor, capital, and combined labor and capital inputs, by branches, 1960–67 (average annual compound rates)*

	Output per unit of labor							Output per unit of capital					Output per unit of combined inputs				
	Bulgaria	Czechoslovakia	East Germany	Hungary	Poland	Rumania	Yugoslavia	Bulgaria	Czechoslovakia	East Germany	Hungary	Poland	Bulgaria	Czechoslovakia	East Germgny	Hungary	Poland
1. Mining, power, and heavy industry:																	
Electric power	12.2	3.8	4.2	6.1	5.0	4.7	8.5	6.4	−.8	−1.9	−1.0	−0.3	7.1	−0.2	−0.6	1.0	0.7
Mining, including fuels	7.1	1.9	.7	1.8	1.8	3.6	5.4	−9.6	−3.1	−7.9	−8.9	−3.2	−.7	−.6	−3.6	−2.9	−.4
Primary metal industries	(1)	1.5	1.2	3.5	(1)	7.2	(1)	(1)	−5.1	−4.2	−4.0	(1)	(1)	−2.6	−.7	−.2	(1)
Ferrous metals	4.5				2.4		2.3	−7.9				−1.1	−3.4				.7
Nonferrous metals	3.9				3.7		4.6	−2.9				0	.6				1.9
Machinery and transport equipment	7.5	.2	2.7	.1	2.5	5.4	3.8	1.6	−4.5	−2.8	−4.0	0	6.0	−1.4	1.8	−.4	1.9
Chemicals and rubber	8.4	4.0	6.7	15.2	4.8	9.5	7.3	−1.6	−1.5	2.3	7.2	−1.3	2.6	1.0	5.0	11.0	.9
Building materials	4.5	7.6	3.5	3.2	2.6	7.6	3.7	−3.1	1.6	−5.5	−5.1	−1.6	2.3	4.4	−.1	0	.5
Subtotal, group 1	6.9	.5	3.3	3.3	2.4	6.6	5.9	−1.1	−4.7	−2.9	−2.8	−1.1	3.7	−2.1	1.1	1.4	.9
2. Lumber, paper, and light industry:																	
Lumber and wood products	.4	11.6	1.5	3.2	5.9	.2	6.7	−6.1	7.7	−4.7	−2.3	3.2	−.6	10.6	.5	.3	5.2
Paper and allied products	10.0	1.3	4.5	5.9	1.8	4.8	7.4	−8.5	−2.8	−1.5	2.5	−1.1	−2.2	−1.0	2.1	4.8	.5
Textile mill products	3.9	.4	5.2	2.6	2.8	2.6	2.3	−4.1	−1.5	−1.1	−1.8	1.6	1.5	−.5	3.6	6.1	2.4
Leather and fur processing	3.3	1.5	4.7	.1	3.4	4.3	1.9	−2.8	4.0	1.4	−2.4	−.1	2.6	1.1	4.1	−.3	2.8
Apparel and related products	(1)	1.0	6.1	1.2	2.9	5.0	(1)	(1)	−4.5	−.8	−2.8	−.1	(1)	.3	5.7	.8	2.7
Printing	3.5	−.7	1.9	4.7	(1)	4.5	(1)	1.9	−.4	−5.0	2.3	(1)	3.0	−.6	.7	3.9	(1)
Glass, ceramics, and others	.2	1.9	1.8	1.2	.3	4.0	(1)	−9.2	−1.2	−5.8	−11.5	−3.0	−2.7	.6	0	.9	−1.5
Subtotal, group 2	1.6	3.0	4.1	2.4	3.0	2.9	4.1	−5.2	3.5	−2.2	−2.1	.8	.6	2.2	2.7	1.7	2.4
3. Food processing and tobacco	3.5	.7	2.0	7.1	3.2	3.1	8.6	.3	−1.2	−1.7	4.7	.8	2.4	−.3	.7	6.2	2.2

[1] Not available.

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APPENDIX A

METHODOLOGY

The growth of Eastern European industrial output was measured by independently calculated indexes of industrial production for 1938, and 1946–1967. The basic reason for independent calculations is that the gross output and material product measures officially published for Soviet-type economies differ in methodology or lack adequate description. Recognition of statistical inadequacies has led some Eastern European statistical agencies (e.g. in Hungary, 1957 and 1959) to publish alternative net measures.[1]

The industrial production indexes published by the Research Project on National Income in East Central Europe rely entirely on Eastern weights, mostly for the year 1956 (except for East Germany and Rumania, for which later years' weights were used). These indexes are based on representative, sample series of products expressed in physical or conventional units and combined into indexes by weights.[2] The summary index was built up in three stages. At the highest level of aggregation, the weights are the sums of wages and salaries plus returns to industrial fixed capital. Subgroups were aggregated into branches (groups) on the same basis, but with labor weights only.

At the first level of aggregation, wholesale prices were applied to individual commodities. Actually, the most serious drawbacks occurred here. Due to lack of product prices these were either estimated on the basis of early postwar prices (Czechoslovakia) or foreign trade prices (Bulgaria). Finally, in the most recently calculated indexes (East Germany and Rumania), 1958 Hungarian average unit price weights were assigned for the primary aggregation of individual products into indexes of industrial subgroups. The choice of 1958 Hungarian price weights for calculating the subgroup indexes was governed by the fact that, while indigenous data were lacking, a consistent set of Hungarian data for that (base) year was available for an adequately large number of products.

The extent of the possible bias caused by a substitute system of weights, commonly used by Western economists in measuring Soviet industrial expansion, was also tested by the recalculation of the growth of a rapidly recovered Western economy, the Federal Republic of Germany. In this case, little correlation was found between the growth and the relative under- or over-valuation by the substitute weighting system. In other words, the results obtained by gross value added weights or by wages and salaries were in reasonable agreement.[3]

As a second step for this study, all the countries' industrial output indexes were recalculated on the basis of 1960 branch weights. This involved an aggregation of branch outputs, each weighted by compensation of employees (wages and salaries paid in 1960) plus an assumed 10 per cent average rate of return to fixed capital. This imputed return to capital, calculated in proportion to the value of fixed assets, was added to labor costs in the individual branches of industry in an attempt to approximate full factor cost weights for our calculated index. Of course, actual marginal productivity of capital probably varied considerably, but it could not be estimated directly, and the application of a uniform rate of return seemed preferable to other possible procedures.

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[1] *See* Ottó Lukács and Zoltán Román, "Az ipar nettó termelési indexének felülvizsgálata (A Revision of the Index Number of Net Industrial Output)," *Statisztikai szemle,* vol. 37, no. 5, May 1959, pp. 475–496. With a summary in English.

[2] Except Hungary where the Revolution and the supporting general strike gives distortions in 1956–1957 data.

[3] See Gregor Lazarcik and George J. Staller, *A New Index of Czechoslovak Industrial Output, 1937 and 1947–1965.* (Occasional paper, 24.) 1968, pp. 15–16.

APPENDIX B

NOTES AND SOURCES FOR TABLES

A. General: Indexes of Industrial Output

Industry branch data were taken from publications and manuscripts to be published by the Research Project on National Income in East Central Europe at Columbia University (Occasional papers—OP) as follows:

Bulgaria: Gregor Lazarcik and Alexej Wynnyczuk, *Growth of Industrial Output*, 1939 and 1948–1965, OP–27, 1968. Updated for 1966–67.

Czechoslovakia: Gregor Lazarcik and George Staller, *A New Index of Czechoslovak Industrial Output, 1937 and 1947–1965*, OP–24, 1968. Updated for 1966–67.

East Germany: *Growth of East German Industrial Output, 1936, 1948, and 1950–1967*, MS to be published.

Hungary: Laszlo Czirjak, *Indexes of Hungarian Industrial Production, 1938 and 1946–1965*, OP–16, 1968. Updated for 1966–1967.

Poland: Maurice C. Ernst, *Indexes of Polish Industrial Production, 1937–1960*, OP–5, 1965. Updated 1960–67.

Rumania: *Indexes of Rumanian Industrial Output, 1938, 1948, and 1950–1967*, MS to be published as a revised version of OP–10, awaiting publication.

In addition, the Yugoslav official industrial production indexes were taken directly from statistical yearbooks. (See Bibliography, p. 460.)

B. Employment

Industrial employment data were taken from the following sources:

Czechoslovakia: Gregor Lazarcik, *Czechoslovak Gross National Product by Sector of Origin and by Final Use, 1937 and 1948–1965*, OP–26, 1969, updated for 1966–1967.

Hungary: Laszlo Czirjak, *Hungarian Economic Development as Revealed by Production Indexes, 1938 and 1946–1967*, MS to be published.

For all the other countries official data from statistical yearbooks were taken directly.

C. Capital

Bulgaria: Gross fixed capital series were taken from statistical yearbooks (Bulgaria, Tsentralno statistichesko upravlenie, *Statisticheski godishnik*) 1962, p. 117; 1963, p. 121; 1966, p. 104; and 1968, p. 131.

Czechoslovakia: As above in A.

East Germany: Germany (Democratic Republic). Staatliche Zentralverwaltung für Statistik. *Statistisches Jahrbuch der Deutschen Demokratischen Republik*, 1968, pp. 56–57.

Hungary: As above in A.

Poland: Główny urząd statystyczny. *Rocznik statystyczny inwestycji i środków trwałych, 1946–1966 and 1967.*

Rumania: Direcţia centrală de statistică. *Anuarul Statistic al Republicii Socialiste România, 1968*, p. 118.

D. Western Countries

In East-West comparisons the following 15 Western countries are enumerated: Austria, Belgium, Canada, France, Germany, Italy, Japan, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States. See OECD, *Industrial production; supplement to "Main economic indicators,"* 4th quarter, 1967, pp. 8–9, 18–21, 24–27; and, *ibid.*, 1st quarter, 1969, pp. 19, 20, 24, and 27.

GROWTH OF OUTPUT, EXPENSES, AND GROSS AND NET PRODUCT IN EAST EUROPEAN AGRICULTURE

By GREGOR LAZARCIK*

CONTENTS

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APPENDIXES

TABLES

I. INTRODUCTION

Agriculture had and still has an important role in the national economic development of Eastern European countries.[1] Until recently, agriculture was the largest economic sector in most of the Eastern European countries. In 1967 about 39 percent of the total economically

[1] In the present study Eastern Europe includes Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, Rumania, and Yugoslavia.

active population in Eastern Europe was in agriculture. The percentages for individual countries were as follows: [2]

	Agriculture as percent of total	
	Economically active population (1967)	GNP (1965–67)
Bulgaria	46	18.2
Czechoslovakia	18	12.1
East Germany	17	8.8
Hungary	29	20.1
Poland	39	24.2
Rumania	60	23.4
Yugoslavia	56	20.8

The employment figures exaggerate the relative economic importance of agriculture because the output per active person in agriculture ranges somewhere between one-third and one-half of that in industry. In terms of final output, agriculture's contribution to the GNP is substantially smaller than its employment share would indicate. The very large percentages of active population in agriculture in the majority of these countries, however, indicate an enormous potential of human resources that can be drawn upon to sustain rapid industrialization. Indirectly, such a trend should result in higher output per active person in agriculture and an improvement in the levels of living.

After a three to five-year reconstruction period following World War II, all of the developing countries of Eastern Europe showed an intense interest in rapid industrialization expressed in their Five-Year plans. The problem of financing industrialization arose. It was obvious that agriculture, being the largest sector of these economies, had to carry the heaviest burden in the initial phase until the industry was able to generate adequate profits to sustain its continued growth. Because of rural overpopulation,[3] productivity and incomes in agriculture were so low in most of these countries (except East Germany, western Czechoslovakia, and parts of Hungary) that the bulk of their population lived at subsistence level, and only a very small surplus was available to support industrialization. The Communist governments of Eastern Europe concluded that their aims of control over output and improvement in agricultural productivity could best be achieved through large-scale, centrally controlled, collectivized agriculture. A gradual collectivization of private farms started around 1949 and was stepped up in the following years. By 1953, however, agricultural production did not show any tangible improvement, and the drive for collectivization was relaxed until 1956. Yugoslavia took the lead and dissolved almost all collectives in 1953, while Poland—where collectivization was moving at the slowest pace (at the peak in 1955 only 9 percent of agricultural land was in collectives)[4]—decided in a dramatic

[2] Source: U.S. Bureau of the Census cited *in* U.S. Congress, Joint Economic Committee. *Soviet Economic Performance: 1966–67*, Washington, U.S. Government Printing Office, May 1968, p. 20. For GNP see Table 24.

[3] For a detailed discussion of the problem of agricultural overpopulation, see Wilbert E. Moore, *Economic Demography of Eastern and Southern Europe*, Geneva, League of Nations, 1945.

[4] See Poland Głowny urząd statystyczny. *Rolniczy rocznik statystyczny, 1945–1965*, Warsaw, 1966, p. 46.

move to decollectivize in the fall of 1956. Since that time the few remaining collective farms account for about 1 percent of agricultural land in Poland and only 0.2 percent in Yugoslavia.[5] Thus these two Communist countries have a unique dual system: a socialized system in all non-agricultural sectors of the economy; while the bulk of agricultural resources, comprising about 86 percent of agricultural land, is in private ownership and management in each country; the remaining 14 percent is owned and managed by the state.

All other Communist countries of Eastern Europe followed the Soviet example of the 1930's with respect to agriculture. After 1956 the governments' pressures to collectivize were resumed and accelerated. By the end of the 1950's or the beginning of the 1960's, depending on the country, the socialization process was essentially completed by the transfer of the bulk of private farms into collectives or state farms. In 1967 the share of socialized agricultural land (in collective and state farms) in the total was as follows (in percentages): 92 in Bulgaria,[6] 88 in Czechoslovakia,[7] 85 in East Germany,[8] 84 in Hungary,[9] and 85 in Rumania.[10] Private plots of collective farmers are not included in the socialized sector, but with private farms.

As a result of these two diametrically opposed governmental policies toward agriculture, two groups of countries in Eastern Europe can be distinguished: (1) countries with predominantly socialized agriculture (with only 8 to 16 percent of agricultural land in private holdings)—Bulgaria, Czechoslovakia, East Germany, Hungary, and Rumania; and (2) countries with overwhelmingly private agriculture (with about 14 percent of total agricultural land in state ownership and only a fraction of one percent of the land in collective farms)—Poland and Yugoslavia.

These unique conditions permit us to undertake a comparative study between two types of agricultural systems in Eastern Europe: socialized versus private. Yet both types operate in these Communist countries under a more or less uniform centrally planned economic system, excepting Yugoslavia, which has undergone significant decentralization. In the following pages the post-World War II comparative agricultural performance of Eastern Europe will be analyzed with the aid of statistical tables. This will be done by country, by groups of countries (socialized versus private agriculture), and regionally. The two groups of Eastern Europe will be compared with Western Europe in an attempt to better appraise their growth performance. All postwar data are related to prewar levels in order to discern the progress or lack of it in relation to a "normal" prewar period.

In this basically statistical study several aspects of comparative agricultural growth are presented: (1) the more important production and input measures, (2) production per capita, (3) changes in productivity

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[5] See Poland, Głowny urząd statystyczny, *Rocznik statystyczny 1968*, Warsaw, 1968, p. 216, and Yugoslavia, Savezni zavod za statistiku, *Statistički godišnjak SFRJ. 1967*, p. 146.

[6] Bulgaria, Tsentralno statistichesko upravlenie, *Statisticheski godishnik 1968*, Sofia, 1968. p. 191.

[7] Czechoslovakia, Státní statistický úřad, *Statistická ročenka ČSSR 1968*, Prague, 1968, p. 301.

[8] Germany (Democratic Republic). Staatliche Zentralverwaltung für Statistik, *Statistisches Jahrbuch der Deutschen Demokratischen Republik, 1968*, Berlin, 1968, pp. 255–57.

[9] Hungary, Központi statisztikai hivatal, *Statisztikai évkönyv 1967*, Budapest, 1968, p. 146.

[10] Rumania, Direcţia centrală de statistică, *Anuarul statistic al Republicii Socialiste România 1968*, Bucharest, 1968, p. 252.

of land and labor in agriculture, (4) some aspects of progress in mechanization and levels of agricultural investment, and (5) a more detailed account of output, input, and productivity ratios in Czechoslovak agriculture. The results of the study thus afford a critique of the announced Communist economic rationale behind collectivization: greater and more efficient production than private farming could provide. Indeed, the proclaimed rationale may have been only a part of their real short term purpose: to control the resources of agriculture and thus extract a surplus even at the expense of productivity. Whether such control does enhance productivity and growth for the economy as a whole is now being seriously questioned in Eastern Europe, and various reforms featuring some degrees of decentralization are being implemented to try to reactivate producers' interest in efficiency. Our examination of agricultural performance should provide some reflections on this question.

II. Concepts and Methods

A. General Definitions and Remarks

The definition of agriculture as an economic sector used throughout this study for all countries under consideration refers to all economic activities which the United Nations system classifies as "major group 01" in the *International Standard Classification of all Economic Activities.*[11] It should be noted that forestry, fishing and hunting are not included in agriculture, as may be the case in some U.N. statistics. The coverage of our data ranges from 95 percent for Yugoslavia to almost 100 percent for Czechoslovakia, Hungary, and Poland. To insure the comparability of the statistical measurements among Eastern European countries as well as between different regions (Eastern and Western Europe), the standard definitions and methods for classification and coverage developed and used by the Food and Agriculture Organization of the United Nations are followed as closely as possible.[12]

Since the official Eastern European production measures differ from those used by FAO, or are non-existent, an independent, uniform calculation of all relevant measures was made by the Research Project on National Income in East Central Europe at Columbia University.[13] The statistical results of this paper for Eastern Europe are based on these newly constructed series. Our indexes and other summary measures are based on physical quantity series consisting of between 80 to over 100 individual products for each country. The necessary data were compiled from official publications and statistical yearbooks of respective countries. In general, the basic data are consistent enough throughout the area to permit meaningful aggregation and comparisons. Wherever necessary, adjustments were made to comply with uniform standards used by the United Nations. All these countries have official statistical services that collect and evaluate agricultural production data. On the whole, the techniques they use in estimating production do not differ significantly from those used in

[11] U.N. Statistical Papers, Series M, no. 4, rev. 1. New York, 1958, p. 6.
[12] U.N. Economic Commission for Europe, *Agricultural Sector Accounts and Tables, A Handbook of Definitions and Methods*, Geneva, December 1956.
[13] For its publications on agriculture, see Appendix I, Notes and Sources, p. 525.

Western Europe and in the United States. Unlike the U.S.S.R., which used to report its harvest in terms of gross "biological yield," the Eastern European countries report their production in terms of the actual "barn yield," net of losses incurred during harvesting, hauling, and threshing.[14] The official data on production of agricultural commodities seem to meet the test of internal consistency; no major deficiency was found by cross-checking the data.[15] However, the reliability of the basic raw data depends largely on the impartiality and competence of the primary sample-taking agents. In certain instances there have been indications of an upward bias in some reported statistics for certain years. Unfortunately, we have no means to test the degree of their partiality. The question of impartiality and competence in data reporting applies to non-Communist countries as well.

B. WEIGHTING SYSTEM AND BASE PERIOD

To facilitate international comparisons, the measures of agricultural performance should be expressed in terms of a common system of prices or other weights. The best available uniform weights for Eastern Europe seemed to be the Western European wheat-based price relatives devised and used by the Food and Agriculture Organization of the United Nations for the calculation of agricultural production in Western Europe. In the absence of separate regional weights for Eastern Europe, the FAO Western European weights were used as adequate, though not perfect, approximations for the aggregation of agricultural output. These regional price relatives of agricultural products are the arithmetic averages of all of the national wheat-based price relatives weighted by the respective country's production of the farm products concerned. The national wheat-based price relative consists of the national producer price of the product expressed as a percentage of national producer price of an equal weight of wheat. In most cases the prices represent averages of producer prices for the 1952–56 period. Wheat-based world weights were used for a few commodities for which regional weights were lacking. FAO uses world weights for the Soviet Union and Eastern Europe combined. Though such use may be justified for a very large country such as the U.S.S.R., for Eastern Europe it seems more appropriate to use the regional weight of neighboring Western Europe with more similar agricultural conditions.[16]

The FAO regional weights were used for the calculation of agricultural output (to be defined later). All other related measures of performance (i.e., total production, operating expenses, gross product, depreciation, and net product of agriculture) were derived from output (calculated in terms of wheat-based price relatives) on the basis of percentage relationships of these measures for each country and each

[14] For a detailed discussion concerning the differences between barn yield and biological yield see Naum Jasny, *The Socialized Agriculture of the USSR,* Stanford, Stanford U. Press, 1949, p. 775.

[15] For some of the minor differences in data reporting, see U.S. Department of Agriculture, Economic Research Service, *Agricultural Statistics of Eastern Europe and the Soviet Union, 1950–66* (ERS–Foreign, 252) February 1969, pp. 1–9.

[16] The Western European wheat-based weights used for our calculations appear in U.N. Food and Agriculture Organization, *Production Yearbook 1966,* vol. 20, pp. 648–49.

year calculated in each country's constant prices paid to or by producers for their products or production requisites.[17] This system of valuation takes into account the differences in relative scarcities in each country, especially with respect to inputs from outside of agriculture; and at the same time it permits the expression of all measures in terms of uniform wheat-based price relatives (wheat units) for all countries and regions. The index numbers are computed by a modified Laspeyre's formula[18] using the FAO Western European regional wheat-based price relatives, described above, as weights.

The time comparison base period chosen in this study for index numbers is the prewar five-year average, 1934–38, whenever possible.[19] The use of a five-year average seems to be adequate to smooth out seasonal fluctuations due to weather conditions.

C. DEFINITIONS OF PRODUCTION AND INPUT MEASURES

1. Total crop and animal production

This gross measure includes the production of all crops and pasture and all animal products including livestock inventory changes, before any allowances are made for uses for further agricultural production. This concept contains all intermediate produce: fodder crops, feed, seeds, eggs used for hatching, and milk fed to calves, all of which are re-employed in the agricultural sector and thus constitute an element of duplication. Total production is measured at the farm level (adjusted for harvesting losses, i.e. in terms of "barn yield") for each calendar year. This measure is the same as "gross agricultural production" calculated in all Eastern European countries as well as in Luxemburg, Switzerland, and most Latin American and Asian countries where various terminology is used.[20] The latter term is not suitable because its meaning in the United States is different.[21] Thus to avoid confusion the term "total crop and animal production" is used here because it describes clearly the coverage of production, and because the term "total crop production" is being used by many OECD countries including the United States.[22] However imperfect, this first gross measure represents a starting point from which other, economically more useful measures of agricultural performance are calculated. Since all Eastern European countries calculate this measure, it is used to check and compare with their officially published "gross agricultural production."

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[17] The national weights used were as follows: Bulgaria, 1939 leva; Czechoslovakia, 1956 crowns; East Germany, 1965 marks; Hungary, 1955 forints; Poland, 1956 zlotys; Rumania, 1938 lei; Yugoslavia, 1964 dinars; Western Europe, 1959 U.S. dollars.

[18] The formula is:

$$\frac{\Sigma P_k Q_i}{\Sigma P_k Q_k},$$

where P_k represent the selected constant prices, Q_k the quantities of the base year, and Q_i the quantities of the given year.

[19] Because of lack of data the base for Bulgaria is the year 1939, for Rumania 1938, and for Yugoslavia the 1936–39 average.

[20] U.N. Food and Agriculture Organization, Meeting on Index Numbers of Food and Agricultural Production, *National Indices of Agricultural Production*, Rome, 1956, pp. 2–7.

[21] In the U.S.A., "gross farm production measures the production of all crops and pasture consumed by all livestock, and the product added in the conversion of feed and pasture into livestock and livestock products for human use and into farm-produced horse and mule power." See U.S. Dept. of Agriculture, *Agricultural Statistics* 1952, p. 661.

[22] Organization for European Economic Cooperation, *OEEC Statistical Bulletins: Definitions and Methods*, pt. IV, Paris, 1955, p. 13.

2. Intermediate produce

This is the part of total agricultural production that is utilized on farms to further production, and it includes products returned to farms in the form of by-products of the food industry to be used for livestock feeding. Items included in intermediate produce are: feed, litter, seed, manure, farm inventory losses thereof, milling offals produced from grain and oilcake made from oilseeds sold by agriculture and then bought back for feeding livestock, brewers' by-products, and skim milk. Estimation of intermediate produce is a prerequisite for the calculation of agricultural output.

3. Agricultural output

In this study agricultural output is defined as end-use output from agriculture available for human consumption and industrial use, plus changes in stocks, work in progress, and farm investment in kind by farmers' own efforts. These concepts are used by the U.N. economic organs to calculate agricultural output in Western European countries [23] and by the OECD member countries [24] in full coordination with the FAO. The U.S. Department of Agriculture uses a similar concept under "farm output," differing only in that it omits farm investment in kind.[25]

The FAO indexes of agricultural production published in its yearbooks omit changes in stock and farm investment in kind.[26] In Eastern Europe only Poland and Yugoslavia publish an index of output.

In this study the output of agriculture is calculated by subtracting from total crop and animal production all intermediate products utilized on farms in further production. The physical quantities of output are then aggregated by the FAO wheat-based weights discussed above.

4. Current Operating Expenses and Depreciation

Current operating expenses are defined here as the total quantity of all goods and services bought by the agricultural sector from all nonagricultural sectors and from abroad and used up in the production of agricultural output. The items included in expense are: expenditures on imported feed, including feed manufactured from imported commodities, handling charges on interfarm sales, fertilizers, pesticides, fuel and lubricants, electricity, maintenance and repairs of farm buildings, machinery and equipment provided by the nonagricultural sectors, and all other miscellaneous expenses of the agricultural sector not accounted for elsewhere.[27]

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[23] U.N. Economic Commission for Europe, *Output, Expenses, and Income of Agriculture in European Countries*, 1st, 2nd, 3rd, 4th and 5th Report, 1953, 1955, 1958, 1961, and 1965.
[24] Organization for European Economic Cooperation, *The Measurement of Agricultural Production and Food Consumption*, Paris, 1955, p. 15.
[25] U.S. Dept. of Agriculture, *Major Statistical Series of the U.S. Department of Agriculture; How They Are Constructed and Used* (Agriculture handbook, 118), vol. 2: *Agricultural Production and Efficiency*, 1957, pp. 27–31.
[26] U.N. FAO, *Production Yearbook 1966*, pp. 647–58.
[27] U.N. ECE, *Agricultural Sector Accounts*, p. 10.

Depreciation is here defined and calculated as the current charge to take account of wear and tear and obsolescence of capital goods servicing agriculture. The annual charge is based on the cost of replacing the assets at the end of the estimated economic lifetime of each asset. Straight line depreciation is used for the estimation of this charge.

Calculations of expenses and depreciation are necessary for the estimation of the gross and net product of agriculture, i.e., the value added by agriculture. The magnitude and trend of production expenses indicate the extent to which the agricultural sector depends on the nonagricultural sectors for its production requisites.

5. Gross Product and Net Product

The gross product of agriculture is the gross value added by productive activity within the agricultural sector to the value of materials and services which are obtained from outside of the agricultural sector. Thus it is the contribution of the agricultural sector to gross national product.[28]

In this study the gross product of agriculture is obtained from agricultural output by subtracting current operating expenses. The gross product is directly affected by prices received by farmers for products and prices paid for production expenses. These prices contain elements of indirect taxes and subsidies. A part of indirect taxes, consisting of turnover tax, is included in the price of purchased inputs. Thus this part of indirect tax is already subtracted from gross product through its inclusion in the prices of operating expenses. The turnover tax realized on eventual sales to consumers is made possible in the first instance by the lower prices paid to farmers for their products, and it is also implicitly already subtracted from the gross product. Consequently, the gross product of agriculture is more or less net of indirect taxes.

Subsidies received by collective and state farms in the form of lower prices (i.e., lower than for private farmers) paid for their inputs are reflected in their gross product. However, the subsidies consisting of direct grants to state farms, collectives, and machine-tractor stations are not included in the gross product. It was impossible to estimate these direct subsidies for all Eastern European countries, and therefore they could not be added to the gross product which, as a consequence, is not expressed fully—either at market prices or at factor cost prices as used in Western Europe. This omission has some effect on rate of change in gross product over time. Also, the absolute level of gross product is lower than that valued at factor cost by the amount of direct subsidy. In fact, the gross product in Eastern Europe is valued at prices administered by respective governments.

Although we use "wheat-based" price relatives to make our output and other measures commensurate within Europe, the relative sizes of total production, output, expenses, and gross and net value added in

[28] *Ibid.*, p. 7.

each year for the countries of Eastern Europe are determined in relation to output on the basis of studies for each country in its own prices. Thus, although we apply international wheat-based price relatives for the sake of commensurability, the price regimen of each country is reflected in our results. In particular, the incidence of turnover tax on items of current operating expenses, subsidies via differential pricing of inputs as between socialized and private sectors in a given country, and subsidies via pricing of state purchases do enter our statistical results.

The net product of agriculture is the gross product as defined above minus an allowance for using up fixed capital in the production process, in short, depreciation. It is the contribution of the agricultural sector to net national product or net value added by the sector.[29]

III. Growth and Structure of Production

A. Performance of Socialized versus Private Agriculture

The various measures of production and expenses for individual countries, groups of countries, and Eastern Europe as a whole, calculated according to the methods outlined above, are summarized in Tables 1 to 4. Data for Western Europe are given for regional comparisons with Eastern Europe. The data in Table 1 showing year-by-year performance of Eastern Europe as a whole and of two groups of countries—one with predominantly socialized agriculture, the other with overwhelmingly private agriculture—show the following results:

[29] *Ibid.*, p. 8.

TABLE 1.—*Eastern Europe: Indexes of total agricultural production, output, expenses, gross product, depreciation, and net product*

[1934-38=100]

	1934-38	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
A. Countries with socialized agriculture: [1]											
1. Total crop and animal production	100.0	71.3	75.5	79.9	95.1	88.5	95.7	93.6	97.4	97.2	108.4
2. Intermediate produce	100.0	74.4	77.1	81.4	103.4	89.6	106.5	103.0	94.9	105.2	111.4
3. Output of agriculture	100.0	69.8	74.7	79.2	91.2	88.0	90.6	89.2	98.5	93.4	104.0
a. Output of crops	100.0	78.5	81.3	86.3	102.4	88.2	105.5	89.0	101.5	89.5	105.2
b. Output of animal products	100.0	62.6	69.4	73.4	82.0	87.9	78.5	89.4	96.1	96.6	103.0
4. Current operating expenses	100.0	96.6	107.4	121.4	138.1	137.7	150.2	165.0	180.7	198.1	215.1
5. Gross product	100.0	67.5	72.0	75.7	87.3	84.0	85.7	83.0	91.7	84.9	94.8
6. Depreciation	100.0	93.7	102.1	109.4	112.9	119.4	118.5	122.2	125.8	137.9	198.8
7. Net product	100.0	66.1	70.4	73.8	85.9	82.0	83.9	80.8	89.9	82.0	89.1
B. Countries with private agriculture: [2]											
1. Total crop and animal production	100.0	91.7	96.7	93.6	93.3	89.1	99.4	99.9	108.7	107.3	120.1
2. Intermediate produce	100.0	95.5	95.0	87.6	83.8	78.7	90.9	93.4	98.5	103.4	114.0
3. Output of agriculture	100.0	88.2	98.4	99.1	102.0	98.5	107.2	105.8	114.1	110.8	125.7
a. Output of crops	100.0	92.7	105.7	97.0	108.3	98.6	108.0	100.4	112.0	97.4	116.7
b. Output of animal products	100.0	84.0	91.4	101.1	96.1	98.4	106.5	110.8	116.0	123.6	134.2
4. Current operating expenses	100.0	131.5	127.8	133.2	132.3	144.2	147.2	142.5	159.5	167.5	191.4
5. Gross product	100.0	84.2	95.6	95.9	99.2	94.3	103.5	102.3	109.8	105.5	119.5
6. Depreciation	100.0	116.0	105.6	99.9	101.7	99.0	102.6	99.7	104.8	102.9	109.8
7. Net product	100.0	82.0	94.9	95.6	99.0	93.9	103.6	102.5	110.2	105.7	120.2
C. Total, Eastern Europe (A+B):											
1. Total crop and animal production	100.0	80.4	85.0	86.0	94.3	88.8	97.4	96.4	101.5	101.7	112.5
2. Intermediate produce	100.0	85.9	86.8	84.7	92.7	83.7	98.0	97.8	96.9	104.2	112.8
3. Output of agriculture	100.0	76.8	83.8	86.8	95.3	92.1	97.0	95.6	104.5	100.1	112.3
a. Output of crops	100.0	84.2	91.1	90.6	104.8	92.4	106.5	93.6	105.8	92.6	109.8
b. Output of animal products	100.0	70.5	77.5	83.6	87.2	91.8	88.7	97.2	103.4	106.5	114.4
4. Current operating expenses	100.0	110.9	115.8	126.2	135.7	140.4	148.9	155.8	172.0	184.4	205.4
5. Gross product	100.0	73.9	81.0	83.4	91.8	87.9	92.5	90.3	98.6	92.8	104.2
6. Depreciation	100.0	103.3	103.6	105.3	108.1	110.6	111.6	112.5	116.8	122.8	160.4
7. Net product	100.9	72.1	79.7	82.1	90.8	86.5	91.3	89.0	97.5	91.0	100.9

See footnotes on p. 474.

TABLE 1.—*Eastern Europe: Indexes of total agricultural production, output, expenses, gross product, depreciation, and net product*—Continued

	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968 [3]
A. Countries with socialized agriculture: [1]											
1. Total crop and animal production	105.6	111.3	114.9	109.8	108.7	112.0	115.7	123.6	136.2	139.7	138.3
2. Intermediate produce	104.8	110.8	116.4	105.3	106.4	107.0	108.7	118.3	135.8	137.9	136.4
3. Output of agriculture	106.0	111.5	114.1	111.9	109.8	114.3	119.0	126.1	136.4	140.6	139.1
a. Output of rops	103.3	109.2	113.0	104.5	104.8	110.7	111.8	119.7	129.9	135.3	126.1
b. Output of animal products	108.1	113.4	115.0	118.0	113.9	117.2	124.9	131.3	141.7	144.8	149.7
4. Current operating expenses	218.3	266.2	285.3	293.3	321.6	348.1	396.2	443.9	491.3	514.6	509.1
5. Gross product	96.7	98.7	100.0	97.0	92.3	95.0	96.1	99.9	107.1	109.7	108.6
6. Depreciation	141.4	171.6	200.4	220.8	233.4	245.1	254.4	239.9	263.6	275.3	272.7
7. Net product	94.3	94.7	94.5	90.2	84.6	86.8	87.5	92.2	98.5	100.6	99.6
B. Countries with private agriculture: [2]											
1. Total crop and animal production	118.5	128.4	130.8	139.4	127.8	137.9	137.6	147.4	159.3	162.4	166.4
2. Intermediate produce	108.2	121.3	125.1	129.4	125.5	127.7	131.0	135.9	150.2	152.5	156.2
3. Output of agriculture	128.0	134.9	135.9	148.6	130.0	147.2	143.7	157.9	167.7	171.4	175.7
a. Output of crops	114.5	124.6	126.9	142.9	105.1	129.8	144.3	154.4	166.2	171.1	177.6
b. Output of animal products	140.7	144.7	144.5	153.9	153.6	163.8	143.1	161.2	169.1	171.7	173.9
4. Current operating expenses	194.7	223.0	220.6	232.0	241.3	275.4	273.3	366.2	331.0	360.8	370.4
5. Gross product	121.8	126.7	128.0	140.8	119.6	135.3	131.6	138.4	152.4	153.7	157.5
6. Depreciation	109.2	115.2	113.6	109.8	106.3	115.1	114.4	150.0	160.1	164.4	168.3
7. Net product	122.6	127.5	129.0	142.9	120.5	136.7	132.7	137.6	151.9	153.0	156.8
C. Total, Eastern Europe (A+B):											
1. Total crop and animal production	111.4	118.9	122.0	123.0	117.2	123.5	125.5	134.2	146.5	149.8	150.6
2. Intermediate produce	106.6	116.5	121.1	118.4	116.8	118.2	120.8	127.9	143.6	145.8	146.6
3. Output of agriculture	114.4	120.5	122.5	126.0	117.6	127.0	128.5	138.3	148.4	152.4	153.2
a. Output of crops	107.8	115.4	118.6	120.0	104.9	118.4	124.9	133.7	144.5	149.8	146.9
b. Output of animal products	120.1	124.9	125.9	131.2	128.5	134.3	131.6	142.3	151.7	154.7	158.6
4. Current operating expenses	208.5	248.5	258.7	268.1	288.6	318.2	345.7	412.0	425.4	451.4	453.2
5. Gross product	106.3	109.4	110.7	113.7	102.7	110.4	109.6	114.6	124.4	126.5	127.2
6. Depreciation	127.5	147.2	162.9	172.9	178.5	189.0	194.0	201.1	218.9	227.5	229.8
7. Net product	105.0	107.1	107.6	110.1	98.2	105.7	104.6	109.4	118.7	120.4	121.0

[1] Bulgaria, Czechoslovakia, East Germany, Hungary, and Rumania.
[2] Poland and Yugoslavia.
[3] Preliminary.

Source: See App. I. Indexes were calculated from physical quantities weighted by FAO Western European wheat price relatives for 1952–56.

TABLE 2.—*Growth of total crop and animal production, and intermediate produce in agriculture*

	Indexes, 1934-38=100						Average annual rates of growth			
	1934-38	1948-50	1954-56	1960-62	1965-67	1968 [1]	1948-50 to 1954-56	1954-56 to 1960-62	1960-62 to 1965-67	1948-50 to 1965-67
Bulgaria:										
Production	100.0	81.4	97.7	132.3	170.5	160.1	3.2	5.2	5.2	4.4
Intermediate produce	100.0	78.2	97.9	120.3	142.9	134.5	3.8	3.5	3.5	3.6
Czechoslovakia:										
Production	100.0	83.1	96.6	102.9	110.8	124.5	2.5	1.1	1.5	1.7
Intermediate produce	100.0	84.2	99.4	93.1	95.1	109.5	2.8	−1.1	.4	.7
East Germany:										
Production	100.0	73.7	92.6	98.4	116.6	121.5	3.9	1.0	3.5	27
Intermediate produce	100.0	75.5	76.5	100.0	114.5	121.5	.2	4.6	2.7	2.5
Hungary:										
Production	100.0	80.3	95.5	109.5	129.7	128.7	2.9	2.2	3.4	2.8
Intermediate produce	100.0	79.7	96.0	103.2	119.6	108.8	3.1	1.2	3.0	2.4
Poland:										
Production	100.0	98.0	110.2	135.1	158.7	172.5	2.0	3.5	3.3	2.9
Intermediate produce	100.0	96.9	102.2	128.2	146.1	160.9	.9	3.8	2.6	2.4
Rumania:										
Production	100.0	68.2	107.0	131.4	170.1	178.9	7.8	3.5	5.3	5.5
Intermediate produce	100.0	77.4	141.5	151.7	218.0	236.8	10.6	1.2	7.5	6.3
Yugoslavia:										
Production	100.0	82.9	89.2	126.2	150.0	150.9	1.2	6.0	3.5	3.6
Intermediate produce	100.0	78.5	85.7	121.5	146.3	144.1	1.5	6.0	3.8	3.7
Countries with socialized agriculture:										
Production	100.0	75.5	96.1	111.1	133.2	138.3	4.1	2.8	3.5	3.4
Intermediate produce	100.0	77.6	101.0	109.4	130.7	136.4	4.5	1.3	3.6	3.1
Countries with private agriculture:										
Production	100.0	94.0	104.6	132.7	156.4	166.4	1.8	4.0	3.3	3.0
Intermediate produce	100.0	92.7	98.4	126.7	146.2	156.2	1.0	4.3	2.9	2.7
Total, Eastern Europe:										
Production	100.0	83.8	99.9	120.7	143.5	150.6	3.0	3.2	3.5	3.2
Intermediate produce	100.0	85.8	99.6	118.8	139.1	146.6	2.5	3.0	3.2	2.9

[1] Data for 1968 are preliminary.

Source: See App. I.

TABLE 3.—*Growth of agricultural output*

	Indexes, 1934–38=100						Average annual rates of growth			
	1934–38	1948–50	1954–56	1960–62	1965–67	1968 [1]	1948–50 to 1954–56	1954–56 to 1960–62	1960–62 to 1965–67	1948–50 to 1965–67
Bulgaria:										
Output	100.0	82.5	97.6	136.4	180.1	169.0	2.8	5.7	5.7	4.7
(*a*) Crops	100.0	81.4	88.6	119.1	164.4	130.8	1.4	2.7	6.7	4.2
(*b*) Animal products	100.0	84.0	109.6	159.7	201.0	220.2	4.5	6.4	4.7	5.3
Czechoslovakia:										
Output	100.0	82.7	95.1	108.3	119.4	132.8	2.4	2.2	2.0	2.2
(*a*) Crops	100.0	92.4	107.0	116.5	121.1	144.4	2.5	1.4	.8	1.6
(*b*) Animal products	100.0	76.9	87.9	103.3	118.4	125.8	2.3	2.7	2.8	2.6
East Germany:										
Output	100.0	72.9	90.7	97.7	117.6	121.5	3.7	.9	3.8	2.9
(*a*) Crops	100.0	100.7	91.2	91.7	102.5	101.6	−1.7	.1	2.2	.1
(*b*) Animal products	100.0	55.5	90.3	101.3	127.0	133.9	8.8	1.9	4.6	5.0
Hungary:										
Output	100.0	80.6	95.3	113.0	135.2	139.5	2.8	2.9	3.7	3.0
(*a*) Crops	100.0	92.5	103.0	103.5	128.4	132.8	1.8	.1	4.5	2.9
(*b*) Animal products	100.0	72.3	89.9	119.6	140.0	144.0	3.7	4.9	3.2	4.0

Poland:										
Output	100.0	99.4	118.0	141.9	171.0	184.2	2.9	3.1	3.8	3.2
(a) Crops	100.0	100.8	109.9	121.5	167.0	188.8	1.4	1.7	6.6	3.0
(b) Animal products	100.0	97.4	125.9	161.7	175.2	179.7	4.4	4.3	1.6	3.5
Rumania:										
Output	100.0	65.6	93.4	123.5	151.4	156.2	6.1	4.8	4.2	5.0
(a) Crops	100.0	56.8	82.5	112.9	140.4	129.8	6.4	5.3	4.5	5.5
(b) Animal products	100.0	77.9	108.9	138.7	166.9	193.4	5.7	4.1	3.8	4.6
Yugoslavia:										
Output	100.0	86.0	91.7	129.4	152.5	155.6	1.1	5.9	3.3	3.3
(a) Crops	100.0	92.7	86.9	133.6	156.2	149.8	−.9	7.4	3.2	3.1
(b) Animal products	100.0	80.1	96.0	125.7	149.2	160.8	3.1	4.6	3.5	3.7
Countries with socialized agriculture:										
Output	100.0	74.6	93.7	111.9	134.4	139.1	3.9	3.0	3.7	3.5
(a) Crops	100.0	82.0	93.3	107.4	128.3	126.1	2.2	2.4	3.6	2.7
(b) Animal products	100.0	68.5	94.0	115.6	139.3	149.7	5.4	3.5	3.8	4.3
Countries with private agriculture:										
Output	100.0	95.2	110.2	138.2	165.9	175.7	2.5	3.8	3.7	3.3
(a) Crops	100.0	98.5	103.3	125.0	163.9	177.6	.8	3.2	5.6	3.0
(b) Animal products	100.0	92.2	116.8	150.7	167.3	173.9	4.0	4.3	2.1	3.6
Total, Eastern Europe:										
Output	100.0	82.5	100.1	122.0	146.4	153.2	3.2	3.3	3.7	3.4
(a) Crops	100.0	88.6	97.3	114.5	142.7	146.9	1.6	2.4	4.5	2.8
(b) Animal products	100.0	77.2	102.4	128.5	149.6	158.6	4.8	3.9	3.1	4.0
Western Europe, output	100.0	102.9	131.1	155.0	173.6	186.4	4.1	2.8	2.3	3.1

[1] Data for 1968 are preliminary.

Source: See App. I.

TABLE 4.—*Growth of current operating expenses, gross product, depreciation, and net product in agriculture*

	Indexes, 1934–38=100						Average annual rates of growth			
	1934–38	1948–50	1954–56	1960–62	1965–67	1968 [1]	1948–50 to 1954–56	1954–56 to 1960–62	1960–62 to 1965–67	1948–50 to 1965–67
Bulgaria:										
Expenses	100.0	129.8	274.2	685.7	1,632.3	1,725.1	13.3	16.5	18.9	16.1
Gross product	100.0	79.8	87.3	104.5	95.6	78.5	1.5	3.1	−1.5	1.1
Depreciation	100.0	96.6	115.3	148.3	186.8	173.9	3.0	4.3	4.7	4.0
Net product	100.0	79.1	86.2	102.8	92.1	74.8	1.4	3.0	−3.0	.9
Czechoslovakia:										
Expenses	100.0	146.8	228.6	365.5	559.9	590.1	7.7	8.1	8.9	7.9
Gross product	100.0	77.2	83.7	86.2	81.6	93.6	1.3	.5	−1.1	0.3
Depreciation	100.0	106.5	126.2	155.2	199.3	220.1	2.9	3.5	5.1	3.6
Net product	100.0	74.6	79.8	80.0	71.1	82.2	1.1	0	−2.6	−.3
East Germany:										
Expenses	100.0	90.6	132.3	169.9	211.9	215.2	6.5	4.3	4.5	5.1
Gross product	100.0	70.4	84.8	87.4	104.3	108.3	3.1	.5	3.6	2.3
Depreciation	100.0	121.9	138.6	175.8	240.5	252.1	2.2	4.0	6.5	4.1
Net product	100.0	68.0	82.3	83.4	98.0	101.6	3.2	.2	3.3	2.2
Hungary:										
Expenses	100.0	143.2	189.4	370.8	520.9	521.5	4.4	11.8	7.0	7.9
Gross product	100.0	77.3	90.5	99.4	114.9	119.3	2.8	1.6	2.9	2.4
Net product	100.0	76.4	89.3	83.4	105.3	109.7	2.5	−1.1	4.8	1.9
Poland:										
Expenses	100.0	137.1	161.7	226.3	349.9	379.2	2.0	5.8	9.1	5.7
Gross product	100.0	94.8	113.1	132.2	150.9	162.0	3.0	2.6	2.7	2.8
Depreciation	100.0	113.2	105.9	106.4	162.4	175.7	−.9	.1	8.8	2.1
Net product	100.0	93.3	113.6	134.3	150.0	161.0	3.3	2.8	2.2	2.8

Rumania:										
Expenses	100.0	96.9	219.4	403.1	720.2	783.0	14.6	10.7	12.3	12.5
Gross product	100.0	64.2	88.1	111.7	127.5	129.9	5.4	4.0	2.7	4.1
Depreciation	100.0	81.5	121.4	175.2	277.2	300.7	4.4	3.9	9.6	7.5
Net product	100.0	63.0	85.7	107.1	116.6	117.4	5.3	3.8	1.7	3.5
Yugoslavia:										
Expenses	100.0	97.4	129.0	257.7	367.3	345.2	4.8	12.2	7.3	8.1
Gross product	100.0	85.5	89.9	123.2	142.2	146.5	.8	5.4	2.9	3.0
Depreciation	100.0	85.4	90.2	122.5	143.2	148.3	.9	5.2	3.2	3.1
Net product	100.0	85.5	89.9	123.3	142.1	146.4	.8	5.7	2.9	3.0
Countries with socialized agriculture:										
Expenses	100.0	108.5	180.6	300.1	483.3	509.1	8.9	8.8	10.0	9.2
Gross product	100.0	71.7	86.5	96.4	105.6	108.6	3.2	1.8	1.8	2.3
Depreciation	100.0	101.7	128.6	218.2	259.6	272.7	4.0	9.2	3.5	5.7
Net product	100.0	70.1	84.2	89.8	97.1	99.6	3.1	1.1	1.6	1.8
Countries with private agriculture:										
Expenses	100.0	130.8	156.5	231.3	352.7	370.4	3.0	6.7	8.8	6.0
Gross product	100.0	91.9	105.9	129.5	148.2	157.5	2.4	3.4	2.7	2.9
Depreciation	100.0	107.2	102.5	109.9	158.2	168 3	-.8	1.8	7.5	2.3
Net product	100.0	90.8	106.1	130.8	147.5	156.8	2.6	3.6	2.4	2.9
Total, Eastern Europe:										
Expenses	100.0	117.6	170.7	271.8	429.6	453.2	6.4	8.1	9.6	7.9
Gross product	100.0	79.4	93.9	109.0	121.8	127.2	2.8	2.5	2.3	2.5
Depreciation	100.0	104.1	117.4	171.4	215.8	229.8	2.0	6.5	4.7	4.4
Net product	100.0	78.0	92.5	105.3	116.2	121.0	2.9	2.2	2.0	2.4
Total, Western Europe:										
Expenses	100.0	116.5	167.9	206.3	245.7	262.2	6.3	3.5	3.5	4.5
Gross product	100.0	99.0	120.7	140.5	153.2	165.4	3.4	2.6	1.7	2.6
Depreciation	100.0	102.7	142.9	184.7	231.4	254.9	5.7	4.4	4.6	4.9
Net product	100.0	98.8	119.8	137.4	147.6	159.0	3.3	2.3	1.4	2.4

[1] Data for 1968 are preliminary.

Source: See App. I.

(1) The overall performance of countries with private agriculture has been superior to that of countries with socialized agriculture in the postwar period when compared with the prewar base. The former group reached or surpassed the prewar levels of production, output, gross and net product of agriculture by 1953. In subsequent years the expansion continued, and by 1968, the level of these performance measures exceeded the prewar level by 57 to 76 percent. The latter groups of countries reached the prewar level of production and output four years later, in 1957; the gross product index, however, did not reach the prewar level until 1966 while the net product just barely attained the prewar level in the 1967–68 period.

(2) Intermediate produce in both groups of countries grew at a slower rate than either total crop and animal production or agricultural output taken in the postwar period as a whole (Tables 2 and 3). However, the higher rate of growth for countries with socialized agriculture in the 1948–52 to 1954–56 period and for countries with private agriculture in the 1954–56 to 1960–62 period points to an increased effort to expand animal production in order to provide the growing non-agricultural population with better, higher protein-content food. The increasing import of feed and more efficient conversion of domestically grown intermediate products into animal products through improved feeding technology were responsible, on balance, for the higher rate of growth of output than that of intermediate produce.

(3) Within agricultural output, both groups of countries had achieved higher rates of growth in animal products than in output of crops. However, because of their very low output in the early postwar years, the countries with socialized agriculture experienced higher rates of growth of animal products in the postwar period than the other group. But in relation to the prewar period, the increase in output of animal products was higher for the countries with private agriculture (Table 3).

(4) Inputs into agriculture from other sectors increased sharply since the war due to rapid mechanization and better technology on farms. The countries with socialized agriculture had a five-fold rise in current operating expenses between prewar and 1968 as contrasted with 3.7 times rise for countries with private agriculture for the same period. In the postwar period the average annual rate of growth in expenses was about 50 percent higher for the former group than for the latter (9.2 and 6 percent, respectively), but by the 1960's, the latter had shown marked increases (Table 4). Depreciation has followed a similar pattern except that its growth was not as spectacular: 5.7 percent annual compound rates for the former group and only 2.3 percent for the latter, with a small decrease in the early postwar period. The countries with socialized agriculture pushed the mechanization of collectives and state farms at the expense of shrinking the private sector.

(5) Because of rapidly increasing expenses and depreciation the gross and net products grew at a slower rate than output for both groups. The countries with socialized agriculture had a somewhat higher annual rate of increase in the early postwar years, but it slowed down to below 2 percent after 1956 when the collectivization drive was

resumed. The countries with private agriculture experienced a reverse pattern: their gross and net products rose at a faster rate since the mid-1950s, which coincides with the abandonment of collectivization in Poland.

B. PERFORMANCE IN INDIVIDUAL COUNTRIES

In comparison with prewar, the highest increase in total crop and animal production in the postwar period was achieved by Rumania, followed by Poland and Bulgaria. In terms of output, however, Poland ranked first with an 84 percent increase, followed by Bulgaria with 69 percent rise and Yugoslavia and Rumania in the third place with a 56 percent increase for each. The most industrialized countries, East Germany and Czechoslovakia, had the lowest increase in output with 22 and 33 percent, respectively, while Hungary was in the middle with about 40 percent rise. In the postwar period as a whole the output of animal products grew at a higher annual rate than output of crops in all countries except Rumania, which nevertheless in comparison to prewar shows an excellent rise in output of animal products. This progress is evidenced by Rumania's rapidly increasing intermediate produce used up as feed.

The most spectacular increase in inputs from other sectors occurred in Bulgaria with a 17-fold increase, followed by Rumania with an 8-fold increase since prewar. These two countries had the least productive agriculture before the war. Czechoslovakia and Hungary experienced a 6- and 5-fold increase in expenses, respectively, since prewar. East Germany's expenses only about doubled, but its agriculture was already the most developed of all Eastern European countries before the war. Poland and Yugoslavia, though belonging to the group of countries with underdeveloped agriculture before the war, had a relatively moderate rise of about 3.5 times since the prewar period.

Since inputs are subtracted to get gross and net product of agriculture, the countries with the highest cost increases had the most sluggish growth in gross and net product. In fact, these indicators of value added by the agricultural sector remained below the prewar level in Bulgaria (except for 1960–62) and Czechoslovakia, and just surpassed that level in East Germany and Hungary. There was a somewhat better performance in Rumania in the 1960's. Only Poland and Yugoslavia, countries with predominantly private, small-scale agriculture, registered an impressive gain of 62 and 46 percent, respectively, in value added since the war (Table 4). The interrelationship of total production, output, inputs, and gross and net product, which can be readily followed country by country in Tables 2 to 4, seems to reveal a less efficient use of inputs in Czechoslovakia, Bulgaria, East Germany, Hungary, and perhaps Rumania—countries whose agriculture is socialized—than in Poland and Yugoslavia, where agriculture is predominantly in private ownership, mostly small-family. However, the incentives given to Hungarian collective farmers through a share-cropping system in the regions with specialized agriculture brought favorable results in 1960's (see Sandor Kiss, "Hungarian Agriculture Under the NEM," *East Europe*, v. 17, no. 8, August 1968, p. 18).

C. COMPARISON BETWEEN EASTERN AND WESTERN EUROPE

It is of prime interest to compare the agricultural performance between these two regions before more conclusive remarks can be made about the relative efficiency of Eastern European agriculture. It should be noted that already before the war Western European agriculture as a whole was more developed and productive than that of Eastern Europe; and consequently, other things being equal, it should take more effort to increase output by one percent in Western Europe than in Eastern Europe because of increasing diminishing returns to land.

How do these two regions compare in agricultural performance? Table 3 shows that agricultural output rose 86 percent in Western Europe and about 53 percent in Eastern Europe between prewar and 1968. It should be noted that Western European agriculture did not suffer as large war damages as Eastern European, which consequently shows a somewhat higher annual rate of growth when only the postwar period is taken into account. The Western European output performance matches more closely that of the group of Eastern European countries having predominantly private agriculture, especially the Polish output series.

In comparing inputs we find that in the postwar period they grew at an annual rate of 4.5 percent in Western Europe and at a rate of 7.9 percent in Eastern Europe, with an increasing tendency in the latter region and a rather decreasing tendency in the former (Table 4). The rising rate of increase of inputs in the countries with private agriculture in Eastern Europe in the 1960's had brought them close to the rate of the countries with socialized agriculture.

In terms of gross and net product the differences are most striking. Between prewar and 1968 they rose 27 and 21 percent, respectively, in Eastern Europe, whereas the respective increases in Western Europe were 65 and 59 percent, or almost three times greater for net product. Here again the superior performance of Western Europe is very close to that of the Eastern European countries with private agriculture, especially Poland (Table 4). This East-West European comparison gives additional evidence of possible inefficiencies in resource use in Eastern European countries with socialized agriculture, whose net product (net value added) of agriculture is still below the prewar level. In Western Europe and in Eastern European countries with private agriculture, on the other hand, increases of 59 and 57 percent, respectively, occurred between prewar and 1968.

D. CHANGES IN STRUCTURE OF PRODUCTION

It may be of interest to take a few glimpses into structural changes of Eastern European agriculture over time. Such changes are shown in Table 5 in terms of percentages of output and are summarized as follows: The share of intermediate product (difference between total production and output) declined in all countries except Rumania between prewar and 1965–67. Since the share of animal products increased in all countries except Czechoslovakia, the efficiency of the transformation of intermediate produce into animal products probably increased; but increased imports of feed in recent years [30] also contributed to the

[30] U.S. Department of Agriculture, Economic Research Service, *Agricultural Situation in Communist Areas* (ERS-Foreign, 259) 1969, p. 21.

relatively faster expanding output of animal products compared to that of crops. The share of animal products in total output in 1965–67 was from 61 to 66.5 percent in the more industrialized countries (Czechoslovakia, East Germany and Hungary), while in the developing countries (Bulgaria and Rumania) it was below one half and in Poland and Yugoslavia, slightly over one half. In all countries the share of expenses and to a lesser degree depreciation increased dramatically since prewar, while correspondingly the share of gross and net product declined. In all countries with socialized agriculture except East Germany the share of expenses in total output increased four times or more, while in Poland and Yugoslavia the share about doubled between prewar and 1965–67.

TABLE 5.—*Percentage distribution of total production, output, expenses, gross product, depreciation, and net product in agriculture*

[Output of agriculture=100]

Area and period	Total production	Output of agriculture			Expenses	Gross product	Depreciation	Net product
		Total	Crops	Animal products				
Bulgaria:								
Prewar	134.8	100.0	57.2	42.8	5.5	94.5	3.5	91.0
1954–56	134.9	100.0	52.0	48.0	15.5	84.5	4.1	80.4
1965–67	127.6	100.0	52.3	47.7	49.8	50.2	3.6	46.6
Czechoslovakia:								
Prewar	154.7	100.0	37.6	62.4	7.9	92.1	7.6	84.5
1954–56	157.2	100.0	42.3	57.7	19.0	81.0	10.1	70.9
1965–67	143.6	100.0	38.1	61.9	37.0	63.0	12.7	50.3
East Germany:								
Prewar	148.8	100.0	38.4	61.6	12.4	87.6	3.8	83.8
1954–56	151.9	100.0	38.6	61.4	18.0	82.0	5.9	76.1
1965–67	146.0	100.0	33.5	66.5	22.3	77.7	7.9	69.8
Hungary:								
Prewar	153.4	100.0	41.2	58.8	5.0	95.0	1.5	93.5
1954–56	153.6	100.0	44.5	55.5	9.9	90.1	2.5	87.6
1965–67	147.2	100.0	39.1	60.9	19.3	80.7	7.9	72.8
Poland:								
Prewar	199.6	100.0	49.3	50.7	10.2	89.8	6.5	83.3
1954–56	186.3	100.0	45.9	54.1	14.0	86.0	5.8	80.2
1965–67	185.0	100.0	48.1	51.9	20.8	79.2	6.2	73.0
Rumania:								
Prewar	139.1	100.0	58.5	41.5	4.0	96.0	6.5	89.5
1954–56	159.2	100.0	51.6	48.4	9.5	90.5	8.5	82.0
1965–67	156.3	100.0	54.2	45.8	19.2	80.8	12.0	68.8
Yugoslavia:								
Prewar	170.2	100.0	47.2	52.8	4.6	95.4	4.3	91.1
1954–56	165.6	100.0	44.7	55.3	6.5	93.5	4.2	89.3
1965–67	167.3	100.0	48.3	51.7	11.1	88.9	4.0	84.9
Countries with socialized agriculture:								
Prewar	147.5	100.0	44.8	55.2	7.6	92.4	4.8	87.6
1954–56	151.2	100.0	44.8	55.2	14.7	85.3	6.6	78.7
1965–67	146.2	100.0	42.8	57.2	27.4	72.6	9.3	63.3
Countries with private agriculture:								
Prewar	190.9	100.0	48.7	51.3	8.5	91.5	5.9	85.6
1954–56	181.2	100.0	45.6	54.4	12.1	87.9	5.5	82.4
1965–67	180.2	100.0	48.1	51.9	18.2	81.8	5.6	76.2
Total, Eastern Europe:								
Prewar	164.2	100.0	46.3	53.7	8.0	92.0	5.2	86.8
1954–56	163.9	100.0	45.1	54.9	13.6	86.4	6.1	80.3
1965–67	161.0	100.0	45.1	54.9	23.4	76.6	7.7	68.9
Western Europe:								
Prewar		100.0	39.3	60.7	22.0	78.0	5.2	72.8
1954–56		100.0	42.0	58.0	28.2	71.8	5.7	66.5
1965–67		100.0	38.7	61.3	31.2	68.8	6.9	61.9

Sources: Output was calculated from physical quantities weighted by FAO Western European wheat based price relatives. All other items were calculated from output and percentage distribution of these items given in national currencies, and for Western Europe in U.S. dollars; see App. I.

In Bulgaria a part of the phenomenal increase in expenses is due to the use of 1939 weights (no postwar prices were available for Bulgaria), which relatively overvalue inputs in relation to output, whereas the use of more recent prices would not.[31]

Western Europe—because of more favorable conditions for animal production and higher demand for protein—produces a larger share of output in the form of animal products than Eastern Europe as a whole. In the Northern European countries over 80 percent of agricultural output consists of livestock products.[32] The share of expenses—already 22 percent of output in the prewar period—rose by about one half to 31 percent of the output by 1965–67. The Eastern European countries with socialized agriculture are already almost as dependent on inputs from other sectors as Western Europe. Unfortunately, these greatly increased outside resources did not bring as favorable results for socialized agriculture in Eastern Europe as they did for privately operated agriculture in Western Europe or for the countries with private agriculture (Poland and Yugoslavia) in Eastern Europe.

E. CONTRIBUTION OF INDIVIDUAL COUNTRIES TO THE TOTAL OUTPUT OF EASTERN EUROPE

The relative importance of each country as a supplier of agricultural output is shown in Table 6. Bulgaria—being the smallest country—supplied only about 6 percent of output of Eastern Europe. But her importance as a supplier increased to over 7 percent in recent years. In order of importance come Hungary (10 percent), Czechoslovakia (11 percent), Yugoslavia (12 percent), Rumania (13.5 percent), East Germany (14.5 percent), and the largest supplier, Poland, accounting for almost one third of the total output. The importance of the two industrialized countries, East Germany and Czechoslovakia, has declined. Because of better performance the share of countries with private agriculture increased from 38 percent in the prewar period to 43 percent in 1965–67. In comparison with Western Europe, the output of Eastern Europe is less than one half as large, and since the prewar period its relative importance has declined.

A substantially different relationship exists with respect to expenses and depreciation. In all countries with socialized agriculture except East Germany the share of expenses increased substantially since prewar. The level of East German expenses, however, was already very high before the war. The share of expenses for countries with private agriculture declined from 42 percent in the prewar period to only 33 percent in 1965–67, while their share of output increased. For Western Europe expenses in the prewar period were about four times as great as in Eastern Europe, and they reflected the higher contribution of nonagricultural sectors to agriculture. By 1965–67, however, that multiple declined to about two and a half times.

In terms of value added, i.e., gross and net product, the shares in the total for Eastern Europe of all countries with socialized agriculture, except Rumania, decreased from prewar to 1965–67. At the same

[31] From 1939 to 1967 in Bulgaria the ratio of the price per ton of nitrogen to that of wheat declined from about 9 : 1 to about 4 : 1. See U.N. Economic Commission for Europe, *Prices of Agricultural Products and Fertilizers in Europe 1966/67*, Geneva, 1968, pp. 72–73.

[32] U.N. Economic Commission for Europe, *5th Report on Output, Expenses and Income of Agriculture in European Countries*, Geneva, 1965, p. 207.

TABLE 6.—*Percentage contribution of individual countries to agricultural output, expenses including depreciation, gross and net product*

[Eastern Europe=100]

	Output of agriculture			Expenses and depreciation			Gross product			Net product		
	Prewar	1954–56	1965–67	Prewar	1954–56	1965–67	Prewar	1954–56	1965–67	Prewar	1954–56	1965–67
Bulgaria	5.9	5.8	7.3	4.1	5.8	12.6	6.1	5.7	4.8	6.2	5.8	4.9
Czechoslovakia	13.5	12.9	11.1	15.9	19.0	17.7	13.6	12.1	9.1	13.2	11.4	8.1
East Germany	18.0	16.3	14.5	22.1	19.8	14.0	17.1	15.4	14.6	17.4	15.4	14.6
Hungary	11.1	10.3	10.2	5.5	6.6	8.9	11.4	11.0	10.8	11.9	11.5	10.8
Poland	27.0	31.9	31.6	34.2	32.0	27.4	26.4	31.7	32.6	25.9	31.8	33.5
Rumania	13.1	12.2	13.5	10.5	11.1	13.6	13.6	12.8	14.3	13.5	12.5	13.5
Yugoslavia	11.4	10.4	11.8	7.7	5.7	5.8	11.8	11.3	13.8	11.9	11.6	14.6
Countries with socialized agriculture	61.6	57.7	56.6	58.1	62.3	66.8	61.8	57.0	53.6	62.2	56.6	51.9
Countries with private agriculture	38.4	42.3	43.4	41.9	37.7	33.2	38.2	43.0	46.4	37.8	43.4	48.1
Total, Eastern Europe	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Western Europe	182.1	238.7	216.0	376.0	409.8	264.7	154.4	198.4	194.2	152.7	197.8	194.0

Sources: Output was calculated from physical quantities weighted by FAO Western European wheat-based price relatives for 1952–56. Expenses, gross and net product were calculated from output and percentage distribution of these items given in national currencies; see App. I.

time the corresponding shares of countries with private agriculture increased from over a third to close to one half the total net value added of Eastern European agriculture. Again Western Europe shows a similar relative improvement over Eastern Europe as a whole. Western Europe's gross and net product were a little over 50 percent larger in the prewar period, but they became almost twice as large by 1965–67. In terms of gross and net product, the relative increase in relation to Eastern Europe was even greater than in the case of output. The same conclusion holds true here as the one about the relative efficiency of use of inputs made in the previous section.

IV. Per Capita Trends and Levels of Production

A. PER CAPITA PRODUCTION

Trends in per capita production express better than absolute figures the quantitative improvement in the supply of agricultural products and changes in levels of self-sufficiency in domestically produced food. Tables 7 to 10 show trends from prewar to 1968 in agricultural production measures in relation to population for individual countries, groups of countries, and for the two major regions, namely Eastern and Western Europe.

In general, the per capita trends are similar to the total performance measures except that the rates of change are slowed down by increases in population (Table 7). Because of large shifts in the Polish population due to territorial changes after the war, the countries with private agriculture (Poland plus Yugoslavia) show substantially higher per capita results in the postwar period (compared to the prewar) than the countries with socialized agriculture. This upward bias is impossible to eliminate; but it should be kept in mind when making prewar to postwar comparisons on a per capita and per employed basis. However, because of rapid population growth in Poland and Yugoslavia, their average annual rate of growth in agricultural output per capita was 1.9 percent (1.6 percent for crops, 2.1 percent for animal products), while for countries with socialized agriculture the rate was 3.0 percent.

The behavior of output per capita for individual countries is summarized in Table 8. In the early postwar period, when output was recovering from the wartime setback, the indexes of per capita output were far below the prewar level in most countries. In Poland, however, and to a certain extent in Czechoslovakia, where there was a sharp decline in population because of territorial shifts and population transfers, the postwar output per capita compares very favorably with that of prewar. In the postwar period, Bulgaria and Rumania experienced the highest annual rates of growth of per capita output, about 4 percent, followed closely by East Germany with 3.5 percent annual rate of growth, while Poland had only a modest 1.7 annual percentage rate. East German per capita annual rates compared well with other countries because her population actually declined from 19 million in 1948 to slightly over 17 million in 1968;[33] Poland on

[33] *Statistisches Jahrbuch 1968*, p. 3.

TABLE 7.—*Eastern Europe: Indexes of per capita total production, output, expenses, gross and net product in agriculture*

[1934–38=100]

	1934–38	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
A. Countries with socialized agriculture:											
1. Total production	100	69.8	73.8	62.1	92.0	85.6	92.0	89.5	92.6	91.9	100.1
2. Output of agriculture	100	68.4	73.1	77.6	88.2	85.2	87.1	85.3	93.7	88.3	97.9
(*a*) Output of crops	100	77.0	79.5	84.4	99.0	85.2	101.4	85.0	96.4	84.6	98.8
(*b*) Output of animal products	100	61.4	67.8	72.0	79.4	85.1	75.5	85.4	91.5	91.4	97.1
3. Expenses and depreciation	100	93.6	102.8	114.2	124.1	126.2	132.6	141.8	151.8	163.8	197.2
4. Gross product	100	66.2	70.4	74.1	84.4	81.2	82.3	79.3	87.3	80.3	89.2
5. Net product	100	64.8	68.8	72.4	83.2	79.3	80.6	77.2	85.6	77.6	84.0
B. Countries with private agriculture:											
1. Total production	100	115.8	120.3	114.6	112.4	105.5	115.7	114.3	120.0	118.8	131.1
2. Output of agriculture	100	111.4	122.3	121.3	122.9	116.7	124.7	121.1	128.4	122.8	137.2
(*a*) Output of crops	100	116.9	131.5	118.6	130.4	116.7	125.6	114.8	126.1	107.8	127.3
(*b*) Output of animal products	100	106.2	113.6	123.9	115.8	116.7	123.9	127.0	130.6	137.0	146.6
3. Expenses and depreciation	100	157.9	147.6	146.0	144.4	148.4	149.2	142.8	154.0	156.3	172.2
4. Gross product	100	106.2	118.8	117.4	119.4	111.6	120.4	117.0	123.5	116.9	130.4
5. Net product	100	103.6	118.1	117.1	119.3	111.4	120.6	117.4	124.1	117.1	131.3
C. Total Eastern Europe:											
1. Total production	100	90.4	94.7	95.4	103.6	96.5	104.8	102.6	106.9	106.2	116.4
2. Output of agriculture	100	83.8	90.7	93.4	101.5	97.0	101.1	98.6	106.7	101.3	112.7
(*a*) Output of crops	100	91.9	98.7	98.7	111.5	97.2	111.0	96.8	108.1	93.6	110.2
(*b*) Output of animal products	100	76.7	83.7	89.9	92.8	96.7	92.5	100.2	105.5	107.9	114.8
3. Expenses and depreciation	100	117.9	120.1	126.9	132.8	135.1	139.6	143.3	153.7	161.9	188.0
4. Gross product	100	80.6	87.6	89.7	97.8	92.5	96.4	93.2	100.6	93.9	104.6
5. Net product	100	78.6	86.2	88.3	96.7	91.2	90.7	91.8	99.5	92.1	101.2

TABLE 7.—*Eastern Europe: Indexes of per capita total production, output, expenses, gross and net product in agriculture*—Continued

[1934-38=100]

	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	[1] 1968
A. Countries with socialized agriculture:											
1. Total production	99.0	103.7	106.6	101.5	100.0	102.4	105.7	112.4	123.3	125.8	124.0
2. Output of agriculture	99.4	104.0	106.0	103.4	101.0	104.7	108.7	114.6	123.5	126.6	124.8
(*a*) Output of crops	96.8	101.8	104.9	96.4	96.2	101.4	102.2	108.8	116.3	121.8	113.0
(*b*) Output of animal products	101.4	105.8	106.9	109.1	105.0	107.4	114.1	119.4	129.3	130.6	134.4
3. Expenses and depreciation	176.6	313.5	234.0	244.7	264.5	281.6	311.3	331.2	364.5	379.4	373.8
4. Gross product	90.6	92.0	92.8	89.6	84.9	87.0	87.8	90.8	96.8	98.8	97.4
5. Net product	88.4	88.3	87.8	83.4	77.9	79.5	79.9	83.9	89.2	90.6	89.4
B. Countries with private agriculture:											
1. Total production	127.7	136.4	137.4	144.6	131.1	139.7	137.5	145.6	156.1	157.7	160.3
2. Output of agriculture	137.9	143.3	142.8	154.2	133.3	149.1	143.6	156.0	164.4	166.4	169.3
(a) Output of crops	123.3	132.2	133.2	148.2	107.8	131.3	144.2	152.5	162.8	166.1	171.1
(b) Output of animal products	151.8	153.8	152.0	159.8	157.6	166.1	143.1	159.4	165.8	166.7	167.6
3. Expenses and depreciation	172.2	189.7	185.7	188.9	190.5	211.9	207.9	273.8	255.6	272.2	277.0
4. Gross product	131.0	134.5	134.4	145.9	122.5	136.9	131.4	136.8	149.3	149.2	151.7
5. Net product	132.1	135.5	135.6	148.3	123.7	138.6	132.8	136.1	149.0	148.6	151.1
C. Total Eastern Europe:											
1. Total production	114.3	121.0	123.2	123.4	116.7	121.9	123.0	130.6	141.6	143.9	143.8
2. Output of agriculture	113.9	118.8	120.0	122.4	113.4	121.4	122.0	130.4	139.0	141.9	141.8
(*a*) Output of crops	107.2	113.6	116.1	116.6	101.1	113.2	118.5	125.9	135.4	139.5	135.9
(*b*) Output of animal products	119.6	123.3	123.3	127.5	124.0	128.6	125.1	134.2	142.1	144.0	146.9
3. Expenses and depreciation	175.4	206.0	216.4	223.9	235.6	255.2	271.6	309.7	322.4	338.0	338.1
4. Gross product	105.8	107.9	108.3	110.5	99.0	105.6	104.2	108.0	116.6	117.7	117.6
5. Net product	104.5	105.5	105.3	107.0	94.7	101.1	99.3	103.2	111.2	112.1	112.0

[1] Preliminary data.

Sources: Calculated from physical quantities weighted by FAO Western European wheat based price relatives and population data taken from statistical yearbooks of respective countries (see Appendix II).

TABLE 8.—*Per capita growth of agricultural output*

	Indexes, 1934-38=100						Average annual rates of growth			
	1934-38	1948-50	1954-56	1960-62	1965-67	1968 [1]	1948-50 to 1954-56	1954-56 to 1960-62	1960-62 to 1965-67	1948-50 to 1965-67
Bulgaria:										
Output	100.0	75.8	85.9	113.	144.1	133.3	2.1	4.8	4.9	3.9
Crops	100.0	74.7	77.9	98.9	131.1	103.1	.7	4.1	5.9	3.4
Animal products	100.0	77.4	96.8	133.0	161.1	173.9	3.8	5.5	3.9	4.4
Czechoslovakia:										
Output	100.0	96.1	104.2	112.9	120.3	132.7	1.4	1.3	1.3	1.3
Crops	100.0	107.4	114.5	121.5	122.0	144.2	1.1	1.0	.1	.8
Animal products	100.0	89.3	96.3	107.8	119.4	125.8	1.3	1.9	2.1	1.7
East Germany:										
Output	100.0	65.7	83.9	94.3	114.2	117.6	4.1	2.0	3.9	3.3
Crops	100.0	90.8	84.4	88.6	99.6	98.3	−1.2	.8	2.3	.5
Animal products	100.0	50.0	83.6	97.8	123.4	129.3	8.9	2.7	4.8	5.5
Hungary:										
Output	100.0	79.8	89.0	103.2	121.7	124.1	1.8	2.5	3.3	2.5
Crops	100.0	91.7	96.2	94.6	115.5	118.2	.8	−.3	4.1	1.4
Animal products	100.0	71.6	83.9	109.3	126.0	128.3	2.7	4.5	2.9	3.4
Poland:										
Output	100.0	139.6	148.9	163.1	185.9	197.0	1.1	1.5	2.6	1.7
Crops	100.0	142.1	138.8	139.8	181.3	200.2	−.4	.1	5.3	1.4
Animal products	100.0	137.3	158.7	185.7	190.3	192.1	2.4	2.6	.5	1.9
Rumania:										
Output	100.0	63.6	84.4	104.0	123.5	125.9	4.8	3.5	3.5	4.0
Crops	100.0	55.1	74.5	94.9	114.4	104.6	5.2	4.1	3.8	4.4
Animal products	100.0	75.8	98.4	116.9	136.3	156.0	4.4	2.9	3.1	3.5
Yugoslavia:										
Output	100.0	85.2	83.5	110.8	123.1	123.2	−.3	4.8	2.1	2.2
Crops	100.0	91.7	79.0	114.1	125.8	118.3	−2.5	5.4	2.0	1.7
Animal products	100.0	79.3	87.5	107.7	120.7	127.5	1.6	3.5	2.3	2.4
Countries with socialized agriculture:										
Output	100.0	73.0	89.1	103.5	121.6	124.8	3.4	2.5	3.3	3.0
Crops	100.0	80.3	88.7	99.2	115.6	113.0	1.7	1.9	3.1	2.2
Animal products	100.0	67.1	89.4	107.0	126.4	134.4	4.9	3.0	3.4	3.8
Countries with private agriculture:										
Output	100.0	118.3	124.1	143.4	162.3	169.3	.8	2.4	2.5	1.9
Crops	100.0	122.3	116.2	129.7	160.5	171.1	−.9	1.8	4.3	1.6
Animal products	100.0	114.6	131.5	156.5	164.0	167.6	2.3	2.9	.9	2.1
Total, Eastern Europe:										
Output	100.0	89.3	102.2	118.6	137.1	141.8	2.3	2.5	2.9	2.6
Crops	100.0	96.4	99.5	111.3	133.6	135.9	.5	1.9	3.7	1.9
Animal products	100.0	83.4	104.5	124.9	140.1	146.9	3.8	3.0	2.3	3.1
Western Europe: Output	100.0	94.9	115.8	130.2	139.1	147.6	3.4	2.0	1.3	2.3

Sources: Data in Table 3 divided by population data taken from statistical yearbooks of respective countries (see Appendix II).

[1] Preliminary data.

TABLE 9.—*Per capita growth of gross product, net product, expenses, and depreciation in agriculture*

	Indexes, 1934–38=100						Average annual rate of growth			
	1934–38	1948–50	1954–56	1960–62	1965–67	1968 [1]	1948–50 to 1954–56	1954–56 to 1960–62	1960–62 to 1965–67	1948–50 to 1965–67
Bulgaria:										
Expenses and depreciation	100.0	107.5	186.4	394.6	852.7	881.7	9.6	13.3	16.7	13.0
Gross product	100.0	73.3	76.9	86.9	76.6	62.0	.8	1.9	−2.6	.3
Net product	100.0	72.8	76.0	85.6	73.8	59.0	.7	2.0	−3.0	.1
Czechoslovakia:										
Expenses and depreciation	100.0	147.4	195.2	273.0	385.7	407.7	4.8	5.8	7.2	5.8
Gross product	100.0	89.8	91.7	90.0	82.4	93.6	.3	−.3	−1.8	−.5
Net product	100.0	86.6	87.5	83.5	71.7	82.2	.2	−.8	−3.1	−1.1
East Germany:										
Expenses and depreciation	100.0	87.7	123.1	164.3	211.1	215.8	5.3	4.9	5.1	5.3
Gross product	100.0	63.4	78.5	84.5	101.4	104.9	3.6	1.2	3.7	2.8
Net product	100.0	61.2	76.2	80.5	95.2	98.4	3.7	.9	3.4	2.6
Hungary:										
Expenses and depreciation	100.0	139.2	170.0	491.5	508.9	503.3	3.4	19.4	.7	7.9
Gross product	100.0	76.7	84.4	90.9	103.5	106.3	1.6	1.2	2.6	1.8
Net product	100.0	75.7	83.3	76.2	94.7	97.8	1.6	−1.5	4.4	1.3
Poland:										
Expenses and depreciation	100.0	180.6	176.7	206.7	300.9	320.7	−.4	2.6	7.7	3.0
Gross product	100.0	133.6	142.7	152.2	163.8	173.4	1.1	1.1	1.5	1.2
Net product	100.0	131.4	143.4	154.4	162.8	172.2	1.5	1.2	1.1	1.3
Rumania:										
Expenses and depreciation	100.0	85.1	143.9	221.8	365.7	393.1	9.1	7.5	10.5	9.0
Gross product	100.0	62.4	79.6	94.2	104.0	105.0	4.1	2.8	2.0	3.0
Net product	100.0	61.1	77.4	90.2	95.0	82.9	4.0	2.6	1.0	2.6
Yugoslavia:										
Expenses and depreciation	100.0	90.4	100.0	164.4	185.4	197.3	1.7	8.6	2.4	4.3
Gross product	100.0	84.6	81.9	105.5	114.8	116.0	−.5	4.3	1.7	1.8
Net product	100.0	84.6	81.9	105.5	114.7	116.0	−.5	4.3	1.7	1.8
Countries with socialized agriculture:										
Expenses and depreciation	100.0	103.5	152.5	247.7	358.4	373.8	6.7	8.4	7.7	7.6
Gross product	100.0	70.2	82.3	89.1	95.5	97.4	1.7	1.3	1.4	1.8
Net product	100.0	68.7	80.1	83.0	87.9	89.4	2.6	.6	1.2	1.5
Countries with private agriculture:										
Expenses and depreciation	100.0	150.5	151.0	188.4	267.2	277.0	.1	3.8	7.2	3.4
Gross product	100.0	114.1	119.3	134.3	145.1	151.7	.8	2.0	1.6	1.4
Net product	100.0	112.9	119.5	135.9	144.6	151.1	.9	2.2	1.2	1.5
Total Eastern Europe:										
Expenses and depreciation	100.0	121.6	153.0	225.6	323.4	338.1	3.9	6.7	7.5	5.9
Gross product	100.0	86.0	95.9	105.9	114.1	117.6	1.8	1.7	1.5	1.7
Net product	100.0	84.4	94.5	102.3	108.8	112.0	1.9	1.3	1.2	1.5
Western Europe:										
Expenses and depreciation	100.0	101.9	143.9	169.8	194.1	206.0	5.9	2.8	2.7	3.9
Gross product	100.0	91.3	106.6	118.1	122.8	130.6	2.6	1.7	.8	2.1
Net product	100.0	91.1	105.2	115.4	118.3	125.7	2.4	1.6	.5	1.5

[1] Preliminary data.

Sources: Data in Table 4 divided by population data taken from statistical yearbooks of respective countries (see Appendix II).

TABLE 10—*Per capita comparisons of levels of output, gross and net product in agriculture*

[Total Eastern Europe=100]

	Total agricultural output			Output of crops			Output of animal products			Gross product			Net product		
	Pre-war	1954–56	1965–67	Pre-war	1954–56	1965–67	Pre-war	1954–56	1965–67	Pre-war	1954–56	1965–67	Pre-war	1954–56	1965–67
Bulgaria	101.3	85.2	106.4	125.3	98.1	123.2	80.6	74.6	92.6	104.0	83.4	69.8	106.1	85.3	71.9
Czechoslovakia	106.4	108.5	93.4	86.4	99.4	78.8	123.6	113.9	105.4	106.4	101.8	76.8	103.5	95.9	63.1
East Germany	122.3	100.4	101.9	101.5	86.1	75.6	140.3	112.2	123.6	116.5	95.3	103.5	118.0	95.1	103.3
Hungary	136.1	118.5	120.8	121.0	117.1	104.7	149.1	119.7	134.1	140.4	123.6	127.3	146.5	129.3	127.6
Poland	88.4	128.8	119.8	94.1	131.2	127.6	83.5	126.9	113.5	86.2	128.3	123.8	84.8	128.7	126.9
Rumania	94.4	78.0	85.0	119.3	89.3	102.2	72.9	68.6	70.9	98.4	81.7	89.7	97.3	79.7	84.9
Yugoslavia	80.5	65.8	72.3	82.2	65.2	77.3	79.1	66.2	68.1	83.4	71.3	83.9	84.5	73.2	89.0
Countries with socialized agriculture	111.4	97.1	98.8	107.9	96.2	93.4	114.5	98.0	103.3	111.9	96.0	93.6	112.3	95.3	90.7
Countries with private agriculture	85.8	104.2	101.6	90.2	105.4	108.4	82.1	103.3	96.0	85.4	106.1	108.6	84.6	107.0	112.4
Total Eastern Europe	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Western Europe	78.8	89.2	79.9	66.9	83.1	68.5	89.0	94.2	89.2	66.8	74.2	71.8	66.0	73.6	71.8

Sources: Calculated from physical quantities weighted by FAO Western European wheat-based price relatives and divided by population data; see App. I.

the contrary had a rapid population growth from about 24 to over 32 million for the same period.[34] In most countries per capita output of animal products increased at a higher annual rate than that of crops in line with the effort to improve protein content of national diets.

In comparing per capita output between Eastern and Western Europe we find very similar trends, with a slight lead for the latter.

The trend in per capita inputs exhibited an ascending pattern similar to that of total inputs in all countries under study. Gross and net product per capita, however, did not recover to the prewar levels in most countries (Table 9). Only Poland and Yugoslavia had gains in both gross and net product. Poland's early postwar, very favorable, per capita figures reflected a sharp decline in population resulting from postwar territorial changes. Czechoslovakia actually experienced a negative rate of growth in per capita gross and net product in the postwar period. Western European gross and net product per capita compared favorably with that of Eastern Europe since the prewar period.

B. PER CAPITA LEVELS OF OUTPUT

Table 10 shows per capita comparisons of relative levels of output, gross and net product in agriculture in relation to the East European level for individual countries and groups of countries in selected periods. These findings show that in the prewar period the per capita level of output was lower in countries which had the highest shares of the active population in agriculture than in the more industrialized countries.

From 1954–56 to 1965–67, however, the levels of per capita output declined in Czechoslovakia and Poland in relation to Eastern Europe as a whole. Bulgaria improved its relative position greatly, followed by Yugoslavia, Rumania, Hungary, and East Germany in descending order. Poland's high level in the postwar years was due to population shifts and rapidly increasing output. Hungary has been and still is the highest per capita producer of agricultural output while Yugoslavia is the lowest. Poland and Bulgaria rank highest in per capita output of crops, while Hungary and East Germany excel in per capita output of animal products. The lowest per capita levels of output of crops occur in East Germany, Czechoslovakia, and Yugoslavia, and the latter also ranks lowest in animal products. All three countries have been large importers of grain in recent years. The levels of gross and net product per capita follow roughly the output pattern for individual countries. Hungary and Poland rank highest while Czechoslovakia and Bulgaria are lowest.

The behavior of country groups reveals that the relative levels of per capita output, and gross and net product, in countries with socialized agriculture have declined over time, while these levels have increased in countries with private agriculture. Since the war the relative position of these two groups interchanged on a per capita basis in relation to Eastern Europe as a whole.

In comparing Western Europe with Eastern Europe, Table 10

[34] *Rocznik statystyczny 1968*, p. 23.

shows that on a per capita basis the former produces only about two thirds of the output of crops and about 90 percent of the output of animal products of the latter. The relative position of both regions did not change since the war. Western Europe is more densely populated per unit of agricultural land, which is reflected in lower per capita output than in Eastern Europe. If we consider quite rightly the groups of countries with private agriculture as being more or less self-sufficient with their current per capita agricultural output, it becomes apparent that Western Europe produces no more than two-thirds of her requirements for crops and perhaps less than 90 percent in the case of animal products. These rough figures are supported by import statistics (see Mueller, *Statistical Handbook of the North Atlantic Area*, pp. 76, 228–229).

Before the war Eastern Europe as a whole was a net exporter of agricultural products, especially of grain. After the war Czechoslovakia and East Germany became heavy net importers of agricultural commodities,[35] principally grain from the Soviet Union. Western Europe has improved her relative position in per capita levels of gross and net product in comparison with Eastern Europe because of more efficient use of inputs, due perhaps to greater incentives for farmers.

V. Productivity of Land

A. Growth of Output and Inputs per Unit of Land

In this section we summarize our findings of output and input measures per hectare of agricultural land.[36] In most Eastern European countries and in Western Europe the area of agricultural land remained remarkably stable in the postwar period. In some countries, i.e., Czechoslovakia, Hungary, and Poland, there was a decline of a few percent, while in Bulgaria and Yugoslavia the agricultural area increased by 6 and 10 percent, respectively from 1948 to 1968. In comparison to the prewar period only Poland had a significant drop of 18 percent in agricultural land due to territorial changes between prewar and 1948. Yugoslavia's agricultural area also dropped by 11 percent from prewar to 1948, but in the following years the area expanded and by 1956 again reached the prewar level. As a result of the relative stability of the area in agricultural land, except for Poland, the output and input measures per unit of land followed the same general trends as the total performance measures in the postwar period given in Tables 1 to 4.

Tables 11 to 14 show the trends of various measures of production and expenses per hectare of agricultural land by country, groups of countries, and regions. In general, the productivity of land increased in all the countries. However, the economically least developed countries had the largest annual rates of increase because their production per unit of land was very low before the war and even lower immediately following it. Poland's upward jump in productivity of land

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[35] Each of these two countries imported about $750 million of agricultural products in 1967. See U.S. Department of Agriculture, Economic Research Service, *Agricultural Situation in Communist Areas* (ERS-Foreign, 259), p. 21.

[36] Agricultural land comprises all arable land, including orchards, gardens, and vineyards; permanent and temporary meadow; pasture; and grazing land.

TABLE 11.—*Eastern Europe: Indexes of production, output, expenses, gross and net product per hectare of agricultural land*

[Indexes 1934-38=100]

	1934-38	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
A. Countries with socialized agriculture:											
1. Total production	100.0	73.0	77.8	82.3	98.2	91.6	99.5	98.1	102.1	101.6	111.1
2. Output of agriculture	100.0	71.5	77.0	81.6	94.1	91.1	94.3	93.4	103.3	97.6	108.6
(*a*) Output of crops	100.0	80.4	83.8	88.9	105.7	91.2	109.9	93.2	106.5	93.5	110.0
(*b*) Output of animal products	100.0	64.2	71.5	75.6	84.7	90.9	81.6	93.5	100.8	101.0	107.6
3. Gross product	100.0	69.2	74.2	77.9	90.1	86.8	89.1	86.8	94.9	88.7	99.1
4. Net product	100.0	67.7	72.5	76.1	88.6	84.7	87.2	84.6	94.2	85.7	93.1
5. Expenses and depreciation	100.0	98.0	108.8	120.5	132.7	135.1	143.9	155.6	167.8	182.0	218.5
B. Countries with private agriculture:											
1. Total production	100.0	108.6	112.9	110.6	110.0	105.0	115.9	115.7	123.0	122.9	137.7
2. Output of agriculture	100.0	104.5	114.9	117.2	120.3	116.2	125.0	122.6	131.5	127.1	144.1
(*a*) Output of crops	100.0	109.7	123.3	114.6	127.7	116.3	125.8	116.3	129.2	111.6	133.7
(*b*) Output of animal products	100.0	99.6	106.8	119.6	113.3	116.2	124.5	128.6	133.8	141.9	154.0
3. Gross product	100.0	99.7	111.6	113.3	116.9	111.1	120.7	118.5	126.6	121.0	137.0
4. Net product	100.0	97.2	110.9	113.1	116.8	110.8	120.8	118.9	127.0	121.2	137.8
5. Expenses and depreciation	100.0	148.1	138.5	141.7	141.0	148.1	150.6	144.9	158.3	162.2	181.4
C. Total, Eastern Europe:											
1. Total production	100.0	88.1	92.9	94.5	103.6	97.7	106.9	105.9	111.3	111.0	122.8
2. Output of agriculture	100.0	84.3	91.6	95.4	104.8	101.3	106.5	105.1	114.7	109.4	122.7
(*a*) Output of crops	100.0	92.5	99.7	99.5	115.1	101.7	117.0	103.0	116.0	101.3	119.9
(*b*) Output of animal products	100.0	77.3	84.7	91.9	95.9	100.9	97.4	106.9	113.5	116.4	125.0
3. Gross product	100.0	81.0	88.6	91.6	100.9	96.6	101.5	99.2	105.1	101.3	113.8
4. Net product	100.0	79.1	87.1	90.2	99.8	95.1	100.3	97.8	107.0	99.4	110.1
5. Expenses and depreciation	100.0	118.8	121.5	129.8	137.6	141.4	147.5	152.5	165.2	175.1	205.5

	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
A. Countries with socialized agriculture:											
1. Total production	110.8	115.4	119.2	114.1	113.0	116.5	120.2	128.4	141.6	145.1	143.5
2. Output of agriculture	111.1	115.6	118.4	116.3	114.1	119.0	123.7	131.0	141.7	146.0	144.4
(a) Output of crops	108.5	113.2	117.3	108.5	103.9	115.2	116.2	124.4	135.0	140.6	130.9
(b) Output of animal products	113.2	117.5	119.3	122.6	118.3	122.0	129.8	136.4	147.2	150.4	155.4
3. Gross product	101.4	102.4	103.7	100.7	95.9	98.9	99.9	103.7	111.3	113.9	112.7
4. Net product	98.8	98.2	98.0	93.6	87.9	90.3	90.9	95.8	102.3	104.5	103.4
5. Expenses and depreciation	198.0	238.5	262.4	276.1	299.5	321.5	355.6	380.0	420.0	439.5	434.6
B. Countries with private agriculture:											
1. Total production	135.9	147.2	149.9	160.2	145.9	160.0	159.4	172.2	186.1	190.3	195.8
2. Output of agriculture	146.8	154.7	155.9	170.8	148.4	170.8	166.5	184.5	195.9	201.0	206.8
(a) Output of crops	131.2	142.8	145.3	164.0	119.9	150.4	167.0	180.3	193.9	200.4	208.9
(b) Output of animal products	161.5	166.0	166.0	177.2	175.5	190.3	166.0	188.5	197.8	201.6	204.9
3. Gross product	130.5	145.2	146.7	161.7	136.5	156.9	153.0	161.7	178.0	180.1	185.4
4. Net product	140.6	146.2	148.0	164.2	137.6	158.6	153.9	160.9	177.5	179.4	184.6
5. Expenses and depreciation	183.3	205.1	203.2	209.6	212.8	243.6	241.7	325.0	305.8	329.5	339.1
C. Total, Eastern Europe:											
1. Total production	121.6	129.3	132.7	134.0	127.4	135.4	137.3	147.4	160.9	164.7	165.8
2. Output of agriculture	125.2	131.1	133.3	137.4	127.8	139.2	140.6	151.9	163.0	167.7	168.8
(a) Output of crops	118.1	125.6	129.0	130.8	114.0	129.8	136.7	146.9	158.7	164.7	161.8
(b) Output of animal products	131.4	135.8	136.9	143.0	139.6	147.2	144.0	156.2	166.7	170.2	174.7
3. Gross product	116.3	118.9	120.4	123.8	111.6	120.9	120.0	125.8	136.5	139.1	140.0
4. Net product	114.9	116.5	117.0	120.0	106.7	115.8	114.5	120.2	130.4	132.5	133.3
5. Expenses and depreciation	193.4	227.1	240.9	251.9	266.8	293.4	313.3	361.9	378.5	400.0	402.8

[1] Preliminary data.

Sources: Calculated from physical quantities weighted by FAO Western European wheat based price relatives and divided by acreage of agricultural land taken from statistical yearbooks of respective countries (see Appendix II).

TABLE 12.—*Growth of total agricultural production and output per hectare of agricultural land*

	Indexes, 1934–38=100						Average annual rates of growth			
	1934–38	1948–50	1954–56	1960–62	1965–67	1968 [1]	1948–50 to 1954–56	1954–56 to 1960–62	1960–62 to 1965–67	1948–50 to 1965–67
Bulgaria:										
Production	100	82.8	99.5	133.2	167.5	154.6	3.1	2.6	4.6	4.2
Output	100	84.0	99.4	137.4	176.9	163.1	2.8	3.2	5.6	4.5
Czechoslovakia:										
Production	100	85.6	102.4	108.8	119.9	135.4	3.0	1.0	2.0	2.0
Output	100	85.0	100.8	114.5	129.2	144.4	2.9	2.1	2.4	2.5
East Germany:										
Production	100	75.2	95.0	102.0	121.9	127.5	3.6	1.2	3.6	2.9
Output	100	74.3	93.0	101.1	123.0	127.5	3.8	1.4	4.0	3.0
Hungary:										
Production	100	82.0	100.0	117.1	141.6	141.2	3.4	2.7	3.9	3.3
Output	100	82.2	100.0	120.7	147.5	152.8	3.3	3.2	4.1	3.5
Poland:										
Production	100	121.1	138.1	168.9	204.0	224.3	2.2	3.4	3.9	3.1
Output	100	122.5	148.0	177.5	220.1	239.3	3.2	3.1	4.4	3.5
Rumania:										
Production	100	70.6	113.5	135.0	170.1	180.8	8.2	2.9	4.7	5.3
Output	100	67.8	99.2	126.8	153.4	158.0	6.5	4.2	3.9	4.9
Yugoslavia:										
Production	100	90.8	90.4	126.6	152.0	152.9	−.1	5.8	3.7	3.1
Output	100	94.1	92.9	129.6	154.5	157.7	−.2	5.7	3.6	3.0
Countries with socialized agriculture:										
Production	100	77.7	100.5	115.4	138.4	143.5	4.4	2.3	3.7	3.3
Output	100	76.7	98.1	116.3	139.6	144.4	4.2	2.9	3.7	3.6
Countries with private agriculture:										
Production	100	110.7	120.5	152.0	182.9	195.8	1.4	3.1	3.8	3.0
Output	100	112.2	127.1	158.4	193.8	206.8	2.1	3.7	4.2	3.3
Total Eastern Europe:										
Production	100	91.8	109.4	131.4	157.7	165.8	3.0	3.1	3.7	3.2
Output	100	90.4	109.7	132.8	160.9	168.8	3.3	3.2	3.9	3.5
Western Europe: Output	100	103.2	130.9	153.5	174.8	189.6	4.0	2.7	2.6	3.2

[1] Preliminary data.

Sources: Data in Tables 2 and 3 were divided by acreage of agricultural land taken from statistical yearbooks of respective countries (see Appendix II).

TABLE 13.—*Growth of output of crops and animal products per hectare of agricultural land*

	Indexes, 1934-38=100						Average annual rates of growth			
	1934-38	1948-50	1954-56	1960-62	1965-67	1968 [1]	1948-50 to 1954-56	1954-56 to 1960-62	1960-62 to 1965-67	1948-50 to 1965-67
Bulgaria:										
Crops	100	82.7	90.2	119.9	161.6	126.3	1.5	4.9	6.2	3.9
Animal products	100	85.4	111.6	160.8	197.4	212.4	4.6	6.3	4.2	5.1
Czechoslovakia:										
Crops	100	95.0	113.6	123.3	131.1	157.1	3.0	1.4	1.2	1.9
Animal products	100	79.0	93.2	109.2	128.1	136.7	2.8	2.7	3.2	2.9
East Germany:										
Crops	100	102.7	93.5	95.0	107.2	106.3	−1.6	.3	2.4	2.3
Animal products	100	56.6	92.7	104.9	132.8	140.5	8.6	2.1	4.8	5.1
Hungary:										
Crops	100	94.3	107.5	110.5	140.1	145.6	2.2	.5	4.9	2.4
Animal products	100	73.8	93.9	127.9	152.7	157.9	4.1	5.3	3.6	4.4
Poland:										
Crops	100	124.7	137.9	152.2	214.8	245.6	1.7	1.7	7.0	3.2
Animal products	100	120.4	157.8	202.0	225.2	233.2	4.6	4.2	2.2	3.7
Rumania:										
Crops	100	58.8	87.6	115.9	142.2	131.3	6.9	4.8	4.2	5.3
Animal products	100	80.6	115.4	142.3	169.0	195.4	6.2	3.5	3.5	4.5
Yugoslavia:										
Crops	100	101.5	88.1	133.9	158.5	152.0	−2.4	7.2	3.4	2.7
Animal products	100	87.6	97.2	125.8	151.1	162.8	1.8	4.4	3.7	3.3
Countries with socialized agriculture:										
Crops	100	84.4	97.7	111.6	133.3	130.9	2.5	2.2	3.6	2.7
Animal products	100	70.4	98.4	120.1	144.7	155.4	5.7	3.4	3.8	4.3
Countries with private agriculture:										
Crops	100	115.9	119.0	143.1	191.5	208.9	.4	3.1	6.0	3.0
Animal products	100	108.7	134.8	172.9	196.0	204.9	3.6	4.2	2.5	3.5
Total Eastern Europe:										
Crops	100	97.2	106.8	124.6	156.8	161.8	1.6	2.6	4.7	2.9
Animal products	100	84.6	112.3	139.8	164.4	174.7	4.8	6.1	3.3	4.0

[1] Preliminary data.

Sources: Data in Table 3 were divided by acreage of agricultural land taken from statistical yearbooks of respective countries (see Appendix II).

TABLE 14.—*Growth of agricultural gross product, net product, expenses and depreciation per hectare of agricultural land*

	Indexes, 1934–38=100						Average annual rate of growth			
	1934–38	1948–50	1954–56	1960–62	1965–67	1968 [1]	1948–50 to 1954–56	1954–56 to 1960–62	1960–62 to 1965–67	1948–50 to 1965–67
Bulgaria:										
Gross product	100.0	91.3	88.9	105.2	94.0	75.7	−0.4	2.8	−2.3	0.2
Net product	100.0	80.5	91.2	103.5	90.5	72.2	2.1	2.1	−2.7	.5
Expenses and depreciation	100.0	118.7	216.2	480.4	1,050.7	1,083.2	10.5	14.2	16.4	13.7
Czechoslovakia:										
Gross product	100.0	79.4	88.7	91.2	88.3	101.7	1.9	.1	−.6	.6
Net product	100.0	76.7	84.7	84.6	76.9	89.4	1.7	0	−1.9	0
Expenses and depreciation	100.0	130.7	189.4	278.1	415.3	445.2	6.4	6.6	8.3	7.0
East Germany:										
Gross product	100.0	71.7	87.0	90.6	109.1	113.7	3.3	.7	3.8	2.5
Net product	100.0	69.3	84.4	86.4	102.5	106.7	3.3	.4	3.5	2.3
Expenses and depreciation	100.0	99.8	137.2	177.2	228.6	234.8	5.5	4.4	5.2	5.2
Hungary:										
Gross product	100.0	78.9	94.4	106.2	125.4	130.8	3.0	2.0	3.4	2.8
Net product	100.0	78.0	93.2	89.1	114.9	120.3	3.0	−.8	5.2	2.3
Expenses and depreciation	100.0	144.1	189.9	574.9	616.8	621.1	4.7	20.3	1.4	8.9
Poland:										
Gross product	100.0	117.1	141.7	165.4	193.9	210.5	3.2	2.6	3.2	3.0
Net product	100.0	115.4	142.4	168.0	192.8	209.1	3.2	2.8	2.8	3.1
Expenses and depreciation	100.0	157.9	175.6	224.6	356.3	390.1	1.8	4.2	9.7	4.9
Rumania:										
Gross product	100.0	66.4	93.5	114.8	129.1	131.3	5.9	3.5	2.4	4.0
Net product	100.0	65.1	90.9	110.0	117.9	118.6	5.7	3.2	.9	3.6
Expenses and depreciation	100.0	89.9	167.9	268.2	450.0	488.7	11.0	8.1	10.9	9.9
Yugoslavia:										
Gross product	100.0	93.5	91.1	123.4	144.0	148.4	−.4	5.2	3.1	2.6
Net product	100.0	93.6	91.1	123.6	144.1	148.5	−.5	5.2	3.1	2.6
Expenses and depreciation	100.0	100.0	110.7	191.0	260.2	251.3	1.7	9.5	6.4	5.8
Countries with socialized agriculture:										
Gross product	100.0	73.8	90.1	100.1	109.6	112.7	3.4	1.8	1.8	2.5
Net product	100.0	72.1	88.2	93.2	100.9	103.4	3.4	.9	1.6	2.0
Expenses and depreciation	100.0	109.1	168.5	279.3	413.2	434.6	7.5	8.8	8.1	8.1
Countries with private agriculture:										
Gross product	100.0	108.2	122.0	148.3	173.3	185.4	2.0	3.3	3.2	2.8
Net product	100.0	107.1	122.4	149.9	172.6	184.6	2.3	3.4	2.9	2.8
Total, Eastern Europe:										
Expenses and depreciation	100.0	142.8	155.1	208.5	320.1	339.1	1.4	5.1	8.9	4.9
Gross product	300.0	87.1	101.9	118.6	133.8	140.0	2.7	2.6	2.4	2.6
Net product	100.0	85.5	101.4	114.6	127.7	133.3	2.9	2.1	2.2	2.4
Expenses and depreciation	100.0	123.4	164.3	253.2	380.1	402.8	4.9	7.5	8.5	6.8
Western Europe:										
Gross product	100.0	99.3	120.5	139.1	154.3	168.0	3.3	2.4	2.2	2.6
Net product	100.0	99.1	119.0	136.1	148.7	161.5	3.1	2.3	1.8	2.4
Expenses and depreciation	100.0	114.3	162.8	200.2	244.7	265.0	6.1	3.5	4.1	4.6

Sources: Data in Table 4 divided by acreage of agricultural land taken from statistical yearbooks of respective countries (see Appendix II).

[1] Preliminary data.

between prewar and 1948 was due to territorial changes which resulted in her obtaining a better quality of land than she had before the war. In all countries except Rumania the average annual rate of growth of output of animal products exceeded that of output of crops. Between prewar and 1968 the countries with private agriculture more than doubled their output per unit land, while the countries with socialized agriculture had only a 44 percent increase. Western Europe, of course, exceeded Eastern Europe in growth of productivity of land by about 12 percent between prewar and 1968.

Current operating expenses and depreciation per unit of land increased from prewar to 1968 most dramatically in Bulgaria (11 times) followed by Hungary (6 times), Rumania (5 times), Czechoslovakia (4.4 times), and Yugoslavia and East Germany (about 2.5 times, each). In the postwar period Western European expenses were increasing at a 4.6 percent annual compounded rate and those of Eastern Europe at 6.8 percent.

From prewar to 1968, gross and net product per unit of land increased most in Poland (more than double), followed by Yugoslavia (48 percent), Rumania, Hungary, East Germany, Czechoslovakia, and Bulgaria in descending order. The latter two countries had an absolute decline. Again Western Europe surpassed Eastern Europe by obtaining almost twice as large an increase (62 versus 33 percent) in net product from prewar to 1968.

B. COMPARISON OF LEVELS OF OUTPUT AND INPUTS PER UNIT OF LAND

Relative levels of productivity of land in relation to the Eastern European level as a base are shown in Table 15. Since the prewar period the differences among countries in productivity of land have been reduced; but in 1965–67 they were still very large, and they were greater in the output of animal products than in that of crops. In 1965–67, for example, East Germany produced almost four times as much of animal products per hectare as either Rumania or Yugoslavia. In countries with socialized agriculture productivity of land in terms of output had been over 50 percent higher than in countries with private agriculture before the war, but the differences have been reduced since then, and in 1965–67 the latter group surpassed the former in output of crops per hectare.

Comparison between Eastern and Western Europe reveals that productivity of land on the average is similar in both regions. Though the productivity of land in Northwestern Europe is much superior to that in Eastern Europe, in Southern Europe, i.e., Spain, Portugal, and Greece, it is on the average much lower than in Eastern Europe.[37]

There have been even larger differences in inputs per hectare among Eastern European countries. Czechoslovakia's and East Germany's levels were about 6 times as large as Yugoslavia's in 1965-67. The use of non-agricultural inputs per unit of land in countries with socialized agriculture exceeded by 70 percent that in countries with private agriculture in 1965-67. In relation to Western Europe, the Eastern Euro-

[37] U.N. FAO, *Production Yearbook 1966*, pp. 35–280.

TABLE 15.—*Comparison of levels of output, gross and net product, expenses and depreciation per hectare of agricultural land in agriculture*

[Total Eestern Europe=100]

	Total agricultural output			Output of crops			Output of animal products		
	Prewar	1954–56	1965–67	Prewar	1954–56	1965–67	Prewar	1954–56	1965–67
Bulgaria	86.5	78.4	95.1	106.9	90.4	110.2	68.9	68.5	82.7
Czechoslovakia	145.6	133.9	117.0	118.2	125.9	98.9	169.1	140.4	131.8
East Germany	225.1	190.9	172.1	186.8	163.7	127.7	258.2	213.2	208.6
Hungary	121.9	110.5	111.8	108.5	109.2	96.9	133.4	111.6	124.0
Poland	87.9	118.6	120.3	93.6	120.8	128.2	83.1	116.8	113.8
Rumania	72.6	65.6	69.2	91.7	75.2	83.2	56.2	57.7	57.7
Yugoslavia	63.2	53.5	60.8	64.4	53.1	65.1	62.2	53.9	57.2
Countries with socialized agriculture	120.2	107.5	104.3	116.3	106.5	98.9	123.5	108.3	108.7
Countries with private agriculture	78.8	91.3	94.9	82.9	92.4	101.3	75.2	90.3	89.7
Total, Eastern Europe	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Western Europe	94.5	121.9	102.8	80.4	105.2	88.2	106.8	119.1	114.8

	Gross product			Net product			Expenses and depreciation		
	Prewar	1954–56	1965–67	Prewar	1954–56	1965–67	Prewar	1954–56	1965–67
Bulgaria	88.8	58.2	62.4	90.6	78.5	64.3	59.1	77.8	163.4
Czechoslovakia	145.6	95.3	96.2	141.6	118.3	85.3	171.3	197.5	187.2
East Germany	214.3	137.5	174.7	217.2	180.8	174.3	277.9	232.2	167.1
Hungary	125.7	87.5	117.9	131.2	120.6	118.1	60.2	69.6	97.7
Poland	85.8	89.6	124.3	84.4	118.5	127.4	111.6	119.3	104.6
Rumania	75.7	52.2	73.0	74.8	67.1	69.1	58.6	59.9	69.3
Yugoslavia	65.5	44.0	70.5	66.3	59.5	74.8	43.1	29.0	29.5
Countries with socialized agriculture	120.6	106.7	98.8	121.3	105.4	95.8	113.3	116.1	123.1
Countries with private agriculture	78.3	93.8	101.4	77.6	93.7	105.0	86.2	81.4	72.6
Total, Eastern Europe	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Western Europe	80.1	94.8	92.4	79.2	93.0	92.3	195.6	193.8	125.9

Source: Calculated from physical quantities weighted by FAO Western European wheat-based price relatives divided by acreage of agricultural land; see App. I.

pean inputs per unit of land were about half as large in the prewar period but increased to about four fifths by 1965–67.

Differences in levels of gross and net product per hectare among countries of Eastern Europe were smaller than those of inputs. The net product per hectare of land in countries with socialized agriculture exceeded by 57 percent that in countries with private agriculture in the prewar period but became lower by 9 percent in 1965–67. The level of Western European gross and net product per unit of land had improved since the prewar period in relation to the Eastern European level but it was still about 8 percent below that of the latter region in 1965–67.

C. YIELDS OF SELECTED CROPS PER HECTARE

Table 16 provides a more specific view of comparative levels and trends in productivity of land among various Eastern European countries. It shows yields per hectare for selected crops: wheat, rye, potatoes, and sugar beets. Before the war the yields in all the Eastern European countries, except East Germany and Czechoslovakia, were substantially below those in West Germany. In Bulgaria, Rumania, and Yugoslavia the average yields were one half or less those of West Germany. It should be noted that the natural fertility of West German land is no better than that of Eastern Europe, and much of the land in the Danubian Plains is of superior quality. Yet this favorable natural endowment of land was not used effectively. In the postwar years an effort has been made to improve the productivity of land, and in most of the Eastern European countries yields have increased substantially. However, despite the large upward potential, the rates of improvement in yields in most Eastern European countries did not match those of West Germany. All countries except Rumania improved substantially their wheat yields. On the whole, Poland and Yugoslavia showed good progress in yields, but they still all lagged substantially behind West German yields in 1965–67.

D. YIELDS PER LIVESTOCK UNIT

Only the three most important animal products are compared among countries, namely, meat yield per pig, milk yield per cow, and yield of eggs per hen. The yields of meat per pig remained below the prewar level in all countries with socialized agriculture but they exceeded the prewar level in the countries with private agriculture.

In the prewar years milk yields per cow were very low in Bulgaria, Rumania, and Yugoslavia but they have since then increased substantially, especially in Bulgaria and Rumania. The countries with higher milk yields before the war, i.e., Czechoslovakia and East Germany achieved only a small increase in comparison to West Germany in the postwar period.

Yields of eggs per hen increased from between 42 to 61 percent in Bulgaria, Hungary, Poland, and Rumania, but in West Germany the yield doubled from prewar to 1968. On the whole the improvement in yields per livestock unit has been meager compared to that of crops per hectare in most of the Eastern countries in the postwar years.

TABLE 16.—*Yields per hectare of agricultural land for wheat, rye, potatoes, and sugar beets per year*

	Quintals per hectare						Indexes of yields per hectare, 1934–38=100					
	1934–38	1948–50	1954–56	1960–62	1965–67	1968 [1]	1934–38	1948–50	1954–56	1960–62	1965–67	1968 [1]
Wheat:												
Bulgaria	12.5	10.0	12.8	17.0	28.0	23.8	100	80	102	136	124	190
Czechoslovakia	17.1	18.6	19.1	24.6	25.5	31.3	100	109	112	144	149	183
East Germany	24.6	24.3	28.1	31.1	35.3	37.3	100	99	114	126	143	152
Hungary	14.0	13.2	13.6	17.9	23.1	25.2	100	94	97	128	165	180
Poland	14.6	12.3	14.1	18.7	21.5	24.7	100	84	96	128	147	169
Rumania	13.3	8.7	9.1	13.0	18.9	16.1	100	65	68	98	142	121
Yugoslavia	12.9	12.6	10.1	16.7	23.8	21.8	100	98	78	129	184	169
West Germany	24.5	24.7	28.4	33.1	34.8	42.3	100	101	116	135	142	173
Rye:												
Bulgaria	10.4	9.3	9.4	9.4	12.2	7.3	100	89	90	90	117	70
Czechoslovakia	16.0	17.5	18.2	21.0	20.5	22.5	100	109	114	131	128	141
East Germany	17.1	17.8	20.7	20.7	23.7	26.7	100	104	121	121	138	156
Hungary	11.1	12.4	11.2	11.0	11.3	12.5	100	112	101	99	102	113
Poland	12.8	12.8	13.2	15.6	18.0	20.5	100	100	103	122	141	160
Rumania	10.6	8.3	9.1	10.6	11.5	7.1	100	78	86	100	108	67
Yugoslavia	8.7	9.7	8.2	10.3	11.8	10.4	100	111	94	118	136	120
West Germany	20.1	21.5	25.2	25.8	28.0	33.1	100	107	125	128	139	165
Potatoes:												
Bulgaria	80.0	70.1	88.9	101.2	105.5	100.0	100	88	111	126	132	125
Czechoslovakia	134.8	108.7	137.4	97.6	122.3	168.2	100	81	102	72	91	125
East Germany	173.0	168.9	164.1	165.0	189.0	195.0	100	98	95	95	109	113
Hungary	73.2	63.7	95.1	87.8	94.8	89.2	100	87	130	120	130	122
Poland	138.0	122.7	125.0	140.7	166.3	185.0	100	89	90	102	120	134
Rumania	82.6	54.3	99.9	95.7	93.1	110.8	100	66	121	116	113	134
Yugoslavia	59.9	68.7	79.7	96.3	84.0	89.8	100	115	133	161	140	150
West Germany	185.0	211.7	221.2	238.9	263.2	291.3	100	114	120	129	142	157
Sugar beets:												
Bulgaria	176.7	125.5	150.4	208.2	317.5	292.0	100	71	85	118	180	165
Czechoslovakia	285.8	247.0	251.0	285.0	326.0	400.0	100	86	88	100	114	140
East Germany	291.0	259.2	267.8	238.4	303.1	320.0	100	89	92	82	104	110
Hungary	206.0	140.0	183.6	215.9	312.3	334.2	100	68	89	105	152	162
Poland	265.0	198.3	182.0	255.0	310.0	354.0	100	75	69	96	117	134
Rumania	148.8	88.8	126.2	160.1	204.9	184.0	100	60	85	108	138	124
Yugoslavia	197.0	132.6	173.3	252.7	357.3	364.0	100	67	88	128	181	185
West Germany	327.2	314.5	335.5	368.0	418.7	431.7	100	96	102	112	128	132

[1] Preliminary data.

Sources: Calculated from statistical yearbooks of respective countries.

TABLE 17.—*Yields per head of livestock for meat, milk and eggs per year*

	Yields per head of livestock						Indexes of yields per head of livestock, prewar=100					
	Prewar	1948–50	1954–56	1960–62	1965–67	1968 [1]	Prewar	1948–50	1954–56	1960–62	1965–67	1968 [1]
Meat per pig in kilograms of live weight:												
Bulgaria	135	105	117	88	113	116	100	78	87	65	84	86
Czechoslovakia	132	99	96	97	116	130	100	75	73	73	88	98
East Germany	133	71	95	93	112	118	100	53	71	70	84	89
Hungary	152	84	98	112	120	132	100	55	64	74	79	87
Poland	79	90	78	86	92	90	100	114	99	109	116	114
Rumania	129	79	78	88	92	102	100	61	60	68	71	79
Yugoslavia	86	81	91	95	110	116	100	94	106	110	128	135
West Germany	99	91	110	153	160	168	100	92	111	155	162	170
Milk per cow in liters:												
Bulgaria	450	406	648	1,358	1,864	1,988	100	90	144	302	414	442
Czechoslovakia	2,004	1,476	1,606	1,800	2,069	2,307	100	74	80	90	103	115
East Germany	2,549	1,891	2,341	2,557	3,079	3,172	100	74	92	100	121	124
Hungary	1,856	1,534	1,760	2,158	2,328	2,502	100	83	95	116	125	135
Poland	1,760	1,550	1,763	2,076	2,257	2,569	100	88	100	118	128	146
Rumania	965	829	1,024	1,345	1,621	1,697	100	86	106	139	168	176
Yugoslavia	789	669	1,052	1,083	1,196	1,016	100	85	133	137	152	129
West Germany	2,489	2,095	2,957	3,389	3,666	3,767	100	84	119	136	147	151
Eggs per hen in number:												
Bulgaria	73	73	76	88	99	104	100	100	104	120	136	142
Czechoslovakia	124	112	96	106	150	160	100	90	77	85	121	159
East Germany	170	95	112	131	148	157	100	56	66	77	87	92
Hungary	66	70	75	82	97	105	100	106	114	124	147	129
Poland	71	81	86	94	96	109	100	114	121	132	135	154
Rumania	56	69	68	84	91	90	100	123	121	150	162	161
Yugoslavia	70	55	60	62	76	79	100	78	86	88	108	113
West Germany	108	120	125	151	202	215	100	111	116	140	187	199

[1] Preliminary data.

Sources: Calculated from statistical yearbooks of respective countries

VI. Productivity of Labor in Agriculture

A. TRENDS IN ECONOMICALLY ACTIVE AGRICULTURAL POPULATION

The most widely used productivity measure in every sector of the economy is output per unit of labor input. In agriculture the statistics on labor force are often not given in homogeneous units, especially among different countries. Some countries count every able-bodied man and woman in agriculture as one full labor unit, though many of these units, especially housewives, may devote no more than half or less of their total working time to agriculture. In some other countries the labor force is expressed in terms of more uniform units, i.e., full man-years of work, man-days of work, or man-hours.

Labor data used in this study are in terms of the economically active population in agriculture, which includes farmers, their wives working in agriculture most of their time, helping family members, and hired labor. The quality of agricultural labor statistics varies from country to country. East German, Czechoslovak, and Hungarian labor data are more homogeneous, while those in other Eastern European countries are rough estimates on the basis of census data taken usually in ten year intervals, and consequently the quality of labor units is less homogeneous.

In all of the Eastern European countries, as well as in Western Europe, the economically active population in agriculture declined substantially from prewar to 1968. The percentage declines for different countries were as follows:[38]

(Decline in percent from the prewar to 1968).

Bulgaria	43
Czechoslovakia	51
East Germany	31
Hungary	35
Poland[39]	40
Rumania	15
Yugoslavia	35
Eastern Europe	34
Western Europe	43

Czechoslovakia had the largest exodus of labor from agriculture due to acute labor shortage in industry in the post war years; the transfer of more than 3 million Sudeten Germans into Germany after the war contributed to the shortage. The large postwar decline (42 percent between 1948 and 1968) of the East German agricultural labor force took place from a 1948 level that was higher than in the prewar period. The Rumanian agricultural labor force was larger in 1948 than in prewar, and this is reflected in the postwar decline of 25 percent. Most of the decline in Polish agricultural labor force (about two-thirds) occurred immediately at the end of World War II, as a result of territorial changes.

[38] Figures for Eastern Europe are based on statistical yearbooks of the respective countries. For Western Europe, FAO, OEEC and OECD agricultural statistics were used.

[39] Poland recently published agricultural labor force data in terms of full-man year equivalents. Numbers are given only for 1950—5,419.100; 1960—5.297.600; 1963—5,420,-300; and 1964—5,446,900; see Główny urząd statystyczny, *Rolniczy rocznik statystyczny, 1945–1965*, p. 17. For the sake of consistency with other countries' statistics, we used the number of economically active population which was generally 16 to 29 percent higher (depending on the year) than that of full man-year equivalents.

B. GROWTH OF OUTPUT AND INPUT PER WORKER

As a result of the decline in the agricultural labor force as a consequence of industrialization, the productivity of labor in agriculture increased sharply in the postwar period. Tables 18 to 20 summarize the trends in labor productivity by country, groups of countries, and regions.

Obviously countries with the largest declines in labor experienced largest increases in labor productivity, provided that total output was not lagging. Bulgaria, Poland, and Czechoslovakia had the largest increases in output per unit of labor since prewar (about three-fold) followed by Yugoslavia, Hungary, Rumania, and East Germany. Poland's large increase between prewar and the immediate postwar period was largely due to sharply reduced population resulting from territorial changes. Poland's population shifts affected favorably the indexes of output per unit of labor in the group of countries with private agriculture. When we consider only the postwar period the average annual compound rate of increase was higher for the countries with socialized agriculture (5.7 percent) than for those with private agriculture (4.4 percent); the agricultural labor force declined at a faster rate in the former than in the latter group. Western Europe's output per unit of labor surpassed all the Eastern European countries; it increased well over three times from prewar to 1968, while in Eastern Europe it increased well over two times in the same period. Western Europe of course experienced larger increase in total output and also a larger decrease in its agricultural labor force than Eastern Europe.

The trends in inputs per worker in agriculture were very impressive in all countries. The dramatic increase occurred in Bulgaria, about 20 times between prewar and 1968, but the level of input was very low before the war. In descending order these were Hungary (9-fold rise), Czechoslovakia (8-fold), Rumania (almost 6-fold rise), Poland (5-fold), Yugoslavia (4-fold), and last, East Germany (over 3-fold rise). Again the countries with socialized agriculture had larger increases in inputs than countries with private agriculture. In Western Europe the increase in inputs per unit of labor was not as rapid as that in Eastern Europe.

The increases in gross and net product per unit of labor were largest in Poland and Yugoslavia, concomitant with turning out a larger product with smaller resources (or getting more with less). Hungary and Czechoslovakia were leaders among the countries with socialized agriculture achieving 69 and 66 percent increases, respectively, in net product per unit of labor from the prewar to 1968. Western Europe again surpassed Eastern Europe by achieving an almost threefold increase in gross and net product per unit of labor, leaving Eastern Europe far behind with a less than two-fold growth.

On the whole the East European performance per unit of labor was impressive. It reflected largely the absorption of the large disguised agricultural unemployment existing before the war in this area by transfers of labor to non-agricultural sectors of the economy, hence permitting better overall use of available human resources.

TABLE 18.—*Eastern Europe: Production, output, expenses, gross and net product per person employed in agriculture*

[Indexes, 1934-38=100]

	1934-38	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
A. Countries with socialized agriculture:											
1. Total production	100.0	67.4	72.8	78.6	96.0	91.8	100.2	98.2	101.5	102.2	113.0
2. Output	100.0	66.0	72.1	77.9	92.0	91.3	94.9	93.6	102.7	98.2	110.5
(a) Crops	100.0	74.3	78.4	84.8	103.4	91.5	110.5	93.3	105.7	94.0	111.7
(b) Animal products	100.0	59.3	67.0	72.2	82.9	91.2	82.2	93.8	100.2	101.6	109.4
3. Gross product	100.0	63.9	69.5	74.5	88.2	87.1	89.7	87.0	95.6	89.3	100.7
4. Net product	100.0	62.6	67.9	72.6	86.7	85.0	87.8	84.7	93.6	86.2	94.7
5. Expenses and depreciation	100.0	90.3	101.5	114.9	129.5	135.4	144.4	155.8	166.2	182.6	221.8
B. Countries with private agriculture:											
1. Total production	100.0	119.6	127.2	124.0	124.7	120.0	135.0	137.0	148.0	150.4	170.3
2. Output	100.0	115.0	129.3	131.3	136.3	132.6	145.6	145.1	158.2	155.4	178.2
(a) Crops	100.0	120.9	139.0	128.5	144.7	132.8	146.6	137.9	155.5	136.6	165.6
(b) Animal products	100.0	109.5	120.1	133.9	128.3	132.5	144.6	151.9	160.8	173.2	190.2
3. Gross product	100.0	109.7	125.7	127.1	132.5	126.9	140.5	140.4	148.0	148.0	169.5
4. Net product	100.0	106.9	124.8	126.8	132.2	126.5	140.6	140.6	152.8	148.2	170.4
5. Expenses and depreciation	100.0	163.3	156.2	158.5	160.4	169.3	175.3	171.7	190.6	198.2	224.4
C. Total, Eastern Europe:											
1. Total production	100.0	95.0	101.8	104.6	116.8	112.0	124.0	123.5	130.1	131.6	147.2
2. Output	100.0	84.5	93.5	98.2	109.9	108.1	114.9	113.8	124.6	120.5	136.7
(a) Crops	100.0	92.6	101.6	102.5	120.7	108.4	126.1	111.5	126.1	111.5	133.6
(b) Animal products	100.0	77.5	86.5	94.6	100.5	107.8	105.2	115.9	123.4	128.3	139.3
3. Gross product	100.0	81.2	90.4	94.4	105.9	103.2	109.6	107.7	117.7	111.8	126.9
4. Net product	100.0	79.3	88.9	92.9	104.7	101.6	108.2	106.0	116.4	109.6	122.8
5. Expenses and depreciation	100.0	118.6	123.8	133.3	143.7	150.9	158.9	165.2	179.0	192.6	228.4

	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	[1] 1968
A. Countries with socialized agriculture:											
1. Total production	112.8	122.6	132.8	131.6	135.4	143.5	151.2	166.8	187.0	195.7	197.5
2. Output	113.2	122.8	132.0	134.1	136.7	146.5	155.6	170.1	187.3	196.8	198.7
(a) Crops	110.4	120.3	130.7	125.1	130.5	141.9	146.1	161.5	178.3	189.5	180.0
(b) Animal products	115.4	124.9	133.0	141.4	141.8	150.3	163.2	177.1	194.5	202.8	213.8
3. Gross product	103.3	108.8	115.6	116.2	115.0	121.8	125.7	134.8	147.1	153.6	155.1
4. Net product	100.7	104.4	109.3	108.0	105.4	111.2	114.3	124.4	135.3	140.9	142.2
5. Expenses and depreciation	201.3	253.0	291.2	317.8	358.0	395.0	446.2	492.5	553.9	591.2	596.5
B. Countries with private agriculture:											
1. Total production	170.0	186.3	191.8	205.6	192.9	211.6	210.7	230.7	252.0	260.1	270.1
2. Output	183.5	195.7	199.4	219.1	196.2	225.9	219.9	247.0	265.1	274.5	285.1
(a) Crops	164.2	180.8	186.2	210.8	158.7	199.2	220.9	241.7	262.9	274.2	288.4
(b) Animal products	201.7	209.8	211.8	226.9	231.7	251.2	219.0	252.1	267.2	274.9	282.1
3. Gross product	174.5	183.7	187.7	207.5	180.4	207.5	201.4	216.5	241.0	246.2	255.6
4. Net product	175.8	184.8	189.2	210.7	181.8	209.7	203.1	215.3	240.1	245.0	254.4
5. Expenses and depreciation	229.4	260.1	260.1	269.0	281.6	322.8	319.7	435.7	413.9	450.4	468.0
C. Total, Eastern Europe:											
1. Total production	146.9	160.4	169.8	175.1	172.2	185.7	190.4	209.3	231.7	240.9	246.1
2. Output	140.4	151.2	158.7	166.8	160.7	177.5	181.4	200.6	218.4	228.0	232.9
(a) Crops	132.3	144.8	153.6	158.8	143.3	165.6	176.2	193.9	212.6	224.0	223.3
(b) Animal products	147.4	156.7	163.1	173.8	175.6	187.9	185.8	206.4	223.3	231.4	241.2
3. Gross product	130.4	131.1	143.4	150.5	140.4	154.4	154.8	166.2	183.0	189.2	193.4
4. Net product	128.8	134.4	139.3	145.8	134.2	147.8	147.7	158.7	174.7	180.2	184.0
5. Expenses and depreciation	216.7	261.7	286.1	305.2	334.8	373.6	403.2	476.6	506.1	542.9	555.0

[1] Preliminary data.

Sources: Calculated from physical quantities weighted by FAO Western European wheat-based price relatives for 1952-56 period and employment data taken from statistical yearbooks of respective countries (see Appendix II).

TABLE 19.—*Growth of output per employed in agriculture*

	Indexes, 1934–38=100						Average annual rate of growth			
	1934–38	1948–50	1954–56	1960–62	1965–67	1968 [1]	1948–50 to 1954–56	1954–56 to 1960–62	1960–62 to 1965–67	1948–50 to 1965–67
Bulgaria:										
Output	100.0	87.6	111.8	181.6	298.1	298.3	4.1	8.4	10.4	7.5
(*a*) Crops	100.0	86.5	101.5	158.6	272.1	230.9	2.7	7.7	11.4	7.1
(*b*) Animal products	100.0	89.0	125.6	212.4	332.9	388.5	5.9	9.1	9.4	8.1
Czechoslovakia:										
Output	100.0	93.5	120.6	188.5	238.1	268.9	4.3	7.7	4.8	5.7
(*a*) Crops	100.0	104.3	135.8	202.6	235.5	292.4	4.5	6.9	3.0	4.9
(*b*) Animal products	100.0	87.0	111.5	180.0	230.1	254.7	4.2	8.3	5.0	5.9
East Germany:										
Output	100.0	62.6	91.8	129.1	164.1	175.0	6.6	5.8	4.9	5.8
(*a*) Crops	100.0	86.6	92.3	121.2	143.1	146.3	1.1	4.6	3.4	3.0
(*b*) Animal products	100.0	47.7	91.5	134.0	177.2	193.8	11.5	6.6	5.7	8.0
Hungary:										
Output	100.0	82.5	103.9	140.6	203.5	214.6	3.9	5.2	7.7	5.5
(*a*) Crops	100.0	94.6	112.2	128.8	193.3	204.4	2.9	2.3	8.4	4.3
(*b*) Animal products	100.0	74.0	98.0	149.0	210.7	221.8	4.8	7.2	7.2	6.3
Poland:										
Output	100.0	144.1	178.7	223.7	282.4	308.5	3.6	3.8	4.8	4.0
(*a*) Crops	100.0	146.5	166.3	191.3	275.4	316.2	2.1	2.4	7.6	3.8
(*b*) Animal products	100.0	141.8	190.8	255.3	289.2	300.9	5.1	5.0	2.5	4.3
Rumania:										
Output	100.0	59.0	88.9	125.3	173.0	184.6	7.1	5.9	6.7	6.5
(*a*) Crops	100.0	51.0	78.4	114.3	160.4	153.5	7.4	6.5	7.0	7.0
(*b*) Animal products	100.0	70.1	103.5	140.8	190.7	228.4	6.4	5.3	6.2	6.1
Yugoslavia:										
Output	100.0	97.8	112.0	175.0	226.7	241.2	2.3	7.7	5.3	5.1
(*a*) Crops	100.0	105.3	106.2	180.6	232.4	231.5	.1	9.4	5.2	4.8
(*b*) Animal products	100.0	91.2	117.3	169.9	221.8	248.4	4.3	6.4	5.5	5.4
Countries with socialized agriculture:										
Output	100.0	72.0	98.2	134.3	184.7	198.7	5.3	5.4	6.6	5.7
(*a*) Crops	100.0	79.2	97.7	128.8	176.4	180.0	3.6	4.7	6.5	4.8
(*b*) Animal products	100.0	66.2	98.5	138.7	191.5	213.8	6.8	5.9	6.7	6.4
Countries with private agriculture:										
Output	100.0	125.2	152.9	204.9	261.5	285.1	3.4	5.0	5.0	4.4
(*a*) Crops	100.0	129.5	143.3	185.2	259.6	288.4	1.7	4.4	7.0	4.2
(*b*) Animal products	100.0	121.2	162.0	223.5	264.7	282.1	4.7	5.5	3.4	4.7
Total, Eastern Europe:										
Output	100.0	92.1	119.6	162.1	215.7	232.9	4.4	5.2	5.9	5.1
(*a*) Crops	100.0	98.9	116.4	151.9	210.2	223.3	2.8	4.5	6.7	4.5
(*b*) Animal products	100.0	86.2	122.5	170.8	220.4	241.2	6.0	5.7	5.2	5.7
Western Europe: Output	100.0	107.0	151.8	209.6	282.3	325.0	6.0	5.5	6.1	5.9

Sources: Data in Table 3 divided by the number of employed in agriculture (midyear figures) taken from statistical yearbooks of respective countries (see Appendix II).

[1] Preliminary data.

TABLE 20.—*Growth of gross product, net product, expenses and depreciation per employed in agriculture*

	Indexes, 1934–38=100						Average annual rate of growth			
	1934–38	1948–50	1954–56	1960–62	1965–67	1968 [1]	1948–50 to 1954–56	1954–56 to 1960–62	1960–62 to 1965–67	1948–50 to 1965–67
Bulgaria:										
Gross product	100	84.6	100.1	139.1	157.9	138.5	2.8	5.6	2.6	3.7
Net product	100	83.9	98.9	136.9	152.1	132.1	2.8	5.6	2.1	3.5
Expenses and depreciation	100	124.3	243.3	634.1	1,775.6	1,979.9	11.8	17.3	22.8	16.9
Czechoslovakia:										
Gross product	100	87.3	106.1	149.9	158.7	189.5	3.3	5.9	1.2	3.6
Net product	100	84.4	101.2	139.0	138.2	166.4	3.1	5.4	−0.1	2.9
Expenses and depreciation	100	143.5	226.4	458.8	744.8	827.9	7.9	12.5	10.2	10.2
East Germany:										
Gross product	100	60.5	85.9	115.6	145.6	156.0	6.0	5.1	4.7	5.3
Net product	100	58.4	83.3	110.2	136.8	146.4	6.1	4.8	4.4	5.2
Expenses and depreciation	100	84.3	135.7	226.6	305.4	322.7	8.3	8.9	6.2	7.8
Hungary:										
Gross product	100	79.1	98.5	123.7	173.0	183.6	3.7	3.9	6.9	4.7
Net product	100	78.2	97.3	103.8	158.5	168.9	3.7	1.1	8.3	4.2
Expenses and depreciation	100	144.5	198.3	671.7	851.4	872.3	6.9	22.5	4.9	11.0
Poland:										
Gross product	100	137.8	171.1	208.5	248.9	271.3	3.7	3.3	3.6	3.5
Net product	100	135.8	172.0	211.8	247.5	269.6	4.0	3.5	3.2	3.6
Expenses and depreciation	100	185.7	211.9	283.5	456.5	502.0	2.2	5.0	10.0	5.4
Rumania:										
Gross product	100	57.8	83.8	113.3	145.6	153.5	6.4	5.2	5.1	5.6
Net product	100	56.6	81.5	108.6	133.1	138.8	6.3	4.9	4.2	5.2
Expenses and depreciation	100	78.5	150.9	266.1	509.4	571.9	11.5	9.9	13.9	11.6
Yugoslavia:										
Gross product	100	97.2	109.8	166.6	211.4	226.4	2.1	7.2	4.9	4.7
Net product	100	98.2	109.8	166.7	211.3	226.1	2.1	6.8	4.8	4.7
Expenses and depreciation	100	104.2	135.0	260.1	384.9	386.3	4.4	11.6	8.3	8.0
Countries with socialized agriculture:										
Gross product	100	69.3	90.6	115.6	145.2	155.1	4.6	4.1	4.7	4.4
Net product	100	67.7	88.2	107.6	133.5	142.2	4.5	3.4	3.9	4.1
Expenses and depreciation	100	102.2	168.2	322.3	545.9	596.5	8.7	11.4	11.1	10.4
Countries with private agriculture:										
Gross product	100	120.8	146.9	191.9	234.6	255.6	3.3	4.5	4.1	4.0
Net product	100	119.5	147.2	193.9	236.8	254.4	3.5	4.7	4.1	4.1
Expenses and depreciation	100	159.3	186.8	270.2	439.3	468.0	2.7	6.3	10.2	6.1
Total Eastern Europe:										
Gross product	100	88.7	112.4	144.8	179.5	193.4	4.0	4.3	4.4	4.2
Net product	100	87.0	110.7	139.8	171.2	184.0	3.8	4.0	4.1	4.1
Expenses and depreciation	100	125.2	178.9	308.7	508.5	555.0	6.1	9.5	10.5	8.6
Western Europe:										
Gross product	100	103.0	139.7	190.0	239.2	287.9	5.2	5.3	4.7	5.1
Net product	100	102.8	137.9	185.8	240.0	276.8	5.0	5.1	5.3	5.1
Expenses and depreciation	100	118.4	188.9	273.4	395.1	454.0	8.1	6.4	7.6	7.3

[1] Preliminary data.

Sources: Data in Table 4 divided by the number of employed in agriculture (midyear figures) taken from statistical yearbooks of respective countries (see Appendix II).

C. LEVELS OF OUTPUT AND INPUTS PER WORKER

It may be useful to bring into focus comparative levels of productivity of labor among different countries in relation to the Eastern European average level. Such data are shown in Table 21.

Very large differences in productivity of labor among the individual countries existed before the war, and in the postwar period they have been reduced only slightly. Before the war a Bulgarian, Rumanian, or Yugoslav worker in agriculture produced hardly one sixth as much output as an East German worker. In the 1965–67 period, the Rumanian worker still produced less than one fifth as much, and the Yugoslav worker a little more than one fifth of the East German output per worker. Czechoslovakia has been the second highest in output per worker, followed by Hungary, Poland, Bulgaria, Yugoslavia, and Rumania on a rapidly descending scale.

The differences in relative levels of output of animal products per worker have been even greater. In 1965–67 period, a Rumanian worker produced only about 12 percent as much as an East German worker, and a Yugoslav worker produced only 17 percent as much.

The differences in relative levels of inputs and gross and net product per worker were approximately of the same order of magnitude as in the case of output.

In comparing the groups we find that before the war the output, gross product, and net product per worker in countries with socialized agriculture were approximately between 66 to 69 percent greater than those in countries with private agriculture. By 1965–67 this lead was reduced to only about 10 to 17 percent for output and gross product, and in the case of net product the countries with private agriculture had already surpassed the former group by 3 percent. The worker in countries with private agriculture had done so with only about half as much inputs as the worker in countries with socialized agriculture.

Western Europe compared very favorably with Eastern Europe over the entire period and for all measures. Its relative levels of output, gross product, and net product per worker increased, and by 1965–67 Western Europe produced between two and two-and-a-half times as much per worker as Eastern Europe. Western Europe compared even more favorably with the countries with socialized agriculture in trends of levels of output and gross and net product.

VII. Progress Towards a Capital-Intensive Agriculture

A. PROGRESS IN MECHANIZATION

The intensification of agricultural performance is associated with increased utilization of mechanical power and improved farm machinery and equipment. A close relationship between mechanical power input and productivity of land and labor has been observed in many countries.[40]

A widely used indicator of the extent of mechanization is the number of tractors per unit of land and per unit of labor. Table 22 pre-

[40] U.N. Food and Agriculture Organization, *The State of Food and Agriculture 1968*, Rome, 1968, pp. 93–95.

TABLE 21.—*Comparisons of levels of output, gross and net product, expenses and depreciation per employed in agriculture*

[Total Eastern Europe = 100]

	Total agricultural output			Output of crops			Output of animal products		
	Prewar	1954–56	1965–67	Prewar	1954–56	1965–67	Prewar	1954–56	1965–67
Bulgaria	64.7	60.5	89.5	80.0	69.8	103.6	51.5	52.8	77.9
Czechoslovakia	182.7	184.1	196.6	148.4	173.2	167.2	212.3	193.1	221.6
East Germany	363.3	278.8	276.4	301.4	239.1	205.2	416.6	311.3	335.0
Hungary	173.1	150.2	163.3	154.0	148.5	141.6	189.5	151.6	181.2
Poland	86.0	128.5	112.7	91.6	131.0	120.1	81.2	126.5	106.6
Rumania	61.4	45.6	49.3	77.6	52.3	59.2	47.5	40.1	41.1
Yugoslavia	58.7	54.9	61.7	59.8	54.5	66.1	57.8	55.3	58.1
Countries with socialized agriculture	125.2	102.7	107.2	121.1	101.7	101.7	128.6	103.4	111.8
Countries with private agriculture	75.6	96.6	91.9	79.4	97.8	98.1	72.3	95.6	86.9
Total, Eastern Europe	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Western Europe	173.7	220.3	227.3	147.6	204.3	195.0	196.1	232.6	253.8

	Gross product			Net product			Expenses and depreciation		
	Prewar	1954–56	1965–67	Prewar	1954–56	1965–67	Prewar	1954–56	1965–67
Bulgaria	66.5	59.2	58.5	67.8	60.6	60.3	44.2	60.0	154.2
Czechoslovakia	182.9	172.6	161.7	177.8	162.6	143.5	214.7	271.7	314.5
East Germany	346.0	264.5	280.6	350.5	264.0	280.1	447.0	338.9	268.8
Hungary	178.7	156.6	172.2	186.4	163.9	172.6	85.3	94.5	142.8
Poland	84.0	127.9	116.5	82.6	128.3	119.3	109.1	129.2	97.9
Rumania	64.1	47.8	52.0	63.3	46.6	49.2	49.4	41.6	49.4
Yugoslavia	60.8	59.5	71.7	61.6	61.1	76.0	39.6	29.9	30.0
Countries with socialized agriculture	125.6	101.4	101.6	126.3	100.6	98.5	118.0	110.9	126.6
Countries with private agriculture	75.2	98.3	98.2	74.6	99.2	101.7	82.5	86.1	70.3
Total, Eastern Europe	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Western Europe	147.3	183.1	204.4	145.6	181.5	204.3	358.4	378.5	278.5

Sources: Calculated from physical quantities weighted by FAO Western European wheat-based price relatives for 1952–56 period divided by the number of employed in agriculture (midyear figures) taken from statistical yearbooks of respective countries. (See App. I).

sents estimates of tractors in terms of standard 15 H.P. tractor units per 1,000 hectares of agricultural land and per 1,000 workers in agriculture by country, groups of countries, and major regions.[41] Our findings show that in the prewar period the extent of the use of mechanical power was very low in terms of Western European standards in most of the Eastern European countries. Only Czechoslovakia, East Germany, and Hungary were close to Western European levels. On the average, however, the level of Western European mechanization was in turn rather low in comparison with that of the United States, where there were about 5 tractors per 1,000 hectares and 135 tractors per 1,000 workers in agriculture in 1938.[42] In Bulgaria, Poland, Rumania, and Yugoslavia agriculture depended heavily on animals for draft power.

Rapid progress towards mechanization started immediately after the war and has continued to gain momentum. In all the countries the rates of increase were spectacular; in fact the percentage increases exceeded those of Western Europe. As a result, the differences among individual countries and between Eastern and Western Europe were somewhat narrowed with the passage of time. In 1968 Czechoslovakia and East Germany had almost 10 times as many tractors per unit of land and twelve to thirteen times as many tractors per worker as Yugoslavia. Rumania's level of mechanization was only slightly higher than that of Yugoslavia, and Poland's intensity in the use of tractors was only about a third to a fifth of that of either Czechoslovakia or East Germany. Hungarian progress in mechanization has lost ground in relation to either Czechoslovakia or East Germany in the postwar years.

The differences in relative levels of mechanization between the countries with socialized and private agriculture, taken as groups, remained about the same in the postwar period.

Western Europe has been more or less keeping a comfortable lead in mechanization over Eastern Europe. In 1968 it still had about 3 times as many tractors per unit of land and about 6.5 times as many tractors per worker as Eastern Europe. Although progress in mechanization of Eastern European agriculture has been very impressive since the war, there is still plenty of room for further improvement toward the West European level.

B. GROWTH OF FERTILIZER CONSUMPTION

Increased use of fertilizers has been the major factor in raising the productivity of land in advanced countries, and it has brought significant increases in crop yields in many agriculturally less developed countries. Most of the Eastern European countries did not turn seriously toward increased use of fertilizers until the late 1950's. Table 23 shows that in the prewar years, consumption of fertilizers per unit of land was very low in all the East European countries except Czechoslovakia and East Germany. The latter country already had an ex-

[41] In other studies the number of tractors is usually given per unit of arable land, we preferred to express it per unit of agricultural land. This, however, has no appreciable effect on outcome of our comparisons.

[42] U.S. Department of Agriculture, *Agricultural Statistics 1952*, p. 637; and Bernard Mueller, *Statistical Handbook of the North Atlantic Area*, New York, The Twentieth Century Fund, 1965, pp. 152, 163.

TABLE 22.—*Number of tractors per 1,000 hectares of agricultural land and per 1,000 workers in agriculture*

	Number of tractors per 1,000 hectares or 1,000 workers						Total Eastern Europe=100		Indexes of number of tractors per 1,000 hectares or 1,000 workers (1953–57=100)					
	Prewar	1948–52	1953–57	1958–62	1963–67	1968 [1]	Prewar	1963–67	Prewar	1948–52	1953–57	1958–62	1963–67	1968 [1]
Bulgaria:														
Per 1,000 hectares	0.28	1.6	3.6	6.9	11.4	15.0	82	119	8	44	100	192	317	417
Per 1,000 workers	0.56	3.3	7.7	16.3	34.6	52.4	64	108	7	43	100	212	449	681
Czechoslovakia:														
Per 1,000 hectares	0.73	3.7	5.9	13.2	24.7	28.1	215	257	12	63	100	224	418	476
Per 1,000 workers	2.34	13.7	23.0	63.9	139.6	167.0	266	435	10	60	100	278	607	726
East Germany:														
Per 1,000 hectares	1.12	2.4	6.4	12.9	23.1	26.9	329	240	18	38	100	202	361	420
Per 1,000 workers	4.61	8.4	26.4	63.5	128.2	151.4	524	399	17	32	100	241	486	573
Hungary:														
Per 1,000 hectares	0.99	2.0	3.0	5.4	9.1	9.7	291	95	33	67	100	180	303	323
Per 1,000 workers	3.59	7.3	11.3	21.8	44.0	49.3	408	137	32	65	100	193	389	436
Poland:														
Per 1,000 hectares	0.01	1.3	2.9	4.0	7.3	10.3	3	76	0	45	100	138	252	355
Per 1,000 workers	0.03	3.8	8.6	12.6	23.3	33.0	3	73	0	44	100	147	271	384
Rumania:														
Per 1,000 hectares	0.26	0.9	1.6	3.1	5.5	6.5	76	57	16	56	100	194	344	406
Per 1,000 workers	0.58	1.8	3.1	6.4	13.0	16.5	66	40	19	58	100	206	419	532
Yugoslavia:														
Per 1,000 hectares	0.15	0.5	0.9	2.3	3.1	3.4	44	32	17	56	100	256	344	378
Per 1,000 workers	0.36	1.2	2.6	7.2	10.7	12.4	41	33	14	46	100	277	412	477
Countries with socialized agriculture:														
Per 1,000 hectares	0.61	1.9	3.7	7.3	13.0	15.2	179	135	16	51	100	197	351	411
Per 1,000 workers	1.63	5.1	9.8	21.6	44.5	55.3	186	139	17	52	100	220	454	564
Countries with private agriculture:														
Per 1,000 hectares	0.06	1.0	2.0	3.3	5.5	7.3	18	57	3	50	100	165	275	365
Per 1,000 workers	0.15	2.6	6.0	10.3	18.1	24.7	17	56	2	43	100	172	302	412
Total, Eastern Europe:														
Per 1,000 hectares	0.34	1.5	2.9	5.5	9.6	11.6	100	100	12	52	100	190	331	400
Per 1,000 workers	0.88	4.0	8.1	16.5	32.1	40.8	100	100	11	49	100	204	396	504
Western Europe:														
Per 1,000 hectares	1.28	5.4	11.0	18.9	27.1	33.1	376	282	12	49	100	172	246	301
Per 1,000 workers	5.91	26.5	59.6	116.9	198.0	265.7	672	617	10	44	100	196	332	446

[1] Data for 1968 are preliminary.

Source: Calculated from statistical yearbooks of respective countries and FAO yearbooks and monthly statistical bulletins.

tremely high level of fertilizer use; in fact it exceeded the Western European level by almost four times and that of Eastern Europe by nine times before World War II. Czechoslovakia's consumption per hectare was about a half of that in Western Europe, and it exceeded by about four times that in Eastern Europe.

Consumption of fertilizers in the postwar period has been expanding at the fastest rate in countries which had the lowest prewar levels, the most rapid increase occurring since the mid-fifties. In the decade between 1953–57 and 1963–68, the consumption of fertilizers per hectare of agricultural land increased over 13-fold in Rumania, over 10-fold in Bulgaria, over 7-fold in Hungary, over 5-fold in Yugoslavia, and only 2.5-fold in Poland. Czechoslovakia and East Germany experienced moderate increases of 2.5-fold and 1.6-fold respectively, from their relatively advanced levels, and they remained the highest users of fertilizers per hectare of agricultural land in Eastern Europe. Their respective annual consumption was 117 and 201 kilograms per hectare in the 1963–68 period. Bulgaria, one of the lowest users of fertilizers before the war, became the third highest user with an annual consumption of almost 80 kilograms in the 1963–68 period. Czechoslovakia and East Germany exceeded the Western European consumption level by 39 and 138 percent, respectively, in the 1963–68 period. Hungary and Poland achieved an average level of 61 and 64 kilograms per hectare, while Yugoslavia and Rumania remained the lowest users with 33 and 22 kilograms per hectare annually in the 1963–68 period.

The countries with socialized agriculture matched their leading position in tractors in the prewar period by leading as well in fertilizer consumption per unit of land by a five-fold margin over the countries with private agriculture. That margin, however, was reduced to about 60 percent in the 1963–68 period. Although the countries with private agriculture were lagging in the intensity of fertilizer consumption, their level of output of crops per hectare has surpassed that of countries with socialized agriculture in recent years (Table 15).

Eastern Europe as a whole compares quite favorably in fertilizer consumption with Western Europe: it is in fact closing the gap between the levels in fertilizer consumption per unit of land. This heavily increased application of fertilizers already has paid off with significantly increased yields in Eastern Europe.

C. SCIENTIFIC METHODS ON THE FARM

Along with increased use of fertilizers, the adoption of better crop varieties and livestock breeds helped to increase yields per unit of input in all the Eastern European countries. Research on improvement of seeds has been carried out by the agricultural research institutes of the Council for Mutual Economic Assistance among others. A significant increase in wheat yields has been attributed partly to the introduction of an improved Soviet hard wheat variety. This wheat strain was sown on more than half the wheat area in Hungary and on more than 80 percent in Bulgaria in recent years. The development of better breeds has contributed to increased yields of milk per cow and eggs per hen in state and collective farms, especially

TABLE 23.—*Consumption of commercial fertilizers per hectare of agricultural land*

	Nitrogen (N), phosphate (P_2O_5) and potash (K_2O) in kilograms per hectare					Total Eastern Europe=100		Indexes of fertilizer consumption per hectare (1953–57=100)				
	Prewar	1948–52	1953–57	1958–62	1963–68 [1]	Prewar	1963–68 [1]	Prewar	1948–52	1953–57	1958–62	1963–68 [1]
Bulgaria	0.5	2.2	7.5	26.0	78.8	5	118	7	29	100	347	1,051
Czechoslovakia	12.2	25.1	47.7	71.8	117.2	117	175	26	53	100	150	246
East Germany	93.4	99.3	122.5	150.1	200.9	898	300	76	81	100	122	164
Hungary	1.3	4.6	8.3	26.2	60.7	12	90	16	55	100	316	731
Poland	4.9	15.6	26.1	35.8	64.0	47	96	19	60	100	137	245
Rumania	.2	.5	1.6	5.0	21.5	2	32	12	31	100	313	1,344
Yugoslavia	.6	1.4	6.4	16.7	32.9	6	49	9	22	100	261	514
Countries with socialized agriculture	17.1	21.4	31.1	46.2	80.7	164	120	55	69	100	148	259
Countries with private agriculture	3.3	9.9	17.8	27.7	50.7	32	76	18	56	100	156	285
Total, Eastern Europe	10.4	16.2	24.9	37.7	67.0	100	100	42	65	100	151	269
Western Europe	24.9	36.0	50.2	63.5	84.5	239	126	50	72	100	126	168

Sources: Calculated from statistical yearbooks of respective countries and FAO yearbooks and monthly statistical bulletins.

[1] Data for 1968 are preliminary.

in Bulgaria and Rumania where the yields were very low before the war.

In Czechoslovakia, East Germany, and Hungary research in support of agricultural technology has been carried on for many years. Technological knowledge has been disseminated through rapidly increasing numbers of agricultural technical institutes and agricultural colleges. The number of trained agronomists has increased several times in every Eastern European country. Application of more advanced farming methods undoubtedly contributed to the higher productivity of land and labor in Eastern Europe.

D. GROWTH OF INVESTMENT

Rapid progress in agricultural mechanization and technology required substantial government financial support. The postwar growth of gross fixed agricultural investment and its share in total investment in Eastern Europe is shown in Table 24. These investment series should be interpreted with a possibly large margin of error because for most of these countries not enough is known about the prices of investment. For example, East German and Yugoslav investment series are given in current prices, but it cannot be ascertained whether the current prices were rising, falling, or remaining essentially the same. Nevertheless, despite their shortcomings, these series may give us a general picture of trends in investment in the postwar years.

In countries with socialized agriculture the government played a major role in providing new investment funds. In all the countries there has been a substantial increase in investment, with the less developed countries showing the greater increases: Rumania almost 9-fold, Yugoslavia 7-fold, Poland over 5-fold. Czechoslovakia and Hungary had 3.5-fold, and 2.5-fold increases, respectively, between 1950–54 and 1965–67. In comparison to West Germany, all of the Eastern European countries seemed to have a higher rate of investment in the postwar period. We recall that West Germany very substantially improved her performance in agriculture (Tables 16 and 17).

Agricultural investment may be usefully related to total investment and then compared with agriculture's share in total GNP. These relationships are shown in Table 24. We notice that agriculture's share in the total investment was relatively low, around 10 percent or less in most of the countries in the 1950–54 period. Only Hungary had a higher share (13 percent). On the other hand the contribution of agriculture to the total GNP was four times as large as the investment share in Bulgaria, three times as large in Rumania and Poland, two and a half times as large in Yugoslavia, and about twice as large in Hungary and Czechoslovakia. In fact in this period the governments sought to extract a maximum surplus from agriculture and to provide in return minimal investment support to the sector.

In the subsequent periods agriculture's share in the total investment increased substantially; but by the second half of the sixties the share of agriculture in the total investment declined in most of the countries. The difference between agriculture's share in total investment and its share in GNP has shrunken (see the ratios in Table 24). In the decade of the 1950's this ratio was rather low, indicating that agri-

TABLE 24.—*Gross fixed agricultural investment, its share in the total investment, and the contribution of agriculture to the total gross national product*

	Indexes of gross fixed agricultural investment, 1950–54=100				Agriculture's share in the total investment, in percent				Percentage contribution of agriculture to the total GNP				Percentage ratio of agriculture's share in investment to its share in GNP	
	1950–54	1955–59	1960–64	1965–67	1950–54	1955–59	1960–64	1965–67	1950–54	1955–59	1960–64	1965–67	1950–59	1960–67
Bulgaria [1]	100	201	342	407	10.0	14.5	12.6	9.3	40.1	33.4	25.5	18.2	34.6	49.5
Czechoslovakia [2]	100	244	358	[3] 351	10.1	16.8	15.6	12.3	21.7	18.1	13.7	12.1	69.0	107.8
East Germany [4]			100	130			13.2	12.4	[5] 10.9	10.2	8.5	8.8		147.7
Hungary [6]	100	119	263	266	13.0	15.7	19.1	15.8	26.5	26.8	22.0	20.1	53.9	82.4
Poland [7]	100	205	310	[3] 529	9.1	12.5	12.6	15.7	33.0	29.5	26.3	24.2	36.0	56.6
Rumania [8]	100	246	678	859	10.1	16.1	20.4	18.5	[5] 31.3	36.3	27.8	23.4	40.1	76.7
Yugoslavia [9]	100	256	521	685	9.2	13.1	10.7	9.2	[5] 24.5	[10] 27.6	22.8	20.8	44.5	45.2
West Germany [11]	100	177	227	217	4.8	5.0	4.1	3.2	8.5	6.3	5.2	4.5	68.1	75.0

[1] State and collective farms investment in leva at 1956 prices; GNP at 1956 adjusted factor cost prices.

[2] Total investment in agriculture and forestry in crowns at 1959 prices; GNP at 1956 adjusted factor cost prices; agriculture includes forestry.

[3] 1965–68 preliminary data.

[4] Agriculture includes forestry and water management; investment in marks at current prices, 1960–64=100; GNP at 1955 adjusted factor cost prices.

[5] 1950 only.

[6] Agriculture includes forestry; investment in forints at 1959 prices; GNP at 1955 adjusted factor cost prices.

[7] Investment in zlotys at 1961 prices; GNP at 1956 adjusted factor cost prices.

[8] Agriculture includes forestry; investment in lei at 1959 prices; GNP at 1960 adjusted factor cost prices.

[9] Agriculture includes fishing; investment including private farming in dinars at current prices; GNP at 1962 adjusted factor cost prices.

[10] 1955 only.

[11] Investment and GNP at constant 1954 prices.

Sources: Investment: Calculated from statistical yearbooks of respective countries; share of agriculture in total GNP: Thad P. Alton, "Economic Structure and Growth in Eastern Europe," in the present volume, pp. 41–67.

culture's share in GNP was two to three times as great as its share in the total national investment. Only Czechoslovakia showed a more favorable ratio. In the 1960's this ratio improved in favor of investment, and in two countries, Czechoslovakia and East Germany, agriculture's share in total investment exceeded its share in GNP. In the still predominantly agricultural countries, Yugoslavia and Bulgaria, the ratio of agriculture's investment share to its GNP share is below one half. This would seem to suggest that agriculture is partly financing industrialization. In the final analysis this ratio reflects governmental price and taxing policies towards agriculture.

It is to be noted that in West Germany this ratio increased to 75 percent in the 1960's. The unweighted average ratio for all Eastern European countries is 81 for 1960–67. This may suggest that on the whole agriculture in Eastern Europe gets a share of total investment that is comparable to that in a market oriented economy, such as West Germany's.

VIII. Trends in Productivity of Czechoslovak Agriculture

A. CAPITAL AND ITS PRODUCTIVITY

For most Eastern European countries complete information on fixed capital assets in agriculture is not available for the whole postwar period, thus ruling out a comprehensive study of capital and labor inputs and total productivity. Czechoslovakia, however, has published enough information in this area to enable us to construct our own series on capital stock and to calculate productivity ratios per unit of capital and per unit of combined inputs.

Table 25 presents indexes of total capital stock, machinery, and equipment and various performance ratios per unit of capital as well as capital per unit of labor, all valued at constant 1936 prices (crowns) paid by farmers. The estimates of actual (depreciated) value of agricultural capital in Czechoslovakia comprise agricultural land, farm buildings (excluding farmers' dwellings), machinery and equipment, all farm animals, all farm inventories, and work in progress. Our findings show a modest 12 percent increase in total capital from the prewar to 1963–67. The overall measure has been affected heavily by retirement of land from production, and land is a major component of agricultural capital. Machinery and equipment, on the other hand, increased about 2.4 times in the same period. Since both output and total capital stock increased by the same percentage, output per unit of capital remained unchanged between prewar and 1963–67. However, the index dropped by several percent below the prewar level between 1948 and 1962 because the level of output was lagging behind that of capital. Gross product and net product of agriculture per unit of capital declined very sharply in the postwar period. Total capital per unit of labor more than doubled because the agricultural labor force decreased by about one half in the same period. Mechanization was reflected in the rapidly increasing quantity of machinery and equipment per unit of labor and of capital input per unit of labor.[43] Both these measures increased almost five times

[43] Capital input comprises current operating expenses, depreciation, and interest on capital. It should not be confused with total capital stock.

since the prewar years. Thus the increased level of mechanization caused a reduction of the labor requirement in agriculture, and the increased output per unit of labor was mainly the result of substituting capital for labor.

B. TOTAL INPUTS

Total inputs into agriculture were calculated as the sum of the value (in constant prices) of current operating expenses, depreciation, labor input (hired labor and imputed value of labor of farmers and family helpers), and interest on capital. Inputs from nonagricultural sectors quadrupled, while the value of labor input decreased by almost one half between the prewar period and 1963–67. The value of labor, the most important input, heavily affected the combined index of all inputs, which increased 53 percent over the whole period.

C. TOTAL PRODUCTIVITY

The total productivity, or the output-input ratio, is defined in this study of Czechoslovak agriculture as the ratio (expressed in percentages) of an index of agricultural output to an index of all production inputs (operating expenses, depreciation, labor input, and interest from capital, weighted at 1937 prices) used to produce that output. The output-input ratio index measures the trend in combined productivity of all inputs over time. The figures in Table 25 show that the postwar output per unit of all inputs remained below the prewar level. The index remained steady at about 84 percent from 1948 to 1962 and then declined to 73 percent in the following five years. Part of the adverse trend in this output-input ratio may be due to the "index number problem," or the bias caused by the changes in relative prices.[44] However, studies for Western countries have shown a continuous increase in total productivity in agriculture. For example, in Western Europe the output per unit of all inputs has been increasing at a two percent average annual compound rate in the 1950's.[45] Even in the Soviet Union there has been recorded an increase in total productivity, especially between 1953 and 1958.[46] The absolute decline of total productivity in Czechoslovak agriculture since the war was caused by several factors. Among these are changes in organization of production from private enterprise to inefficient command-type socialized management, changes imposed by the state in ownership of land (collectivization), discriminatory multiple pricing directed against private farmers, diminished incentives and lack of entrepreneurship, and passive resistance of farmers to socialized agriculture.

IX. Conclusion

At the time of this writing (February 1970) scanty reports are coming from Eastern Europe about the 1969 harvest. The indications are that in Czechoslovakia, Poland, and Rumania, the harvest was poorer than in 1968, while in Hungary and Yugoslavia it was better.

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[44] Vernon W. Ruttan. *Technological Progress in the Meat Packing Industry 1917–1947*, U.S. Department of Agriculture, 1954, pp. 15–20.

[45] U.S. Department of Agriculture, *Expansion of Agricultural Production*, p. 46.

[46] Douglas B. Diamond. "Trends in Output, Inputs, and Factor Productivity in Soviet Agriculture." *in* U.S. Congress, Joint Economic Committee. *New Directions in the Soviet Economy*, Washington, U.S. Govt. Printing Office, 1966, part II–B, p. 352.

TABLE 25.—*Output, capital stock, inputs, and productivity ratios per unit of capital and per unit of all inputs in Czechoslovak agriculture*

	Indexes, 1934–38=100					Average annual rate of growth			
	1934–38	1948–52	1953–57	1958–62	1963–67	1948–52 to 1953–57	1953–57 to 1958–62	1958–62 to 1963–67	1948–52 to 1963–67
(*a*) Output	100.0	85.2	91.4	102.5	112.1	1.4	2.3	1.8	1.8
(*b*) Capital and ratios per unit of capital and labor:									
Total capital	100.0	96.4	98.1	104.1	111.7	.4	1.2	1.4	1.0
Machinery and equipment	100.0	122.3	135.5	163.4	237.5	2.1	3.8	7.8	4.5
Output per unit of machinery	100.0	69.7	67.5	62.7	47.5	−.6	−1.5	−5.7	−2.6
Output per unit of capital	100.0	88.4	93.1	98.5	100.3	1.1	1.1	.4	.9
Gross product per unit of capital	100.0	76.2	71.4	63.0	40.5	−1.3	−2.5	−9.2	−4.3
Net product per unit of capital	100.0	71.1	64.2	52.8	22.8	−2.1	−4.0	−18.3	−7.9
Machinery per unit of labor	100.0	145.9	174.5	267.6	454.8	3.6	8.9	11.2	7.9
Capital input per unit of labor	100.0	142.0	183.3	300.8	491.9	5.2	10.4	10.3	8.6
Total capital per unit of labor	100.0	114.9	126.4	169.1	213.8	1.9	6.0	4.8	4.2
(*c*) Inputs:									
Operating expenses and depreciation	100.0	144.4	192.0	272.4	419.6	5.9	7.2	9.0	7.4
Labor input	100.0	85.4	78.2	63.2	53.4	−1.8	−4.4	−3.4	−3.2
Interest from capital	100.0	96.5	98.4	105.9	114.1	.4	1.5	1.5	1.1
Total inputs	100.0	101.8	109.6	122.3	153.3	1.5	2.2	4.6	2.8
(*d*) Total productivity: Output per unit of all inputs	100.0	83.7	83.4	83.8	73.1	−0.1	0.1	−2.8	−0.9

Sources: G. Lazarcik, "Production and Productivity in Czechoslovak Agriculture, 1934–38 and 1946–1967," Ph. D. dissertation, Columbia University, updated, 1969; Tables 6, 19, and 20.

Generally, animal production is expected to be somewhat lower because of the decline in number of domestic animals reported earlier in the year.

Whatever the outcome of this year's or even next year's agricultural production may be, the important conclusions of this study of postwar Eastern European agriculture will not be affected. The findings of this essentially statistical study are summarized as follows:

(1) Agricultural performance as reflected in our measures has been uneven among the Eastern European countries and over the period under study. Following the initial recovery from the war, agricultural output in the early 1950's entered a period of stagnation concomitant with the increased drive for collectivization. When the pressure to collectivize lessened, output resumed its growth, but again it slackened with the new wave of collectivization between 1957 and 1961. Since then the trend of output has presented a mixed picture. In Bulgaria output has expanded rapidly, but in other countries it has risen at slower rates (see Table 3).

(2) Poland and Yugoslavia decollectivized their agriculture after the first abortive drives in the early 1950's. As a group, their growth performance in most production measures was better than that of the group of countries with socialized agriculture since the mid-1950's.

(3) In terms of gross and net product (i.e., value added in agriculture, or its contribution to GNP and NNP) the group of countries with private agriculture surpassed the group of countries with socialized agriculture by a much greater margin than in the case of production and output. Between the prewar period and 1968 the former group with small-scale, private farming enjoyed a 57 percent increase in both gross and net product, while the latter group with large-scale, mechanized socialized farming scarcely attained the prewar level of gross and net product (Table 4).

(4) Since the countries with socialized agriculture had a significantly higher increase in nonagricultural inputs but had smaller increases in output and gross and net product than those with private agriculture, they must have used their productive resources far less efficiently than the group with private agriculture.

(5) The superior performance of the countries with private agriculture over the countries with socialized agriculture is evident in most growth measures since the mid-1950's, when Poland and Yugoslavia abandoned collectivization. The countries with private agriculture exceeded the performance measures of the countries with socialized agriculture between 1954–56 and 1968 as follows:

In:	*By margin of (percent)*
Total agricultural output	7
Total net product of agriculture	25
Output per capita	–2
Net product per capita	13
Output per unit of land	11
Net product per unit of land	28
Output per unit of labor	–8
Net product per unit of labor	7

Because of faster rates of population growth in the countries with private agriculture, their output per capita and per unit of labor did not show superiority over the countries with socialized agriculture. It should be noted that prewar to postwar comparisons per capita and

per employed favor the countries with private agriculture because of large shifts in the Polish population at the end of the war. It was impossible to eliminate this bias.

(6) Progress in mechanization of agriculture has been very impressive in Eastern Europe, but its level is still significantly behind that of Western Europe. Yugoslavia and Rumania have the lowest levels of mechanization.

(7) A detailed study of output-input ratios for Czechoslovakia (a country with socialized agriculture) shows that output per unit of all inputs (or total productivity) in that country's postwar agriculture has never attained the prewar level, while in the market-oriented economies of Western Europe total productivity has been rising steadily in the postwar years.

(8) A regional comparison of agricultural growth performance showed that Western Europe surpassed Eastern Europe in all significant measures. Thus Western Europe exceeded the performance measures of Eastern Europe from the prewar period to 1968 as follows:

In:	*By margin of (percent)*
Total agricultural output	22
Total net product of agriculture	31
Output per capita	4
Net product per capita	12
Output per unit of land	12
Net product per unit of land	21
Output per unit of labor	40
Net product per unit of labor	50

Significantly enough, the growth performance in Western Europe has been similar to (though better than) that of the Communist countries with private agriculture. At the same time, there is no conclusive evidence that, on the average, Western Europe or the two countries with private agriculture have better agricultural resource endowment than those with socialized agriculture.

(9) On the basis of the above overall growth performance measures, one is led to the conclusion that, up to now, socialized agriculture in Eastern Europe has not lived up to the expectations of the Communist governments for higher growth rates in production measures and agricultural productivity than private family farming could achieve. Our comparisons of socialized versus private farming in Eastern Europe show better results for the latter. The superior performance of private farming is even more apparent in regional comparisons between the group of Eastern European countries with socialized agriculture and Western European agriculture with predominantly private family farming. Inefficiencies in agriculture have made it a bottleneck in economic development in the countries with socialized agriculture.

(10) The findings of this study afford a critique of agricultural systems in Europe. With the evident trend toward rational use of resources in Eastern Europe, readers there, as elsewhere, may want to ponder the implications for productivity. Their concern with industrial and agricultural efficiency has prompted them to decentralize to some degree, to try to rediscover the springs of motivation through profit and other personal incentives. Agriculture, assuredly, will remain a critical sector in Eastern Europe and in the world economy as long as populations continue to expand.

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APPENDIX I

NOTES AND SOURCES FOR TABLES 1 THROUGH 4

A. Eastern Europe

PREWAR PERIOD AND 1948–1967

All quantity series and national prices (except for Western Europe) needed for the construction of Tables 1 through 4 were taken from publications and manuscripts to be published by the "Research Project on National Income in East Central Europe" at Columbia University as follows:

Bulgaria: *Bulgarian Agricultural Production, Output, Expenses, Gross and Net Product, and Productivity, 1939 and 1948–1967*, manuscript (MS) to be published as an *Occasional Paper* (OP), 1969.

Czechoslovakia: Gregor Lazarcik, *Production and Productivity in Czechoslovak Agriculture, 1934–38 and 1946–1967*. Ph.D. dissertation, updated. Columbia University, 1969.

East Germany: *Agricultural Production of East Germany, 1938 and 1950–1967*, MS to be published as an OP, 1969.

Hungary: Laszlo Czirjak, *Hungarian Agricultural Production and Value Addcd, 1934–38 and 1946–1965*, OP–14, 1967. Updated for 1966–67.

Poland: *Polish Agricultural Production, Output, Expenses, Gross and Net Product, and Productivity, 1934–38, 1937 and 1946–1967*, MS to be published as an OP, 1969.

Rumania: *Rumanian Agricultural Production, Output, Expenses, Gross and Net Product, and Productivity, 1938 and 1948–1967*, MS to be published as an OP, 1969.

Yugoslavia: *Yugoslav Agricultural Production and Productivity, Prewar and 1948–1967*, MS to be published as an OP, 1969.

1968

Our indexes for 1967 (weighted by wheat-based price relatives) were extended to 1968 by means of crop output indexes and animal products output indexes for individual countries calculated by the U.S. Department of Agriculture, Economic Research Service, *Indices of Agricultural Production in Eastern Europe and the Soviet Union 1950–68* (ERS-Foreign, 273) Washington, D.C., July 1969, pp. 7–20. Data for 1968 are preliminary. The weights used are 1957–59 average prices received by farmers in Western Europe, expressed in U.S. dollars at prevailing official exchange rates. These relative weights are similar to our FAO wheat-based price relatives for 1952–56.

B. Western Europe

In the present study Western Europe comprises Austria, Belgium-Luxembourg, Denmark, Finland, France, West Germany, Greece, Iceland, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

OUTPUT: 1934–38 AND 1948–1951

U.N. Food and Agriculture Organization, *Yearbook of Food and Agricultural Statistics: Production, 1957*, vol. II, part I, Rome, 1958, p. 25; and Organization for European Economic Cooperation, *Agricultural and Food Statistics*, Paris, 1956, p. 18. An output index in the latter source was spliced with that in the former source and then linked with the 1952 FAO output index.

NOTE.—East German indexes for 1948 and 1949 were not available, therefore a link of indexes was made in 1950 to assure the continuity of the series for the Eastern European region.

1952–1968

U.N. Food and Agriculture Organization, *The State of Food and Agriculture, 1968*, Rome, 1968, p. 10, and a written communication from FAO, Rome, May 1969, which gives the actual wheat-based price weighted aggregates used in our study for calculation of relative shares of Western and Eastern European output.

EXPENSES, GROSS PRODUCT, DEPRECIATION, AND NET PRODUCT

Estimated from output and relative shares of expenses, depreciation, and gross and net product in the output given in U.N. Economic Commission for Europe, *Towards a Capital Intensive Agriculture; Fourth Report on Output, Expenses, and Income of Agriculture in European Countries*, part I–II, Geneva, 1961, pp. 22–27, and *Fifth report on Output, Expenses and Income of Agriculture in European Countries*, vol. I–II, Geneva, 1965, pp. 205–241.

C. Commodity Weights [1]

The FAO wheat-based price relatives for the Western European region for 1952–56 are given in U.N. Food and Agriculture Organization, *Production Yearbook, 1966*, vol. 20, Rome, 1967, pp. 648–49.

[1] Some of the weights were adjusted to correspond with the commodity definitions.

APPENDIX II

SOURCES FOR POPULATION, LAND, AND EMPLOYMENT

A. Eastern Europe

Same sources as for Tables 1 to 4, see Appendix I.

B. Western Europe

1. POPULATION

1934–38 (refers to 1935 and 1938 average) *and 1948–1962:* Bernard Mueller, *A Statistical Handbook of the North Atlantic Area*, New York, The Twentieth *1952*, p. 3; *ibid.*, 1956, p. 3; *ibid.*, 1966, p. 3; for Spain: Mueller, *op. cit.*, p. 153.

1963–1967: Organization for Economic Cooperation and Development, *Main Economic Indicators*, December 1968, p. 135. The population of Turkey was subtracted and that of Finland was added.

1968: Ibid., May 1969, p. 135.

2. AGRICULTURAL LAND

1934–38 and 1948–51 average: Organization for European Economic Cooperation, *op. cit.*, p. 4; for Finland, Franct, and Spain: U.N., F.A.O., *Yearbook, 1949*, p. 13 and Mueller, *op. cit.*, p. 153.

1952–56 average, 1957–61 average, 1962 and 1963: O.E.C.D., *Agricultural and Food Statistics, 1952–1963*, Paris 1965, p. 8; for Finland: U.N. F.A.O. *Yearbook, 1952*, p. 3; *ibid.*, 1956, p. 3; *ibid.*, 1966, p. 3; for Spain: Mueller, *op. cit.*, p. 153. Data in this latter source, available only for 1956–59 average, were adjusted upward to insure consistency with those given in the O.E.C.D. source.

1967: "The OECD Member Countries (5th year)," *OECD Observer*, no. 38, February 1969, pp. 19–20; for Spain obtained as explained above.

Data for all other years: These were obtained by interpolation and extrapolation of the available data given in the above sources.

3. EMPLOYMENT (ECONOMICALLY ACTIVE POPULATION IN AGRICULTURE)

1934–38: Derived from the 1950 employment data and an index of agricultural employment given in O.E.C.E., *Agricultural and Food Statistics*, Paris, 1956, p. 8.

1948 and 1949: Obtained by extrapolation of the 1950 employment data.

1950–1955: Obtained from the 1956 data and indexes of employment for individual countries for 1950–1956 given in O.E.E.C., *Agricultural and Food Statistics, 1952–1963*, Paris, 1965, p. 16; U.N. E.C.E. *Fourth Report on Output, Expenses, and Income in Agriculture in European Countries*, pp. 68–201. For a few countries the data for one or two years (1950, 1951) were not available and had to be estimated by extrapolation. Finland's employment for 1950 is from Mueller, *op. cit.*, p. 39.

1956–1966: Organization for Economic Cooperation and Development, *Labor Force Statistics*, Paris, 1968, p. 22. For Finland estimates were made from Mueller, *op. cit.*, pp. 38–39, and U.N. E.C.E. *Fourth Report on Output, Expenses and Income in Agriculture in European Countries*, p. 21.

1967: OECD Observer, loc. cit. Data for Austria, Denmark, Spain, and Switzerland were obtained by extrapolation of the 1966 employment.

1968: Obtained by extrapolation of the 1967 employment data.

Employment data in the above sources include forestry and fishing. Therefore we adjusted them downward by an estimated 5 percent to remove employment in forestry and fishing for all years. This ratio was chosen on the basis of the Czechoslovak and Austrian employment ratio between forestry and agriculture. The Czechoslovak and Austrian ratio between forest and agricultural area is roughly the same as for Western Europe, see *Statistická ročenka 1967*, pp. 108 and 281, and Mueller, *op. cit.*, pp. 152–53.

THE COUNCIL FOR MUTUAL ECONOMIC ASSISTANCE—DEVELOPMENTS SINCE THE MID-1960's

By HERTHA W. HEISS

The Council for Mutual Economic Assistance—CEMA or Comecon—is frequently described in the West as the East European equivalent of the Common Market, but in reality it is a rather loose regional association without any executive powers whose members' largely self-contained economies are linked together mainly through bilateral trade channels.

Founded twenty years ago as a counterpoise to the Marshall Plan, it was not originally conceived as an instrument for economic integration of the Warsaw Pact allies. A first attempt, initiated by Khrushchev in the early sixties, to transform CEMA into an apparatus for the supranational direction of members' economies failed. The vision of a socialist economic community was replaced by the more modest goal of a "socialist international division of labor," which CEMA was to promote through the coordination of national five-year plans and by organizing production specialization arrangements and economic, scientific, and technical cooperation. But CEMA's activities, hampered by conflicting national interests, lack of incentives inherent in the command economy systems, and cumbersome procedures, proved quite ineffective in advancing regional specialization.

Toward the mid-sixties the uncertainties generated by differently conceived and timed national economic reforms contributed to the stagnation of economic cooperation. The rationalization of national price systems and the partial devolution of economic decision-making envisaged by some of the reform programs, however, seemed to hold some promise of an eventual transition to a sounder economic basis for CEMA cooperation. This prospect receded, at least temporarily, when the concept of centrally directed integration was revived two years ago.

The reopening of the controversy over economic sovereignty—which had led to the defeat of the Khrushchev proposals—precipitated a new CEMA identity crisis which a summit conference in April 1969 did not resolve. But developments since the beginning of 1969 suggest that the idea of endowing CEMA with planning and other supranational authority will once more fall by the wayside. At the same time, the crisis may have provided the necessary push for a more determined exploration of other approaches to closer economic integration which would combine a closer mutual tuning of members' major economic policies with allowance of some scope for market forces in other spheres.

The Current State of Integration

The abandonment of the Soviet-proposed supranational approach to CEMA economic cooperation became official at the organization's 19th Council session in January 1965, which endorsed the flexible policies in effect since mid-1963. In the period that followed most member states were preoccupied with domestic reforms aiming at varying degrees of decentralization of economic decision-making—a trend which seemed to make any reversion to schemes for centrally directed economic collaboration highly unlikely. The U.S.S.R., in addition, probably had reservations about assuming the economic burdens that a renewed push for closer CEMA economic cohesion might have entailed in terms of investment funds, raw material supplies, and foreign exchange resources.

At any rate, Moscow seemed to have accepted the principle put forward by the Romanians in their declaration of April 1964, that "planned management of the national economy is one of the fundamental, essential and inalienable attributes of the socialist state." Next to protecting its own interests, the toning down of differences among other members appears to have been a major Soviet objective in CEMA. Thus, during the September 1965 visit of the Czechoslovak Party-state delegation to the U.S.S.R., Brezhnev made a point of telling his guests that "it would be incorrect—more than that, it would be inadmissible—to oppose the interests of the economic development of the whole system of socialism to the interest of the development of individual socialist countries." With voluntary cooperation reaffirmed and independence of national planning elevated to the status of a basic CEMA tenet,[1] the debate over integration subsided and, indeed, the term itself vanished from CEMA discussions.

De-activation of this divisive issue was not sufficient, however, to break the logjam of national interests which continued to stymie multilateral endeavors, and little headway was made toward an "international socialist division of labor" as neither the continuing expansion of intra-CEMA trade, the specialization arrangements worked out by CEMA organs nor the coordination of national economic development plans made a signal contribution to regional specialization.

Romania and the "Interested-Party Principle"

Here mention must be made of the role of Romania, whose participation in CEMA activities was distinguished by efforts to nip in the bud measures and projects which in its view "overstepped the authority of CEMA," i.e., could be construed as infringing on its sovereignty. In this the Romanians were aided by the statutory requirement that decisions and recommendations in CEMA have to be approved by unanimous vote. The so-called "interested-party principle" enables cooperation not involving all members (Article 4 of the CEMA charter promulgated in 1960). It does not, however, specifically exclude non-interested members from voting in such a situation, thus opening

[1] P. Jaroszewicz at 22nd CEMA Executive Committee session, Radio Moscow, Domestic Service, April 23, 1966.

the door to differing interpretations. The Romanians have apparently frequently rejected its applicability, refusing to opt out of proposed undertakings in which they did not wish to participate, and instead voting them down.

Differences on this point were discussed at the brief CEMA summit meeting in Bucharest on July 7, 1966, as disclosed by Hungary's CEMA representative, Antal Apró, who aligned himself with the "original interpretation of the "interested-party principle," and stressed that "we must all support within CEMA initiatives aimed at the cooperation of those countries which have announced their interest and not only those aimed at the cooperation of all CEMA countries." Apparently no agreement was reached then or at the subsequent 25th Executive Committee session (which in Jaroszewicz's words "contributed to the taking of realistic steps" in this area), for months later a Polish paper delivered one of the sharpest and most explicit blasts at Romanian obstructionist tactics (*Życie Warszawy*, December 19, 1966):

> It is known that one country's . . . lack of interest frequently results in blocking of the implementation of proposals in which other member countries would be vitally interested. This false interpretation of the principle of "universality" in CEMA, in fact, has hampered the development of the organization. Hence, at the Bucharest conference, an agreement was already reached about rejecting this practice and applying the principle of interest. Not all members need be interested, e.g., in coordinating investment, but they should not make it impossible for other members to do so. One member country may not want the CEMA Secretariat to accomplish such practical jobs as the preparation of analyses and development prognosis for various fields of the economy in the CEMA member countries, but this does not mean that this work must be stopped, since other member countries approve of it.

CEMA officials' pronouncements following the 20th CEMA Council session in December 1966 seemed to confirm that differences had not yet been resolved. "The session stressed that . . . 'unanimity' correctly conceived means . . . facilitating also the implementation of the tasks in which only a few CEMA countries are interested. . . . The *consolidation* of the stand of CEMA countries achieved at the 20th Council favors the task of organizing within CEMA cooperation among the countries that are interested in implementing specific measures."

Following the 29th CEMA Executive Committee session in May 1967, Poland's Jaroszewicz sounded a more hopeful note: "It is no secret that there used to be a period in the operation of the CEMA organs when there were tendencies toward a certain narrowing of multilateral cooperation . . . it seems we have left this period behind us." While references to this problem have been fewer since, there was no real evidence either of any unblocking channels for multilateral cooperation. It apparently remained for the recent CEMA summit to clear the way for a wider application of the interested-party principle.

Supranational Integration Concept Revived

In early 1968 there appeared signs of a renewed Soviet interest in tightening coordination within CEMA. Its first manifestations, in the sphere of economic relations with the West, were presumably in part stimulated by the westward drift in CEMA countries' trade patterns and their increasing interest in "joint ventures" with capitalist countries.

Following the demise of the Novotný regime, the barrage of outspoken criticism in the Czechoslovak press, which blamed the country's economic woes in part on the adverse effects of its economic relations with other CEMA members, and in particular with the U.S.S.R., must have convinced Moscow of the need for a far-reaching reform of the Council on Mutual Economic Assistance—the more so as it reflected evident, although more muted, dissatisfaction of other members with the organization. The call for an economic summit at the Dresden conclave in March 1968 (from which Romania was absent) reflected the Soviet resolve to energize CEMA as part of its general effort to reassert authority over and strengthen cohesion of the Warsaw Pact alliance.

It was Poland, however, the most vocal critic of the slow progress within CEMA, which took the lead in floating proposals designed to intensify cooperation among member countries in planning, production specialization and investments, and to reform trade and financial relations. By mid-year its campaign was in full swing, with the term "integration" used with increasing frequency in this context. While political developments in Czechoslovakia relegated discussions of a CEMA summit meeting to the background, economists in member countries and the CEMA secretariat continued to work on reform proposals for CEMA.

Bucharest Speaks Out Against Supranationalism

With signs pointing to a real possibility that other members' CEMA reform proposals might coalesce into an integration drive, Romania's Ceaușescu, in the first major pronouncement on CEMA by a Romanian leader in several years, early in August 1968 strongly reaffirmed his country's opposition to any attempted conversion of "CEMA into a superstate body, transition to a single plan and other similar proposals"—a position he reiterated shortly after the Warsaw Five invasion of Czechoslovakia.

As the integration drive, still spearheaded by Poland, gathered momentum, the U.S.S.R. publicly entered the fray with a *Pravda* editorial (September 30, 1968). In omitting the standard reference to "respect for sovereignty and national interest" in CEMA economic ties, the article appeared to herald the extension of the just enunciated Brezhnev doctrine to the economic sphere. At the Polish Party Congress in November, Brezhnev explicitly gave his blessing to integration, and other CEMA party leaders (except, of course, Romania's) echoed his endorsement.

Bucharest meanwhile had mounted a full-scale attack in public media and officials' pronouncements on the concept of integration as endangering the independence of sovereignty of member states and prejudicing cooperation among them. While strongly denouncing any supranational approach to CEMA cooperation as devoid of any justification under the existing rules of the organization, Bucharest at the same time stressed its willingness to take part in discussions on CEMA, pointed up the extent of its participation in its activities, and its intention to "continue to make its full contribution" to the organization. It also submitted its own proposals for "perfecting" the workings of CEMA on the basis of existing ground rules. Having thus reinforced its credentials as a member in good standing, Bucharest stood its ground.

It was the more integration-minded forces who apparently backed off from a collision course. A de-escalation of the debate and a renewed search for an accommodation with Romania was signaled by the outcome of a symposium of Soviet and East European economists which met in Warsaw in December without Romanian participation. While stressing the need for additional links in CEMA cooperation in industrial production and research, the meeting concluded that such links should continue to be voluntary and that supranational planning for the socialist "economic community" was "unjustified."

Romania meanwhile apparently had succeeded in winning some support from East Germany, where the Romanian Foreign Minister paid a surprise visit in mid-December. Such an alignment, however temporary, seems especially ironical, since Romania had been the target of protracted East German polemics in the early sixties because of Bucharest's opposition to supranationalism in CEMA. (Originally strong supporters of integration, the East Germans appear to have come to the conclusion that they have little to gain economically from closer regional integration at this stage and are concentrating mainly on strengthening bilateral ties with the U.S.S.R.)

At any rate, it appears that prior agreement existed not to hold a full-scale discussion of CEMA reform proposals at the 22d Council session in East Berlin, which, together with the 38th Executive Committee meeting, spanned the organization's 20th anniversary on January 25. While the anniversary occasioned numerous laudatory articles in the communist press, the Council meeting itself was treated in low key, reflecting presumably a lack of expectation that it would produce any major decisions. The gathering's routine character was further underlined by the fact that, despite the anniversary, the delegations were headed by members' permanent CEMA representatives, who meet about every two months as the Executive Committee. The announced agenda of the Council consisted mainly of an evaluation of CEMA activities since the preceding Council session (held December 1967 in Budapest), but, according to Czechoslovakia's representative Hamouz, it was also to determine future work and prepare for an economic summit meeting.

Whatever substantive discussion on the future course of CEMA may have taken place was evidently inconclusive and not recorded in the communique, which was largely retrospective and generally unin-

formative but did allude to "unresolved tasks to which parties and governments devote constant attention." Its references to plan coordination as the principal instrument for effecting a socialist division of labor and to CEMA as an open organization, and its endorsement of extension of members' relations with all countries, took on a special significance, because they clearly reaffirmed the *status quo*. At about the same time formulations and statements appeared elsewhere which seemed designed to allay speculation that an all-out effect to transform CEMA into a supranational organization was in the offing. For example, the Soviet deputy permanent representative to CEMA, A. Zademidko, writing in *Izvestiia*, on January 21, stressed that CEMA had no executive authority or managerial functions, "as is clear from its charter."

A period of intensive bilateral consultations between East European top officials and Moscow, and among the East Europeans followed. Some of the communiques suggested that the groundwork was being laid for a CEMA summit which would avoid a showdown on integration while providing something for everybody on the basis of their reform proposals. Moreover, the unusually pessimistic tone of Poland's CEMA representative Jaroszewicz at the last Executive Committee meeting preceding the summit, and his emphasis on financial and foreign exchange aspects of CEMA reform proposals, implied that Poland had all but conceded the battle for integration and was concentrating instead on areas where its objectives enjoy substantial support in the CEMA community. Thus the stage was set for a summit meeting whose visible results were confined largely to the endorsement of measures to improve the functioning of existing modes of CEMA cooperation, such as plan coordination, production specialization and scientific-technical cooperation.

Long-Term Plan Coordination

The coordination of long-term economic plans was established at the summit meetings of 1962 and 1963 and CEMA's "basic method of operation," and in lieu of the abandoned joint planning was to function as the principal means of developing and extending the "international socialist division of labor."

While the decision to coordinate the national five-year plans had first been made in 1954, in its early stages—for the periods 1956–60 and 1961–65—this "coordination" consisted mainly of bilateral consultations between national planning organs to review mutual requirements for goods deliveries. The purported new coordination in depth for 1966–70 ran into all sorts of delays and difficulties and was still carried out largely on a bilateral basis. Multilateral efforts were limited essentially to a compilation of raw material balances for fuels, power, certain metals and some types of machinery. This process, according to statements at the 22nd Executive Committee meeting, had not yet been completed by the spring of 1966. Although undoubtedly more comprehensive than previously, the coordination efforts were a far cry from what Bulgaria's Stanko Todorov [2] described as a virtual "uni-

[2] "Sotrudnichestvo—moshchnyi faktor razvitiia sotsialisticheskikh stran (Cooperation—a powerful factor in the development of socialist countries)", *Kommunist* (Moscow), vol. 42, no. 3, February 1966, pp. 102–105.

fication of efforts for maximum use of existing and potential new economic and manpower reserves." A Soviet writer, by contrast, conceded that the main objective, the harmonization of long-term trends of specialization within CEMA, was pushed into the background.

The priority reaccorded plan coordination at the 22nd and 23rd CEMA council sessions in 1969 presages a new effort in this sphere. Nonetheless, objectives remain more limited than achievement of a set of mutually consistent plans for the CEMA countries. The summit communique speaks of the need to "perfect and deepen" forms and methods of coordinating economic plans and its extension to additional areas, such as scientific research, investment, construction activity and production in areas "relying on mutuality." Thus, plan coordination, for the time being, remains geared primarily to sectors heavily involved in production of goods for intra-CEMA commerce and to transport facilities servicing this trade. But member countries have apparently agreed to exchange a wider range of information than was called for by the guidelines for 1971–75 plan coordination established by the 20th CEMA Council in 1966. Interested members henceforth may also engage in longer-term coordination and joint forecasting. Soviet CEMA representative Lesechko recently [3] underlined the voluntary nature of such undertakings which he thought useful in affording the participants the "opportunity to consider the results of these consultations at their own discretion when working out their national policies and plans."

While some broadening of the multilateral aspects of plan coordination is to be expected, continuing differences over the scope of such activity, as well as the admittedly still inadequate coordination techniques, make it likely that main reliance will continue to be on bilateral channels for some time to come.

Specialization and Coopfration

Next to plan coordination, the formulation of projects for production specialization and cooperation arrangements among members has been the organization's chief method for furthering the "international socialist division of labor." Specialization and cooperation within CEMA were intended to bring about greater efficiency in production and to accelerate technological progress via a concentration of output of a given product in one or more of the member countries, which would meet the requirements of CEMA as a whole. In theory it was conceived in terms of both collaboration between existing industries and the creation of new complexes of interrelated and complementary industries.

Heretofore, CEMA-wide efforts in this field have not been notably successful, a fact generally acknowledged. For example, Julius Balkow (then East Germany's permanent CEMA representative) noted in 1967 that in spite of a number of successes in production cooperation "we are still at the beginning of a necessary development," and Hungary's Antal Apró similarly conceded that "unfortunately so far we have still failed to achieve a radical breakthrough in specialization."

[3] *Pravda* (Moscow), June 21, 1969.

The underlying cause for this situation, apart from conflicting national interests, has been the lack of sufficient stimulus in the East European economic scheme of things for specialization in manufactured products. As long as the producing enterprise remained insulated from foreign trade activities and performed primarily according to physical output rather than profit criteria, it had no incentive to produce for export rather than for domestic consumption. Therefore, it was not likely voluntarily to make the adjustments that might be required for export production. On the import side, the monopolistic position of domestic industry, often represented by a single major enterprise, especially in the smaller countries, restricted the appearance of foreign products—including those from other CEMA countries. In general, goods have been imported only when demand could not be satisfied from domestic sources, regardless of price and quality considerations.

In practice, most specialization agreements have consisted simply of an allocation of production responsibilty by type or size among countries already producing the items involved, permitting some economies of scale. Although several thousand products—concentrated in the engineering, chemical and ferrous metals industries—are covered, the share of total output affected, even within those industries, is small (e.g., 6 to 7 percent of CEMA's machinery output).

The slow progress of specialization and cooperation has been blamed in part on the CEMA organs—primarily the twenty-odd standing commissions, about half of which represent major branches of industry. Made up of top ministry officials from each of the member countries, they originate and approve proposals for specific projects. These require the unanimous approval of the Executive Committee, which then issues a—nonbinding—recommendation to member governments.

Judging by East European writings, specialization proposals have tended to get bogged down at all levels within the CEMA machinery. Thus, a call by Poland's CEMA representative for a concentration of CEMA specialization work "on a small number of problems assessed as particularly important" [4] by member countries was echoed by an East German writer [5] who declared that "the activities of CEMA bodies devoted to the international division of labor should be freed of the multitude of questions of detail now being dealt with." Czechoslovakia's former CEMA representative Simůnek condemned "the concept that, without exception, all problems must be discussed at the level of the Council organs, and that everything must be solved in a universal manner." [6] Another East German article [7] asserted flatly that "CEMA with its organs is not intended or suited at least in its present form . . . [to produce] prompt and operative agreement and implementation of important measures demanded by concrete requirements of current and future production."

Even when specialization projects have been agreed upon, they are not necessarily honored in practice. This has left countries which expanded output of a given product unable to sell it to their partners,

[4] *Trybuna Ludu* (Warsaw), February 13, 1966.
[5] H. Emmerich, *Die Wirtschaft* (Berlin), April 16, 1966.
[6] *Pravda* (Moscow), March 23, 1966.
[7] "Souveränität und wirtschaftliche Zusammenarbeit," *Staat und Recht* (Berlin), December 1965.

who had also increased production; or, conversely, countries having discontinued production of an item were unable to procure it from other parties to the arrangement. Other factors which have hampered implementation of CEMA specialization schemes include, according to East European writers, insufficient standardization, imperfect dovetailing of production and foreign trade aspects for specialization arrangements, lack of prior agreement on prices; inadequate spelling out of specifications, and adverse repercussions on trade relations with other CEMA partners.

The unsatisfactory state of specialization and cooperation occupied much of the attention of the Executive Committee in 1965. At its behest a conference of CEMA specialists convened in March 1966 in Moscow to study ways and means of ameliorating the situation. Reports, primarily from Czech and Polish sources, revealed a wide range of views and of proposed remedies. There appears to have been general agreement, however, that some new approaches were necessary; discussions apparently centered around proposals (1) to put future specialization arrangements on a contract basis instead of having them take the form of mere recommendations adopted by the governments concerned, and (2) to work out specialization schemes at the operational level "where the greatest expert knowledge can be brought to bear" rather than on a government-to-government basis, as heretofore. There was apparently general support for the first proposal despite considerable differences about the scope and duration of such agreements. Although the conference, in the words of the leader of the Czech delegation, "did not settle anything forthwith," the proposals aired apparently formed the basis for official CEMA discussions.

Following the 29th Executive Committee meeting in May 1967, Poland's Jaroszewicz stated that new rules were being elaborated which aimed at putting specialization undertakings on a firmer economic basis, by tying them more closely to production and foreign trade plans in participating countries, through more "intensive participation" of the enterprises involved either as producers or consumers of the product concerned, and by ensuring compliance through contractual guarantees. But either no final agreement was reached or implementation lagged, for various CEMA reform proposals put forward in 1968—particularly those of Hungary, Czechoslovakia, and Poland—still reflected a continuing need for measures along the lines indicated. And shortly before the 1969 CEMA summit meeting, the U.S.S.R.'s CEMA representative confirmed that the "technical and economic foundations [for cooperation and specialization] its organizational forms and legal basis need further improvement."

From the summit communique it appears that the CEMA states' policymakers in essence accepted the two main proposals of the specialization conference, i.e., the increased use of contractual relations and more direct involvement of the working level.

More Effective Organizational Forms

For a number of years, East European and Soviet criticism of the existing CEMA specialization machinery has been accompanied by calls for the formation of additional international branch associations.

The two existing ones, the organization for cooperation in ferrous metallurgy, *Intermetall*, and the organization for cooperation in the bearings industries, were formed in 1964, and both associations now include all European CEMA members except Romania. Operating on the basis of clearly identifiable mutual interest and with relatively streamlined procedures, they have evidently performed to the satisfaction of their members. It seemed curious, in these circumstances, that no further associations were set up, particularly since plans for an association for the chemical industry were mentioned as long as four years ago, and more recently the establishment of an electronics industry association had been bruited.

While direct evidence is lacking, it may be conjectured that Romania was probably responsible for blocking what in its view may have been an undesirable proliferation of international agencies with some degree of executive authority, which could play a significant integrating role within their respective economic sectors. Although the associations are technically outside the CEMA structure, their formation was accomplished through CEMA channels, where Romanian insistence on the unanimity rule could have prevented their creation.

It appears that in this area Bucharest had to make an important concession at the summit. The communique, with its albeit somewhat lukewarm endorsement of unspecified international organizations to be set up by "interested members according to necessity," seems to have signaled the unblocking of this avenue to multilateral cooperation. Indeed, within three months of the summit the establishment of *Interkhim*, an organization for cooperation in the light chemical industries [8] by all European CEMA members but Romania, was announced.

This prompt action presages the creation of additional such agencies, particularly in branches singled out as the main targets for specialization efforts at the summit.

The communique did not identify these branches "determining technical progress," but economists [9] writing on CEMA have specifically included in this category computers, automation equipment, programmed machine tools and control systems, precision mechanics, plastics, synthetic rubber and fibers, and nuclear energy. Specialization arrangements in these fields are less likely to be sidetracked by conflicting national interests, since they would not entail any breakup of existing production capacities or production relations. With the exception of the U.S.S.R., individual CEMA members obviously have neither the capability to establish and operate a full range of these industries on an economical basis nor the means for obtaining the requisite technology and equipment on their own. Their needs and interests would seem to impel them in the direction of joint investment, production and marketing arrangements as the most realistic approach to the modernization of their industries under present conditions. In addition to possible new industry associations, the proposed CEMA

[8] Organic dyes, chemicals for the rubber and plastics industries, and agricultural chemicals, among others.

[9] E.g., O. T. Bogomolov, "Rastushchie vozmozhnosti ekonomicheskogo sotrudnichestva (Growing chances of economic cooperation)", *Kommunist*, vol. 44, no. 5, March 1968, pp. 82–81; Radu Constantinescu, "Dezvoltarea si perfectionarea colaborării în cadrul C.A.E.R. (Development and improvement of cooperation within CEMA)," *Probleme Economice*, vol. 22, no. 5, May 1969, pp. 3–9.

investment bank—whose establishment was the principal concrete result of the 1969 summit—could become an important force for promoting CEMA integration in the sphere of "developing" industries.

Scientific-Technical Cooperation

Special attention has been devoted since the 20th Council session in 1966 to promoting closer and more effective cooperation in scientific and technical research among member states. Such cooperation has heretofore taken place under rules agreed at the 2nd CEMA Council session in Sofia in 1949 which outlined forms of cooperation such as exchanges of documentation for inventions and technological processes, exchange of scientists and specialists, and mutual technical assistance. In addition, the first five-year plan for coordination of scientific and technical activities of member countries, under which they are coordinating research and 50 major problems covering 185 scientific research themes, is currently being implemented. Despite impressive-sounding figures—e.g., the U.S.S.R., according to one Soviet official,[10] has provided to other CEMA countries 75,000 sets of technical documents, standards and models and has received 22,000—CEMA spokesmen have complained, that development of scientific cooperation "lags behind our needs and possibilities as well as behind the progress that has been achieved in this regard by the advanced industrialized countries."

A major stumbling block to the expansion of CEMA cooperation in science and technology has been the principle, laid down in the Sofia agreement, that information and documentation are to be exchanged among members free of charge. For the industrially most advanced countries, particularly East Germany and Czechoslovakia, this has meant sharing the fruits of their research with other members who have had little to contribute in return. Furthermore, it has been argued [11] that the continuation of scientific technical cooperation without compensation does not fit in with the new principles of economic management and planning being introduced in member states because it represents a negation of commodity-monetary relations and of the effects of the law value which some of the national economic reforms are designed to reflect increasingly.

The problem was taken up by the 30th session of the Executive Committee in July 1967 which approved proposals worked out by the CEMA permanent Commission for Coordination and Scientific Research. The substance of the proposals, which concern "questions of finance and of material incentives in carrying out common scientific and technical research programs and for utilizing their results," has not been disclosed. But comments by the Polish and Czech CEMA representatives indicated that, while free exchange of scientific information was to continue where it "leads to the favorable development of scientific and technical cooperation," in the future this would not preclude payments for the "technological assistance offered to solve

[10] Another source refers to a total exchange among CEMA members of 40,000 complete sets of scientific and technical documents, with the U.S.S.R. furnishing 24,000 and receiving 13,000.

[11] Josef Lašek. "Hospodářská spolupráce a ekonomické zájmy (Economic cooperation and the interests of the economy)", *Nová Mysl*, vol. 21, no. 9, May 3, 1967, pp. 26–29.

particularly difficult problems when such assistance involves considerable expenditure on the part of the assisting country." Although agreement on the proposals for introducing some methods of compensation represented a step forward, CEMA spokesmen recognized that that issue was far from solved and that the settling of accounts from mutual scientific and technological assistance would continue to pose "particularly complicated and touchy problems." In late 1968 an East German writer [12] was still pleading the case for compensation on the grounds that, in the view of the GDR, scientific-technological findings represent merchandise whose exchange required stimulation by economic means. Payment for technological data, he argued, is in any case fully consistent with one of the recognized principles of socialist economic relations, that of mutual advantage.

The great importance currently attached by most CEMA members to improving cooperation in this sphere, last but not least as a preliminary step to future production specialization, was indicated by the initiation last October of top-level meetings of the principal CEMA political figures in the field of science and technology. It is not surprising, therefore, that the CEMA summit also addressed itself to this issue. The subsequent disclosure by Czechoslovakia's CEMA representative, Hamouz, that "scientific technical insights will continue to be exchanged free of charge, [but that] the exchange or sale of the more important licenses, patents and documentation is also possible," seems to have understated the progress made on the compensation issue. Surely, the recent establishment of a new Soviet foreign trade agency, *Vneshtekhnika*, for the express purpose of handling the transfer of technology and related activities involving other socialist countries, reflects the expectation that commercial exchanges of technology among CEMA members will assume increasing importance.

Intra-CEMA Movements of Capital and Labor

Given the closed character of members' economies, there has, of course, been no spontaneous flow of capital or manpower across national boundaries. But beginning with the late fifties there have been a number of joint investment projects, mostly bilateral, among CEMA countries. These agreements are based on certain common principles, namely: the facility financed is the sole property of the country in whose territory it is located; credits usually take the form of entire plants or machinery and equipment to be used for the installation, but can also be in the form of other commodities needed by the recipient country and unrelated to the project; credits are long term, with a usual interest rate of 2 percent; they are repayable in the material or commodity produced by the facility in which investment is made.

The few instances of multilateral investments in production facilities are the Brăila reed cellulose plant in Romania, initiated in 1956 and financed jointly by Czechoslovakia, East Germany and Poland; and the Kingisepp phosphate mine project in the Estonian Soviet Socialist

[12] M. Humml. "Die Ökonomisierung des Austausches wissenschaftlich-technischer Ergebnisse und Erfahrungen zwischen sozialistischen Ländern," *Sozialistische Aussenwirtschaft*, October 1968, pp. 12–15.

Republic begun in 1963 with Bulgarian, Czechoslovak, East German, Hungarian, and Polish participation. In the bilateral field, Czechoslovakia leads the way, with investments in Poland (sulphur production, coal copper mining), in Romania (thermal power plants), and Bulgaria (copper mining). East Germany has invested in Polish lignite mining, and Poland in Soviet potassium salt mining and processing.

While the U.S.S.R. has emphasized its contribution to the economic development of its CEMA partners through its economic assistance (which since 1960 has been limited primarily to Bulgaria), little publicity has been given to the substantial "development credits" it has received since 1966. Since the mid-sixties Soviet economic writers have promoted the idea that Moscow's CEMA partners should participate financially in the development of its raw material resources in order to assure a continued and increasing flow of primary products in the long term.

The Czechoslovaks, who already in 1960 had extended a credit of some $300 million to the U.S.S.R., were the first to respond to the Soviet drive for raw material financing arrangements—by concluding in September 1966 an agreement for the supply of $550 million worth of Czechoslovak goods between 1967 and 1971 to be repaid with 60 million tons of Soviet oil in 1971–1984. In 1968 similar agreements were concluded for natural gas ($44 million) and an iron ore pelletizing plant. East Germany also agreed in April 1967 to a long-term arrangement involving unknown amount of goods deliveries on credit in return for oil. Further East German investments were agreed in July 1969, but the commodities and amounts involved were not specified. It is not known whether Poland, too, agreed to provide "development assistance" to the U.S.S.R. in return for the assurances it received in November 1966 for a near doubling of Soviet oil deliveries (47 million tons of crude during 1971–1975).

Even though some CEMA countries—notably East Germany and to some extent Czechoslovakia—suffer from a manpower shortage, while others, like Poland and Bulgaria, have surpluses, labor mobility has been rejected in principle as a capitalist approach to manpower problems. Nonetheless, there have been some instances of "labor force exchanges" apart from small-scale commuting across national boundaries in border areas. Beginning in 1967, on the basis of a labor-force agreement concluded between the two countries, several thousand young Hungarian workers have gone to East Germany to work for 2–3 years. Apparently the number was envisaged to reach a level of about 100,000 eventually (*Polityka* (Warsaw), August 26, 1967), but there have been indications of Hungarian problems in recruitment of "guest workers" presumably related to reported dissatisfaction of the first Hungarian contingents in the GDR. The East Germans have also employed Polish workers, but on a smaller scale and mostly in connection with construction projects apparently contracted out to Polish enterprises such as the Schwedt-Leuna oil pipeline, part of the Thierbach electric power station and the Ilmenau industrial complex, where employment of up to 2,000 Poles is contemplated.

The most interesting "labor exchange" program was initiated in 1967 between the U.S.S.R. and Bulgaria, which has the novel feature of involving repayment in raw materials. Under a 10-year agreement, 3,000 Bulgarian lumberjacks are participating in timber-logging in the Komi Autonomous Republic (which borders on the Arctic Circle), for which Bulgaria is to receive 500,000 cubic meters (17,650,000 cubic feet) of lumber annually. As a result of recent negotiations the original output target for this joint project is being raised 2.6 times, which will presumably entail an increase in Bulgarian workers as well. Similiar raw-material-for-labor arrangements were concluded in May 1969 for the construction of a pulp and paper combine in Arkhangelsk (with the help of 2,000 Bulgarian experts) and for metallurgical installations in unspecified locations in the U.S.S.R. Since Bulgaria, in view of the very high-level and projected rapid expansion of its trade with the U.S.S.R., is hardly in a position to supply additional goods as its contribution to Soviet raw materials development, the U.S.S.R. evidently welcomes Bulgarian manpower contribution to the development of resources, particularly in remote areas where it has had trouble recruiting and keeping Soviet workers.

Prospects Opened by the Summit

At the summit meeting, when it finally materialized (April 23–26, 1969) in the form of CEMA's 23rd, "extraordinary," Council session, member countries' heads of state and party chiefs made some progress toward resolving the impasse over the scope and forms of future economic cooperation, as some of the foregoing discussion has indicated. As expected, the persistence of divergent views on the desirability and degree of economic integration evidently precluded any breakthrough on this fundamental issue. The communique did not mention integration but referred to "many problems regarding deepening relations which must be jointly studied further to work out mutually acceptable solutions." It also contained several formulations favored by Bucharest, such as reinstatement of "respect for sovereignty and national interest" among the principles for CEMA cooperation, and stress on the fact that all decisions at the summit had been adopted unanimously. (Since this is mandatory for all CEMA recommendations, specific mention appeared designed to dispel rumors that the meeting might have attempted to modify the CEMA unanimity requirement.) These and other reaffirmations of the *status quo*, as well as post-summit comments, strongly suggest that consideration of a supranational approach to CEMA cooperation was deferred, perhaps indefinitely. At the same time, the meeting appears to have achieved some significant results, particularly agreement in principle eventually to liberalize intra-CEMA trade and improve the framework for financial relations. Among the measures designed to promote intensified plan coordination, specialization and scientific-technical cooperation, on which agreement was reached, there are few, if any, new departures, as far as can be judged from the limited information available. Even so, the unblocking of multilateral channels for cooperation, the re-activation or endorsement of already charted—

but for some reason not implemented—plans and policies may end the water-treading of the past half-decade. Given the admittedly continuing differences among members, the negotiations to translate the summit "action program" into specific measures are bound to be difficult and protracted. Moreover, on certain crucial problems, such as the need for some degree of harmonization of internal pricing within CEMA, establishment of more realistic exchange rates and other questions related to the eventual transition of convertibility, little headway was made. Nonetheless, in clearing the way for the removal of some of the obstacles to more extensive economic cooperation, the summit meeting has brightened somewhat the prospects for a more effective functioning of the Council of Mutual Economic Assistance.

EASTERN EUROPEAN COMMUNIST COUNTRIES FOREIGN TRADE STATISTICAL TABLES

The following tables on the foreign trade of the Eastern European Communist Countries contain the latest available full-year data for all six Eastern European Communist Countries. The following information is contained in the tables: geographic distribution of trade turnover of the Eastern European Communist Countries combined and of the individual countries for the years 1958, 1961, 1963, and 1965–1967; geographic distribution of exports and imports of the Eastern European Communist Countries combined and of the individual countries for the years 1965–1967; commodity composition of exports and imports of each of the Eastern European Communist Countries for 1965–1967, except East Germany (1965 is the latest year for which data are available), and the commodity composition of the Eastern European Communist Countries combined for 1965; average annual growth rates of trade of the Eastern European Communist Countries combined and of the individual countries for the periods 1959–67 and 1966–67.

The tables have been compiled from official yearbooks and monthly statistical bulletins published in the various Eastern European Communist Countries. All data are given in current U.S. dollars converted from national currencies at official rates of exchange. All six Eastern European Communist Countries report export data on an f.o.b. basis (exports include reexports). Hungary's imports are recorded as c.i.f. Bulgaria, East Germany, and Poland report imports on an f.o.b. basis as does Czechoslovakia, but it is believed that Czechoslovakia's imports are actually recorded on a c.i.f. basis. Rumania does not indicate the basis on which its imports are recorded, but imports from the Free World are believed to be c.i.f.

The area breakdowns used in the tables are as follows: *Eastern European Communist Countries:* Bulgaria, Czechoslovakia, East Germany, Hungary, Poland and Rumania; *Far Eastern Communist Countries:* Communist China, North Korea and North Vietnam; *Other Communist Countries:* Albania, Cuba, Mongolia, and Yugoslavia (Cuba is listed as a Free World less-developed country for 1958). The Free World is broken down into the *Developed Countries:* Western Europe (except Portugal, Spain and Greece), the United States, Canada, Australia, New Zealand, Japan, and the Republic of South Africa; and the *Less Developed Countries:* Asia (except Japan), Africa (except the Republic of South Africa), Latin America (except Cuba) and Spain, Portugal and Greece.

TABLE I–A.—*Eastern European Communist countries: Distribution of foreign trade, 1958, 1961, 1963, and 1965–67*

[Dollar amounts in million U.S. dollars]

	1958		1961		1963		1965		1966		1967	
	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent
Total [1]	$11,774	100.0	$16,783	100.0	$19,630	100.0	$23,370	100.0	$25,008	100.0	$26,898	100.0
Communist countries	8,350	70.9	11,985	71.4	14,392	73.3	16,526	70.7	17,107	68.4	18,514	68.8
U.S.S.R	4,330	36.8	6,358	37.9	8,132	41.4	9,128	39.1	9,247	37.0	10,180	37.8
Eastern European Communist countries [2]	2,982	25.3	4,711	28.1	5,354	27.3	6,284	26.9	6,513	26.0	7,065	26.3
Bulgaria	208	1.8	375	2.2	456	2.3	511	2.2	526	2.1	628	2.3
Czechoslovakia	792	6.7	1,249	7.4	1,383	7.0	1,640	7.0	1,643	6.6	1,722	6.4
East Germany	810	6.9	1,220	7.3	1,292	6.6	1,546	6.6	1,696	6.8	1,820	6.8
Hungary	429	3.6	654	3.9	782	4.0	883	3.8	931	3.7	1,024	3.8
Poland	553	4.7	835	5.0	1,008	5.1	1,234	5.3	1,224	4.9	1,316	4.9
Rumania	190	1.6	379	2.3	433	2.2	470	2.0	494	2.0	555	2.1
Far Eastern Communist countries [3]	763	6.5	379	2.3	245	1.2	306	1.3	395	1.6	406	1.5
Other Communist countries [4]	273	2.3	536	3.2	660	3.4	806	3.4	951	3.8	862	3.2
Free World	3,424	29.1	4,798	28.6	5,238	26.7	6,845	29.3	7,901	31.6	8,384	31.2
Developed countries	2,495	20.9	3,552	21.2	3,838	19.6	4,922	21.1	5,840	23.4	6,231	23.2
Less developed countries	965	8.2	1,247	7.4	1,399	7.1	1,922	8.2	2,062	8.2	2,152	8.0

[1] Because of rounding, components may not add to the totals shown.
[2] East European Communist countries' exports to and imports from each other; consequently there is double counting.
[3] Communist China, North Korea and North Vietnam.
[4] Albania, Cuba, Mongolia and Yugoslavia.

TABLE I–B.—*Bulgaria: Geographic distribution of foreign trade, 1958, 1961, 1963, and 1965–67*

[Dollar amounts in millions of U.S. dollars]

	1958		1961		1963		1965		1966		1967	
	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent
Total [1]	$740	100.0	$1,328	100.0	$1,767	100.0	$2,354	100.0	$2,783	100.0	$3,030	100.0
Communist countries	635	85.8	1,130	85.1	1,454	82.3	1,808	76.8	2,025	72.8	2,300	75.9
U.S.S.R.	394	53.2	692	52.1	946	53.5	1,202	51.1	1,370	49.2	1,555	51.3
Eastern European Communist countries	208	28.1	375	28.2	456	25.8	511	21.7	526	18.9	628	20.7
Far Eastern Communist countries [2]	[3] 19	2.6	17	1.2	9	0.5	7	0.3	12	0.4	14	0.4
Other Communist countries [4]	[5] 12	1.6	47	3.5	43	2.4	88	3.7	117	4.2	104	3.4
Free world	105	14.2	198	14.9	313	17.7	545	23.2	758	27.2	730	24.1
Developed countries	76	10.2	154	11.6	233	13.2	398	16.9	600	21.6	546	18.0
Less developed countries	29	3.9	45	3.4	81	4.6	147	6.3	158	5.7	185	6.1

[1] Because of rounding, components may not add to the totals shown.
[2] Communist China, North Korea, and North Vietnam.
[3] Excluding North Vietnam.
[4] Albania, Cuba, Mongolia, and Yugoslavia.
[5] Excluding Mongolia.

TABLE I–C.—*Czechoslovakia: Geographic distribution of foreign trade, 1958, 1961, 1963, and 1965–67*

[Dollar amounts in millions of U.S. dollars]

	1958		1961		1963		1965		1966		1967	
	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent
Total [1]	$2,870	100.0	$4,070	100.0	$4,622	100.0	$5,361	100.0	$5,481	100.0	$5,544	100.0
Communist countries	2,022	70.4	2,838	69.7	3,447	74.6	3,927	73.2	3,851	70.3	3,980	71.8
U.S.S.R.	949	33.1	1,369	33.6	1,799	38.9	1,978	36.9	1,835	33.5	1,942	35.0
Eastern European Communist countries	792	27.6	1,249	30.7	1,383	29.9	1,640	30.6	1,643	30.0	1,722	31.1
Far Eastern Communist countries [2]	221	7.7	95	2.3	57	1.2	63	1.2	79	1.4	63	1.1
Other Communist countries [3]	61	2.1	125	3.1	208	4.5	246	4.6	295	5.4	253	4.6
Free world	848	29.5	1,232	30.3	1,175	25.4	1,434	26.8	1,630	29.7	1,564	28.2
Developed countries	478	16.6	744	18.3	721	15.6	931	17.4	1,054	19.2	1,048	18.9
Less developed countries	371	12.9	488	12.0	454	9.8	503	9.4	575	10.5	516	9.3

[1] Because of rounding, components may not add to the totals shown.
[2] Communist China, North Korea, and North Vietnam.
[3] Albania, Cuba, Mongolia, and Yugoslavia.

TABLE I–D.—*East Germany: Geographic distribution of foreign trade, 1958, 1961, 1963, and 1965–67*

[Dollar amounts in millions of U.S. dollars]

	1958		1961		1963		1965		1966		1967	
	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent
Total [1]	$3,613	100.0	$4,532	100.0	$5,044	100.0	$5,879	100.0	$6,420	100.0	$6,735	100.0
Communist countries	2,677	74.1	3,439	75.9	3,959	78.5	4,343	73.9	4,693	73.1	4,993	74.1
U.S.S.R	1,546	42.8	1,983	43.7	2,449	48.6	2,516	42.8	2,661	41.4	2,825	42.0
Eastern European Communist countries	810	22.4	1,220	26.9	1,292	25.6	1,546	26.3	1,696	26.4	1,820	27.0
Far Eastern Communist countries [2]	258	7.1	115	2.5	48	.9	70	1.2	96	1.5	115	1.7
Other Communist countries [3]	63	1.7	122	2.7	170	3.4	211	3.6	240	3.7	233	3.5
Free world	936	25.9	1,093	24.1	1,084	21.5	1,536	26.1	1,727	26.9	1,742	25.9
Developed countries	720	19.9	856	18.9	838	16.6	1,132	19.2	1,282	20.0	1,257	18.7
Less-developed countries	216	6.0	237	5.2	247	4.9	404	6.9	446	6.9	484	7.2

[1] Because of rounding, components may not add to the totals shown.
[2] Communist China, North Korea, and North Vietnam.
[3] Albania, Cuba, Mongolia, and Yugoslavia.

TABLE I-E.—*Hungary: Geographic distribution of foreign trade, 1958, 1961, 1963, and 1965–67*

[Dollar amounts in millions of U.S. dollars]

	1958		1961		1963		1965		1966		1967	
	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent
Total [1]	$1,314	100.0	$2,054	100.0	$2,511	100.0	$3,030	100.0	$3,159	100.0	$3,476	100.0
Communist countries	942	71.7	1,480	72.0	1,749	69.7	2,076	68.5	2,105	66.6	2,350	67.6
U.S.S.R.	353	26.9	688	33.5	860	34.2	1,079	35.6	1,044	33.1	1,205	34.7
Eastern European Communist countries	429	32.6	654	31.8	782	31.1	883	29.2	931	29.5	1,024	29.5
Far Eastern Communist countries [2]	98	7.5	56	2.7	32	1.3	39	1.3	47	1.5	35	1.0
Other Communist countries [3]	62	4.7	81	3.9	75	3.0	75	2.5	83	2.6	84	2.4
Free world	372	28.3	575	28.0	762	30.3	954	31.5	1,054	33.4	1,126	32.4
Developed countries	284	21.6	441	21.5	579	23.1	703	23.2	778	24.6	839	24.1
Less developed countries	88	6.7	134	6.5	183	7.3	251	8.3	276	8.8	287	8.3

[1] Because of rounding, components may not add to the totals shown.
[2] Communist China, North Korea, and North Vietnam.
[3] Albania, Cuba, Mongolia, and Yugoslavia.

TABLE I–F.—*Poland: Geographic distribution of foreign trade, 1958, 1961, 1963, and 1965–67*

[Dollar amounts in millions of U.S. dollars]

	1958		1961		1963		1965		1966		1967	
	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent
Total [1]	$2,286	100.0	$3,190	100.0	$3,749	100.0	$4,568	100.0	$4,766	100.0	$5,171	100.0
Communist countries [2]	1,335	58.4	1,993	62.5	2,449	65.3	2,956	64.7	3,004	63.0	3,348	64.7
U.S.S.R	599	26.2	975	30.6	1,265	33.7	1,510	33.1	1,533	32.2	1,823	35.3
Eastern European Communist countries	553	24.2	835	26.2	1,008	26.9	1,234	27.0	1,224	25.7	1,316	25.5
Far Eastern Communist countries [3]	118	5.2	58	1.8	48	1.3	64	1.4	79	1.7	75	1.5
Other Communist countries [4]	64	2.8	125	3.9	126	3.4	147	3.2	167	3.5	132	2.6
Free world	952	41.6	1,197	37.5	1,300	34.7	1,612	35.3	1,762	37.0	1,823	35.3
Developed countries	749	32.8	950	29.8	992	26.5	1,155	25.3	1,342	28.2	1,420	27.5
Less developed countries	203	8.9	247	7.8	308	8.2	457	10.0	420	8.8	403	7.8

[1] Because of rounding, components may not add to the totals shown.
[2] The data for individual Communist countries given in the Polish statistical yearbook do not add to the total for Communist countries given in the same source.
[3] Communist China, North Korea, and North Vietnam.
[4] Albania, Cuba, Mongolia, and Yugoslavia.

TABLE I–G.—*Rumania: Geographic distribution of foreign trade, 1958, 1961, 1963, and 1965–67*

[Dollar amounts in millions of U.S. dollars]

	1958		1961		1963		1965		1966		1967	
	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent
Total [1]	$950	100.0	$1,607	100.0	$1,937	100.0	$2,179	100.0	$2,399	100.0	$2,941	100.0
Communist countries	739	77.8	1,104	68.7	1,334	68.9	1,416	65.0	1,430	59.6	1,543	52.5
U.S.S.R.	489	51.5	650	40.4	812	41.9	845	38.8	804	33.5	829	28.2
Eastern European Communist countries	190	20.0	379	23.6	433	22.4	470	21.6	494	20.6	555	18.9
Far Eastern Communist countries [2]	47	5.0	40	2.5	50	2.6	62	2.9	82	3.4	103	3.5
Other Communist countries [3]	12	1.3	36	2.2	39	2.0	38	1.8	50	2.0	56	1.9
Free world	211	22.2	503	31.3	603	31.1	763	35.0	970	40.4	1,398	47.5
Developed countries	154	16.2	407	25.3	476	24.6	603	27.7	783	32.7	1,121	38.1
Less developed countries	58	6.1	96	5.9	128	6.6	160	7.3	186	7.8	278	9.4

[1] Because of rounding, components may not add to the totals shown.

[2] Communist China, North Korea and North Vietnam.

[3] Albania, Cuba, Mongolia, and Yugoslavia.

TABLE II–A.—*Eastern European Communist countries: Geographic distribution of exports and imports, 1965–67*

[In million U.S. dollars]

	1965		1966		1967	
	Exports	Imports	Exports	Imports	Exports	Imports
Total [1]	11,773	11,598	12,306	12,702	13,402	13,497
Communist countries	8,418	8,107	8,536	8,572	9,352	9,162
U.S.S.R.	4,692	4,436	4,538	4,709	5,105	5,075
Eastern European Communist countries	3,172	3,112	3,259	3,254	3,533	3,532
Far Eastern Communit countries [2]	159	147	222	172	263	143
Other Communist countries [3]	394	412	514	436	450	412
Free world	3,354	3,490	3,771	4,130	4,049	4,335
Developed countries	2,343	2,579	2,665	3,175	2,846	3,385
Less developed countries	1,012	911	1,106	956	1,203	950

[1] Because of rounding, components may not add to the totals shown.
[2] Communist China, North Korea, and North Vietnam.
[3] Albania, Cuba, Mongolia and Yugoslavia.

TABLE II–B.—*Bulgaria: Geographic distribution of exports and imports, 1965–67*

[In million U.S. dollars]

	1965		1966		1967	
	Exports	Imports	Exports	Imports	Exports	Imports
Total [1]	1,176	1,178	1,305	1,478	1,458	1,572
Communist countries	934	874	997	1,028	[2] 1,135	1,165
U.S.S.R.	614	589	664	706	772	783
Eastern European Communist countries	275	236	256	270	305	323
Far Eastern Communist countries [3]	4	3	8	4	11	3
Other Communist countries [4]	41	47	70	47	47	57
Free world	242	303	308	450	323	407
Developed countries	156	242	218	382	223	323
Less developed countries	86	61	90	68	100	84

[1] Because of rounding components may not add to the totals shown.
[2] The data for individual countries as reported in the Bulgarian statistical yearbook add to slightly more than the total for Communist countries given in the same source.
[3] Communist China, North Korea and North Vietnam.
[4] Albania, Cuba, Mongolia a.id Yugoslavia.

TABLE II–C.—*Czechoslovakia: Geographic distribution of exports and imports, 1965–67*

[In millions of U.S. dollars]

	1965		1966		1967	
	Exports	Imports	Exports	Imports	Exports	Imports
Total [1]	2,688	2,672	2,745	2,736	2,864	2,680
Communist countries	1,965	1,961	1,928	1,923	2,051	1,929
U.S.S.R.	1,023	955	920	915	977	965
Eastern European Communist countries	789	851	817	826	887	835
Far Eastern Communist countries [2]	35	28	39	39	39	24
Other Communist countries [3]	119	127	151	144	148	105
Free world	723	711	817	813	813	751
Developed countries	444	487	494	561	526	522
Less-developed countries	279	224	323	252	287	229

[1] Because of rounding, components may not add to the totals shown.
[2] Communist China, North Korea, and North Vietnam.
[3] Albania, Cuba, Mongolia, and Yugoslavia.

TABLE II–D.—*East Germany: Geographic distribution of exports and imports, 1965–67*

[In million U.S. dollars]

	1965		1966		1967	
	Exports	Imports	Exports	Imports	Exports	Imports
Total [1]	3,070	2,810	3,205	3,215	3,456	3,279
Communist countries	2,297	2,046	2,386	2,307	2,599	2,394
U.S.S.R.	1,311	1,205	1,276	1,384	1,408	1,418
Eastern European Communist countries	852	693	921	775	999	821
Far Eastern Communist countries [2]	36	35	56	40	71	44
Other Communist countries [3]	98	113	132	108	121	111
Free world	773	763	819	908	857	884
Developed countries	559	573	575	707	598	659
Less developed countries	214	190	244	201	259	226

[1] Because of rounding, components may not add to the totals shown.
[2] Communist China, North Korea, and North Vietnam.
[3] Albania, Cuba, Mongolia, and Yugoslavia.

TABLE II–E.—*Hungary: Geographic distribution of exports and imports, 1965–67*

[In millions of U.S. dollars]

	1965		1966		1967	
	Exports	Imports	Exports	Imports	Exports	Imports
Total [1]	1,509	1,520	1,593	1,566	1,701	1,775
Communist countries	1,058	1,018	1,089	1,016	1,167	1,183
U.S.S.R.	525	553	527	517	613	592
Eastern European Communist countries	468	415	493	438	487	537
Far Eastern Communist countries [2]	22	18	26	21	26	10
Other Communist countries [3]	42	32	43	40	40	44
Free World	452	502	504	550	534	592
Developed countries	322	381	378	399	394	446
Less developed countries	130	121	126	151	141	147

[1] Because of rounding, components may not add to the totals shown.
[2] Communist China, North Korea, and North Vietnam.
[3] Albania, Cuba, Mongolia, and Yugoslavia.

TABLE II–F.—*Poland: Geographic distribution of exports and imports, 1965–67*

[In millions of U.S. dollars]

	1965		1966		1967	
	Exports	Imports	Exports	Imports	Exports	Imports
Total [1]	2,228	2,340	2,272	2,494	2,527	2,645
Communist countries [2]	1,409	1,548	1,400	1,604	1,611	1,737
U.S.S.R.	781	728	741	792	902	921
Eastern European Communist countries	528	706	521	702	590	726
Far Eastern Communist countries [3]	28	36	46	33	52	24
Other Communist countries [4]	70	77	91	77	67	66
Free world	819	793	872	890	915	908
Developed countries	607	548	663	679	692	728
Less developed countries	212	245	209	211	223	180

[1] Because of rounding, components may not add to the totals shown.
[2] The data for individual Communist countries given in the Polish statistical yearbook do not add to the total for Communist countries given in the same source.
[3] Communist China, North Korea, and North Vietnam.
[4] Albania, Cuba, Mongolia, and Yugoslavia.

TABLE II–G.—*Rumania: Geographic distribution of exports and imports, 1965–67*

[In millions of U.S. dollars]

	1965		1966		1967	
	Exports	Imports	Exports	Imports	Exports	Imports
Total [1]	1,102	1,077	1,186	1,213	1,395	1,546
Communist countries	756	660	735	694	789	754
U.S.S.R	438	406	410	394	433	396
Eastern European Communist countries	260	210	251	244	265	290
Far Eastern Communist countries [2]	35	27	47	35	65	38
Other Communist countries [3]	23	16	28	22	27	29
Free world	346	418	451	519	606	792
Developed countries	255	348	337	446	413	708
Less developed countries	90	70	114	73	193	84

[1] Because of rounding, components may not add to the totals shown.
[2] Communist China, North Korea, and North Vietnam.
[3] Albania, Cuba, Mongolia, and Yugoslavia.

TABLE III–A.—*East European Communist countries: Commodity composition of foreign trade, 1965*

[Dollar amounts in millions of U.S. dollars]

	1965	
	Value	Percent
Total exports [1]	$11,773	100.0
Machinery and equipment	4,518	38.4
Fuels, raw materials, and other materials	3,695	31.4
Foodstuffs	1,610	13.7
Consumer goods	1,950	16.6
Total imports [1]	11,598	100.0
Machinery and equipment	3,348	28.9
Fuels, raw materials, and other materials	6,082	52.4
Foodstuffs	1,574	13.6
Consumer goods	593	5.1

[1] Because of rounding, components may not add to the totals shown.

NOTE.—Data for later years are not available for East Germany.

TABLE III-B.—*Bulgaria: Commodity composition of foreign trade, 1965–67*

[Dollar amounts in millions of U.S. dollars]

	1965		1966		1967	
	Value	Percent	Value	Percent	Value	Percent
Total exports [1]	$1,176	100.0	$1,305	100.0	$1,458	100.0
Machinery and equipment	291	24.8	332	25.5	372	25.5
Fuels, raw materials, and other materials	297	25.3	298	22.8	328	22.5
Foodstuffs	427	36.3	485	37.1	543	37.2
Consumer goods	160	13.6	190	14.6	216	14.8
Total imports [1]	1,178	100.0	1,478	100.0	1,572	100.0
Machinery and equipment	514	43.6	696	47.1	770	49.0
Fuels, raw materials, and other materials	521	44.2	627	42.4	653	41.5
Foodstuffs	84	7.1	87	5.9	77	4.9
Consumer goods	59	5.0	68	4.6	72	4.6

[1] Because of rounding, components may not add to the totals shown.

TABLE III-C.—*Czechoslovakia: Commodity composition of foreign trade, 1965–67*

[Dollar amounts in millions of U.S. dollars]

	1965		1966		1967	
	Value	Percent	Value	Percent	Value	Percent
Total exports [1]	$2,688	100.0	$2,745	100.0	$2,864	100.0
Machinery and equipment	1,304	48.5	1,364	49.7	1,393	48.6
Fuels, raw materials, and other materials	823	30.6	809	29.5	820	28.6
Foodstuffs	119	4.4	106	3.9	125	4.4
Consumer goods	444	16.5	466	17.0	525	18.3
Total imports [1]	2,672	100.0	2,736	100.0	2,680	100.0
Machinery and equipment	800	29.9	886	32.4	820	30.6
Fuels, raw materials, and other materials	1,308	49.0	1,244	45.5	1,273	47.5
Foodstuffs	425	15.9	447	16.3	439	16.4
Consumer goods	140	5.2	159	5.8	148	5.5

[1] Because of roundi :g, components may not add to the totals shown.

TABLE III-D.—*East Germany: Commodity composition of foreign trade, 1965*

[Dollar amount in millions of U.S. dollars]

	Value	Percent
Total exports [1]	$3,070	100.0
Machinery and equipment	1,458	47.5
Fuels, raw materials and other materials	890	29.0
Foodstuffs	92	3.0
Consumer goods	629	20.5
Total imports [1]	2,810	100.0
Machinery and equipment	421	15.0
Fuels, raw materials, and other materials	1,728	61.5
Foodstuffs	576	20.5
Consumer goods	84	3.0

[1] Because of rounding, components may not add to the totals shown.

NOTE.—Data for later years are not available.

TABLE III–E.—*Hungary: Commodity composition of foreign trade, 1965–67*

[Dollar amounts in millions of U.S. dollars]

	1965		1966		1967	
	Value	Percent	Value	Percent	Value	Percent
Total exports [1]	$1,509	100.0	$1,593	100.0	$1,701	100.0
Machinery and equipment	494	32.7	498	31.2	529	31.1
Fuels, raw materials, and other materials	360	23.9	392	24.6	407	23.9
Foodstuffs	333	22.1	345	21.6	372	21.9
Consumer goods	322	21.3	359	22.5	393	23.1
Total imports [1]	1,520	100.0	1,565	100.0	1,775	100.0
Machinery and equipment	427	28.1	445	28.5	573	32.3
Fuels, raw materials, and other materials	866	57.0	901	57.6	937	52.8
Foodstuffs	147	9.6	128	8.2	151	8.5
Consumer goods	80	5.3	90	5.8	114	6.4

[1] Because of rounding, components may not add to the totals shown.

TABLE III–F.—*Poland: Commodity composition of foreign trade, 1965–67*

[Dollar amounts in millions of U.S. dollars]

	1965		1966		1967	
	Value	Percent	Value	Percent	Value	Percent
Total exports [1]	$2,228	100.0	$2,272	100.0	$2,527	100.0
Machinery and equipment	767	34.4	802	35.3	911	36.1
Fuels, raw materials, and other materials	782	35.1	779	34.3	834	33.0
Foodstuffs	404	18.1	377	16.6	392	15.5
Consumer goods	274	12.3	315	13.9	389	15.4
Total imports [1]	2,340	100.0	2,494	100.0	2,645	100.0
Machinery and equipment	767	32.8	875	35.1	978	37.0
Fuels, raw materials, and other materials	1,107	47.3	1,178	47.2	1,229	46.5
Foodstuffs	309	13.2	288	11.5	289	10.9
Consumer goods	158	6.7	154	6.2	149	5.6

[1] Because of rounding, components may not add to the totals shown.

TABLE III–G.—*Rumania: Commodity composition of foreign trade, 1965–67*

[Dollar amounts in millions of U.S. dollars]

	1965		1966		1967	
	Value	Percent	Value	Percent	Value	Percent
Total exports [1]	$1,102	100.0	$1,186	100.0	$1,395	100.0
Machinery and equipment	204	18.5	206	17.4	265	19.0
Fuels, raw materials, and other materials	542	49.2	564	47.6	587	42.1
Foodstuffs	234	21.2	281	23.7	388	27.8
Consumer goods	121	11.0	135	11.4	155	11.1
Total imports [1]	1,077	100.0	1,213	100.0	1,546	100.0
Machinery and equipment	419	38.9	497	41.0	755	48.8
Fuels, raw materials, and other materials	552	51.2	589	48.6	644	41.6
Foodstuffs	33	3.1	38	3.1	41	2.7
Consumer goods	72	6.7	89	7.3	106	6.9

[1] Because of rounding, components may not add to the totals shown.

TABLE IV.—*Eastern European Communist countries: Average annual rate of increase of foreign trade, by country, 1959–67*[1] *and 1966–67*[2]

[In percent]

	Eastern European Communist countries		Bulgaria		Czechoslovakia		East Germany		Hungary		Poland		Rumania	
	1959–67	1966–67	1959–67	1966–67	1959–67	1966–67	1959–67	1966–67	1959–67	1966–67	1959–67	1966–67	1959–67	1966–67
Total	9.6	7.3	17.0	13.5	7.6	1.7	7.2	7.0	11.4	7.1	9.5	6.4	13.4	16.2
Communist countries	9.3	5.8	15.4	12.8	7.8	0.7	7.2	7.2	10.7	6.4	10.8	6.4	8.5	4.4
U.S.S.R	10.0	5.6	16.5	13.7	8.3	−0.9	6.9	6.0	14.6	5.7	13.2	9.9	6.0	−0.9
Eastern European Communist countries	10.1	6.0	13.1	10.9	9.0	2.5	9.4	8.5	10.2	7.7	10.1	3.3	12.6	8.7
Far Eastern Communist countries[3]	−6.8	15.1	(4)	36.5	−13.0	.2	−8.6	27.9	−10.5	−3.8	−4.9	8.1	9.0	28.4
Other Communist countries[5]	13.6	3.4	(4)	8.5	17.1	1.3	(4)	4.9	(4)	6.2	8.3	−5.1	(4)	20.7
Free world	10.5	10.7	24.1	15.7	7.0	4.4	7.1	6.5	13.1	8.7	7.5	6.3	23.4	35.4
Developed countries	10.9	12.5	24.6	17.1	9.1	6.1	6.4	5.4	12.8	9.3	7.4	10.9	24.7	36.3
Less developed countries	9.3	5.8	22.8	11.9	3.7	1.2	9.4	9.4	14.0	7.0	7.9	−6.1	19.1	31.7

[1] 1958 is the base year.
[2] 1965 is the base year.
[3] Communist China, North Korea, and North Vietnam.
[4] Cannot be ascertained because countries included vary.
[5] Albania, Cuba, Mongolia and Yugoslavia.

POSTWAR ECONOMIC GROWTH IN EAST GERMANY: A COMPARISON WITH WEST GERMANY

By EDWIN M. SNELL AND MARILYN HARPER *

CONTENTS

I. INTRODUCTION

Economic growth in East Germany should have a certain interest for students of comparative economic systems. Evidently the partition of Germany after World War II did not at once change the German people. The economic differences that soon appeared—and have persisted—between East and West Germany result from the assimilation of the "two Germanies" into two European systems, at different stages of economic and political development, differently organized for different ends. A study of how the East German economy has grown and how it has diverged from the West German economy thus should tell something about the two systems.

After World War II the U.S.S.R. imposed on the highly developed economy of East Germany the repressive institutions and the policies of forced growth used by Stalin in industrializing the U.S.S.R. Under these institutions and policies East Germany has been largely cut off from the Western market that sustained its highly specialized industries and has had to adapt to the limitations of

*The authors are indebted to Jerry T. Crawford for substantial help in preparing the final draft of this paper.

state-to-state trading with industrializing economies. In this new environment, East Germany itself has behaved like an industrializing economy.

West Germany, on the other hand, under United States and Western European influence, readily adopted the institutions of representative government and the policies of a competitive market economy. German organizing and technical skill, the fever to rebuild and prosper, the new competitive atmosphere, and the opportunities offered by rapidly developing world demand produced an enormously successful economy, one of the pacesetters in the postwar Western world.

The differences in national product per capita and living conditions between the German economies have been large since the late 1940's. So far as they can be measured, the differences have not been getting less. But the differences have been changing in character. The East Germany of the 1950's—of food shortages, bombed-out city centers, workers idle for lack of materials and parts—seemed at first just to be lagging behind the West Germany of the "economic miracle." Today the "two Germanies" seem to belong to different worlds. East Germany in many ways recalls prewar Germany; West Germany belongs to the "Americanized" present—and the future.

II. Prewar Economies of East and West Germany

Before World War II the area of present East Germany was quite as highly developed economically as that of West Germany. In 1936, when output returned to the pre-depression level of 1929, industrial production per capita was slightly higher in East Germany and agricultural output was substantially higher. By 1939, as a result of continued preparation for war, with a steady shift of investment toward the east, East German industrial output rose 37 percent, and per capita output was 16 percent higher than in West Germany. Output in 1939 is probably the best measure of prewar capacity, although recovery must sometimes be measured against output in 1938 and 1936, years for which fuller data are available.[1]

The prewar industries of present East Germany differed in structure from those of West Germany. A larger share of output (43 against 35 percent) was concentrated in consumer goods production, and a smaller share (10 against 18 percent) in mining and metallurgy. Within the investment goods industries, East Germany specialized in textile machinery, machine tools, office equipment, radio receivers, and airplane motors and airplanes; West Germany, in heavy industrial equipment, agricultural machinery, pumps and compressors, ships, heavy electric motors, instruments, watches, and medical equipment. In chemicals, East German output was concentrated in basic chemicals, coal chemicals, and synthetic rubber; West German output, in pharmaceutical products, synthetic fibers, paints and dyes, and tires.

East German industry had developed without much local hard coal and steel. The chief mineral resources were (and are) brown coal and

[1] For regional breakdowns of output and employment in Germany before and during World War II, see Bruno Gleitze, *Ostdeutsche Wirtschaft* (East German Economy), West Berlin, Duncker & Humblot, 1956, especially the appendix tables, pp. 145ff, and Wolfgang F. Stolper, *The Structure of the East German Economy*, Cambridge, Mass., Harvard Univ. Press, 1960.

nonmetallic minerals,[2] the basis of East Germany's substantial chemical industry. Mining and metallurgy were largely concentrated in West Germany—the Ruhr and Saar valley. Present West Germany supplied 98 percent of the hard coal, 94.5 percent of the iron ore, and 93.5 percent of the rolled steel produced in prewar Germany, excluding the areas now part of Poland. (See Table 1.) East German industry depended on West Germany (and to some extent on former German Silesia) for coal and steel, and there was a large exchange of semimanufactures and finished goods between the two areas. (See Table 2.)

TABLE 1.—*East and West German shares of prewar output of selected raw materials, 1938*

	East Germany	West Germany	Total	East German as a percent of total
Iron ore (thousand tons Fe content)	186	3,179	3,365	5.5
Potassium fertilizer (thousand tons K_2O content)	1,272	907	2,179	58.4
Hard coal [1] (thousand tons)	3,513	151,367	154,880	2.3
Coke (thousand tons)	278	39,755	40,033	.7
Brown coal (thousand tons)	119,647	69,804	189,451	63.2
Pig iron (thousand tons)	231	17,518	17,749	1.3
Crude steel (thousand tons)	1,437	19,878	21,315	6.7
Rolled steel (thousand tons) [2]	1,031	14,484	15,515	6.6

[1] The area now in Poland supplied 31,300,000 tons of hard coal in 1938.
[2] Excluding semifinished steel.

Source: Gleitze, *op. cit.*, pp. 191–193.

TABLE 2.—*Regional breakdown of the commodity output and trade of Germany, 1936*

[Billion Reichsmark]

	Territory east of the Oder-Neisse line	East Germany (except East Berlin)	Berlin	West Germany (including the Saar)	Total
Net output of industry and agriculture	4.0	9.7	2.7	23.9	40.3
Exports to other areas of Germany	1.7	4.2	1.8	4.2	----
Exports in foreign trade	.2	1.1	.3	3.2	4.8
Imports imports from other areas of Germany	1.6	4.1	2.1	4.1	----
Imports foreign trade	.4	.7	.4	2.7	4.2
Balance	−.1	+.5	−.4	+.6	+.6
Apparent consumption	4.1	9.2	3.1	23.3	39.7

Sources: U.N., ECE, *Economic Bulletin for Europe,* no. 3, 1949, p. 28; Cf. Gleitze, *op. cit.,* p. 6.

Agriculture in the two areas was also quite specialized. East Germany produced potatoes, grain, oilseeds, and sugar beets in large enough amounts to give the area (even including East Berlin) a small net export surplus in foodstuffs. West German agriculture specialized in meat and dairy products, truck farming, and viticulture, and the area had a substantial deficit in foodstuffs.

[2] These include uranium ores, which have been mined heavily under Soviet control for Soviet use since World War II.

III. Contrasts In Postwar Recovery and Growth

The collapse of Nazi Germany in 1945 (*der Zusammenbruch*, as the West Germans call it) and the partition of Germany among the victors cut production to a fraction of peak wartime levels. In 1948 industrial production was still less than one-half the 1939 level. The East Germans were hit far harder than the West Germans, because they were cut off more completely from outside markets, on which they were more dependent than West Germany, and because the Soviet occupation, dictated by hatred and economic need, was much harsher than the occupation of West Germany.

A firm basis for German economic recovery was laid in 1948–49, when the two new German regimes were founded, after drastic currency reforms. Thereafter it took the East Germans ten years of hard work to bring their economy back to the level of 1939. West Germany, under more favorable circumstances, reached the 1939 level in the early 1950's. While the East German economy was still moving toward complete recovery, the West German economy was growing rapidly, maintaining nearly as large an advantage in output per capita as existed in 1948. Table 3 gives estimates of postwar recovery and growth in GNP by major producing sectors in East and West Germany. These estimates, like most previous Western estimates, show that East German GNP per capita has run at 70 to 75 percent of the West German level.[3]

Table 3.—*Postwar growth of GNP by sector of origin, East and West Germany*

[1936=100] [1]

	1950		1955		1960		1967 [2]	
	East Germany	West Germany	East Germany	West Germany	East Germany	West Germany	East Germany	West Germany
Industry and handicrafts	70	113	120	202	167	285	213	380
Agriculture and forestry	73	97	92	115	107	133	122	152
Construction	60	114	90	209	146	261	219	329
Transport and communication	89	130	124	189	147	247	172	290
Trade	56	113	95	165	125	238	144	316
Other services	99	139	98	193	101	248	108	344
Total GNP	77	117	108	184	137	249	168	328

[1] Estimates based on earlier ones by Edwin M. Snell, updated by David Wigg.
[2] In 1967, the West German economy stood still. A comparison in terms of 1966, or of 1968 or 1969, would be less favorable to East Germany.

[3] The first comparison of East and West Germany, by Ferdinand Grünig for 1949, found the East German net national product per capita to be nearly one quarter less than the West German. See Ferdinand Grünig, "Volkswirtschaftliche Gesamtrechnung für die sowjetische Besatzungszone," *Vierteljahrshefte zur Wirschaftsforschung*, no. 1, 1950, pp. 16–34. The first full-scale effort was made by Wolfgang Stolper, who found East German GNP per capita in 1950–58 to be about 65 to 70 percent of West Germany's. These comparatively low figures reflect the unaccountable mistake, in an otherwise careful effort, of putting the 1936 East German consumption level at 89 percent of the West German. See Stolper, *op. cit.*, especially p. 440. The most recent estimates are those published by Maurice Ernst; "Postwar Economic Growth in Eastern Europe," *in* U.S. Congress, Joint Economic Committee, *New Directions in the Soviet Economy*, Washington, 1966, part IV, pp. 877–882. Ernst finds postwar East German GNP to be consistently about 75 percent of the West German level. Differences between Ernst's estimates and the present ones result chiefly from a difference in base years: Ernst's estimates are made with 1936 weights; the present estimates, with 1955 weights.

In comparing the series for East and West Germany in Table 3, one should allow for a major difference in population trends in the two areas. The East German population is now only about 5 percent above the 1936 level; the West German population has grown by 43 percent. On a per capita basis, the growth of East German production from 1936 to 1967 bears the following relation to West German growth (West German index=100):

Industry	76
Agriculture	109
Construction	90
Transport and communications	81
Trade	62
Services	43
Total	71

Still another view of the same estimates is given in Table 4, where per capita output in major sectors is compared. Here the results are slightly different, because per capita levels in East and West Germany were not the same in 1936. In particular, East Germany had a slightly (2 percent) higher output in industry, and a substantially (19 percent) higher output in agriculture, with a resulting 3 percent lead in GNP.

TABLE 4.—*Comparison of output per capita in East and West Germany in selected years*

[Per capita output in West Germany=100]

	1950	1955	1960	1967
Utilities	102	101	125	115
Mining	92	114	129	152
Manufacturing	66	67	72	68
Agriculture and forestry	98	114	126	135
Construction	59	52	75	96
Transport and communications	71	73	74	79
Trade	54	63	64	59
Other services	77	60	53	44
Total	71	70	73	73

Table 4 reveals a sharp contrast between a relatively high East German output of utilities, mining, and agriculture and a relatively low level of output in manufacturing. In utilities, mining, and agriculture, East Germany has been producing more per capita than West Germany since the early 1950's. In manufacturing—and as a result, in transport and communications and trade—East Germany has been producing much below the West German per capita level. The output of "nonproductive" services, which recovered rapidly—as a result of the reinstitution of state services—is now lowest of all relative to the West German level. Construction, which was at a low level in 1950, has risen very rapidly to nearly the West German per capita level.

These contrasts, which are also reflected in the composition of GNP by sector of origin,[4] point to most of the important differences in economic development between East and West Germany since World

[4] See Thad P. Alton, "Economic Structure and Growth in Eastern Europe," *in this volume*, p. 43ff.

War II. Per capita output in agriculture has been higher in East Germany in spite of slower recovery and growth of output, because the East German population has lagged so far below the rapidly growing West German population. Increases in East German agricultural output over the prewar level have been achieved mainly by increasing subsidies, by supporting rising prices for output and greatly expanding supplies of low priced fertilizer, seed, and imported feed. The relatively high level of East German output per capita in utilities and mining reflects the preoccupation of the leadership with expanding output of basic materials. The expansion of capacity in fuels, power, and metallurgy for years absorbed most of the rapid increase in construction. In pushing the expansion of the basic materials industries, the leaders had the justification not only of Communist doctrine but also of the loss of imports from West Germany, which the U.S.S.R. could not begin to replace. The shortage of imported materials—which is also to say, insufficient Soviet demand for East German manufactures—has been one of the main reasons why manufacturing output has expanded less rapidly in East than in West Germany. The lag in East German manufacturing in turn has been crucial in holding back the whole East German economy.

Significant differences between the East and West German economies are also evident from comparisons of the uses of GNP. East Germany has devoted a smaller share of GNP both to consumption and to domestic fixed capital investment than West Germany. If estimated in West German prices, personal consumption in East Germany has run from a low of about 50 percent of GNP in 1950 to a high of about 60 percent in 1955, with the share falling again to about 52 percent in the mid-1960's. In West Germany the share of personal consumption has consistently been close to 60 percent of GNP.[5]

Fixed capital investment, only about 15 percent of GNP (at West German prices) in the early 1950's, began to increase rapidly after 1955 and has come to more than 20 percent of GNP in the 1960's. Until recent years, West Germany has allocated a substantially larger share of GNP to fixed capital investment—from 1955 through 1965 the share was at or above 25 percent.[6]

As indicated by these estimates, the East German leadership has shifted from a strong preference for increasing consumption—the main goal in the uncertainty of the early 1950's—to one for increasing investment, which has become the primary objective since the regime has enjoyed relative security behind the Berlin wall.

The smaller shares of East German GNP going to consumption and fixed capital investment are offset by larger shares used for other purposes. First, East Germany has allocated relatively more of its GNP for state administration, defense, and public services, although the difference has declined with the rise in West German defense expenditures.[7] Second, a sharply increased share of East German GNP has gone to rising inventories—mainly of unsaleable goods. Additions

[5] The East German shares are implied by the comparison of consumption levels given below in Section VII, p. 589ff.

[6] Cf. Ernst, *op. cit.*, p. 890. The present estimates are based on purchasing power comparisons. See Edwin M. Snell, "Economic Efficiency in Eastern Europe," *this volume*, pp. 293–296.

[7] Cf. Frederic L. Pryor, *Public Expenditures in Communist and Capitalist Nations*, London, Allen & Unwin, 1968, p. 61. Pryor's "adjusted budget expenditures" are not 18–19 percent of GNP, as in the tabulation below, but 30 to 33 percent of GNP (in 1962). They constitute so much larger a share because, first, Pryor's calculations are in dollars and, second, they relate to GNP at factor cost.

to inventories, which in the mid-1950's accounted for only about 2 percent of GNP, rose enormously thereafter to account for 3½–4 percent of GNP in the 1960's.[8] In West Germany, the rate in any two or more years has not averaged more than about 1½ percent. Third, East Germany long had a substantial surplus in the foreign account, arising from large payments to the U.S.S.R. of reparations and occupation costs. More recently it has declined; in the mid-1960's it was accounted for by the repayment of indebtedness to the U.S.S.R. and the accumulation of gold or hard currency reserves.[9] The East German balance for these purposes has in many years been a larger share of GNP than the West German foreign account balance, which has represented chiefly net foreign investment.

In the mid-1960's (1965–67), as a result of these differences, the shares of GNP in East and West Germany devoted to major uses were about as follows, if valued at 1954 West German prices (percent of total):

	East Germany	West Germany
Private consumption	52	61
Investment:		
Fixed capital	24	25
Additions to inventories	3½	1
Administration, defense, and public services [1]	18½	15
Foreign account	2	−2
Total	100	100

[1] Including nonprofit institutions.

The effect of differences in resources and in policy on personal consumption has been to keep the East German consumer at a level much below that enjoyed by the West German consumer. In 1955 the level was only 60 percent of the West German level, rising to a high of over 70 percent in 1955 and again in 1959, and falling thereafter to below 65 percent.[10] Fixed capital investment has been much below the West German per capita level during most of the period—although it has risen from less than one-half the West German level in 1950, to 60 percent by 1960 and close to 70 percent by the mid-1960's. There is a sharp contrast, moreover, between investment in construction, which may now represent 90 percent of the West German level, and investment in machinery and equipment, which can scarcely be more than one-half the West German level.

The resulting decline in the relative size of the East German capital stock has been offset in part by the relative decline in the East German population, so that fixed capital per person in East German enterprises, substantially greater than in West German enterprises in 1950, is still close to the West German level. This, however, does not hold true for the machinery and equipment inventory. With per capita GNP increasing at about the same rate in East and West Germany, incremental capital/output ratios evidently have been substantially

[8] Snell, *op. cit.*, pp. 261–262.

[9] An indication of the recent trend is the more rapid growth since 1960 of national income produced (in constant prices) than of national income used domestically. See Germany (Democratic Rep.), Staatliche Zentralverwaltung für Statistik, *Statistisches Taschenbuch der Deutschen Demokratischen Republik 1969*, p. 21.

[10] Estimates based on purchasing power comparisons. See Snell, *op. cit.*, pp. 293–296. Rough estimates of fixed capital stocks, mentioned below, are obtained in the same way.

lower in East Germany until recently. This reflects the existence of more idle capacity in East Germany in the 1950's. At the same time the average capital/output ratio has been consistently higher in East Germany, the difference having been so large in 1950, when much more of East German capacity was idle, that even a considerable reduction in the difference between East and West German fixed capital/output ratios has left the over-all East German ratio higher, mainly because of the much higher ratio in industry.

Thus the relatively low investment level in East Germany implies some improvement in capital efficiency but not an absolute lead over West Germany. In the use of capital as in the use of labor, the East German economy has operated at a substantially lower level of factor productivity throughout the postwar period. The reasons, some of which have been touched on, will be considered further in the following sections, with special reference to industry.

IV. External Factors Retarding East German Economic Development

The external causes of slow East German recovery through the mid-1950's seem sufficient to explain it. These are Soviet exploitation, the loss of the large trade with West Germany, and a costly adjustment to barter trade with the Communist world.

A. SOVIET EXPLOITATION

The main target of Soviet demand for reparations after World War II was Germany, the rich arch-enemy, and the weight of Soviet demands fell on East Germany. Soviet forces began with looting and the hasty dismantling of East German plants (1945–46) repeated on a small scale in 1947. They also carried off a good deal of timber, livestock, and industrial goods, removed a good deal of railroad rolling stock, and tore up one set of track from all double-tracked rail lines in East Germany. Levies on current production, which also began in 1945, continued into the mid-1950's. Besides goods and services delivered as reparations and in payment of occupation costs, the U.S.S.R. bought substantial amounts with the profits of the "Soviet corporations" (*Sowjetische Aktiengesellschaften*, or SAG), which until the early 1950's operated much of East German heavy industry. As of the end of 1954 the U.S.S.R. had turned over the last of the Soviet managed plants, except for the uranium mines.[11] The last reparations payments apparently were made in the mid-1950's; the payment of occupation costs, substantially reduced in the mid-1950's, was discontinued as of 1959. The total value of goods and services taken by the Soviet military occupation authorities or turned over by the East German regime has been estimated at up to $20 billion. It undoubtedly ran well over $10 billion (1955 prices).

The economic effects of war damage and dismantling, however, have been somewhat exaggerated. According to West German sources, war damage equaled 17 percent and dismantling (through 1946) equaled 50 percent of the value of industrial fixed capital in 1936.[12] These

[11] The uranium mines have since been run by a "joint Soviet-East German" corporation. Beginning in 1957 they have been run at little or no cost—or net benefit—to the East German state budget.

[12] A useful summary of the evidence on Soviet dismantling is given by Heinz Köhler, *East Germany's Integration into the Communist Bloc* (Ph. D. dissertation), University of Michigan, 1961, pp. 5–70. The above estimates are on p. 21.

estimates probably represent an upper limit. But in any case, losses should be measured against the value of fixed capital in the peak year of 1943, when fixed capital in East German industry was much greater than in 1936. As a result of rearmament and the expansion of war production, investment in heavy industry had grown enormously in the late 1930's and early war years. Fixed capital in German industry as a whole rose by one-half, and the increase was undoubtedly larger in East Germany. Thus, in spite of war damage—especially to buildings—and Soviet dismantling of as much as $4 billion worth (at 1955 prices) of machinery and equipment, the value of fixed capital in East German industry in the late 1940's was greater than in 1936, though less than in 1939.[13] (See Table 5.)

TABLE 5.—*Growth of fixed capital in industry* [1] *in East and West Germany, 1936 to 1966*

	East Germany [3]		
	West Germany [2] (1950=100)	(1950=100)	(West Germany=100)
1936		81	
1939		110	
1944		148	
1950	100	100	48
1960	205	148	31
1966	310	212	33

[1] Industry includes mining, utilities, and manufacturing (except handicrafts). West German data exclude the Saar and West Berlin.

[2] West German data for World War II and earlier years represent a fixed share of the capital assets of the German Reich within 1937 borders, a practical basis for calculating the age and structure of postwar fixed capital assets by the "perpetual inventory" method, but not useful for prewar comparisons with East Germany. For West German estimates see, in particular, the work of Rolf Krengel and Wolfgang Kirner, and the earlier work by Ferdinand Grünig, all of the Deutsches Institut für Wirtschaftsforschung (DIW) in West Berlin. These include Rolf Krengel, *Anlagevermögen, Produktion und Beschäftigung der Industrie im Gebiet der Bundesrepublik von 1924 bis 1956* (DIW Sonderhefte, neue Folge, 42, Reihe A: Forschung), West Berlin, Duncker & Humblot, 1958, and "Die ersten Ergebnisse der Neuberechnung des industriellen Anlagevermögens für das Gebiet der Bundesrepublik auf der Preisbasis 1958," and "Produktionsvolumen und Produktionsfaktoren der Industrie im Gebiet der Bundesrepublik Deutschland," *Vierteljahrshefte zur Wirtschaftsforschung*, no. 3, 1963, pp. 274–93, and no. 4, 1967, pp. 394–414, respectively; Ferdinand Grünig, *Versuch einer Volksvermögensrechnung der Deutschen Bundesrepublik* (DIW Sonderhefte, neue Folge, 41, Reihe B: Vorträge), West Berlin, 1958, p. 46; and Wolfgang Kirner, *Zeitreihen für das Anlagevermögen der Wirtschaftsbereiche in der Bundesrepublik Deutschland* (DIW-Beiträge zur Strukturforschung, Heft 5), West Berlin, 1968, p. 108.

[3] The estimates for East Germany 1936, 1939, and 1943 are based, first, on the estimate that West Germany (excluding the Saar) had 57 percent, and East Germany, one-half that, or 28.5 percent of fixed capital of the Reich in 1939. These figures represent the share of the 2 areas in output and employment, and in spite of structural differences, the share of fixed capital must have been close to the same ratio. Compare Kirner, *op. cit.*, pp. 47ff and 82. Second, the same relation between increases in output and fixed capital between 1936 and 1939 and between 1939 and 1944 is assumed for East Germany as is shown for Germany as a whole (as indicated in Krengel's series), i.e., that fixed capital increased almost as fast as output.

[13] Köhler accepts the estimate, made by various writers, that East German industrial capacity was reduced to about one-half of the 1936 level, an estimate that can hardly be reconciled with direct comparisons of fixed capital in East and West German industry since the war. It may be noted that if this estimate were used, industrial output per unit of fixed capital would be substantially higher in East than in West Germany industry in the 1950's, and factor productivity almost the same—a real "economic miracle", if it had happened.

For postwar years, the relation of fixed capital stock in East German industry to that in West German industry is based on an estimate for 1961 by Edwin M. Snell, "Industrial Efficiency in Eastern Europe," in this volume, p. 270, above. Snell's estimate has been adjusted to include utilities in the figure for West Germany and to exclude the Saar. The estimate for East Germany is moved to 1960 and 1966 with the help of the series for 1955–66 in constant East German prices by Manfred Melzer, "Das Anlagevermögen der mitteldeutschen Industrie 1955 bis 1966," *Vierteljahrshefte zur Wirtschaftsforschung*, no. 1, 1968, pp. 105–32. The estimate for 1950 is based on Melzer's index back to 1955 and on figures given by Maurice Ernst, which show that net additions to East German capital stock in industry in 1951–55 were only one-half those in 1956–60. According to Ernst, only about 6 percent of GNP was invested in industry in 1951–55, about 9 percent in 1956–60, and GNP in 1956–60 was about 30 percent greater than GNP in 1951–55. Ernst, *op. cit.*, pp. 880 and 890. The recently published East German series on investment and fixed capital in constant prices (the latter going back only through 1955) bear out these estimates. See Germany (Dem. Rep.), *Statistisches Taschenbuch 1969*, pp. 25, 27.

Moreover, East Germany emerged in the late 1940's with a larger fixed capital stock in industry, on a per capita basis, than West Germany. For although West Germany had suffered much less from dismantling, losing less than 5 percent of the fixed capital stock existing in industry in 1945, the westward shift of population after the war had greatly increased the West German population relative to the East German. In 1950 the population of East Germany was about 40 percent and fixed capital in East German industry was 48 percent, of the level in West Germany (without the Saar or West Berlin). Since 1950, the fixed capital stock in East German industry has dropped relative to the West German level—the effect of low East German investment in the 1950's having been only partly offset by the continued gain in population of West Germany and the decline through the 1950's in the East German population. (See Table 5.) Even so, fixed capital/output ratios in industry remain much higher in East than in West Germany.[13a]

East German recovery undoubtedly was delayed by Soviet dismantling in metallurgy, the chemical industry, and engineering. From 55 to 65 percent of the 1936 capacity in these branches reportedly was dismantled. In sharp contrast, 30 percent or less of the 1936 capacity of mines, power plants, most of the consumer goods industries, and the food industries was affected.[14] Dismantling thus removed much of the heavy industry capacity—including the entire aircraft industry and all other capacity for military production—built in the late 1930's and the war years, leaving East German manufacturing capacity predominantly in light and food industry and light machine building, as in 1936.

Under favorable circumstances, demand for consumer goods—and for equipment to produce consumer goods—would have recovered quickly, though more slowly than demand for producer goods, as happened in West Germany. But actually conditions were far from favorable for reviving consumer goods production—lack of demand on the Communist market was an important factor—and the removal of so much of the plant and equipment of East German heavy industry was a serious handicap to recovery.

Soviet dismantling also damaged the East German rail system. According to rough estimates of track and rolling stock, the value of the East German railroads was reduced by 30 percent, or by as much as $1 billion.[15] If the Russians had been more efficient in converting

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[13a] See Snell, *this volume*, p. 270. The East Germans themselves, although tending to minimize differences in output per worker between East and West German industry, on occasion acknowledge the much higher capital/output ratios in East German industry. In the engineering industries, one article puts the East German capital/output ratio in 1955 and 1964 at about 75 percent above the West German ratio. Hans Gräser and Hermann Schirmer, "Kosten- und Grundfondsanalysen zur Vorbereitung von Rationalisierungsmassnahmen," *Deutsche Finanzwirtschaft*, vol. 20, no. 19, 1966, p. F9.

[14] Köhler, *op. cit.*, p. 21.

[15] The reports on loss of trackage are specific—one track was removed from all double tracking, which works out to about 30 percent of all trackage, as estimated. See Köhler, *op. cit.*, pp. 19, 20. East German published data on track mileage are consistent with these figures. There apparently is no estimate for rolling stock, and the East Germans have not been so obliging as to publish figures. But data on the volume of traffic moved and turnover time indicate that the East Germans must have kept about two-thirds of the freight cars. They must also have retained a large share of the locomotive park, in order to handle the traffic in 1950, especially since many East German locomotives were not yet required in 1950. West German estimates of rolling stock in the late 1940's, though doubtless based on good sources, are surely too low. See Deutsches Institut für Wirtschaftsforschung, *Wochenbericht*, no. 9 and 36, 1950, no. 40, 1952. See also Hellmuth Kalus, *Wirtschaftszahlen aus der SBZ*, (Economic figures from the Soviet zone of occupation), Bonn, Bundesministerium für Gesamtdeutsche Fragen, various editions.

East Germans standard gauge equipment to run on Soviet broad gauge track, the East Germans would have lost more.[16] The capacity of the system, about 46 percent of West German capacity before the war, fell to less than one-third of West German capacity in 1950. The capacities of the East German and West German systems have since increased at about the same rate, though the depreciated value of the East German system has declined because of the slow replacement of old equipment. By making maximum use of capacity, the East Germans have been able to handle the traffic generated by postwar recovery, even with relatively little help from long-distance trucking, but at the cost of high operating expenses and poor service.

Soviet levies on current production undoubtedly did more to hold back East German recovery than did dismantling of industry and transport. From 1945 through the mid-1950's, uncompensated deliveries to Soviet forces and to the U.S.S.R. amounted to up to $10 billion. In the late 1940's and early 1950's, when the amounts taken were largest and output was far from prewar levels, uncompensated deliveries averaged 20 percent of gross industrial production or about 40 percent of net value added in industry.[17]

The effect on production can be gauged from the over-all effect on the trade balance. As shown below,[18] East Germany in 1950 exported 4½ times more than it imported. The imbalance was so great in the late 1940's and early 1950's that the value of the materials used to produce manufactures for the U.S.S.R. was larger than the value of the materials shipped by the U.S.S.R. to East Germany. In other words, material-poor East Germany was in effect a net exporter not only of value added in manufacturing but also of raw materials. Much of the cost was absorbed by the East German population, but the regime had also to hold down investment. According to calculations published by Maurice Ernst, gross fixed capital investment in 1950–1954 was only 14½ percent of GNP, two thirds of the share—and one-half of the per capita investment—in West Germany.[19]

Uncompensated deliveries were reduced several times during the 1950's, and by 1957 the only remaining such deliveries were those to pay occupation costs which had also been reduced to a third of the earlier level and were finally cancelled as of the end of 1958. By the late 1950's therefore the main cost of uncompensated deliveries was the current cost of foregone investment since the war, a large cost equal to seven percent of the Gross National Product.

B. THE REORIENTATION OF TRADE

Costly as it was, Soviet exploitation has done less to retard recovery and growth than the loss of East Germany's large specialized trade with West Germany. Even as uncompensated deliveries were reduced, and Soviet deliveries grew, supplies were still too small to operate East German industry at capacity. In 1958, less than one-half of East German industrial capacity was operating above 1939 level: plants

[16] Sopade Informationsdienst (Social Democratic Party Information Service), *Die Reparationen in der Sowjet-Zone von 1945–1952* (Denkschriften, 51). Bonn [1953], p. 12. This paper by the SPD is one of a series of comprehensive reports on Soviet exploitation.
[17] Cf. Köhler, *op. cit.*, pp. 53–54.
[18] Table 6.
[19] Ernst, *op. cit.*, p. 890.

founded or expanded to serve Soviet recovery—shipyards, railroad equipment plants, and some producers of precision machinery, electrical machinery, and heavy industrial equipment—and those developed to help replace imports from West Germany, notably mines and steel plants. Production of chemicals and electric power was also well above the 1939 level. But the rest of industry was producing far below the 1939 level. Overall industrial output was either slightly down (in 1936 prices) or about 10 percent up (in 1950 prices) from the 1939 output.[20] Per capita output, 16 percent greater than in West Germany in 1939, had slipped to about 75 percent of the West German figure. And factory productivity, almost exactly the same as in West Germany in 1939, was down to about five-sixths of the West German level.

East Germany has never made up the lag that developed in the early 1950's. Trade with the U.S.S.R. and the other Communist countries—the indispensable basis of growth for a small command economy—has scarcely developed even now to the point where the volume of East Germany's foreign trade equals the volume of its external trade in 1936. And the mix of East German exports to the Communist world is more and more disadvantageous; they are heavily weighted with standard machinery items and basic chemicals, which East Germany's main customers have been producing rapidly in increasing amounts for themselves.

The external trade of West Germany suffered far less from the collapse. West Germany had had no trouble finding a market for its coal, steel, and heavy machinery, in strong demand as Europe recovered from the war. And the West Germans readily replaced East German consumer goods and light machinery as demand rose, from expanded domestic output and from imports. The size of the West German economy, its character, and its renewed and deepened connections with the world market made all the difference.

The contrast between the recovery of East and West German external trade is shown in Table 6.

TABLE 6.—*East and West Germany: Indexes of the growth of external trade in selected years, 1936–65*

[1936=100]

	East Germany		West Germany	
	Imports	Exports	Imports	Exports
1936	100	100	100	100
1950	12	45	60	62
1955	27	51	128	143
1960	63	65	239	250
1965	82	93	413	366

NOTE.—Prewar estimates based on estimates of Ferdinand Grünig, cited by Gleitze, *op cit.*, p. 7. Postwar data for East Germany from official figures, adjusted for price changes and reparations and other nonreported deliveries West German data from official sources, in constant prices. The link with prewar estimates is based on adjusted foreign trade data using the implied price indexes in the original postwar data.

[20] Comparison of estimates by Wolfgang Stolper with a 1936 base and Bruno Gleitze's data on changes in output from 1936 to 1939. Stolper, *op. cit.*, p. 265. Gleitze, *op. cit.* Unpublished estimates by Thad P. Alton (including handicrafts) would yield about the same results. He finds, however, that the recovery of industry excluding handicrafts came three years earlier than as shown by Stolper. The difference reflects differences in pricing and weights. Stolper used the same prices for East and West Germany—the results are comparable. If Alton's prices (1959 Hungarian prices) were used to obtain 1958 weights for measuring West German industrial growth, the year of West German recovery likewise would be advanced.

It should not be concluded that East German industries are in general still running below capacity for want of supplies and customers. That effect of the reorientation of East German trade to the U.S.S.R. and Eastern Europe—the predominant effect of the 1950's—has almost disappeared, indicated by a sharp decline in monthly fluctuations in output. Fluctuations were large in the early and middle 1950's, mainly because supplies were not sufficient to maintain a high level of output; fluctuations were less pronounced in the late 1950's in spite of pressure for increased output, and since 1960 have stabilized at a level comparable with that in West German industry.[20a]

It may then be presumed that East Germany industry has exhausted its "hidden reserves," and the continued lag in efficiency thus reflects long-term factors less likely to change.

Some of the effects of the reorientation of trade are brought out when imports and consumption of key commodities are compared with those in 1936. As shown in Table 7, East German imports and consumption of hard coal [21] have remained well below the prewar level, and it is only since the late 1950's that Soviet crude oil deliveries have begun to provide a significant share of East German fuel needs. Even now East German per capita production and consumption of petroleum products is little more than one-third the West German level. Accordingly, the economy has become heavily dependent on brown coal, of which East Germany is the "world's largest producer," as official speakers and writers sometimes note.

TABLE 7.—*Supply of hard coal in East and West Germany before and after World War II*

[Million metric tons]

	East Germany			West Germany		
	Output	Net trade	Apparent Consumption	Output	Net trade	Apparent Consumption
1936	3.5	+8.7	12.2	128.7	−27.0	101.0
1950	2.8	+3.5	6.3	[1] 110.8	[1] −11.9	[1] 98.8
1955	2.7	+6.3	9.0	[1] 130.7	[1] +2.8	[1] 133.5
1960	2.7	+8.0	10.7	142.3	−11.1	131.2
1967	1.8	+8.3	10.1	112.0	−10.7	101.3

[1] Data for West Germany exclude the Saar. Because of rounding, West German figures for 1950 do not add up to total.

Sources: Prewar production figures are taken from Gleitze, *op. cit.*, p. 191; prewar trade figures are taken from U.N., E.C.E., *Economic Bulletin for Europe*, no. 3, 1949, p. 32. West Berlin is excluded. Other data from statistical yearbooks.

Under favorable conditions for strip mining, brown coal is a competitive fuel, particularly for producing electric power close to the mines. Since the mid-1950's, however, the East Germans have had to use deposits lying well below the surface, and production costs have mounted. Moreover, they have made extensive use of brown coal as a basis for producing organic chemicals (via calcium carbide), as a source of liquid fuels (by the Fischer-Tropsch hydrogenation process

[20a] Günter Schrott, "Zur Kontinuität der industriellen Produktion in der DDR in den Jahren 1956 bis 1965," *Statistische Praxis*, v. 21, no. 11, 1966, p. 510–13.

[21] Coke imports are not included in Table 7. Their inclusion would not greatly affect the conclusions drawn from Table 7.

developed in prewar Germany), and even as a basis for making metallurgical coke and for firing locomotives. Production of "high-temperature brown coal coke," used at the Calbe iron works, runs over 1 million tons. These uses involve high capital or operation costs. The capital costs of using coal to produce organic chemicals and liquid fuels are so much higher than the costs when crude oil is used that major expansion of the output of these products was delayed until enough Soviet crude oil became available. Only in the mid-1960's did chemical production again reach the 1939 level.

A second handicap was the shortage of steel. Prewar East German steel consumption was supported largely by imports of West German pig iron, scrap, and steel, chiefly finished steel. By the early 1950's East Germany was getting almost as much pig iron as in the 1930's, and substantially more iron ore, practically all from the U.S.S.R. But steel imports from the U.S.S.R. and other sources did not reach the prewar level until the 1960's. Steel consumption rose to the 1938 level only in 1957, in contrast with West Germany, which had reached the 1938 level by 1951. Since the mid-1950's, however, steel consumption has risen at a much faster rate in East Germany, and per capita consumption is now about five-sixths of the West German level. Changes in steel supply in East and West Germany are given in Table 8.

TABLE 8.—*Supply of finished steel in East and West Germany before and after World War II* [1]

[Million metric tons]

	East Germany			West Germany		
	Output	Net trade	Apparent consumption	Output	Net trade	Apparent consumption
1936	0.9	+1.2	2.1	12.3	−4.4	7.9
1950	0.8	+0.3	1.1	8.2	−1.4	6.8
1955	1.9	+0.7	2.6	14.2	−0.1	14.1
1960	2.6	+1.5	4.1	18.6	−3.9	22.5
1967	3.1	+2.0	5.1	18.3	−6.6	24.9

[1] Rolled steel excluding castings and forgings.

Sources: Prewar figures are taken from U.N., ECE, *Economic Bulletin for Europe*, no. 3, 1949, p. 34. Other data from statistical yearbooks.

Machinery output has followed the growth of steel consumption. In terms of regaining the level of 1939, when German steel consumption and machinery production were nearly double the 1936 level, East Germany's machinery production recovered in 1959 or 1960; West German production, in 1955.

The East German lag in machinery output was somewhat less than in steel consumption because a much larger share of finished steel has been used for machinery production in East than in West Germany. This difference is somewhat offset by the fact that East Germany has switched since the war to the production of "steel-intensive" machinery—ships, railroad rolling stock, and above all, equipment for heavy industry. As a result of Soviet orders, and of attempts to build a metallurgical industry and expand mining, output of "steel-intensive" items was the part of East German machinery and equipment production that most exceeded prewar levels by the mid-1950's.

By 1956, for example, output of railroad rolling stock was already at least 4 times, output of shipbuilding was perhaps 15 times, and the output of metallurgical equipment was 11 times the 1939 level. These products, which had provided scarcely 2 percent of 1939 output, provided some 20 percent of machinery and equipment output in the late 1950's and used about 30 percent of the finished steel consumed in producing machinery and equipment. Output of other important products—textile machinery, machine tools, automobiles, and trucks, for example—had increased little, if at all, both for lack of materials and for lack of foreign demand. This shift in output obviously brought about a considerable increase in steel consumption per dollar's worth of machinery. The only significant offsetting change was the substantial increase (50 percent by 1958) in the output of precision machinery and optical equipment, which had provided about 4 percent of prewar East German output.

Since 1958 the mix of machinery output has changed somewhat, mainly in response to changing Soviet demand and the expanding output of competitive products elsewhere in Eastern Europe. But East German output and exports are still steel-intensive, and steel inputs per dollar's worth of output have continued to rise. Output of ships, electrical equipment, and most types of industrial machinery sold earlier to the U.S.S.R. has continued to rise rapidly. Output of the lagging items has either declined since 1958 (as in the case of textile machinery and machine tools) or has increased moderately, barely reaching the 1939 level (as in the case of automobiles and trucks). The principal changes in trends have been a decline in the output of locomotives and of most kinds of precision machinery—business machinery is the big exception. The main indicators of machinery output since 1958 are shown in Table 9.

TABLE 9.—*Changes in East German machinery output 1958–67*

	1967 index (1958=100)[1]	Percentage of finished steel consumption in 1958 [2]	Projected steel consumption in 1967 as a percentage of 1958 consumption
Machine tools	82	2	2
Textile machinery	85	2	2
Railroad equipment	115	8	9
Automotive equipment	160	10	16
Shipbuilding	216	7	15
Electrical equipment	200	9	18
Precision machinery and optical equipment	120	1	1
Other machinery (for industry, construction, and agriculture)	149	61	118
Total	174	100	181

[1] Unpublished estimates of Thad P. Alton and associates.
[2] Klaus Steinitz, *Die Eisenmetallurgie in der Reproduktion der DDR*, East Berlin, 1961, p. 150. Data are based on first half of 1958.

Table 9 also shows the percentage share of finished steel consumption in producing various types of machinery in 1958 and projected consumption in 1967—assuming the same tonnage per dollar's worth of equipment—as a percentage of 1958 consumption.

Some examples of increased Soviet imports of East German machinery are shown in Table 10. In all the cases, except ships, Soviet

purchases increased more rapidly from 1962 to 1966 than East German output of these products.

TABLE 10.—*Growth of East German exports of selected machinery products to the U.S.S.R., 1962–66*

	1966 index of exports (1962=100)	1966 index of East German output (1962=100)	Share of U.S.S.R. in East German exports in 1966 (percent)
Chemical apparatus	145	129	78
Food industry equipment	150	107	59
Agricultural machinery	201	116	28
Construction and roadbuilding equipment	582	151	64
Shipbuilding products	130	137	87
AC motors	432	177	64
Communications equipment	369	----------	51
Accounting machines	239	135	45

Source: Lothar Albert and Wolfgang Ries, "Die aussenwirtschaftlichen Beziehungen zwischen der DDR und der UdSSR (The external economic relations between East Germany and the U.S.S.R.)," *Statistische Praxis*, v. 22, no. 10, 1967, p. 557 (556–559).

Another cause of high steel consumption in East Germany machinery production, besides the product mix, is the retention of old designs. A great deal of East German equipment is far heavier than similar Western equipment, in good part because the machinery manufacturers have little incentive to change designs, risking complications with customers and suppliers. In many or most European countries consumption of steel per dollar's worth of output has been declining for many years. In East Germany, consumption has not declined; on the contrary, it seems to have been going up. As implied by Table 9, the cause lies in part in changes among commodity groups, and there are also increases because of a rapid rise in the production of heavy industrial machinery. The East Germans themselves have repeatedly criticized machinery design and mix and pointed out the need for related improvement in the mix of steel supplies. The state has apparently not found an effective way of bringing pressure for such changes—perhaps because no great effort has been made.

The shift to the Soviet market and the slow recovery of domestic consumption also profoundly affected the consumer goods industries that had accounted for some 40 percent of output, and a much higher share of external deliveries, in 1936. Stolper's indexes [22] show the following numbers for output in the principal branches, in 1958 (1936=100):

Woodworking	93.8
Sawmills	95.5
Cellulose, paper, and cardboard industry	86.7
Textile industry	69.0
Shoe and leather industry	118.1
Clothing industry	46.7
Paper and printing industry	54.8
Ceramics industry	74.5

The main light industry product, the production of which boomed, was flat glass, of which East Germany produced only about 2 million

[22] Stolper, *op. cit.*, p. 270.

square meters in 1936. The needs of postwar reconstruction shot production to about 13 million square meters by 1950, and thereafter output fluctuated at about that level. Production of musical instruments and toys also rose by more than one-half above the 1938 level.

In 1958, thus, the level of output of consumer goods was well below the 1936 level (71 percent at 1936 prices; or 80 percent at 1950 prices) and not over two-thirds of the 1939 level.[23] But the dismal production record did not prevent the recovery of consumption. Consumption of all these products, although it had recovered slowly, had reached the 1938 level by the late 1950's.

Much the same thing may be said of output of food, beverages, and tobacco. According to Stolper's estimates, output in 1958 was 17 to 20 percent above the 1936 level,[24] or about 11 to 17 percent below the 1939 level, for output rose by a little over 40 percent from 1936 to 1939. Yet food consumption had reached the prewar level by 1955.

Since 1958, some of the light and food industries have reached the 1939 level, some have not. The output of lumber and furniture, clothing, and paper and printing is still well below the 1939 level. The production of musical instruments and toys, already much increased beyond the 1939 level in 1958, has continued to show rapid increases. The production of textiles, shoes and leather, and glass and ceramics is somewhat above the 1939 level—20 to 25 percent in 1967. Food industry output is slightly higher than in 1939. Over-all, output of light and food industries is still barely up to the prewar peak levels. Summary comparisons are shown in Table 11.

TABLE 11.—*Indexes of postwar growth of East German light and food industries*

	1958–67 (1958=100)	Prewar to 1967 (1939=100)
Lumber and furniture	83	73
Musical instruments	154	(1)
Toys and sporting goods	241	
Textiles	137	125
Clothing	148	(2)
Shoes and leather	144	120
Paper and printing	128	56
Glass and ceramics	132	122
Food processing and tobacco manufacturing	116	106

[1] Ca. 300.
[2] Less than 50.

Source: 1959–67—unpublished estimates of Thad P. Alton & Associates; prewar to 1967—Stolper's previous estimates, 1936 to 1958, plus some of Alton's, and data on changes from 1936 to 1939 from Gleitze.

The reason for the continued lag in output of the light and food industries is the fact that their exports have remained far below prewar levels. Prewar East Germany produced a large surplus of these goods for export. In the postwar period this surplus has been much smaller as a share of output in the 1950's for lack of demand, and more recently for lack of capacity. The Communist countries, long intent on developing their own consumer goods industries, have recently become more interested in trading consumer goods. The U.S.S.R., moreover, has insisted on large increases in consumer goods

[23] Using changes from 1936 to 1939 in Gleitze, *op. cit.*, pp. 169–170.
[24] Depending on price weights.

deliveries in place of machinery items for which demand has been weakening. (See Table 12.) The scale is still small, however, relative to total East German output. East Germany has sold consumer goods to the West as well, but there the demand is not strong and the Western market has taken a negligible part of East German output. Exports of consumer goods, which represented the largest single item in prewar external deliveries, have risen to only about 20 percent of East German exports. Exports of the food industry, which were substantial before the war, have run at only 2–3 percent of total postwar exports (apart from reparations).

TABLE 12.—*Growth of East German exports of consumer goods to the U.S.S.R., 1962–66*

	1966 index of exports (1962=100)	Share of U.S.S.R. in 1966 East German exports
Furniture	291	77
Miscellaneous wood products (Kulturwaren)	148	35
Rugs	464	41
Ready-to-wear clothing and sewing materials	132	38
Outer wear for men and boys	180	88

Source: Albert and Ries, *op. cit.*

V. The Effects of Domestic Institutions and Policies

It is doubtful whether the new Communist regime, with its Soviet-style institutions and policy objectives, did a great deal to hamper recovery during the late 1940's and early 1950's—except in agriculture. It is clear, however, that since the mid-1950's the economic policy and the organization of the economy have contributed substantially to the lag in East German efficiency and growth.

The unfolding of Communist economic development, as it occurred in other Eastern European regimes, was delayed in East Germany, first, by the presence of experienced Soviet officials concerned with stability and production for Soviet use; second, by the dire necessities of an East German economy operating far below capacity; and third, by anxiety lest the flight of East Germans westward via Berlin should suddenly undermine the position of the regime. The availability of this alternative for East Germans, which enforced a real "peaceful competition" with West Germany, was perhaps the most powerful restraint on the East German Party and state until the regime finally put up the Berlin wall—the "wall of shame"—in August 1961.

A. THE RESTRAINING INFLUENCE OF THE SOVIET OCCUPATION

The Soviet occupation of East Germany led quickly to the nationalization of large-scale industry, trade, and finance; the breaking up of large agricultural holdings; and the imposition of central planning. All these measures were essentially complete by 1948. But the new Communist regime was not in a position to exploit fully its nominal control over the economy. Until well into the 1950's, Soviet "advisors" and the Soviet managers of heavy industry, well organized and ex-

perienced, were the dominant influence on the economy. They greatly reduced the scope for mistakes by inexperienced and overzealous East German Communists. The East Germans had time to learn before taking over full responsibility for planning and management.

B. THE CONSTRAINT OF POVERTY

Furthermore, the new East German regime was constrained by a lack of resources to tackle the most urgent need—to increase personal consumption. Given the reserves of unused capacity in most industries—except those delivering goods to the U.S.S.R. and replacing high priority imports from West Germany—it was far less urgent to increase investment. And from 1950 to 1955, investment in fact grew less rapidly than consumption in East Germany—the only Communist country in which that happened.

As a result of the need for consumer goods and services, the leadership was also compelled to tolerate private ownership of small business to a far greater extent than elsewhere in Eastern Europe. In 1955, private firms (including handicrafts) still accounted for more than 20 percent of industrial production, nearly one-half of construction activity, and one-third of retail trade, as shown in Table 13, The continuance of private enterprise in these fields, and the active cooperation of many—not all—local party and state officials, interested in supplying the population, made for relatively efficient use of available supplies during the recovery period.

TABLE 13.—*Socialization of the East German economy*

[Share of gross production]

	Industry and handicrafts	Construction	Transport and communications	Trade	Other	Total
Socialized:						
1950	70.7	31.6	83.6	62.1	88.1	61.8
1955	78.9	56.0	87.7	83.8	91.5	73.3
1960	84.5	78.0	92.6	86.6	92.7	84.4
1965	85.7	83.2	94.9	88.7	93.1	86.9
1966	85.4	83.7	94.9	88.8	93.6	86.8
1967	85.2	86.0	95.5	88.4	93.7	86.8
Semistate: [1]						
1950						
1955						
1960	6.5	8.1	2.0	4.6	1.7	5.5
1965	8.0	7.9	2.3	5.0	2.6	6.6
1966	8.4	8.1	2.3	5.1	2.9	6.9
1967	8.9	7.1	2.1	5.5	2.9	7.2
Private:						
1950	29.3	68.4	16.4	37.9	11.9	38.2
1955	21.1	44.0	12.3	16.2	8.5	26.7
1960	9.0	14.0	5.4	8.8	5.7	10.1
1965	6.3	8.9	2.9	6.1	4.2	6.5
1966	6.1	8.2	2.8	6.0	3.5	6.3
1967	5.9	6.9	2.4	6.1	3.5	6.0

[1] Mixed State-private ownership in which the share of the State is over 50 percent.

Source: Germany (Dem. Rep.), Staatliche Zentralverwaltung für Statistik. *Statistisches Jahrbuch der DDR 1968* (Statistical yearbook of the GDR 1968), p. 37.

A substantial private agriculture also survived more or less intact until the late 1950's, because the regime could not afford the risks and costs of forced collectivization—a probable drop in output and effici-

ency and substantial expenditures for new collective facilities. Most of the "new peasants" who had been given small holdings from the estates divided up in the "land reform" of 1945–46 were absorbed into collectives in 1952. But the bulk of the "old peasantry," with two-thirds of the agricultural land, had large enough holdings—though very small by U.S. standards—and the skill and determination to hang on. And the regime, while discriminating against them in tax rates, prices, and supplies of seed, fertilizer, and machine services, left the most stubborn of them in possession until the late 1950's, when general economic recovery was complete. See Table 14.

TABLE 14.—*Agricultural cooperatives: Number and share of agricultural land, 1950–67*

Year	Number of co-ops	Agricultural land in co-ops			Share of Socialist agriculture in total agricultural land [2] (percent)
		Total (1,000 hectares)	In type III co-ops [1]		
			Area (1,000 hectares)	Share of total (percent)	
1950					5.7
1951					6.5
1952	1,906	218	29	13.3	6.7
1953	4,691	754	443	58.8	26.0
1954	5,120	931	743	79.8	24.5
1955	6,047	1,279	1,152	90.1	27.3
1956	6,281	1,501	1,413	94.1	30.4
1957	6,691	1,632	1,545	94.7	32.7
1958	9,637	2,386	2,080	87.2	37.8
1959	10,132	2,794	2,439	87.3	48.2
1960	19,261	5,420	3,427	63.2	92.5
1961	17,860	5,431	3,536	65.1	92.7
1962	16,625	5,460	3,614	66.2	93.3
1963	16,314	5,456	3,643	66.8	93.6
1964	15,861	5,456	3,674	67.3	93.7
1965	15,139	5,455	3,734	68.5	93.9
1966	14,216	5,449	3,813	70.0	94.0
1967	13,073	5,429	3,938	72.5	94.1

[1] Type III agricultural cooperatives are those with the highest degree of socialization of production goods.
[2] Including state farms, which held 6.87 percent of the agricultural land in 1967.

Source: *Statistisches Jahrbuch der DDR 1968*, pp. 26 and 257.

The regime helped to secure the food supply—although at a fairly low level—by tolerating the independent peasantry. Under the threat of collectivization and of changes in procurement quotas and prices, the peasants raised less food than in the 1930's.[25] They had little reason to invest in mechanization and new buildings—they probably would not have been able to get the machines and the building materials if they had wanted to. From the mid-1950's, reduction of procurement quotas and increases in prices of agricultural products and in availability of supplies, machinery, and fertilizer produced some improvement, but even then agricultural output increased little during the 1950's above the prewar levels. The main achievement of the 1950's was a reduction of almost one-third percent in the agricultural labor force,[26] partly by eliminating the large labor surplus still found in the village in 1950, and partly by increasing the supply of machine services through the Machine Tractor Stations.

[25] See above, p. 574.
[26] Estimates of the Foreign Demographic Analysis Division, U.S. Bureau of the Census. East German statistics suggest an even greater decline (*Statistiscks Jahrbuch de DDR 1969*, p. 32).

The reduced level of food production in postwar East Germany required the regime to import grain and animal products in order to reach the prewar level of food consumption. In this respect East Germany was not worse off than West Germany, for though in West Germany agricultural output and efficiency were soon above prewar levels, the large postwar increase in population forced the West Germans to increased food imports by even more than the East Germans. Indeed, as a result of the population shift, per capita output of most foods—breadgrains, potatoes, meat, milk, sugar, and most fruits and vegetables—has been at least as high as in West Germany, in some cases much higher. Per capita food imports by East Germany are only two-thirds the West Germany level.

The food supply was stabilized not only by the postponement of collectivization but also by the retention of rationing of meat, fats, sugar, coffee, and some other foodstuffs at fairly low prices—through retail trade and in lunches at factory canteens—until the spring of 1958, long after rationing had been abandoned elsewhere in Eastern Europe. Most of the increase in the supply of these foods was sold at much higher prices off the ration, and the regime was under constant temptation—and perhaps some urging from Moscow—to eliminate rationing. But caution prevailed. As economic officials undoubtedly warned, the scarcity of other types of consumer goods made a great many East Germans relatively indifferent to price. They could, in effect, afford to buy whatever they wanted, if available. In this case, as in others, realism prevailed—for a considerable time—over political considerations.

C. THE RESTRICTIONS IMPOSED BY OPEN COMPETITION WITH WEST GERMANY

A third reason for caution and realism—which greatly amplified the effect of the first two reasons mentioned—was the availability of an easy escape route through Berlin for East Germans who had had enough of Communist rule—who had a "nose full," as the Germans say. For the East German regime and the Soviet occupiers, the existence of this alternative was a restraint on policy. It put East German "socialism," in effect, into competition with the West German "social market economy." This competition magnified the urgency of bringing consumption back at least to the prewar level and the need, meanwhile, for distributing food in a more or less equitable way. It also led to official allocation and, as necessary, compulsory remodeling of all space in private housing, as a result of which East Germans had little trouble getting their allotment of housing. Again, fear of losing skilled labor led to the establishment of highly differentiated wage and salary schedules, no less differentiated than in West Germany. At least the East German doctor, scientist, plant manager, or chief mechanic could say he was "earning as much" as in West Germany, a comparison that had some meaning for him even though the East German money would buy much less. Finally, the fear of losing skilled labor and management powerfully reinforced the decision to tolerate small private businesses. The owners of those businesses, like doctors and scientists and unlike peasants, were quite mobile. So the state allowed

them not only to exist but also to earn, by East German standards, a good living. Even after heavy taxes, many "capitalists" were better paid than senior Communist functionaries, and the most enterprising handicrafts operators, under more favorable tax rates, may have done even better.

In spite of this restraint, the East German atmosphere was so oppressive that anywhere from less than 150,000 to more than 350,000 people left every year, mostly via West Berlin and almost all for West Germany, where they helped to sustain the "economic miracle," once the heavy unemployment of the early 1950's was absorbed. There was also a considerable eastward movement. On a net basis, some 2 million people, or over 10 percent of the 1950 population, left between 1949 and 1961.[27]

This loss was a matter of serious political concern. But as a matter of economic efficiency and welfare a steady loss at this level was on balance an economic advantage to East Germany as well as to West Germany, although the East German leadership would never admit it. Until the late 1950's, employment in both industry and agriculture was substantially larger than necessary for production. As the East Germans would say, there were large "hidden reserves." With fewer mouths to feed and fewer bodies to house, the East German population was clearly better off as a result of "flight from the republic." To be sure, the proportion of young adults and of males in those fleeing to West Germany was higher than in the population as a whole. Thus the unfavorable population structure, inherited from two World Wars and a depression, further deteriorated. East Germany was left with an even larger surplus of females and an even higher share of old people than West Germany. But the marginal effects on the economy of the size and quality of the labor force are far overshadowed by the economic benefits of reducing a population that was underemployed and short on housing and consumer goods. Walter Ulbricht's contention that East Germany lost $7 billion (30 billion East marks) through the foregone labor of the refugees, calculated from the cost of educating so many people, does not take into account the fact that East Germany could not make proper use of them.[28] Even in the 1960's, when East Germany could have readily employed, housed, and fed a larger population, there is every reason to suppose that a 10-percent larger population would have been somewhat less productive, on the average, and less prosperous than the actual population.

D. REMOVAL OF THE RESTRAINTS

The restraint and realism imposed on the East German leadership by the needs of the recovery period began to give way in the mid-1950's, as things improved. The Soviet advisors and managers had almost all gone by 1955, and the new Soviet leadership under Khrushchev relied increasingly on contacts with the East German party

[27] Jerry W. Coombs, Jr., "Recent Demographic Changes in Eastern Europe" (U.S. Congress, House Committee on the Judiciary, Subcommittee no. 1, *Study of Population and Immigration Problems*, Europe, part II), Washington, 1963, pp. 54–56.

[28] See article by Walter Ulbricht, *Pravda*, December 30, 1961. Other East German estimates, which apparently include the cost of reparations, ran up to $29 billion (120 billion East marks). *Presse-Informationen*, May 6, 1965, p. 11.

leaders rather than on the remaining Soviet representatives in East Berlin to get the information and exert the pressure needed to control East Germany. Under Khrushchev the East Germans thus were much more masters in their own house.

Moreover, the rise of Khrushchev also brought the end of Soviet exploitation (except for much reduced occupation costs) and a large increase in Soviet trade with East Germany. The previous East German emphasis, set by necessity on increasing consumption, was soon shifted to an emphasis on increasing investment. The East German leadership further hoped, with sufficient support, to begin catching up with West Germany. And Khrushchev, himself ready to engage in a similar economic contest with the United States, sympathized and promised support.

The East German regime, thus freed from two of the three main restraints that had so limited its freedom of action—the third, the opening to the West through Berlin remained—almost at once began to act more as the other East European regimes had been acting. Already at the end of 1955, Walter Ulbricht had begun pushing an increase in the growth rate over the advice of his ministers and holding open the prospect of catching up with West Germany. Had not Khrushchev himself promised to make East Germany a "show window" of Communism? [29] In the spring of 1956, he got his way, announcing a first draft of the economic plan for 1956–60 that called for an average annual growth of the economy (national income) of about 8 percent.[30] Under the shock of the Hungarian uprising and the Polish riots of 1956, Ulbricht for over a year allowed himself to be overruled. The plan for 1956–60 was redrafted and the program announced in October 1957 called for an average annual increase of 5 percent.[31]

But thereafter, Ulbricht's confidence and power again increased. At the end of the year a slightly more ambitious plan for 1960 was adopted.[32] Emboldened by the West German recession of 1958, he soon began to take a firmer line on prospects for the "victory of socialism.[33] And by July, speaking to the 5th Party Conference, he was ready to announce the goal of catching up with the West Germans: [34]

> The economy of the German Democratic Republic is to be developed within a few years so that the superiority of the socialist social order of the GDR over the rule of imperialistic forces in the Bonn state will be clearly shown, and as a result the per capita consumption of our working population in all important foods and consumer goods will reach and exceed the per capita consumption of the entire population of West Germany.

Ulbricht had by then succeeded in getting the Party leadership to demote his critics, including Fritz Selbmann, a long-time senior functionary in heavy industry.[35] To establish further his authority, he

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[29] Fritz Schenk, *Magie der Planwirtschaft,* Köln, Kiepenheuer & Witsch, 1960, p. 128. In 1957, Schenk, a special assistant to Bruno Leuschner, head of the State Planning Commission, defected, bringing considerable inside information on the regime.

[30] *Neues Deutschland,* April 1, 1956, enclosure.

[31] *Die Wirtschaft,* October 24, 1957, pp. 1, 3. The report of the SED Central Committee to 33rd meeting of the SED, and Ulbricht's speech on the plan.

[32] *Neues Deutschland,* December 20, 1957, pp. 1–2. The full text of the plan is given in a special supplement to *Die Wirtschaft* of the same date.

[33] *Die Wirtschaft,* January 10, 1958, pp. 1, 3–7.

[34] *Neues Deutschland,* July 11, 1958, p. 1ff.

[35] For an interesting summary of the party line on these changes, see Otto Reinhold, "Das 35. Plenum und die Wirtschaftswissenschaftler" (The 35th Plenum and the economists). *Wirtschaftswissenschaft,* v. 6, no. 2, February–March 1958, pp. 161–171. The accusation of "managerialism" against Selbmann appears on pp. 168–169.

abolished the industrial ministries, which had been the stronghold of opposition to his grandiose ambitions. To replace the ministries as organs to guide the enterprises, he had ordered the establishment of some 70 industrial associations (*Vereinigungen Volkseigener Betriebe*, or VVB; Associations of State-owned enterprises), far too small and too numerous to exercise much influence on policy. Most of these associations, in addition, were established in "leading firms" of the branches they represented, at a safe distance from the "capital" in East Berlin, and under the thumb of the local Party boss.[36]

Finally in absolute control of the economy, Ulbricht went ahead with his plans for pushing economic growth through 1965, at rates that assumed increases in efficiency—in output per unit of materials, of labor, and of capital—nearly as great as those in 1951–1955, the peak recovery years. The rates were very close to those in his original plan for 1960. Industrial output was to increase by 9.4 percent per year, and since industrial employment could not be increased, output per worker was to grow at about the same rate. Agricultural output was to increase at 3 percent per year, in spite of a continued decline in employment growth—a rate not yet reached in any East European country. With these and other equally ambitious goals, "national income" was to rise at a rate of 7.5 percent per year.[37]

Not content with pushing through these ambitious plans, Ulbricht had also moved to upset the balance that had kept the East German economy secure, a balance that depended on food rationing and the survival of private business, handicrafts, and an independent peasantry. In May 1958, he had decreed an end to food rationing, which had stabilized food supply through the postwar period.[38] This miscalculation shortly led to a rapid increase in sales of meat and butter, shortages, long lines before the shops, and—finally—informal rationing through registration of customers at the local butcher shop and dairy, a requirement that lasted, at least in some areas, until 1966. That was the first of Ulbricht's independent miscalculations to come home to him.

The campaign against private business, revived with progress toward recovery in the mid-1950's, got into full swing in 1958. Private businessmen, who had been under rising pressure since 1956 to take on the state as a "partner," were put under greatly increased pressure, which they could scarcely resist, for their old contacts in the ministries that had arranged for supplies and markets were no longer in a position to help. In 1958–59 more than one-half of private enterprise (excluding handicrafts) moved into the "semi-state" category.

Private handicrafts firms likewise were put under attack, through changes in tax regulations that much reduced the profits of handicrafts firms, through reductions in the number of hired workers they could employ and still retain handicrafts status, and through harassment for price violations and withholding of supplies. Handicrafts enter-

[36] Ulbricht announced his sweeping reorganization on February 10, 1958, in a speech to the *Volkskammer*. The basic law was published in *Neues Deutschland*, February 13, 1958, p. 3.

[37] The goals, already indicated in general by statements in the spring and summer of 1959, are given in the plan law. *Neues Deutschland*, October 2, 1959, special supplement. For earlier developments, see *Presse-Informationen*, April 1, 1959.

[38] *Neues Deutschland*, May 28, 1958, pp. 1–2. The regime continued the rationing of potatoes.

prises responsible for about one-fourth of all handicrafts production gave up and joined cooperatives.

Finally, it was the turn of agriculture. As already mentioned, the collectivization campaign intensified in 1958–59, and many peasants, weary of the struggle, agreed to join cooperatives, in which they would keep their own livestock and tools. In 1960 the regime, sensing that resistance was ebbing, moved suddenly to force all peasants into cooperatives by intimidation. The beginning of the campaign, in Rostock *Bezirk*, was so unexpectedly easy that the Party was ordered to complete the collectivization of the peasants throughout East Germany. By the end of April 1960, practically all the peasants were in collectives. Ulbricht apparently was hopeful that collectivization would actually help in realizing his growth plans, because of the "benefits of large-scale operation." His views were not shared by all, but of course they prevailed.[39]

E. THE CHARACTERISTIC INEFFICIENCIES OF THE SYSTEM[40]

With the easing of the external limitations on the East German economy, the deficiencies of the system itself became increasingly visible. The bureaucratization of industry and the forcing of economic growth produced a number of clearly recognizable symptoms of waste and inefficiency. These include high specific consumption of materials, the growth of large inventories, the long periods required to complete construction projects, the obsolescence of new equipment installed, and wastage of labor.

Specific consumption of materials in industry is often much higher in East than in West Germany, as East German writers have pointed out. As already noted, consumption of steel has increased much faster than machinery production, because of changes in the mix of machinery output and because of the poor assortment of steel, obsolete design, and high losses in processing. In the 1960's, steel input per dollar's worth of machinery output has risen to close to three times the West German level. Much the same is true for Czechoslovakia and Poland.

Another example is the specific consumption of fuels to produce electric power. As one East German author shows, thermal power plants in East Germany consumed in the early 1960's over one-third more fuel (in kilocalories) per kilowatt-hour of net power produced than West German power plants, mainly because more East German generating equipment consists of old units less efficient than the large units now being built.[40a]

East Germany likewise uses more electric power to produce a dollar's worth of industrial output. Electric power consumed per person employed in industry is about the same in East and West Germany,

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[39] For Ulbricht's view, see "Die ökonomische Hauptaufgabe der DDR . . ." in Sozialistische Einheitspartei Deutschlands, Zentralkomitee, *Neue Probleme der Übergangsperiode vom Kapitalismus zum Sozialismus in der DDR*, East Berlin, Dietz, 1959, pp. 30–31. For evidences of discussion and disagreement, in particular from theoretician Fred Oelssner, see Reinhold, *op. cit.*, pp. 169–170.

[40] For more detailed discussion of the characteristic inefficiences of the East German and other East European economics, see Snell, *op. cit.*

[40a] Hans-Jürgen Tanke, "Niveau und Entwicklung der Elektroenergieerzeugung der DDR," *Statistische Praxis*, v. 22, no. 1, 1967, p. 25 (25–27).

and output per employee in East German industry is about two-thirds of the West German level.[40b] Thus electric power consumed per dollar's worth of output is about 50 percent greater in East Germany. There are two main reasons. One, already mentioned, is the heavy use of power in making calcium carbide, still used extensively in East Germany for producing acetylene as a basis for organic chemical production. In 1964, the East German author quoted above estimated that 28 percent of East German electric power consumption went to producing calcium carbide, as against 12 percent in West Germany. The West German chemical industry uses chiefly ethylene and propylene to produce organic chemicals, a more economical process, particularly in respect of electric power consumption. The second main reason for relatively high East German power consumption in industry is the obsolescence of so much East German machinery, new and old, which produces less per machine hour. The high consumption of electric power is associated, that is, with the high capital/output ratios in East German industry.

One of the most visible evidences of inefficiency, in East Germany as elsewhere in Eastern Europe, was the rapid growth of inventories after the mid-1950's. In 1955, East German inventories were only about one-third of GNP, lower than in other East European countries, and not especially high by West European standards. Even then, of course, East German inventories contained a substantial volume of unsalable goods, as well as stocks of scarce goods hoarded by producers. From then through 1965, however, industrial inventories increased at the rate of 9 percent per year, or at one-and-a-half times the rate of increase of industrial output.[41] Inventories in the hands of trade organizations rose at about the same rate. This increase, probably faster than in any other European country, seems to reflect mainly the push to increase output, which greatly expanded holdings of unsalable goods. As a result, additions to inventories amounted, on the average, to more than 3 percent of GNP, or double the share in West Germany.[42]

The long construction periods in East Germany and the high level of unfinished construction likewise appear to be typical of a Communist economy. It takes at least twice as long to get a construction job done in East Germany as in West Germany. The basic cause is that the building industry is undercapitalized and fragmented in small firms. Almost nothing was invested in the early 1950's; large investments have been made in construction machinery, and construction firms have been consolidated only in the 1960's. But projects are also delayed because construction capacity is divided among too many projects. The impatience of the leadership to start major new installations is an important factor, as is the tendency of project planners to underestimate costs and promise early completion.

The growth of unfinished investment, quite rapid in the late 1950's, has apparently been fairly well controlled since then. From 1957 to 1961, the value of unfinished investment (in current prices) tripled,

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[40b] Snell, *op. cit.*, p. 267.

[41] Using Western estimates of industrial growth, which show a 5¼ percent average annual increase in the period East German statistics show an annual increase of 7½ percent.

[42] See Snell, *op. cit.*, pp. 261–262.

reaching some 15 billion East marks (about $4 billion), or more than one year's investment.[43] The amount apparently has not risen much and may have declined somewhat since 1965, mainly as a result of spacing out of big projects.

The giant projects have contributed heavily to unfinished investment. Construction of each of the big power stations started in the late 1950's—two at Lübbenau with capacity of 300 and 600 megawatts and one at Borna with a capacity of 100 megawatts—was planned to take from 6 to 7 years. The big expansion of the Leuna chemical combine (called Leuna II) was planned at 8 years, from 1959 to 1968. In these and other cases, the East Germans themselves have pointed out that Western—even Soviet—completion times are only half as long or shorter.

But little has changed. According to a recent (1968) work by two East German specialists on the subject,[44] the following description of most frequent completion times would still hold—no "basic change" has been made:

Size of investment project	*Most frequent time of completion*
Up to 5,000,000 marks ($1,000,000)	Less than 1 year.
5,000,000 to 10,000,000 marks ($1,000,000 to $2,000,000)	3 to 4 years.
10,000,000 to 20,000,000 marks ($2,000,000 to $4,000,000)	5 to 6 years.
20,000,000 to 50,000,000 marks ($4,000,000–$10,000,000)	7 to 10 years.
More than 50,000,000 marks (more than $10,000,000)	More than 10 years.

The big projects that have more recently caused major delays and additional costs include the oil refinery at Schwedt, the "second stage" of the huge brown coal-chemical-power combine Schwarze-Pumpe at Hoyerswerda, and the integrated steel plant Eisenhüttenkombinat Ost. When such projects are finished, they often produce much below scheduled capacity. Worst of all, perhaps, their equipment, much of it ordered 10 years earlier, is likely to be in part obsolescent when it goes into operation.

The low quality of much of the new equipment installed in East Germany is best indicated by the difficulty the East Germans have had selling this equipment in the West. As they themselves pointed out in 1961, their capital goods sold less well in Western markets than any other of their exports—at discounts of up to and even over one-half of the price obtained by Western competitors selling similar items. Other things besides the mere serviceability of the equipment influenced East German selling prices. They were not well established in the market, and were selling in comparatively small lots to relatively few customers. Foreign trade representatives were often more concerned with sales than with price. And so on. But the evidence—not only for East Germany—is that the low price of East European machinery in Western markets is in considerable part related to its utility.[45]

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[43] These calculations are based on an article by Günter Spiess in *Die Wirtschaft*, May 22, 1958; and G. Wagner, "Kampf den unvollendeten Investitionen und der Mittelzersplitterung" (Fight against unfinished investments and the fragmentation of investment resources). *Deutsche Finanzwirtschaft*, no. 19, 1962, pp. 3–6. The information given in the next paragraph also comes from the latter sources.

[44] Kurt Matterne and Siegfried Tannhäuser. *Die Grundmittelwirtschaft in der sozialistischen industrie der DDR*, East Berlin, Die Wirtschaft, 1968, p. 74. The original mark figures have been converted to dollars at approximately their purchasing power parity.

[45] See Snell, *op. cit.*, pp. 254–257.

The East Germans have themselves commented on the quality of their machinery, mostly, to be sure, in the early years of the Seven Year Plan, when a good deal of open discussion of problems was permitted. Walter Ulbricht himself urged enterprises not to buy old machines, surely an indication that a great many were being marketed.[46] The economic weekly commented in 1961 on the defective quality of machine tools.[47] Various comments were made on the obsolete design of textile machinery intended for installation in the early 1960's.[48] Since these two categories were among the leading prewar exports of East Germany, they may perhaps stand for deficiencies in many of the established products of East Germany.

Perhaps most critical of all for East Germany was the wastage of labor through the continued use of so much old equipment and through failure to install labor saving equipment—both a direct result of having concentrated on increasing output without much regard to cost. In 1961 about 6 percent of all production workers were engaged in moving materials; 11 percent, in repairing equipment. These figures continued to rise in spite of increases in the mechanization of these jobs—moving materials to over 6½ percent by 1965 and repair work to 15 percent of all production workers. Employment in material handling is highest in metallurgy and the building materials industries, even though material handling is the most highly mechanized in these industries. Repair work is especially high, of course, in utilities—in 1965, 41 percent of all production workers were engaged in that activity. As a writer pointed out, the trend in these activities, if continued, would bring the share of repair work to 20 percent by 1970, 25 percent by 1975, and so on.[49]

VI. Economic Reforms and Inefficiency

In the years 1963–1965 the East German regime made some effort to change organization and policy to remedy these inefficiencies. But the leadership was unwilling to accept the political costs of allowing more "technocratic" influence on policy and a greater autonomy to managers. There is little reason to expect any marked upturn in East German growth as a result of efforts of 1963–1965, and the classic inefficiencies of command economies will continue to characterize the East German economy.

In 1963 the failure of Ulbricht's ambitious plan to "overtake" West Germany [50] made him the sponsor of "scientific" planning and of the first East German economic reform—the "New Economic System for Planning and Managing the Economy" (NES), which he formally announced in 1963.[51] The architect of the reform, as of the new economic plans, was Erich Apel, engineer and political opportunist.

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[46] *Die Wirtschaft*, May 6, 1959, p. 5.
[47] *Die Wirtschaft*, August 2, 1961, pp. 13–14.
[48] H. Liebsch, G. Scholz, and J. Streber, *Sozialistische Rekonstruktion der Industrie und internationale Wirtschaftsbeziehungen*. East Berlin, Die Wirtschaft, 1960, pp. 15–16; Günther Mittag, *Aktuelle Probleme der sozialistischen Rekonstruktion der Industrie der DDR*, East Berlin, Die Wirtschaft, 1961, p. 58.
[49] Andreas Zieger, "Der Einfluss des technischen Fortschritts auf die Entwicklung des Reparaturwesens und des innerbetrieblichen Transports in der volkseigenen Industrie," *Statistische Praxis*, v. 21, no. 5, 1966, p. 181 (179–183).
[50] See Bruno Gleitze, *Die Industrie der Sowjetzone unter dem gescheiterten Siebenjahrplan*. Berlin, Duncker & Humblot, 1964.
[51] *Neues Deutschland*, July 16, 1963.

Apel apparently convinced Ulbricht that at least some of the changes advocated by reformists elsewhere in Eastern Europe would make it possible to run the economy more efficiently, including the use of the "market mechanism," or as Ulbricht was to call it, "a closed system of economic levers." [52] Apel probably held out the prospect that freeing the economy of some administrative restraints would result in a rapid acceleration of growth. And, Apel was doubtless moved by political ambitions. Sensing that the crisis following the abandonment of the long-term plan had put a premium on the need for a new "campaign" stressing economic efficiency, he became an advocate of economic reform, and apparently sold Ulbricht on a modified reform plan, based on earlier experience and discussion of decentralization.

The new system reflected several of the features suggested by the reformists, though it was noticeably constrained by the administrative ground rules and economic preferences of the regime. A three-stage price reform was introduced in industry (eventually completed in January 1967) to encourage more rational assessments of costs and revenues and more economies in the use of scarce and imported raw materials which had been priced too low. Some officials apparently wanted a system of variable prices, influenced by world market prices. What they got were new fixed prices, many of which still reflected government priorities more than real costs. For example, prices on lightweight structural steel were kept artificially low, because this material was favored in construction.

Additional measures to prod efficiency were enacted to back up the price reform. A system of management incentives was introduced in industry, including financial rewards for lowering costs and increasing profits, and fines for sub-par performance. In construction, differentiated interest rates were used to shift priority from new starts to the completion of old projects and the modernization of existing installations. Foreign and domestic trade activities as well as industry were subjected to new rigid contracts which fixed delivery deadlines, and set higher standards of quality, styling, and customer service. Finally, procurement prices for agricultural products were raised further in an attempt to induce greater output and better land use.

The regime also took steps to reduce centralized control over the day-to-day financial operations of the economy. The VVB's (*Vereinigungen Volkseigener Betriebe*)—or Associations of State-owned Enterprises, which had been established in 1958 when the industrial ministers were abandoned, were given greatly increased authority—to the point that they might be compared to large subsidiaries of diversified U.S. corporations. Most of them were put under new managers, younger men with industrial experience. In 1963 there were about 85 of these associations, each responsible for one specialized branch of industry. The VVB's to some extent replaced the regional authorities as tax collectors for their subordinate enterprises. Both VVB's and individual enterprises were permitted to retain an increased share of their profits to finance working capital and investment, which had previously been covered by direct government grants. The VVB's were allowed to use part of their earnings

[52] Walter Ulbricht, *Das neue ökonomische System der Planung und Leitung der Volkswirtschaft in der Praxis*, East Berlin, Dietz, 1963. p. 9.

to form their own funds, to finance industrywide investment and research programs, to establish central incentive and bonus funds, and to cover the deficits of their unprofitable subordinates—deficits which also had been made up by the central government. In this way, the regime tried to overcome the "gift-ideology" supposedly created by the availability of government grants to cover long-term investments and short-term losses. Now managers presumably would be more directly involved in the fate of their enterprises.

The downgrading of direct government grants was accompanied by a greater role for the state banking system. If investments and working capital could not be financed from profits, the enterprises and VVB's now were expected to obtain bank loans. Agriculture, trade, and local government agencies were also encouraged to use loans to finance increased shares of both current and long-term expenses. Loan applications had to be justified to the lending agencies on the basis of profitability and not merely on the basis that the loan was needed to meet enterprise plans. The banks, charged with extending credit, were allowed to charge interest on loans ranging from 1.8 percent to 12 percent, depending on the importance of the borrowing firm, the nature of the project for which the credit was sought, and the time period involved. Interest-free loans were granted in special cases. Industrial branches of the State Bank were established to monitor the work of one or more related VVB's—part of the attempt to replace direct controls with indirect control by means of the credit system.

The regime also reduced the number of plan goals that had to be met by enterprises, though the reduction fell far short of the economists' hopes for a single target for value of sales. The NES provided for four main indicators—the value of sales or, in some cases, output, the total wage bill, payments to the central government, and investments. Nevertheless, this was an improvement over the old system which bound enterprises to detailed plans for virtually all phases of operation. The new indicators effectively maintained central control, but left enterprise managers with more authority to determine the details of enterprise operations.

If all of the features of the NES had been put into effect and allowed to operate with the minimum administrative interference for a number of years, some effects might have been seen. As it was, however, some of the planned provisions were introduced only on an experimental basis, some were postponed or modified, and some never seem to have gotten past the discussion stage.

At the same time, the new beginning in economic policy was also running into difficulties. Under Apel, the planners had been taking a harder look at the feasibility of draft directives, considering, really for the first time, management opinions and technical studies made by engineering groups.[53] The findings presumably supported the position which had been taken by the VVB's—the plan directives for output,

[53] For Apel's views, see Erich Apel, *Aktuelle Fragen der ökonomischen Forschung,* East Berlin, Dietz 1964.; Erich Apel and Günther Mittag, *Planmässige Wirtschaftsführung und ökonomische Hebel,* East Berlin, Dietz, 1964; and Erich Apel and Günther Mittag, *Ökonomische Gesetze des Sozialismus und Neues Ökonomisches System der Planung und Leitung der Volkswirtschaft,* East Berlin, Dietz 1964.

let alone any improvement in efficiency, could not be achieved with the resources available. It can be assumed that Apel presented these findings to Ulbricht, stressing the inadequacy of past planning methods and probably begging for more time—and possible more authority—to revamp the planning system and prepare a new, workable plan. In any event, no final plan figures were announced as the economy entered the first year of the plan period. In October 1964, Ulbricht, apparently influenced by Apel's arguments, announced new plan directives, this time calling for a lower average rate of growth for industrial output (5.7–6.7 percent) and a higher average rate for investments (7.4–9.0 percent).

In addition to planning difficulties—and probably an internal debate between the VVB's and the political leadership on the desirable rate of growth—the appearance of the long-term plan was being delayed by the protracted negotiations on the Soviet-East German long term trade agreement for 1966–1970. East German growth, whether it was to be extensive or intensive, depended heavily on supplies of Soviet raw materials. Moreover, much of East German output of consumer goods and machinery was being exported to the Soviet Union. The East Germans had hoped to be able to turn to the West for advanced equipment to modernize their industries, paying for it through export of consumer goods, light machinery and precision equipment. In effect the U.S.S.R. was being asked to reduce its imports demand, while maintaining exports, and advance credit to finance the exports in part.

The U.S.S.R., however, had troubles of its own and rejected the German position. The Soviet terms—firmly accepted by East Germany in December 1965—provided in nearly all cases for considerably lower increases in deliveries of raw materials than in 1961–65. Moreover, the agreement levied increased export obligations on East Germany, particularly for consumer goods and more advanced machinery which the East Germans had hoped to sell in the West. Worst of all, the agreement committed the East Germans to take large amounts of Soviet equipment.

To Apel, the settlement seems to have been the last straw. The Soviet impositions on the East German economy dictated a continued policy of forced growth, at the expense of modernization. On the day of the signing of the trade agreement, he shot himself in his office in East Berlin, and all the momentum behind the campaign for major economic reform was lost.

Ulbricht immediately began to dismantle the power of the VVB's and of the State Planning Commission. In December 1965, industrial ministeries were again re-established and the VVB's were subordinated to them. The State Planning Commission, under the direction of Apel's colorless deputy, Gerhard Schürer, was deprived of any direct command function and remained simply an advisory body to the Council of Ministers. These steps have been followed since 1965 by renewed efforts to socialize agriculture, and by greater central controls over research institutes and small state-owned, semistate, and private industrial enterprises. To be sure, the regime has tried to maintain and even extend some of the management and worker incentives introduced by the NES. Agricultural prices were raised again in 1965, the use of bank credit was extended, and enterprises were allowed to retain more of their earnings to finance investment and working cap-

ital. Some leading export enterprises were even allowed to deal directly with foreign customers instead of being forced to deal through state foreign trade enterprises. But the New Economic System as a whole has amounted to little more than an administrative cleanup.

Production plans, the resumed drive for socialization, and the tightening of administrative controls since 1965 all signify that the East German leadership has returned to a policy of forced growth, though with some restraint. Trade agreements signed for 1969 with the Warsaw Pact countries provided for greatly increased exchanges of machinery and equipment, continuing to tie the East German level of technology—and the East German economy—to the Soviet bloc.

Under such policies, East Germany cannot eliminate the causes of the familiar inefficiencies of a command economy—the mounting inventories of unsold goods and the hoarding of scarce commodities, the long construction times, the high capital and labor costs associated with the extensive use of old and obsolete equipment, the inferior mix and quality of its output, the weakening demand for its exports. Planners and management are fighting an increasingly skillful holding action to control the symptoms. They may keep the East German economy from falling further behind the West German one—they will hardly succeed in "catching up."

VII. Consumer Welfare—East and West Germany

The East German standard of living occupies an intermediate position between the West German one and that of the other Eastern European Communist countries, with Czechoslovakia not far behind. To most East Germans, the most relevant comparison has always been with West Germany. It also is a more appropriate comparison than most, because the patterns of consumer preferences to a large extent have continued to be the same in both areas. Table 15 compares per capita consumption in East and West Germany in 1950 and during the 1955–1967 period.[54]

Table 15.—*Per capita consumption in East and West Germany, 1950–66*

Year	East Germany Index, 1955=100	West Germany Index, 1955=100	E.G./W.G. ratio
1950	55.8	66.3	0.605
1955	100.0	100.0	.718
1956	99.3	107.4	.664
1957	103.8	112.7	.662
1958	114.7	116.3	.708
1959	121.9	121.0	.724
1960	128.6	128.1	.721
1961	130.2	135.1	.692
1962	128.0	141.3	.651
1963	129.9	144.0	.648
1964	131.3	149.9	.629
1965	133.6	157.2	.610
1966	140.9	160.8	.620
1967	145.7		

Sources: For East German data see App. B. For West German data: Series on household purchases of goods and services for personal consumption at constant prices, as published in *Wirtschaft & Statistik* (Economics & Statistics) December 1963, pp. 714–741 and *Statistisches Jahrbuch der Bundesrepublik Deutschland 1967* (Statistical Yearbook of the FRG), p. 504.

[54] See Appendix B for the indexes and weights used in the comparison.

Before 1961, when East German contact through Berlin was easy, invidious comparisons were inevitable—the grass indeed was greener on the other side. Considering its postwar problems, however, East Germany's standard of living had improved rapidly. By the mid-1950's, many East Germans probably were better off than in 1936, when living standards in the two Germanies had been roughly comparable. As shown in Table 15, per capita consumption of goods and services in East Germany rose from 60 percent of the West German level in 1950 to 72 percent in 1955. Following a decline in 1956, East German consumption continued to grow faster than in West Germany, again reaching 72 percent of West German consumption at the end of the 1950's.

Troubles for the East German consumer, however, had begun to build in the late 1950's. Supplies of foodstuffs, which had generally outrun the rise in personal incomes in the early 1950's, could not keep pace with the 40 percent increase in incomes that occurred in the last half of the 1950's. Strong inflationary pressures resulted. In addition, inventories of consumer manufactures were rising as East Germans began to boycott many poor quality domestic goods. As shown in Table 16, an increasing gap between the growth of personal incomes and consumption appeared in the second half of the 1950's, reflected in a huge rise in savings deposits. Ignoring these warning signs, the regime in 1958 decided to end food rationing. Then in 1960, the leaders felt that they could afford to force the final collectivization of agriculture. These actions, together with bad weather, produced an acute food shortage, further intensifying inflationary pressure.

TABLE 16.—*Indexes of East German per capita personal income, consumption and savings deposits, 1955–68*

[1955=100]

Year	Per capita personal income	Per capita consumption	Per capita savings
1955	100.0	100.0	100.0
1956	103.3	99.3	124.9
1957	114.3	103.8	186.3
1958	127.0	114.7	235.0
1959	138.6	121.9	293.1
1960	146.9	128.6	367.5
1961	152.6	130.2	426.4
1962	154.3	128.0	454.2
1963	156.8	129.9	497.8
1964	160.2	131.3	580.9
1965	166.3	133.6	662.5
1966	171.7	140.9	740.4
1967	179.5	145.7	823.8

Sources: Income data are derived from published data on the "incomes and expenditures of the population" (from various journal articles, monographs, and news stories) and "national income" (Soviet concept; from statistical yearbooks) adjusted to correspond approximately to Western definitions of personal income. Consumption data are from table 10. For detailed methodology, see app. A. Savings data are from statistical yearbooks.

Beginning in 1960, the trends in East and West German consumption were reversed: consumption in West Germany accelerated, while it stagnated in East Germany, slipping to about 63 percent of the West German level in 1966. Food shortages and long lines quickly deflated any optimism that had been felt by consumers in the late 1950's. Emigration rose sharply in 1960 and dissatisfaction among the remaining population ran high. Once protected by the Berlin Wall, built in August 1961, Ulbricht turned his attention to the problems of inflation and mismanagement, and no longer promised major gains to consumers. In effect, however, the consumer benefited. After 1963, when inflationary pressures subsided, conditions began to improve. The worst shortages of consumer goods and services were alleviated, and some improvements in quality and assortment began to appear as the "New Economic System" provided added incentives to make production responsive to demand. Although the Wall undoubtedly has made East Germans less aware of their comparative poverty, they are still dissatisfied with their standard of living. On the other hand, they are no longer preoccupied with this dissatisfaction. The fact that only about 400 of the more than 600,000 East Germans over working age who were allowed to visit West Germany in 1964–1967 elected not to return to the East would seem to indicate that not all East Germans feel strongly enough about their disadvantages to make the break.

The gap between East and West German consumption levels is matched by differences in the patterns of consumption in the two countries. The diet in East Germany—roughly equal to West Germany in caloric intake—is much less varied. The average East German consumes more starchy foods (potatoes, bread, etc.) and fats, and less of quality meats, fresh fruits, milk, and coffee than the average West German. An East German drinks more hard liquor and less beer and wine than a West German. Interestingly, Germans in the East appear to consume more fresh vegetables per capita than those in the West; data for vegetables may not be comparable. Per capita consumption in 1967 of a number of food products is shown in Table 17.

TABLE 17.—*Annual per capita consumption of selected foodstuffs, East and West Germany, 1967*

	Unit	West Germany [1]	East Germany
Grain (flour)	kilogram	68.9	94.0
Potatoes	do	110.0	156.6
Sugar	do	32.3	31.6
Meat	do	70.4	61.5
Fats (fat value)	do	12.5	29.4
Fresh fruit	do	90.0	32.7
Vegetables	do	62.9	76.0
Whole milk	do	104.0	101.2
Eggs	do	14.6	12.3
Beer	liters	127.2	84.5
Wine	do	15.1	4.7
Cigarettes	number	1,652	1,150

[1] Data for the fiscal year 1967–68 were used.

The greatest East German deficiencies are in consumer manufactures and private services. West Germans enjoy great advantages in both the quality and quantity of consumer durables, particularly the more expensive items such as automobiles, refrigerators, and television sets. East Germans buy fewer leather shoes, and the low quality of both shoes and clothing probably would prevent their sale in West Germany.[55] Indeed, East German dissatisfaction has been reflected in the recurrent build-up of stocks of unsalable merchandise, despite drastic reductions in prices of unsold merchandise.

The lack of automobiles has been partly made up by the use of motorcycles and by the increased availability—and the low cost—of public transportation. Railways have lost much of their importance since the closing of the Berlin border, but public use of buses and taxis has risen steadily. The use of telephones has expanded, although the number of residential lines still is well below that in West Germany. Residential telephones, in fact, largely are confined to officials, doctors, and others requiring telephones for their work. Other consumer services, such as those provided by barbers, tailors, and laundries, have not kept pace with demand, resulting in a substantial rise in prices. Employment in private services has fallen to low levels. Workers skilled in the building and mechanical trades have been able to "moonlight" at rates well above their normal wages.

The most glaring deficiency is in the quality of housing. Although East Germans have more housing units per capita and pay less rent—the result of state rationing of all housing—a great many West German dwellings are newer, larger, and better equipped than any in East Germany, except those for Party *Bonzen.* In West Germany, war time destruction of housing was somewhat heavier than in East Germany, and new housing has been added much faster in the postwar period. Moreover, retirement of old housing has been higher in West Germany, running at a rate of about 0.3 percent of total housing stock per year as against 0.15 to 0.25 percent for East Germany. According to the housing census taken at the beginning of the 1960's,[56] about 29 percent of West Germany housing was of pre-1900 vintage, compared to 45 percent in East Germany; and 34 percent of the housing stock in West Germany was built after World War II, compared with only 10.5 percent in East Germany. The East Germans also have less useful living space—an average of 18.3 square meters per capita in 1967 compared with 21.5 square meters for West Germany. Even more striking are differences in sanitary and heating facilities. As shown below, only about 3 percent of East German houses have all the basic conveniences (central heating, toilet, bath, water, gas and electricity) compared with about 20 percent in West Germany. At the other extreme, 64 percent of East German houses are

[55] According to Politbüro member Erich Muckenberger, 1 percent of the shoes offered to the public for sale, as of 1967 or 1968, met "world-market" standards ("Q" quality rating). *Neues Deutschland,* June 8, 1968.

[56] In 1960 for West Germany and in 1961 for East Germany. Housing of unknown age has been excluded from the above figures.

without central heating, a bath, and an inside toilet, compared with 25 percent in West Germany.[57]

	West Germany, 1965	East Germany, 1967
All major conveniences	20.4	2.9
Without central heating	42.5	23.2
Without central heating and bath	11.7	10.0
Without central heating, bath or inside toilet	25.4	63.9

The East German leaders have given priority to construction of modern housing units in the new industrial cities like Eisenhuettenstadt and Læuna in order to attract labor and make propaganda for socialism. The government also has pushed the use of modular and prefabricated units to cut construction costs and is sponsoring the remodeling of older units. New investment in housing, however, still takes a back seat to industrial priorities. Moreover, the regime has been unwilling for political reasons to raise rents—a move that might induce landlords to improve or at least maintain older buildings.

In contrast to private services, the East German regime has put heavy emphasis on education and medical services. The number of students at all educational levels has risen steadily, and the government has tried particularly to make university education available to as large a group as possible. Fees have been kept low and scholarship aid has been extended on a large scale. In 1967, 83 percent of all full-time students held some sort of scholarship. The government also has tended to favor the application of children from the working classes—46 percent of university students in 1967 were from worker or peasant families.

This percentage, however, has declined during the 1960's, coincident with a rise in the share of students from the intelligentsia from 15.6 percent of university students in 1960 to 20.4 percent in 1967. In terms of the availability of university education, particularly to poorer segments of the population, East Germany has done better than West Germany. In 1967, for example, about 6 out of 1,000 East Germans were enrolled in university study compared with about 4 per 1,000 in West Germany. The scope of East German education, however, is much narrower—largely confined to the technical and scientific needs of the economy and burdened with political indoctrination, particularly at lower levels.

[57] Data on East German useful floor space in 1967 and on East and West German retirement rates are from *Die Wirtschaft*, no. 41, 1968, p. 8–9. Data on West German useful floor space are based on an estimate for 1959 in Maria Elisabeth Ruban, *Die Entwicklung des Lebensstandards in der Sowjetunion unter dem Einfluss der sowjetischen Wirtschaftspolitik und Wirtschaftsplanung*, Berlin, Duncker & Humblot, 1965, which was then brought up to date with data from U.N., *Annual Bulletin of Housing and Building Statistics for Europe, 1966*. Data on the age of housing and on the structure of housing by type of facility are from East and West German yearbooks. West German rents for housing with various types of facilities (from *Statistiches Jahrbuch für die Bundesrepublik Deutschland, 1960*, p. 275) were applied to both West and East German housing in order to obtain a weighted average rent for each country in terms of West German 1956/57 marks.

The government has channeled considerable resources to the development of medical services. Many new hospitals and rest homes have been built. The technical level of these facilities is high, but doctors are in short supply. Nearly 5,000 doctors and dentists left the country before the border was closed in 1961, and the increased numbers of doctors that have graduated from medical schools or have been brought in from other Eastern European countries have barely made up for the loss. Most affected by the shortage are the growing number of elderly people in the population. In 1966, there were 12 doctors and 4 dentists per 10,000 people in East Germany, somewhat fewer than in West Germany. On the other hand, East Germany had slightly more hospital beds per 10,000 people (110 in 1966) than did West Germany.

To some extent the differences in East and West German consumption are explained by differences in income distribution and in the price structure of the two Germanies. Average nominal household incomes appear to be about the same, but East German incomes are clustered more closely about the average than in the West. According to a study by Gerhard Göseke,[58] more than 20 percent of West German households (including pensioners) had incomes of less than one-half the average, while about 16 percent were 50 percent or more above it. In East Germany in the same year approximately 10 percent of households had incomes of less than one-half the average, while about 13 percent exceeded the average by more than 50 percent.[59] East Germany's income structure since 1960 has become slightly more compressed. There has been little change in the share of extremely low income households, but in 1967 only about 10 percent of households had incomes of more than 50 percent above the average. The different East German income structure is explained partly by a conscious policy of equalizing incomes, partly by the absence of a wealthy propertied class, and partly by the larger proportion of households in which both the husband and wife are gainfully employed.

The greater equalizer of consumption in East Germany is the price structure, which is consciously designed to favor the low income groups. Low prices are maintained by subsidies for staples such as bread and for some services such as public transportation, utilities, housing, health, and education. On the other hand, prices for such luxuries as automobiles, television sets, coffee, and tropical fruit are maintained at high levels, as shown in Table 18. Thus the lowest income groups, which spend a high proportion of their incomes on basic foodstuffs and housing are relatively better off in East Germany than their nominal income would seem to indicate. On the other hand, the more prosperous families, which are able to devote a larger share of their incomes to luxury goods, are at a disadvantage in comparison with the West. As more East Germans rise into the more prosperous groups, the contrast between costs of living in East and West Germany will undoubtedly increase.

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[58] Gerhard Göseke, *Verteilung und Schichtung der Einkommen der privaten Haushalte in der Bundesrepublik 1955 bis 1959.* (DIW Sonderhefte, neue Folge, 66) West Berlin, Duncker & Humblot, 1963.

[59] *Statistiches Jahrbuch der DDR 1968.*

TABLE 18.—*Prices and purchasing power comparisons for selected consumer goods in East and West Germany, 1966*

Item	Unit	Prices in East and West German marks, respectively		Hours and minutes of work necessary to purchase [1]			
				East Germany		West Germany	
		East Germany	West Germany	Hours	Minutes	Hours	Minutes
Foodstuffs:							
Rye bread	1 kilogram	0.52	1.14	0	10	0	15
Flour	do	1.32	1.09	0	26	0	14
Sugar, white	do	1.64	1.25	0	32	0	16
Butter	do	10.00	7.81	3	17	1	43
Eggs	10 units	3.50	2.30	1	09	0	30
Stew meat (beef)	1 kilogram	9.80	9.85	3	13	2	9
Pork chops	do	8.00	8.49	2	38	1	52
Coffee, ground	do	70.00	17.10	23	02	3	46
Oranges	do	5.00	1.54	1	39	0	20
Lemons	do	5.00	1.48	1	39	0	20
White cabbage	do	0.40	0.75	0	08	0	10
Potatoes	5 kilograms	0.85	2.06	0	17	0	27
Tobacco	50 grams	3.00	1.35	0	59	0	18
Clothing and shoes:							
Man's suit (50 percent wool).	Piece	143.00	172.00	47	2	37	48
Woman's dress (50 percent wool).	do	79.20	69.80	26	3	15	20
Man's dress shirt (synthetic).	do	75.00	17.01	24	40	3	44
Woman's stockings (nylon type).	1 pair	9.80	2.63	3	13	0	35
Man's leather shoes	do	48.20	34.50	15	51	7	35
Miscellaneous items:							
Leather school bag	Piece	25.20	26.80	8	23	5	54
Vacuum cleaner	do	239.00	168.00	78	37	36	55
Refrigerator	do	1,350.00	335.00	444	05	73	38
Television set (table model).	do	2,050.00	690.00	674	21	151	39
Automobile (East German "Wartburg", West German "Volkswagen").	do	14,800.00	4,735.00	4,868	25	1,040	40

[1] Based on estimated hourly earnings in industry of 3.04 DME in East Germany and 4.55 DMW in West Germany. Official data for West Germa in. Official data on monthly earnings in East Germany, adjusted to hourly basis assuming a 48-hour workweek.

Sources: East and West German statistical yearbooks.

Although considerations of the structure of prices and incomes help to explain the different patterns of consumption in East and West Germany, it is obvious that considerable differences would be expected simply because East German per capita consumption is so far below that of West Germany. Thus it is interesting to compare the present pattern of East German consumption with that of West Germany in the mid-1950's when the respective levels of per capita consumption were about equal in the two countries.

This comparison reveals a number of similarities. East Germans now consume per capita about the same quantity of starchy foods and also sugar and coffee as did West Germans in 1955–56. Per capita consumption of leather footwear is also the same. The main difference is that the East Germans consume more of other foodstuffs—meat, vegetables, fats—and less in the form of rent, automobiles and some other consumer durables than the West Germans did in 1955–56. A comparison of apparent consumption of selected products is given in Table 19.

TABLE 19.—*Annual per capita consumption of selected products in East Germany in 1967 and in West Germany in 1955–56.*

	West Germany, 1955–56	East Germany, 1967
Grain (flour), kilogram	94	94
Potatoes, kilogram	157	157
Sugar, kilogram	27	32
Coffee, kilogram	2	2
Meat, kilogram	48	61
Fats, kilogram	14	29
Vegetables, kilogram	48	76
Fresh fruit, kilogram	45	33
Beer, liter	71	85
Automobiles, number [1]	10	6
Motorcycles and scooters, number [1 2]	47	60
Leather shoes, pair	2	2

[1] Per 1,000 people.
[2] Available stock.

The largest deficiency again is in the quality of housing. The East Germans do have somewhat more living space per dwelling than did the West Germans in the mid-1950's (18.3 square meters per capita in East Germany in 1967, compared with 16.1 square meters in West Germany in 1955), but their housing still is ill-equipped by the earlier West German standards. About 8 percent of the West German housing stock of 1956–57 was equipped with all major conveniences and 48 percent had none of the basic conveniences compared with 3 percent and 64 percent respectively in East Germany in 1967.

The structure of East German consumption can be expected to gravitate toward Western standards. This is probably most evident in the steps taken, as in other Communist countries, to increase the availability of passenger automobiles. Moreover, efforts continue to be made to adapt the quality as well as the assortment of consumer goods of all types to the desires of consumers. Eventually, the leadership will have to confront similarly the issue of housing.

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* See also *East Germany; a selected bibliography,* compiled by Arnold H. Price of the Library of Congress, Washington, 1967, and a somewhat older bibliographical study put out by the U.S. Bureau of the Census *Bibliography of social science periodicals and monograph series: Soviet zone of Germany 1948–1963,* Washington, 1965.

APPENDIX A

METHODOLOGY FOR TENTATIVE COMPARISON OF NATIONAL PRODUCTS IN EAST AND WEST GERMANY

The most satisfactory method of comparing National Products internationally is to calculate one country's output in terms of the other's prices, reverse the procedure, and take the geometric mean of the ratios obtained.[1] A greatly simplified version of this laborious procedure is used to obtain an estimate of East German gross national product (GNP) in West German marks (DMW) for 1966. (For the detailed calculation, see the notes to Table 20.)

The first step in this calculation was to value the "material production" entering into the end uses of the East Germany GNP by the use of DME[2]/DMW ratios for the various kinds of goods and services included. The total covers the personal consumption component of "material production," plus deliveries to "nonproductive" service sectors, plus gross fixed investment, plus increases in inventories. The data in DME were obtained by using the partial input-output table published in the 1968 East German statistical yearbook. The DME/DMW ratios vary widely from sector to sector, mainly because of the differences in relative costs (and therefore in prices) in these sectors in East and West Germany. The totals for "material production" entering into the final uses of East German GNP are 95.8 billion DME and 81.3 billion DMW.

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[1] For details see Milton Gilbert and Irving B. Kravits, *An International Comparison of National Products and the Purchasing Power of Currencies,* OEEC, Paris, 1954.

[2] East German mark.

TABLE 20.—*Basic calculation of East German GNP, 1966*

	Billion DME	DME/DMW ratio	Billion DMW
Goods (industry, handicrafts, agriculture)	[1] 68.1	[2] 1.40:1	48.6
Construction	[1] 11.0	[3] 0.76:1	14.5
Transport and communications	[1] 3.7	[4] 1.11:1	3.3
Trade	[1] 11.7	[5] 0.83:1	14.1
Miscellaneous "material production"	[1] 1.3	[2] 1.40:1	0.9
Subtotal	[6] 95.8		81.3
Net housing rent	[7] 1.7	[8] 0.45:1	3.8
Other value added in "nonproductive" services	[9] 12.7	[10] 0.66:1	19.2
Less "nonproductive" services used in material production	[11] −2.8	[12] 0.96:1	−2.9
Total GNP and end uses	107.4		101.5
Adjusted GNP			96.4
Per capita GNP			5,637.4
West German GNP			481.5
Per capita GNP			8,074.0
Ratio of East German per capita GNP to West German per capita GNP			69.8

[1] Derived from the partial input-output table published in the East German *Statistisches Jahrbuch 1968*, pp. 45–47.

[2] Based on the relation between East German industrial exports in domestic prices in 1966 and the estimated value in foreign trade prices. The value in domestic prices (industrial delivery prices, the same basis used above) is taken from Gunter Hartig, "Volumen und Struktur der Finalproduktion der Industrie der Jahre 1960 und 1966," *Statistische Praxis*, v. 63, no. 7, 1968, p. 373 (371–375). The value at foreign trade prices represents the total given in the statistical yearbooks less 5 percent for handicrafts exports and 2 percent for agricultural exports. The comparison of the two volumes for exports yields the result 1 DME=$0.15, in accounting dollars, as the approximate purchasing power equivalent for East German products at "world market prices." East Germany gets somewhat higher than world market prices in exports to the USSR and substantially lower than world market prices in exports to the West. The internal purchasing power of the West German mark in 1966 for industrial and agricultural goods is estimated at 5 percent above its exchange rate value, or $0.21. Thus the DME/DMW ratio is 21/15, or 1.40:1.

[3] Based on calculations of comparative productivity in construction in 1958 made by Wolfgang Stolper in his *Structure of the East German Economy* (Cambridge, Harvard University Press, 1960). The estimate for 1958 was brought forward to 1966 using construction price indexes for both areas.

[4] Based on comparative East and West German freight rates for coal.

[5] Based on the DME:DMW ratio for wages in trade (0.70:1) and the 1.40:1 ratio for material inputs in trade, see footnote [2], above.

[6] The subtotal of 95,800,000,000 DME for "material production" in the end uses of GNP less depreciation of 8,500,000,000 DME, or very close to the official figure for "national income," which is 87,200,000,000 DME. The difference represents minor factors which have been ignored in this calculation.

[7] Net housing rent in DME is estimated gross rent, 2,380,000,000,000 DME, adjusted to exclude services provided to the housing sector (water, sewage, repairs, and the like).

[8] Based on comparisons of East German rents and West German rents, 1956–57 level, for comparable units, adjusted to 1966 using West German price indexes for rents.

[9] Employment in "nonproductive" services (including U.S. Bureau of the Census estimates of employment not reported in official East German statistics) times estimated annual wages in "nonproductive" sectors. Thus the total value added in "nonproductive" services (apart from housing rent) is 1,701,800 x 7,452 DME, or 12,700 000,000 DME.

[10] Based on a comparison of estimated annual wages in the "nonproductive" sector—in East Germany 7,452 DME (see footnote [9] above) and in West Germany 11,207 DMW (derived from data on total wage payments by the government divided by government employment).

[11] Estimated value of services of banking, insurance, and communal installations to "material production." Estimates are based on a model in Helmut Egerland, "Die Ausnutzung der Verflechtungsbilanz," *Deutsche Finanzwirtschaft*, v. 18, no. 11, 1964, p. 57.

[12] Based on the DME/DMW ratio for wages in "nonproductive" services (0.66:1), used above, and the 1.40:1 ratio for material inputs. See footnotes [2] and [10], above.

Value added in "nonproductive" services must be added to the total for "material production" to obtain a total for GNP. Value added in "nonproductive" services includes net housing rent and total labor costs. Net housing rent of 1.7 billion DME is estimated at 3.8 billion DMW. Total labor costs in administration, public services, defense, banking and insurance, and miscellaneous services are estimated at 12.7 billion DME. The conversion rate to DMW is based on the assumption that efficiency in "nonproductive" services is the same in East and West Germany. Although this assumption is not entirely satisfactory, it is the standard one used by Western economists in making international comparisons. The DME/DMW ratio is therefore based on average wages for the respective groups of workers in East and West Germany. The result of these calculations is an estimated total GNP for East Germany in 1966 of 101.5 billion DMW, or 21.1 percent of the GNP of West Germany (including West Berlin). According to official West German data, West German GNP in 1966 was 481.5 billion DMW.

The next step should be to value West German GNP in DME. To avoid this time-consuming procedure, we have simply assumed that, as estimated by Maurice Ernst, such a calculation would give a figure for East German GNP which is about 10 percent lower relative to West German GNP than the one obtained in the preceding computation.

Taking the geometric mean between the two ratios of East to West German GNP (that is, reducing the estimate of 101.5 billion DMW by 5 percent), we obtain a final estimate of 96.4 billion DMW, or 5,637 DMW per capita. Thus our estimate of per capita GNP in East Germany comes to 70 percent of the comparable West German figure (8,074 DMW per capita).

APPENDIX B

CONSUMPTION INDEXES FOR EAST GERMANY

1. General

Indexes of the quantity of East German consumption of consumer goods and services were calculated for total consumption and for four categories of consumption (foods and beverages, clothing and shoes, other manufactured articles, and services). The indexes were constructed from commodity series representing mainly consumption in physical units. The weights for the four main categories and for the sub-categories of services are shares in expenditures of private households (both cash and imputed expenditures) in East Germany. Within categories, the weights are West German retail prices. The base year is 1955.

Data on West German personal consumption of goods and services in 1936, 1950, and 1955 were estimated from official data in current prices published in 1960 adjusted by implied price indexes in earlier official publications, chiefly *Wirtschaft und Statistik*. The figures for 1960 and later years were derived from a series showing consumption in constant prices published in the official West German statistical monthly *Wirtschaft und Statistik*.

2. Category Weights

The weights for the categories of foods and beverages, clothing and shoes, other manufactured articles, and services are the estimated expenditures of private East German households in 1955. The indexes were adjusted to exclude purchases for private consumption of the Soviet Armed Forces stationed in East Germany, using the estimated value converted to constant prices. These purchases were largely of clothing and shoes, but small adjustments were also made in the indexes for foodstuffs and services.

3. Foods, Beverages, and Manufactured Articles (Tables 17–18)

The only regular source of detailed consumption figures is the East German statistical yearbook (*Statistisches Jahrbuch der Deutschen Demokratischen Republik*), which publishes per capita and per household statistics for selected commodities in physical units. These data are shown in Tables 21 and 22. In most instances, the weights for individual products are West German retail prices in 1955, published in the official West German statistical series *Preise, Löhne, Wirtschaftsrechnungen*[1] (Prices, Wages, and Economic accounts). Where retail prices were not available, unit values of exports were used as weights.

[1] Germany (Fed. Rep.), Statistiches Bundesamt. *Preise, Löhne, Wirtschaftsrechnungen* (Fachserie M), Stuttgart, Kohlhammer (with several subseries).

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TABLE 21.—*Per capita consumption of foods and beverages, 1955–67*

Subcategory	Unit of measure	Weight [1]	1955	1956	[2] 1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	[3] 1968
Foods:																
Grains (flour)	Kilograms	0.79	117.3	123.9	114.5	109.6	104.0	96.2	92.9	96.5	91.9	94.3	94.9	94.3	94.0	91.8
Meat and meat products	do	4.64	45.0	45.3	47.2	50.2	53.7	55.0	56.3	53.5	56.0	58.0	58.7	60.1	61.4	63.0
Fish (fresh)	do	1.50	12.2	11.6	12.8	11.7	11.9	12.8	12.7	13.3	13.7	13.3	16.5	16.0	16.3	16.4
Animal fats (fat content)	do	2.99	6.5	6.8	6.7	7.0	6.7	6.6	6.5	5.7	6.3	6.6	6.1	5.8	5.9	5.8
Vegetable fats and oils (fat content)	do	2.45	9.9	11.0	10.7	10.3	10.4	10.4	10.8	12.8	12.0	11.9	12.2	12.1	11.8	11.6
Butter (fat content)	do	8.06	7.3	7.4	8.0	9.0	10.2	10.4	10.3	9.2	9.5	9.7	9.6	9.9	10.5	10.8
Milk (whole)	Liters	.41	90.7	91.8	97.5	95.4	106.9	94.5	87.8	87.1	95.1	93.9	94.1	95.7	96.5	99.2
Cheese	Kilograms	3.23	3.0	2.9	3.0	3.6	3.5	3.6	3.8	4.0	4.3	4.2	4.3	4.6	4.5	4.5
Eggs	Units	.21	116.0	139.0	157.0	176.0	177.0	197.0	203.0	181.0	189.0	205.0	211.0	213.0	216.0	220.0
Potatoes	Kilograms	.17	174.6	175.6	174.6	167.9	170.7	173.9	160.0	154.5	158.8	155.9	156.5	155.7	156.3	150.0
Legumes	do	1.49	1.9	1.8	1.6	1.5	1.2	1.7	1.2	1.4	1.0	1.2	1.3	1.3	1.4	1.2
Vegetables	do	.75	42.7	37.4	45.6	67.6	51.5	60.7	58.8	57.6	62.9	67.7	63.8	73.0	76.7	73.9
Domestic fruit	do	.73	25.9	18.8	12.1	61.0	32.1	73.0	34.4	45.8	43.9	37.5	38.7	46.6	50.2	47.8
Tropical fruit	do	1.20	3.2	3.1	3.6	5.7	6.4	7.1	6.0	6.0	4.9	5.7	7.8	10.8	11.1	11.2
Sugar	do	1.38	27.4	28.2	29.2	29.4	28.8	29.3	31.6	30.4	29.9	30.7	30.1	29.3	31.6	32.9
Coffee (roasted)	Grams	.021	287.0	385.0	524.0	714.0	821.0	1,140.0	1,360.0	1,520.0	1,581.0	1,700.0	1,800.0	1,900.0	1,900.0	2,000.0
Tea	do	.027	77.0	88.0	90.0	93.0	85.0	88.0	88.0	89.0	89.0	89.0	90.0	87.0	87.0	84.0
Alcoholic beverages:																
Beer	Liters	1.21	68.5	64.5	76.0	76.5	81.2	79.5	80.4	77.5	76.5	80.3	80.6	81.7	84.5	86.3
Wine	do	1.60	1.7	1.7	1.8	1.9	2.5	3.2	3.4	3.8	4.0	4.0	4.2	4.4	4.7	4.6
Distilled liquor	do	23.45	4.4	4.2	4.6	3.8	3.5	3.5	4.0	4.4	4.4	4.6	4.7	5.3	5.3	5.7
Tobacco and products:																
Cigarettes	Units	.08	1,042.0	1,033.0	1,046.0	1,036.0	1,054.0	1,069.0	1,065.0	1,071.0	1,080.0	1,098.0	1,123.0	1,136.0	1,150.0	1,201.0
Tobacco	Grams	.03	176.0	193.0	202.0	199.0	191.0	130.0	123.0	135.0	125.0	106.0	100.0	101.0	88.0	77.0

[1] See Methodology. The weights (DM per unit) for the construction of the index number are based on West German retail prices in 1955.

[2] Physical data adjusted to correspond to later years. The official East German reporting system was slightly modified in 1963.

[3] Preliminary data.

TABLE 22.—*Apparent consumption of manufactured articles, 1955–67*

Subcategory	Unit of measure	Weight [1]	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968 [2]
Per capita:																
Shoes:																
Leather	Pairs	22.00	1.0	1.0	1.0	1.2	1.5	1.6	1.7	1.8	1.6	1.7	1.8	1.8	2.0	1.9
Other	do	8.30	1.3	1.1	1.1	1.2	1.4	1.5	1.5	1.5	1.6	1.3	1.4	1.5	1.5	(6)
Wool and wool-type fabric.	Square meters.	10.20	6.0	4.9	4.6	5.1	5.6	5.1	5.2	4.9	4.5	4.5	4.5	4.6		
Cotton and cotton-type fabric.	do	2.36	17.6	17.5	17.7	19.9	22.1	22.3	22.3	24.4	17.3	21.3	21.3	23.9	34.5	(6)
Silk and synthetic fabric.	do	4.20	3.1	2.8	3.3	3.8	4.1	4.0	4.0	4.1	3.6	3.9	4.2	4.5		
Hose:																
Ladies' nylon-type hose. [3]	Pairs	4.12	1.0	.8	.9	1.2	1.5	1.6	1.8	2.1	1.9	1.9	2.0	2.5	2.3	(6)
Other	do	2.41	4.6	4.0	3.7	4.2	4.1	3.2	3.3	2.9	2.4	2.8	3.3	3.1	2.6	(6)
Knit outerwear	Units	15.94	.8	.8	.9	1.0	1.0	1.0	1.2	1.2	.9	1.0	1.1	1.1	1.1	1.2
Knit underwear	do	2.45	5.4	4.3	4.6	5.6	5.7	6.1	6.5	6.6	6.3	6.5	6.4	6.3	6.1	5.8
Per 100 people:																
Cameras	do	79.80	4.1	5.3	3.2	2.6	1.8	1.5	1.2	1.9	1.8	1.2	1.1	1.4	1.7	(6)
Pocket and wrist-watches.	do	44.10	10.7	8.7	8.6	9.3	11.5	15.1	15.6	10.2	9.9	9.2	8.0	[4] 9.3	[4] 7.3	(6)
Automobiles	do	5,550.00	.1	.1	.1	.2	.3	.3	.4	.3	.4	.4	.5	.6	.6	.6
Motorcycles and mopeds.	do	696.00	.6	1.1	1.2	1.4	1.5	1.6	1.7	1.4	1.1	1.1	.9	.8	.9	.9
Bicycles	do	166.00	3.3	2.6	2.2	2.1	2.4	2.8	2.3	2.6	2.1	1.8	2.0	2.1	2.1	(6)
Per household:																
Carpet and runners	Square meters.	19.18	.6	.6	.7	.8	.9	1.0	1.0	1.1	.9	1.0	1.0	1.1	1.1	1.4
Upholstery and decorator and drapery material.	do	9.86	4.0	4.0	4.0	4.7	5.4	6.0	6.4	5.6	[5] 4.7(5.0)	4.6	4.5	4.6	5.0	(6)
Net curtains	do	2.09	5.2	2.8	4.5	4.6	4.6	4.8	5.4	5.3	[5] 4.7(5.1)	4.9	4.6	4.8	5.1	5.8
Household glassware	Kilograms	2.69	2.5	2.7	2.6	3.2	3.4	3.2	2.7	2.7	(6)	(6)	(6)	(6)	(6)	(6)
Household porcelain	do	4.73	2.1	2.0	1.9	2.2	2.6	2.6	2.7	2.6	[5] 3.8(4.1)	4.1	3.9	4.2	4.2	(6)
Earthenware	do	3.30	1.6	1.3	1.2	1.3	1.1	1.3	1.2	1.3	[5] .9(1.0)	.8	.8	(6)	(6)	(6)
Per 100 households:																
Refrigerators	Units	499.00	.3	.4	.4	.9	1.5	2.6	2.8	3.2	[5] 3.8(4.1)	5.2	5.7	5.8	6.2	6.1
Sewing machines	do	306.12	2.2	1.6	1.3	2.0	2.1	1.6	1.8	1.4	[5] 1.2(1.3)	.3	.9	.8	1.0	1.4
Radios	do	199.00	9.4	[7] 9.9	[7] 10.3	9.7	12.3	10.6	9.8	14.2	[5] 8.1(8.7)	5.6	8.7	11.4	11.2	12.2
Television sets	do	798.00	.1	[7] .4	.9	2.7	5.1	7.6	6.9	7.8	[5] 8.3(8.9)	8.1	7.3	7.4	6.6	5.5

[1] See Methodology. The weights (DM per unit) for the construction of the index numbers are based on West German retail prices in 1955.

[2] Preliminary data.

[3] Physical data adjusted to correspond to other items. Official East German data are on the basis of pairs per woman between the ages of 15 and 60.

[4] Including all types of watches.

[5] These data were adjusted to agree with household numbers as reported in the 1964 census. The figures inside the parentheses are comparable to the pre-1963 series. Those not in parentheses are comparable to the post-1963 series.

[6] Not available.

[7] Physical data adjusted to correspond to later years. The official East German series was modified in 1963.

4. Consumer Services (Table 23)

The category of services was subdivided into housing, utilities, transportation, postal and communications services, entertainment, domestic services, and other personal services. The indexes for these subcategories are shown in Table 19. The weights are estimated expenditures of East German households. The series for individual services were taken mostly from the *Statistisches Jahrbuch.* The index for housing was calculated for a series on gross rental payments (including imputed rental of units occupied by owners), and was adjusted to a constant price basis. The utilities index was calculated from the series representing the serving of households with gas, water, electricity, and trash removal. The figures for transportation were derived from changes in the number of passenger-kilometers traveled on all forms of public transportation. Postal and communications services were taken from the number of letters, parcels, and local telephone calls. The entertainment index was based on data for movie and theater admissions, weighted by household expenditures on these items in 1955. Employment series were used to estimate changes in consumption of domestic and other personal services such as the services of barbers, seamstresses, and private laundries, as well as local artisans and craftsmen.

TABLE 23.—*Index of per capita consumption of consumer services, 1955–67*

[1955-100]

Subcategory	Weight [1]	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967 [2]
Housing	2.03	101.3	102.9	104.8	106.6	108.5	111.2	113.3	108.6	111.4	111.5	112.5	133.5
Utilities	.57	107.0	114.0	119.0	121.0	126.0	137.0	146.0	147.0	158.0	172.0	181.0	191.0
Transportation	1.50	103.2	107.6	109.5	113.4	117.8	115.0	108.0	102.6	111.1	111.8	114.2	116.0
Postal and communications services	.28	101.6	106.7	110.1	109.9	115.0	105.7	107.5	110.4	111.0	110.7	109.6	113.4
Entertainment	.27	107.7	116.0	104.5	100.3	93.0	86.6	76.9	62.0	57.6	49.5	44.3	43.7
Domestic services	.15	104.2	95.8	91.7	69.2	60.9	51.7	45.3	42.5	40.2	38.3	36.2	31.9
Other personal services [3]	.38	100.0	100.8	97.2	91.8	89.5	84.0	82.5	78.6	80.7	80.1	80.5	80.2
Total	5.18	102.8	106.0	107.1	107.8	109.9	109.8	108.9	104.7	109.4	110.5	112.2	114.3

[1] See Methodology. The weights are based on shares of expenditures of private households in East Germany in 1955.

[2] Preliminary data.

[3] Excluding services of insurance and some repair services.

5. Evaluation of Indexes of Consumption (Table 24)

Indexes of the type used in this report have some limitations as measures of consumption and are even less dependable as indicators of welfare. Many of these inadequacies are inevitable in any attempt to measure consumption or welfare quantitatively, and some are peculiar to the study of the USSR and Eastern Europe.

The first question in evaluating consumption data is the appropriateness of the available commodity series. East German statistics in physical units are probably accurate on the whole, but there is not enough detail on varieties of individual products to provide any direct indication of quality. When quality improves, as apparently it did for East German shoes and clothing in 1963, a decline in the quantity index may hide an improvement in consumer satisfaction. Changes in the degree of processing of goods, like changes in quality, are insufficiently reflected in the quantity index. Data on consumption of textile fabrics, for example, are used to represent consumption of both yard goods and clothing. There was probably a slight tendency for the degree of processing of consumer goods to increase after 1955. Another deficiency in the basic data is that those for most nonfood goods represent apparent consumption (production plus net imports) rather than actual consumption. Consequently, the index may show an increase in availability that in fact is going almost entirely into inventories rather than into consumption. Changes in consumption of personal services present special problems of measurement. The use of an employment series is particularly imprecise because productivity may change for many reasons.

The coverage of total consumption and the main categories of consumption appears to be adequate. The only class of commodities not represented at all is the grouping known as "articles for personal and health needs and other chemical products," presumably such items as perfume, soap, and cosmetics. This category is a relatively unimportant one (2.2 percent of household expenditure in 1962, the last year in which it was reported separately), and its exclusion should have little effect on the indexes for consumption of goods. Within categories the coverage varies. All major goods and beverages are included. Most major categories of shoes and textiles are represented. In the category of other manufactured articles, where variety is great, only a small selection of individual items could be used, but the selection is believed to represent adequately developments in the group as a whole. Although data for services are scarcer, the attempt has been made to make the series as representative as possible, and information from other sources seems to confirm the trends obtained.

More serious are the questions of appropriateness and significance of the weights. In East Germany, as in other Soviet-type economies, the supply and assortment of consumer goods and services are largely determined by central planners, and consumer preferences are not always considered. Except for rationed items, consumers are free to buy unlimited amounts at the going prices, but these prices rarely are at an equilibrium level, shortages and gluts being the result. Consequently, East German consumer prices correspond less closely to the marginal utilities of consumers than do consumer prices in Western economies, where both supplies and prices are more flexible.

The deficiencies in East German prices are most serious on the level of individual products and least serious for broad categories of goods, demand for and supply of which usually are roughly balanced in the aggregate. These considerations, as well as availability of data, were the reasons for using West German prices as weights for individual products series and East German consumer purchases as weights for broad categories of consumption. The use of West German prices, which reflect West German demand patterns, also introduces distortions, although preferences of East German consumers probably continue to be generally similar to West German preferences.

Even the best consumption index may not be a good measure of changes in the welfare of the population, which is affected by many things other than physical consumption. In East Germany, such unmeasurables as the wastefulness of waiting in queues, the political atmosphere, the regime's promises, and the degree of access to West Germany not only have a great effect on the way people evaluate their living conditions but also change rapidly and drastically.

In spite of their limitations, these indexes are believed to be roughly accurate indicators of changes in living conditions in East Germany. The trends they show are supported by information from other sources.

TABLE 24.—*Adjusted index of per capita consumption of consumer goods and services, by category,*[1] *1955–67*

Category	Weight	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967[2]
1955=100													
Foods and beverages:													
Total	22.27	99.9	104.8	111.5	111.0	116.0	114.9	114.4	116.5	119.7	121.2	126.5	129.5
Soviet purchases[3]	.17	105.9	105.9	70.6	52.9	52.9	52.9	52.9	52.9	52.9	52.9	52.9	52.9
Adjusted index[4]	22.10	99.9	104.8	111.8	111.4	116.5	115.4	114.9	117.0	120.2	121.7	127.1	130.1
Clothing and shoes:													
Total	6.75	89.8	90.6	103.4	114.2	112.8	117.1	119.7	101.8	109.0	112.1	117.7	133.2
Soviet purchases[3]	1.54	96.1	93.5	66.2	57.1	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6
Adjusted index[4]	5.21	87.9	89.8	114.4	131.1	130.5	136.1	139.5	116.3	125.7	192.8	136.9	157.0
Other manufactured articles	5.88	104.3	110.4	134.4	167.9	192.4	202.1	187.6	197.2	201.0	206.3	227.2	227.8
Services:													
Total	6.29	102.8	106.0	107.1	107.8	109.9	109.8	108.9	104.7	109.4	110.5	112.2	114.3
Soviet purchases[3]	.04	225.0	150.0	150.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Adjusted index[4]	6.25	102.1	105.8	106.9	107.8	109.9	109.8	109.0	104.8	109.4	110.6	112.3	114.4
Grand total	39.44	99.3	103.8	114.7	121.9	128.6	130.2	128.0	129.9	131.3	133.6	140.9	145.7
PREVIOUS YEAR=100													
Link relative	39.44	99.3	104.5	110.4	106.2	105.5	101.2	98.3	99.1	103.4	101.8	105.5	103.4

[1] See Methodology. The weights are based on shares of expenditures of private households in East Germany in 1955. The subtotals for all categories except "Services" are aggregated by applying the price weights to the base year quantities of Tables 21 and 22.

[2] Preliminary data.

[3] Purchases by Soviet troops in East Germany.

[4] Adjusted to exclude Soviet purchases.

YUGOSLAVIA'S NEW ECONOMIC STRATEGY: A PROGRESS REPORT

By J. T. CRAWFORD

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I. INTRODUCTION

In 1960, industrial output in Yugoslavia grew at a rate of 16 percent; by 1962 the rate had slid to 6 percent and by 1963 it had rebounded to 15 percent. In 1964, industry grew at a rate of 16 percent; by 1967 it had fallen to below zero and in 1969 reached a rate of 11 percent. These volatile shifts in the rate of output—coming on the heels of a period of sustained growth in the last half of the 1950's—reflect a shift in Yugoslavia's economic strategy. Instead of the all-out drive for rapid growth which dominated policy in the 1950's, the Yugoslav government in the 1960's, and particularly since 1965, has been trying to harness growth to the goals of increased efficiency and closer ties with the world market.

In the quest for efficiency, the government has made sweeping changes to improve the structure of prices, release enterprises and banks from political domination, and expose the economy to a freer operation of market forces at home and to more foreign competition from abroad. Long freed from obligatory production goals, Yugoslav enterprises have acquired a larger role in investment financing, a freer hand in setting their own prices and engaging in foreign trade, and—for the first time in a Communist country—the right to accept direct foreign investment.

Yugoslavia has had to pay a price for these sweeping changes in the form of the large gyrations in the rate of growth in industrial output. Indeed, the government itself did not expect the path of reform to be smooth. The Yugoslav economy contains both the potential for rapid growth and the vulnerability to inflation and balance of payments difficulties common to other developing, and even advanced, countries. Moreover, nearly 20 years of experience has demonstrated how hard it is to reconcile the ideological goal of workers' self-management, the desire to loosen restraints on market forces, and the need for government intervention in the economy. The changes made since 1965 represent the most ambitious attempt to date to face up to this problem, and an evaluation of this set of reforms is the main objective of this paper. To provide some understanding of how and why the Yugoslavs arrived at these latest reforms, the paper first reviews briefly the economic performance and policy during the 1950's and the crisis of the early 1960's.

II. Policies and Performance in the 1950's

In the 1950's the main concern was industrialization, not efficiency. Fueled by easy credit, massive government investment, and protective subsidies, industrial output almost tripled between 1952 and 1960. Industrialization substantially broadened the range of industrial commodities produced and was the main factor in the near doubling of real national income during 1952–60.

A. INDUSTRIALIZATION

In Yugoslavia as in other Communist countries, the aim of industrialization at first was simply to develop heavy industry. Large government investments were poured into electric power plants, mining, new steel mills and chemicals plants, and factories for producing machinery and equipment. Except for selected reconstruction and modernization, most light industries were neglected. The one clear exception was the rapidly growing paper industry, which received substantial government support. Investment in all light industries in 1954, however, was only about equal to investment in ferrous metallurgy and about one-half of that in fuels and power.

Then, in the mid-1950's, investment policy shifted. The stress on investment in basic raw materials and machine building was preserved, but there was a marked drop in investment in metallurgy, and a new emphasis on the consumer goods sector.

There were a number of reasons for these changes. First, new capacity installed in ferrous metallurgy had outrun demand. Second, demand for consumer goods and food had outrun supply. Unfavorable weather and the resulting shortfalls in agriculture increased the imbalance. Imports now had to satisfy many of the basic needs of the population in addition to providing essential industrial raw materials and capital goods. The government hoped that expanding consumer goods output, besides reducing the burden on imports, would provide incentives for boosting agricultural production and would yield increased exports. Most of the consumer industries—wood products, textiles, leather and

footwear, and food processing—traditionally had exported a large share of their output.

According to the economic plan for 1957–61, however, investment priority still was to be given to the steel industry as well as to electric power, coal, oil, nonferrous metallurgy, chemicals, metal and electrical products, construction materials, and consumer goods. It was, in fact, hard to find a sector of industry that was not given priority. The industrialization program, begun as a one-sided effort to develop heavy industry, had become an all-sided attempt to develop everything.

B. DECENTRALIZATION

Along with industrialization, the Yugoslav government had been trying to develop a new decentralized economic system—one that was launched essentially for political reasons but was early defended on the grounds that it promised greater economic efficiency. In theory, the new system was to combine social ownership of capital, workers' management of enterprises, and a generally free operation of market forces—in effect, "market socialism." In practice, as the system evolved during the 1950's, it combined partially free markets with substantial governmental control over prices, investment, and foreign trade. Despite the controls, the new set-up was a far cry from the Soviet-style system that had existed in 1945–49. Under that system, Yugoslav enterprises had been run by government-appointed managers, who took their orders from directors of industrial groups, in turn responsible to federal and republican ministers, and to a 3,000-pound plan published by the Federal Planning Commission.

The decision to decentralize came out of the rupture of political and economic relations with the Cominform in 1948. In 1949, once Tito had become convinced that a reconciliation could not be arranged, the Yugoslavs openly repudiated the Stalinist system. The main thrust of their attack was that the centralized bureaucracy had expropriated the leading role of the working class.

From this negative appraisal, the Yugoslav theorists fashioned a doctrine of decentralization under workers' management that not only would counter Stalinism but also would breathe a little life into the vague Marxist doctrine of "the withering away of the state." Moreover, decentralization looked promising as a way of gaining political support from Yugoslavia's diverse and often antagonistic nationality groups. Economic justifications also were found. A freer economic system under workers' management would promote efficiency and enlist grass roots initiative to help weather the effects of the Soviet economic boycott and the drought of 1949–50.

The new economic system was kicked off in 1950 by a law establishing workers' councils as organs of self-management in enterprises.[1]

According to the law, workers' councils, elected by all enterprise employees, were responsible for general enterprise policies affecting production, income distribution, and prices. Day-to-day operations were left to a management board, composed of elected members of the

[1] The General Law on Management of Economic Enterprises and Higher Economic Associations by Workers' Collectives, enacted July 2, 1950, and still the basis for the enterprise management system.

workers' council and an enterprise director, who was appointed by a joint committee of workers and local government representatives.

At first, the councils were given little room to operate. The ailing Soviet-style Five Year Plan for 1947–51 was replaced in 1950 by a "key projects program," a far less detailed but still compulsory economic plan. The economic ministries were abolished only to be replaced by a maze of government committees and industry-wide directors having broad supervisory powers.

During 1952–54, this cumbersome system was dropped and the government made its first stab at decentralization. Prices were decontrolled, centrally imposed output goals for enterprises were eliminated, and enterprises were allowed to run their own affairs, subject to supervision by local government bodies and to federal and republic tax and credit policies. The government also shed its monopoly over foreign trade. A number of individual enterprises were allowed to engage directly in trade, and government controls consisted only of a few commodity quotas and foreign exchange repatriation. Finally, in 1953, the attempt to collectivize agriculture was officially abandoned, and in 1955, the government relaxed its grip on investment resources by allowing firms to bid for a part of the available funds.

The elimination of federal production goals for enterprises did not signify an overnight break from centralized planning.[2] The period 1952–54 was a transitional one in which the federal government still set output quotas for branches of the economy and local governments set minimum rates of capacity utilization for individual enterprises. These remnants of centralized planning were removed only after 1954. Plans continued to be drawn up at all levels from the more detailed plans of enterprises and communal governments to the increasingly generalized plans of the Federal Planning Institute. The federal plan—a projection of output, employment, investment, incomes, trade, and, most importantly, the government's economic policy and priorities—paradoxically was adopted as a law which was not legally binding on enterprises. As a result, implementation largely depended on the effectiveness of government economic controls. The surprising thing was the degree to which price and trade control had been loosened during 1952–54.

The new powers of workers' councils went to their heads. As might be expected, they raised wages. Under conditions of tight supply and heavy demand in most sectors of the economy, it was relatively easy to cover these wage hikes by raising prices. Moreover, scarce foreign currency frequently was used for the import of non-essentials; there was no effective system of allocating foreign exchange to enterprises that could make the best use of it. Because such behavior jeopardized the effort to industrialize, the government in 1955 began to tighten up the system. Price and wage controls were instituted, and enterprises were regrouped by branch of activity into "chambers." These "chambers" (which still exist) established broad business policies, represented enterprises in dealings with the government, and generally tried to bring the self-interest of enterprises into line with the national

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[2] A detailed account of Yugoslav economic planning is given in Albert Waterston. *Planning in Yugoslavia*, 1962.

interest. Decisions of the "chambers" legally were not binding and membership at first was voluntary except for foreign trade enterprises. In 1958, membership was made mandatory for all enterprises, government representatives were included on the governing boards, and the chambers increasingly became concerned with enforcing government economic regulations.

Although only a few prices were directly fixed by the government, the scope of price controls was enlarged by putting price ceilings on a number of industrial products, and setting minimum prices for agricultural commodities. The government also required producers to give notice one month in advance of any intended price increase, which would go into effect only if no federal action was taken. Federal price control was concentrated on wholesale prices; local governments were given considerable supervisory power over retail prices.

The government at first relied on taxes to prevent excessive wage increases. In 1957, however, complicated restrictions on the distribution of enterprise income were imposed, which required firms to allocate part of their earnings to various internal funds, and to pay progressive taxes both on the remaining income and on wages paid out.[3] These regulations served not only to restrict wage increases but also to mobilize funds for investment.

The rules governing foreign trade transactions also were tightened. In 1955, the Bank for Foreign Trade was created as an adjunct to the National Bank, and a federal chamber was set up to establish standards for enterprises engaging in trade. Firms that qualified were listed on a foreign trade register, and were subject to periodic inspection of their financial and production position. Trade transactions primarily were controlled by a complex multiple exchange rate system. The foreign exchange earnings had to be immediately surrendered to the National Bank at a base rate of 632 dinars per dollar. The foreign exchange to be made available for import then found its way to enterprises through sales and loans by the Foreign Trade Bank at varying rates of exchange, which frequently were well above the base rate and depended on the currency and import involved. In addition to foreign exchange controls, the government introduced import licenses for some products and imposed export quotas on some agricultural products and industrial goods, such as copper, in order to insure adequate domestic supplies.

C. RESULTS

The industrialization drive of the 1950's produced dramatic results. For the period 1952–60, industry as a whole grew by an average annual rate of 13.5 percent. The fastest rates—ranging from 18 to 24 percent—were achieved by the newer industries—electrical products, chemicals, oil and ferrous metals—that had started from a small base after the war. The slowest rates—still a commendable 8 to 10 percent—were recorded in more traditional industries such as coal, nonferrous metals, wood processing, building materials, textiles, and leather and footwear.

[3] See Hoffman and Neal, *Yugoslavia and the New Communism*, 1964, pp. 255–256.

In a relatively short period of time, this growth had resulted in a wide assortment of new domestic products, including plastics, refrigerators, television sets, motorcycles, and automobiles. Industrial exports were increased to 3 times the 1952 level and amounted to three-quarters of all exports in 1960 compared with 57 percent in 1952.

Industrialization naturally involved some sacrifice on the part of consumers. Still, a modest increase took place in real wages, a greater assortment of clothing, furniture and other consumer goods was on the market, and humble beginnings were made late in the 1950's to augment the wholly inadequate stock of housing. Even agriculture, haunted by weather disturbances, was able to record progress. Average agricultural output during 1956–60 was about 35 percent above the average during 1951–55. The growth of GNP by sector of origin is shown in Table 1.[4]

TABLE 1.—*Yugoslavia: Growth of gross national product, 1950–68*[1]

[Indexes: 1950=100]

	1950	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
Gross national product	100	123	121	141	146	164	175	183	186	206	225	231	244	248	257
Industry	100	140	155	178	199	226	259	280	297	345	399	431	449	447	415
Handicrafts	100	143	145	153	159	163	169	182	177	182	203	223	233	244	259
Agriculture	100	145	123	166	159	190	180	175	172	188	193	184	210	219	210
Forestry	100	61	63	60	62	65	68	69	74	81	79	80	79	77	77
Construction	100	90	67	81	86	102	120	129	131	145	160	142	136	144	150
Transport and communications	100	111	114	129	141	151	182	188	196	217	240	261	283	291	295
Trade and catering	100	140	142	171	189	211	248	254	259	295	347	350	375	378	384
Services	100	107	110	114	117	122	128	136	139	146	152	155	154	154	158
Of which housing	100	106	107	109	111	113	116	119	123	139	143	147	152	156	161

[1] The basic data for the weights and indexes used to construct this table came from the Yugoslav Statistical Yearbooks and other publications of the Yugoslav Statistical Institute. The weights used are 1962 factor costs. Yugoslav indexes of physical volume of production were used for all sectors except services, for which employment indexes were used. The results differ from the Yugoslav official index of "social product" because of the addition of "nonproductive" services, not included in the Yugoslav index, and because Yugoslav indexes of physical volume were used for construction which gave a much lower growth rate than the Yugoslav index of national product in construction at constant prices.

III. The Crisis of 1960–61 and Its Aftermath

The very rapid rates of growth achieved in industry put strong pressures on prices. Moreover, the dependence of industrial growth on imports of raw materials and machinery created huge deficits in the balance of payments and heavy repayment obligations on the $900 million worth of Western credits obtained during the 1950's. These problems began to get out of hand in 1960–61. Outlays for investment rose by 55 percent between 1959 and 1961 and personal income went up by 37 percent. The pressure of demand was reflected in a 20-percent rise in the cost of living and a 32-percent increase in imports. Exports increased only by 19 percent between 1959–61 so that the trade deficit grew from $211 million in 1959 to $341 million in 1961.

[4] See Tables 1 and 3 through 5.

Consequently, the government in 1961 adopted a deflationary policy together with reforms of the enterprise and foreign trade system. Investment credits granted by the National Bank were restricted, price controls were reinforced, and new regulations were imposed on enterprises to try to keep wage increases more in line with productivity. In addition, the dinar was devalued, a single exchange rate (750 dinars per dollar) replaced the multiple exchange rate system, and a tariff system was instituted. Export subsidies, however, were retained and a new system of import controls to back up customs tariffs was installed, which subjected over 75 percent of imports (all but a number of raw materials and some consumer goods) to commodity quotas, restrictive licensing, or central allocations of foreign exchange.[5]

Under the impact of these measures, industrial growth was cut from a rate of 16 percent in 1960 to an average rate of about 7 percent in 1961–62 and the trade deficit was reduced to $197 million in 1962. Restrictions were eased somewhat in the second half of 1962, but in 1963, with revival already on its way, the government began pushing the economy again. An expansionary credit policy and a more lenient tax policy led to a rapid upsurge in investment and consumer spending, which in 1964 culminated in renewed inflationary pressures and severe deficits in both the commodity trade balance and the balance of payments on current account.

These recurring crises and the government's sporadic efforts to relieve them, began to expose the pitfalls of past growth strategy. First, the obsession with rapid growth had produced large-scale waste and inefficiency throughout the economy. Past growth rates had been partly illusory; much of the newly created capacity could be operated only under a policy of easy credit and broad price and import restrictions. In the stampede to invest, many inefficient enterprises had been created. Some of these, such as those in steel and machine building, depended heavily on hard currency imports for production while promising little in the form of hard currency exports. Moreover, the limited domestic market was a breeding ground for monopolies or near monopolies, such as in oil, steel, machine building, and rubber, that were shielded from foreign competition by the prevailing shortage of foreign exchange or by import controls. Much of this type of development could be traced to the investment policies of the government itself—from the local to the federal level. Federal, republican, and local organs of government accounted for about 60–65 percent of all investment in the late 1950's, and nearly all new enterprises were financed by government funds, either through direct investment or through loans from government investment funds.

The bias toward inefficiency was being reinforced by the growing dependence on trade with other Communist countries. Exports under clearing agreements with the U.S.S.R. and Eastern European Communist countries had risen by 84 percent between 1962 and 1964—the warmest period of political and economic relations since trade had resumed in 1954. Imports from these countries had doubled during the same period. In 1964, the Communist countries accounted for 34 per-

[5] For more on the reforms of 1961 see OECD, *Economic Survey, Yugoslavia*, May 1962, pp. 23–24, Waterston, *op. cit.*, pp. 62–80, and Hoffman and Neal, *op. cit.*, pp. 255–261.

cent of total Yugoslav exports and supplied 28 percent of Yugoslav imports. This clearing trade was providing outlets for many Yugoslav goods that could not compete in other markets—notably machinery and equipment, iron and steel products, and consumer manufactures. The prices obtained by exporters under clearing agreements usually were higher and quality standards lower than in other markets. Although these outlets gave a boost to domestic output, there was no incentive, and probably a disincentive, to increase quality and cut costs. Moreover, the inevitable compromises involved in drawing up commodity lists forced the Yugoslavs to provide a market for many inferior goods in addition to the valuable supplies of raw materials received from the Communist countries.

Meanwhile, Yugoslavia's payments' position with the hard currency area, mainly the developed western countries, had deteriorated. Hard currency imports had risen by 45 percent compared with a 20 percent rise in exports during 1962–64. The deficit in hard currency trade amounted to $354 million in 1964, nearly three-quarters of the value of exports to this area. The main problem was that Yugoslavia's traditional hard currency market for agricultural products and raw materials (over one-half of hard currency exports) could not keep pace with its appetite for hard currency imports. For example, exports of food and raw materials to the important Western European market during 1960–64 rose by about 60 percent compared with an increase of nearly 90 percent in imports from this area. Exports of manufactured goods to hard currency markets, particularly semi-finished goods, had risen steadily but these goods still were a small offset to imports.

IV. The New Strategy

It was clear that unless basic changes were made in both the economic policy and in the economic system, the government would constantly be forced to intervene in the economy—thus continuing to sidetrack its goal of achieving market socialism. Moreover, if noncompetitive lines of production continued to be developed, the Yugoslav economy would be forced to depend even more on Communist countries for export markets, a development incompatible with the government's desires to maintain an independent position between East and West and to obtain large amounts of Western technology.

The policies that emerged from the critique of the early 1960's amounted to a repudiation of forced industrialization in favor of a strong orientation toward greater stability and efficiency. The new strategy called for deflation and sweeping changes in the price structure, followed by a progressive easing of controls, including import restrictions. The first steps, beginning in the last half of 1964, were expedient measures to halt inflation and redress the balance of payments. Effective demand was reduced by a tight credit policy that restrained investment and consumer spending. The government also cut its own spending, reinforced import controls, and, in March 1965, imposed a general freeze on industrial prices. These steps were followed in July 1965 by a price reform which was combined with a devaluation of the dinar, a reduction in tariffs, and the removal of export premiums.

By the price reform, which raised agricultural and raw materials prices relative to those in manufacturing, the government hoped to stimulate production in agriculture and force more efficient operations in the manufacturing sector. The government had been trying for some time to narrow the imbalance between agricultural and industrial prices, as reflected during 1952–64 by wholesale price increases of 208 percent in agriculture compared with 16 percent in industry. As a result of the 1965 price reform, agricultural wholesale prices were increased by 26 percent and industrial prices by 16 percent between July 1965 and the beginning of 1966. Agricultural prices continued to rise during 1966 while 90 percent of industrial prices were again frozen following the reform.

Wages were allowed to increase along with prices, to the extent that industries and enterprises were in a position to do so under the new cost conditions. In fact, although real wages fell in the last half of 1965, every industry by early 1966 was able to bring real wages back to or above the July 1965 level. The higher price increases granted to many of the raw materials industries enabled them to raise wages by somewhat more in 1965 than did some manufacturing industries such as metalworking, leather and footwear, wood processing, and paper.

In conjunction with the devaluation of the dinar, the price reform was intended to bring the level and structure of Yugoslav prices more in line with those in the world market. The official exchange rate was raised by two-thirds from 750 to 1,250 dinars per dollar [6] in an effort to stimulate exports and discourage imports. The effect of devaluation would be partly offset by the increase in producers' prices, by a 50-percent reduction in tariffs from an average rate of 22 percent to 11 percent, and by the elimination of export subsidies.

Yugoslavia also sought relief from its heavy foreign debt commitment. Creditors were asked, and most consented, to defer debt repayments due in 1965–68. A total relief of $121 million was obtained during 1965, including about $12 million in rescheduled payments on PL 480 and Export-Import Bank credits from the United States.

The government also tried to improve the allocation of investment funds. Banks were put on a profit and loss basis and were given increased resources by the transfer to them of the government's "social investment funds," a process which had begun during 1963–64. To exist, banks had to be "founded" by enterprises and local governments that subscribed capital and made up the board of directors of a bank. By law, however, government representatives were limited to 10 percent of the votes in any bank's board of directors. Enterprises also received additional investment resources. The social investment funds had subsisted on required contributions from firms. These were now ended. In addition, direct taxes on enterprise incomes were eliminated and the incidence of the turnover tax was shifted from wholesale to retail establishments. These measures were expected to give enterprises and banks control over 70 percent of investment resources, and the new link between enterprises and banks was supposed to result in a sort of capital market. Finally, after some ideo-

[6] As of January 1, 1966, the currency was revalued at 100 old dinars to one new dinar which made the new exchange rate 12.5 :1.

logical soul-searching, enterprises were given the right to invest in other enterprises.

As with prices, the government was careful not to let the new powers of banks and enterprises get out of hand. Prior to the July reforms, bank reserve requirements had been raised from 20 to 35 percent, and banks had been instructed to use 25 percent of their investment resources to finance enterprise inventories rather than new investment. In addition, 20 percent of enterprise investment funds had been frozen.

Moreover, the adjustment of prices and the exchange rate in 1965 was followed in 1966 by a revaluation of enterprises' fixed assets. The resulting increase in depreciation allowances at a given level of income would reduce the funds available for distribution by the enterprise.

The first major relaxation of controls came at the beginning of 1967 when restrictions on about one-half of imports were liberalized—a first step in exposing enterprises to foreign competition. At the same time, almost all exports were completely freed from control, and most restrictions on the authority of enterprises and banks to participate directly in trade were lifted. The government even removed some of the discrimination against private farmers by allowing them to import small tractors. As in 1961, the new foreign trade regulations involved a new system for governing imports. A free list was established, containing some 1,600 products that could be imported simply by obtaining foreign currency from the banks in exchange for the dinar equivalent. A conditionally free list, with about 800 products, was set up to regulate major products imported through clearing arrangements. Under this system, enterprises were required to fulfill import quotas contracted for under clearing agreements, after which they could purchase additional amounts of these goods with hard currency. The procedure was directed primarily at Yugoslavia's trade with Communist countries.

Products not on the free or conditionally free lists were covered by a variety of foreign exchange controls: central exchange allocations, arrangements that linked imports to the value of exports, and quotas on the amount of foreign exchange receipts that enterprises could retain. Retention quotas ranged from a basic rate of 7 percent with higher rates for major exporting firms. In addition, importers could use 10 percent of their depreciation allowances and obtain foreign loans for purchases of capital equipment. Finally, a few goods such as wheat, rice, coffee, and sugar were subject to import quotas, and restrictive licensing was employed for a handful of commodities, including weapons, ammunition, and opium.

Apparently, the government did not expect the liberalization of imports to aggravate the balance of payments. Forecasts for 1967 called for a 7 to 10 percent rise in imports—much less than the 22 percent increase experienced in 1966. The main reason for optimism was the selection of commodities to be liberalized. Most of the goods on the free list were basic raw materials and semi-finished goods that were normally imported in large quantities to sustain or supplement domestic output. These included iron ore, coal, oil, chemical raw materials, and iron and steel products. Demand for these products was

expected to grow slowly, given the continued tight controls on the domestic economy.

In addition, leading export products such as cable, nonferrous metals, and wood products were liberalized; many of them had not been imported at all for several years. A few consumer goods, such as leather and footwear, fruits, and vegetables, rounded out the free list. According to data for 1963–65, about one-half of the value of liberalized imports (including those on the conditional free list) had come from developed western countries, one-third from Communist countries, and the remainder from less developed countries. On the other hand, the liberalized goods had made up only about one-third of all imports from the West, compared with about one-half of imports from both Communist and less-developed countries.

Besides exposing enterprises to foreign competition, the government in July 1967 adopted a law permitting foreign investment in partnership with Yugoslav firms—the first Communist country to do so. The basic restrictions in the law prevented the foreign partner from investing more than 49 percent of the total assets of the joint undertaking; required that at least 20 percent of foreign earnings from the venture be reinvested in the firm or be deposited in a Yugoslav bank; and levied a 35-percent tax on foreign earnings above the compulsory reinvestment ratio, with lower rates if more than the minimum was reinvested. The foreign investor was given the right to recover capital invested and to sell his share of an enterprise to third parties, although the Yugoslav partner holds first option to buy.

Foreign investment normally will not be permitted in service fields such as trade, banking, insurance, domestic transport, and public utilities. The foreign investment law was adopted partly in the hopes of acquiring new technology, which already has been secured through licensing and cooperation agreements and outright purchases, but primarily to improve the quality of production, scientific research, and marketing practices. In addition, direct foreign investment would lessen the need to rely on purchases of foreign capital through credits.

The government followed up its liberalization of trade with a major relaxation of price controls. Restrictions on about 44 percent of producers' prices had been removed by the end of 1967 and by the end of 1968, 56 percent of producers' prices and 70 percent of retail prices were free of control. The relaxation of price control generally followed the pattern of import liberalization. Prices of raw materials, such as coal and building materials, were largely freed as were prices of wood products, leather, footwear, and food products. On the other hand, prices of most ferrous and nonferrous metals, oil products, and chemicals were kept under control. Several prices of machinery and equipment, including consumer durables, were freed, but price formation in these sectors continued to be heavily influenced by controls.

V. Results, 1965–1969

The reform of 1965 had a much stronger impact than its short-lived predecessor in 1961. Deflationary measures were retained longer, the resulting recession was deeper, and more pronounced structural changes took place in the economy and its institutions.

A. RECESSION AND RECOVERY

By 1967, the deflationary program had succeeded in enforcing greater price stability. As shown in Table 2, industrial wholesale prices rose by only 2 percent in 1967 and remained stationary in 1968, compared with an increase of 11 percent in 1966. The cost of living increased by 6 percent and 5 percent, respectively, in 1967 and 1968 but most of the increase resulted from government-sponsored hikes in rent and other services. Banner years in agricultural production in 1966 and 1967 were reflected in a decline of 8 percent in agricultural producers' prices between 1966 and 1968.

TABLE 2.—*Yugoslavia: Recession and recovery, 1964–69*

	Percentage change from previous year					
	1964	1965	1966	1967	1968	1969
Gross national product	9	3	6	2	6	(1)
Industrial output	16	8	4	−1	6	11
Industrial employment	9	3	−1	−1	−1	4
Inventories of industrial goods	−5	18	22	27	9	−3
Real gross fixed investment	16	−9	−7	−9	20	8
Average real personal income	12	2	11	7	4	6
Industrial wholesale prices	5	16	11	2	0	3
Agricultural wholesale prices	24	42	17	−4	−4	9
Cost of living	12	33	24	6	5	8
Imports	25	−3	22	8	5	19
Exports	13	22	12	3	1	17
Total trade deficit (million U.S. dollars)	−430	−196	−355	−455	−533	−660
Hard currency deficit (million U.S. dollars)	−354	−270	−299	−437	−484	−547

[1] Not available.

The deflationary program had been expected to reduce the rate of growth of industrial output. In fact, the industrial growth rate collapsed. The clampdown on liquidity led to a decline of 25 percent in real investment during 1965–67—far more than intended. As a result, construction activity fell by 30 percent, leading to marked slowdowns in the output of building materials, steel, and industrial machinery. Although personal incomes continued to increase, except in the last half of 1965, controls on consumer spending led to a slow-down in the production of clothing, leather goods, footwear, furniture, and other consumer manufactures.

The overall result of these developments was a rapid decline in the rate of industrial growth from 16 percent in 1964 to an actual drop in output in 1967. Industrial employment fell by 3 percent during the same period and the number of "registered" unemployed—an understated measure—climbed from 228,000 at the end of 1964 to 318,000 at the beginning of 1968.[7] The situation was eased only slightly by increased migration of workers to Western Europe.

According to quarterly data on industrial output, the recession appeared to have bottomed out in 1966 at a growth rate of 3 percent. Because there were still inflationary pressures in the economy, how-

[7] Includes only workers registered with employment offices. A survey published in April 1968 gave an estimate of 422,000 unemployed, or about 4 percent of the labor force. Under the United States or other Western practice the figure would doubtless be still higher.

ever, the government imposed new credit restrictions in the second half of 1966 and the downturn continued. Another factor in prolonging the recession was the accelerated buildup of inventories of industrial products during 1966–67. By 1967, stocks of finished goods were 82 percent above the 1964 level. Finally, the problem of sluggish demand was compounded for some industries by the liberalization of imports in 1967. The relaxation of controls encouraged enterprises and consumers to substitute foreign for domestic goods, which further aggravated the recession in the iron and steel, machine building, clothing and footwear, and other consumer goods industries.

The import liberalization also led to a rapid upsurge in hard currency imports at the expense of imports from Communist and other bilateral partners. The hard currency deficit had been improved in 1965–66. In 1967, however, imports from hard currency countries rose by 21 percent and exports grew by only 9 percent, leaving a hard currency trade deficit of $437 million compared with $299 million in 1966. Meanwhile, imports from clearing partners fell by 9 percent, including an 8 percent drop in imports from Communist countries. Total exports under clearing arrangements fell by 4 percent, but exports to Communist countries rose by one percent, leaving an increased surplus on clearing account with these countries. Including Yugoslavia's large net earnings from invisibles such as transit, the cumulative surplus on goods and services with Communist countries reached $150 million in 1967.

The recession unleashed a barrage of public criticism together with demands for help from industries most affected by both the deflationary policy and foreign competition. One of the first complaints came from producers of grey pig iron, who claimed that lower foreign prices—in this case Soviet prices—were resulting in inroads into their home market. Domestic output of grey pig iron had fallen by 12 percent during 1967. In response to this protest, the government in July 1967 enacted Yugoslavia's first anti-dumping law and restricted imports of grey pig iron.

Pleas for assistance also came from the metal products industry, which produces a wide range of machinery and transport equipment. Hurt first by the cutback in investment, this industry in 1967 was suffering from increased imports of high quality equipment under favorable credit terms. Production in the industry dropped by 5 percent during 1965–67. The most publicized complaint came from the association of railway car producers, which objected to a contract entered into in September 1967 by the Zagreb rail transport enterprise to purchase $20 million in rail cars from Italy. The rail car association, unable to match the Italian offer on price and credit terms, succeeded in getting the government to cancel the contract in order to give domestic producers another crack at securing the order. The industry finally came up with enough bank financing and is now turning out the rail cars for the Zagreb firm.

Many other pleas for assistance, however, were not acted upon by the government. As a result, the reforms and deflationary measures drove some unprofitable firms out of business and prompted others to merge and lay off surplus labor in order to cut costs. Substantial progress

already had been made during 1962–64 in eliminating old plants and in integrating enterprises. Including socialized craft establishments, the total number of firms in industry had dropped by over 700 between 1962 and 1964. The recession during 1965–67 resulted in a further drop in the number of enterprises in the coal, construction materials, metal products, and leather goods industries, while mergers continued to reduce the number of independent firms in the petroleum, electric power, and shipbuilding industries. A total of 240 craft and industrial firms were integrated or otherwise eliminated during 1965–67.

The coal industry suffered the greatest drop in output—a 13 percent decline during 1965–67—and production in 1968 was still 11 percent below the 1964 level. The share of industrial production also fell in the ferrous metals, metal products, wood, textiles, and leather goods industries as shown in Table 3. Some industries on the other hand were able to weather the recession fairly well. The electric power, petroleum, chemicals, and paper industries were aided by continued large investments in new facilities. Nonferrous metals, shipbuilding, and electrical equipment were helped along by exports, and producers of household appliances benefited from a shift in consumer spending in favor of durables. These industries were maintaining rates of growth of 3 to 13 percent when total industrial production stopped growing in 1967.

TABLE 3.—*Production by industry, 1960–68*

	Growth of output			Share of industrial social product (percent)			
	1961–64	1965–67	1968	1960	1964	1967	1968
Electric power	60	31	10	4.2	5.1	7.2	6.9
Coal	21	−13	3	5.2	4.6	4.1	4.1
Oil	87	54	3	3.9	4.6	4.8	5.4
Ferrous metals	22	11	9	5.6	4.3	3.7	3.5
Nonferrous metals	44	13	8	5.8	4.6	5.2	5.0
Nonmetals	67	16	8	2.6	3.0	2.4	2.3
Metal products	48	3	5	17.8	18.0	16.1	15.9
Shipbuilding	37	47	39	1.7	1.6	1.7	2.0
Electrical products	107	13	9	5.6	6.1	5.7	6.1
Chemicals	89	42	16	5.8	6.5	7.2	7.0
Building materials	30	9	11	3.7	3.1	3.4	3.5
Wood products	62	5	5	6.5	6.4	6.0	6.1
Paper	119	36	9	2.1	2.1	1.8	1.8
Textiles	50	11	4	12.6	12.0	11.1	11.0
Leather	62	−3	0	2.2	2.5	2.4	2.5
Rubber	68	23	0	1.3	2.0	1.9	1.8
Food processing	48	19	0	6.1	5.5	6.6	6.7
Tobacco	47	−3	1	3.8	3.6	2.5	2.6
Other				3.5	4.4	6.2	5.8
Total industry	53	12	6	100.0	100.0	100.0	100.0

Source: *Statistical Yearbook of Yugoslavia*, 1967 and 1969.

Nevertheless, the recession provoked general criticism in academic, government, and business circles of the state of the economy and of the ineffectiveness of economic policy.[8] The recession by 1967 was impairing efforts to modernize and increase labor productivity. Output per

[8] A good example of this criticism is found in a report by a group of Zagreb economists printed in P.E.P., *Economic Reform in Yugoslavia*, Research Publications, London, July 1968, pp. 241–272.

worker rose by only one percent in 1967. Moreover, the depressed demand conditions at home no longer could be relied upon to produce gains in exports when even the most export-minded firms could not afford to grant favorable credit terms and could not obtain adequate financing from the banks.

In response to these problems, the government in late 1967 took steps to revive growth. Credit terms for exports, investment, and consumer purchases were eased. Moreover, the government recontrolled about 10 percent of the previously liberalized imports and raised tariffs in order to assure markets to faltering industries such as textiles, steel and chemicals. To hold the line against inflation, the regime temporarily froze personal incomes in service sectors, such as banking, trade, and insurance, where excessive increases in wages had been taking place.

The shift in policy began to take effect in the second quarter of 1968 and industrial growth quickly reached boom proportions. Industrial output rose by 6 percent in 1968 compared with 1967, but the annual rate of growth since the last quarter of 1968 has been about 11 percent. Industrial employment, which continued to drop through most of 1968, began to revive at the end of the year and regained the 1965 level in 1969. The growth of industrial inventories slowed down during 1968 and dropped by about 3 percent in 1969. Wholesale prices have remained fairly calm, rising by 3 percent in 1969. The only sharp increases have been in prices of wood products (such as furniture, up 11 percent), which are not controlled. The cost of living rose by about 8 percent over the 1968 average, mainly because of another jump in rents at the beginning of 1969, but also reflecting increased retail prices for clothing and footwear, and for communal transport and communications services.

The revival has reflected both the relaxation of credit controls and the greater import protection, afforded particularly to steel and chemicals. These industries together with shipbuilding, construction materials, and electrical products, particularly consumer durables, have led the advance. Much of the increased production of chemicals, however, still is going into inventories. Aided by easier credit conditions, fixed capital investment in 1968 rose by 26 percent at current prices. The expansion of consumer credit (62 percent in 1968) is reflected in the rise since the last half of 1968 in the output of consumer goods such as textiles. Average personal incomes increased by about 10 percent in 1968 (5 percent in real terms) but savings deposits increased by 28 percent, absorbing a significant share of the added earnings. Incomes and savings rose even faster in 1969, by 15 and 37 percent respectively.

The new restrictions on imports, while promoting production, were not able to improve Yugoslavia's foreign trade position. The commodity trade deficit with the hard currency area rose from $437 million in 1967 to $484 million in 1968—the result of a 6 percent increase in imports as against a 3 percent rise in exports. The lag in exports primarily resulted from quotas and high tariffs in the EEC countries, which caused a decline in Yugoslav sales of meat and other agricultural products in 1968. On the other hand, hard currency exports of industrial raw materials and manufactures recovered from a poor showing

in 1967, which largely was attributed to slowdowns in economic activity in Western Europe in that year. The hard currency trade deficit climbed an additional 13 percent in 1969 to about $547 million, but exports to this area rose by a healthy 24 percent compared with a 22 percent increase in imports. Net earnings from invisibles—tourism, transport, and remittances from Yugoslav workers abroad—continued to offset a substantial part of the commodity trade deficit with the hard currency area. In 1968, the balance of payments deficit with this area was about $124 million.

Trade with the U.S.S.R. and Eastern Europe continued to stagnate in 1968. Imports rose by 7 percent while exports dropped by 4 percent, reflecting Yugoslav efforts to wipe out surpluses with this area. Exports rebounded in 1969, rising by 5 percent compared with a 4 percent increase in imports.

B. STRUCTURAL CHANGES

The most dramatic impact of the reforms and recession of 1965–67 has been on the structure of investment spending. As shown in the tabulation below, the banking and tax reforms have raised the share of enterprises and banks in total investment resources to nearly 80 percent. Enterprises themselves have not been financing a larger share of total investment than before the reform, but a good part of their resources are now going to (and coming from) the banks rather than government funds. The overall share of government in investment has been more than halved since 1964. Although the share of the federal government has increased slightly—reflecting its growing fund for backward areas—federal investment is far lower now than in the early 1960's, when the General Investment Fund was operating in full force.

	Percent of total investment resources		
	1960	1964	1968
Enterprises	31	26	31
Banks	1	31	47
Government	63	36	16
Federal	37	7	9
Republic	7	8	3
Local	18	21	4
Other	5	7	6

Source: *Statistical Bulletin of the National Bank*, no. 2, 1969.

Investment by banks and enterprises now dominates every main branch of the economy except transportation, culture and welfare, and, of course, administration. Government investment, however, still is significant in housing, agriculture, and in industries such as electric power, machinery and equipment, and paper. The shares of enterprises, banks, and government in total investment in each of the main branches of the socialized sector of the economy in 1968 are shown below:

	Total (million dinars)	Percent		
		Enterprises	Banks	Government and other
Industry	10,146	30	55	15
Agriculture	1,840	32	46	22
Construction	557	71	18	11
Transportation	3,130	36	34	30
Commerce [1]	2,518	48	49	3
Housing [2]	4,635	25	54	21
Culture, welfare, and administration	1,916	1	24	75
Other [3]	398	65	25	10
Total	25,140	31	47	22

[1] Includes tourist facilities and services.
[2] Includes communal activities.
[3] Forestry and crafts.

Source: *Statistical Bulletin of the National Bank*, no. 2, 1969.

The shift of funds away from local and republic government bodies has led to a sharp drop in the share of investment in administration and government services. The other major change in the overall structure of investment has been the increased share of commerce, reflecting new spending for tourist facilities and increased investment in retail and foreign trade establishments. The socialized sector of agriculture has received a lower percentage of investment, but this decline might have been offset by increased private spending in agriculture, for which data are not yet available. Investment in housing as well as agriculture would be considerably larger if private investment were included. Finally, industry's share has increased gradually, from an average of 37 percent in 1961–64 to 40 percent in 1968, as shown below:

	Percent of total investment [1]		
	Average 1961–64	Average 1965–68	1968
Total investment	100	100	100
Industry	37	39	40
Agriculture, fishing, forestry	11	9	8
Construction	2	2	2
Transport	13	12	13
Trade and catering	5	8	10
Crafts	1	1	1
Housing and communcal activities	19	20	18
Culture, education, science, welfare	7	6	5
Administration, government services	5	3	2

[1] Socialized sector only. Data may not add to total because of rounding.

Source: *Statistical Yearbook of Yugoslavia 1968*, and *Indeks*, no. 4, 1969.

Significant changes have taken place in investment within industry. Although there still is a bias toward heavy industry, increased emphasis in this sector is being put on fuels and powers—traditionally bottleneck sectors—and on nonferrous metallurgy with its already sound export position in copper, lead and zinc products and the essential ingredients for a successful aluminum industry. On the other hand, the share of investment in machinery and equipment has declined sharply, primarily in the metal products industry, which continues to suffer from excess capacity and decreased market possibilities. Investment in ferrous metallurgy, although still at a high level, is beginning to taper off now that the large new capacities of the Skopje

plant are coming into use. This industry is due for modernization and diversification of output rather than substantial new construction. Finally, there is a continuing priority on developing the chemicals industry.

Except for food processing, light industry is receiving a far lower share of total investment resources than in the early 1960's. Many of the firms in textiles, leather, and other light industries still have not recovered from the effects of the reform and recession. Most light industrial enterprises are too small in any case to rely heavily on their own resources, and sales conditions have not revived enough to induce them to seek bank credit for modernization or expansion. Moreover, light industry in particular was affected by the drastic reductions in spending by local and republic governments, which had accounted for a large share of investment in these industries. Trends in the structure of industrial investment are summarized below:

	Percent of industrial investment		
	Average 1961–64	Average 1965–68	1968
Fuels and power	28	37	41
Ferrous metals	10	13	11
Nonferrous metals	5	7	8
Chemicals	9	8	7
Machinery and equipment	14	11	9
Wood and paper	9	6	6
Textiles and leather	9	5	5
Food and tobacco processing	6	5	5
Other [1]	10	8	8

[1] Includes nonmetals, building materials, rubber, printing, moviemaking, and miscellaneous industries.

Source: *Statistical Yearbook of Yugoslavia 1968*, and *Statistical Bulletin*, no. 4, 1969.

In line with government objectives, the drop in fixed capital investment during 1965–67 was offset by a steady rise in personal consumption as a share of GNP. As shown below, the largest change in the structure of GNP was the huge decline in inventory investment in 1967, primarily reflecting the working-off of stocks of raw materials at the pit of the recession. The share of inventory investment dropped still further in 1968 as stocks of finished goods began to be worked off during the revival of output.[9] Government consumption of goods and services was held to about the same rate of growth as GNP throughout 1965–68.

	Percent of GNP at market prices				
	1964	1965	1966	1967	1968
Personal consumption	45	48	50	53	54
Gross fixed investment	29	24	22	25	27
Change in stocks	11	12	12	5	3
Government consumption	17	16	16	17	18
Net exports and other	—2	(1)	(1)	(1)	—2

[1] Negligible.

Source: OECD, *Economic Survey, Yugoslavia*, November 1969. Data for 1968 were estimated from data reported in the Yugoslav press.

[9] Inventory investment in Yugoslavia appears to be grossly overvalued. Inventory changes in other Eastern European countries has averaged some 3–4 percent of GNP and in Western European countries, only 1–2 percent. See Edwin Snell, "Economic Efficiency in Eastern Europe" in *this volume*.

Consumer spending has been directed increasingly toward entertainment, home furnishings, consumer durables, and a wide variety of imported manufactures. Lower shares of disposable income have been spent for food and clothing. Much of the increase in personal incomes since 1964, however, has gone not into consumption but into savings deposits. According to budget studies for four-member workers' households, savings have risen from less than 4 percent of income in 1964 to nearly 9 percent in 1967.

Although personal incomes have increased throughout the economy, the Yugoslavs have made some progress since 1964 in reducing wage disparities between economic sectors. Agricultural incomes in particular were given a substantial boost by the price reform. The average wage in socialized agriculture, for example, rose from 77 percent of the average wage in the overall economy to 87 percent in 1967, and still represented 83 percent of the average in 1968. As shown below, workers in construction and commerce also improved their position while wages in industry, transport and services increased more slowly than the nationwide average.

	Percentage of average wage [1]	
	1964	1968
Total economy	100	100
Industry	100	97
Agriculture	77	83
Construction	91	95
Transport	111	108
Commerce	104	105
Services [2]	121	117

[1] Socialized sector.
[2] Comprises the average wage in so-called nonproductive services such as banking, insurance, education, and government services.

Source: *Statistical Yearbook of Yugoslavia 1968*, and *Indeks*, no. 4, 1969.

The initial gain in agricultural incomes relative to industrial wages, however, is not likely to be sustained without further price reforms. As shown below, wholesale and retail prices of industrial products began to overtake agricultural prices when the latter declined during 1967–68. Moreover, judging by data for the socialized sector, agricultural incomes per worker stagnated during 1968 after having outstripped increases in industrial wages during 1965–67.

	Percentage change			
	1965 over 1964	1966 over 1965	1967 over 1966	1968 over 1967
Prices:				
Wholesale:				
Agriculture	42	17	−4	−4
Industry	16	11	2	0
Retail:				
Industrial goods	26	23	7	4
Foodstuffs	44	22	3	1
Real wages: [1]				
Socialized agriculture	8	19	10	−1
Industry	4	10	4	5

[1] Increase in average wage per worker deflated by cost-of-living index.

Source: *Statistical Yearbook of Yugoslavia 1968*, and *Indeks*, no. 4, 1969.

The political goal of narrowing the gap between have and have-not regions appears to have taken a back seat since 1964. The less developed areas were generally hit hardest by the recession. As shown in Table 4, investment and output in Bosnia and Hercegovina, Montenegro, and Macedonia generally lagged behind the national growth rate during 1965–68. Of the backward areas, only Kosovo, which is heavily supported by federal funds, was able to improve its share of total investment and national product. Some improvement was made in narrowing regional gaps in wages. Industrial and agricultural wages (socialized sector) in Macedonia and Kosovo rose faster than the national average, and there was a marked slowdown in wage increases in prosperous Slovenia, which had been far ahead of even the advanced republics in 1964. On the other hand, industrial incomes in Bosnia and Hercegovina, and agricultural incomes in Montenegro lagged well behind the average rate of increase for the country as a whole.

TABLE 4.—*Regional structure of investment, production, and wages, 1964–68* [1]

	Percent of investment		Percent of national product		Relative industrial wage (national average=100)		Relative agricultural wage (national average=100)	
	1965 [2]	1968	1964	1967	1964	1968	1964	1968
Less developed	30.1	28.8	21.3	20.8	90	91	84	85
Bosnia and Hercegovina	12.9	12.1	12.3	11.7	99	96	91	92
Montenegro	3.0	2.6	1.8	1.7	90	90	94	85
Macedonia	10.6	9.2	5.3	5.3	85	87	74	83
Kosovo	3.6	4.9	1.9	2.1	84	91	78	81
Advanced	69.8	71.2	78.6	79.2	103	102	112	105
Slovenia	13.6	13.1	16.1	14.9	127	116	149	117
Croatia	23.3	21.5	26.2	26.8	104	107	102	104
Serbia proper	24.1	27.7	25.2	26.4	92	94	97	94
Vojvodina	8.8	8.9	11.1	11.1	90	90	99	106

[1] Data may not add to totals because of rounding.
[2] Data are not available for 1964 for Kosovo so 1965 was substituted.

Source: *Statistical Yearbook of Yugoslavia 1968*, and *Indeks*, no. 4, 1969.

Yugoslavia's foreign trade has edged further in the direction of hard currency countries, particularly since the liberalization of imports in 1967. Trade in hard currency, which is mostly with developed Western countries, accounted for 61 percent of the total trade turnover in 1968 compared with 59 percent in 1964. The clearing trade with the U.S.S.R. and Eastern European Communist countries fell from 31 percent of the turnover in 1964 to 30 percent in 1968. The remaining clearing trade, almost entirely with less developed countries, slid from 10 percent of total turnover in 1964 to 9 percent in 1968. As shown below, the most important changes in the geographic composition of trade since 1964 have been the increased share of the Common Market countries in Yugoslav imports and the decline in the share of imports from the United States because of the end of wheat deliveries under Public Law 480.

	Exports		Imports	
	1964	1968	1964	1968
Total (million U.S. dollars)	893	1,264	1,323	1,797
Percent of total:				
Hard currency	54	55	63	65
United States	6	7	13	5
Common Market	28	28	28	37
Other	20	20	22	23
Clearing	46	45	37	35
CEMA	34	34	28	27
Other	12	11	9	8

Source: *Statistics of Foreign Trade SFRJ*, 1966, and *Indeks*, no. 2, 1969.

The commodity structure of Yugoslavia's foreign trade has become more balanced during the 1960's. As shown below, exports of food and raw materials fell from 45 percent to 35 percent of all exports while the shares of chemicals and manufactured products—particularly finished goods—rose substantially between 1961–64 and 1965–68. The changes were similar, but less pronounced, in the structure of imports. Purchases of food and raw materials fell from 35 to 30 percent of total imports, and this change was offset primarily by a rise in imports of semi-manufactures. Purchases of machinery and equipment remained the largest import category, averaging about one-third of total imports during 1961–68.

[Percent]

	Exports		Imports	
	1961–64	1965–68	1961–64	1965–68
Food, beverages, tobacco	30	24	15	12
Raw materials and fuels	15	11	20	18
Chemicals	4	6	9	10
Semimanufactures	22	24	19	23
Machinery and equipment	17	18	32	32
Finished manufactures	12	17	4	4
Other	(1)	(1)	1	1
Total	100	100	100	100

[1] Negligible.

Source: *Statistics of Foreign Trade SFRJ*, 1963, 1966, 1967, and *Indeks*, no. 4, 1969.

On a regional basis, most of Yugoslavia's exports of food, raw materials, fuels, and semi-manufactures continue to be sold for hard currency, while most exports of chemicals, equipment and finished manufactures still are sold under clearing agreements. In return, Yugoslavia spends hard currency for nearly 80 percent of its imports of equipment and two-thirds of its imports of chemicals. Imports of food, raw materials and manufactures are more closely divided between the hard currency and clearing areas, as shown in Table 5.

TABLE 5.—*Regional Shares of Yugoslav Imports and Exports by Commodity, 1962 and 1967*

[Percent]

	Hard currency area		Clearing area			
			Non-Communist		Communist	
	1962	1967	1962	1967	1962	1967
Exports:						
Food	75	75	9	12	16	13
Raw materials	69	54	11	13	20	33
Fuels	59	71	32	24	9	5
Chemicals	32	28	26	18	42	54
Semimanufactures	57	58	15	9	28	33
Machinery	37	28	28	14	35	58
Finished goods	76	43	5	4	19	53
Total exports	60	52	16	11	24	37
Imports:						
Food	70	46	16	24	14	30
Raw materials	65	61	30	19	5	20
Fuels	24	42	11	11	65	47
Chemicals	63	67	9	11	28	22
Semimanufactures	62	54	8	9	30	37
Machinery	79	79	3	2	18	19
Finished goods	54	58	7	7	39	35
Total imports	67	63	11	10	22	27

Source: *Statistics of Foreign Trade SFRJ*, 1962 and 1967.

The Communist countries take over one-half of Yugoslav exports of chemicals, machinery and finished goods, and one-third of exports of raw materials and semifinished goods. Yugoslavia still depends heavily on these countries for imports of fuels and other material inputs, such as raw cotton and semifinished iron and steel products, and also receives a number of consumer manufactures. The decline in the importance of clearing trade with non-Communist countires has affected nearly all of the main commodity groups, with the principal exception of food products. The most significant decline has been in the share of Yugoslav exports of machinery. Yugoslavia has extended a number of credits for equipment purchases to less developed countries but these have been drawn upon slowly in recent years.

The regional and commodity composition of trade could change drastically after 1970. In early 1969, Yugoslavia proposed to its clearing partners—including the CEMA countries—that bilateral trade agreements be abolished in favor of trade on a hard currency basis. As of January 1970, the proposal had been accepted by several clearing partners, including Spain, Switzerland, Tunisia, the United Arab Republic, and Mainland China.

At worst, the replacement of clearing agreements with payment in hard currency would result in a drop in an already stagnating trade. At best, it would weed out the exchange of inferior or "soft"

goods, bring trade more in line with the new freedoms enjoyed by Yugoslav firms, and cut the reams of red tape involved in the barter system. Unfortunately, the benefits to be gained in enterprise efficiency would be greatest if the clearing system could be abolished in trade with the CEMA countries—the least likely to agree to it. Most of these countries might accept a watered-down version, providing for settlement of outstanding balances in hard currency, as proposed earlier by Yugosavia. Such a system, however, would do little if anything to upgrade the commodity exchange and it might involve more protracted negotiations and added trade controls to insure a closer payments balance.

VI. Conclusions

Yugoslavia emerged from the reform and recession with a freer economy, and, except for the partial retreat from import liberalization, it is still freer. The market is operating under less price control, banks and enterprises are more independent of political influences, and even the private sectors of agriculture, crafts, and services are being treated with something more than tolerance by the government.

Thus far, however, returns in the form of improved efficiency and higher exports have been less than the government has hoped for. Disappointment is inevitable. Substantial gains in competitiveness are a long term proposition for most semideveloped countries. Perhaps, as Yugoslav critics are quick to point out, progress has been held back because the reforms have not gone far enough. In any case, it will remain very hard to retain and enlarge economic freedom and at the same time achieve sustained growth.

As in other developing countries, economic growth in Yugoslavia still provokes distortions in prices, resource allocation, and the balance of payments. Because the domestic market is small, domestic competition cannot be relied upon to promote efficiency and police prices. Chronic shortages of foreign exchange make it impossible to use competing imports consistently or widely as an antidote for inflation. A selective use of competing imports to spur efficiency might eliminate non-competitive firms or promote new monopolies through mergers but not make existing firms more competitive, particularly in the key area of quality.

Foreign investment doubtless would help to inject competitiveness into the system without straining the balance of payments. Political considerations, however, probably will keep the Yugoslavs from allowing the large influx of outside capital needed to substantially raise overall efficiency. Yugoslavia's foreign investment law, by November 1969, had attracted only 14 joint contracts valued at $161 million (only $43 million by foreigners). Proposals to make the law more appealing to foreign investors are being considered, and 48 Yugoslav and Western banks and the International Finance Corporation have set up the International Investment Company for Yugoslavia (IICY), a $12 million institution, to help Western companies invest in ventures where foreign ownership of over 49 percent of assets is possible.

Unfortunately, the maladjustments accompanying growth may be aggravated by the greater power given to enterprises and banks in

the distribution of resources between investment and incomes. First, the workers' management system has shown itself to be inflationary. Although the workers' councils do not play an active role in all enterprises, it is a safe bet that they tune in when wage decisions are being discussed.[10] In any event, when given a free hand, as in 1952–54 and during most of the 1960's, enterprises have raised money wages much faster than increases in sales, and with no relationship to gains in productivity, as shown below:

	Percentage change over preceding year				
	1964	1965	1966	1967	1968
Enterprise income [1]	26	24	25	8	4
Total expenditures	25	23	23	9	6
Of which personal incomes	38	39	36	10	12
Industrial output per worker	7	4	5	1	7
Industrial income per worker	29	38	37	10	10

[1] Includes sales or other business proceeds of economic organizations in the socialized sector.

Sources: *Statistical Bulletin of the National Bank*, no. 3, 1969, *Statistical Yearbook of Yugoslavia 1968*, and *Indeks*, no. 4, 1969.

Secondly, the reform of the banking system has not solved the problem of allocating investment resources to the more efficient and profitable areas of the economy. The self-interest of republics still presents an obstacle to capital mobility. Moreover, there is a danger that the new lines between banks and the enterprises providing capital to them will give rise to vested interests in the allocation of bank investment funds. Many banks may have been freed from political control only to be confined by local business interests. Eventually, the accumulation of bank funds—at least in the major banks—should outgrow the capital requirements of founders. There are already some cases in which major commercial banks have crossed regional lines in awarding investment credits. Many marginal investments in local enterprises, however, could take place before this practice becomes widespread.

The continuing problems of underdevelopment and institutional deficiencies pose the need for continuing control, but what kind and how much? The government would like to preserve the larger role now given to market forces by relying on generalized types of short-term control. At best, this would require that the present short-term monetary instruments be sharpened. An anti-cyclical fiscal policy—not deliberately used to any great extent now—also could be added to the arsenal. The effectiveness of such controls, of course, is limited by the lag with which they operate—a serious obstacle in Yugoslavia, where the economic situation often changes rapidly and unpredictably.

Moreover, in order to avoid inflationary increases in incomes, investment, and imports with monetary and fiscal policy alone, the government probably would have to resort to a fairly deflationary policy. This would be unacceptable. The resulting low growth rate would not only be politically objectionable but, as in recent years, counterproductive.

[10] For a suggestive account of the theoretical implications of workers' management see Benjamin Ward, *The Socialist Economy, A Study of Organizational Alternatives*, 1968, pp. 182–257.

Because growth is necessary, and because growth inevitably will put strong pressures on prices and imports, the government periodically will have to impose direct price and import controls. Price control might be kept to a minimum if an incomes policy were introduced. In the past, the government has resorted to ad hoc income controls, such as the wage freeze in the service sector in 1968, or to complex restrictions on the distribution of enterprise incomes, such as in 1957. The problem again is being studied. As a preliminary step, a law was passed in 1968 providing for joint government-business consultations on income distribution and reaffirming the right of direct intervention by the government. A committee has been set up to make specific recommendations to the government on an incomes policy.

Imports, however, present more of a problem. As a leading Yugoslav economist summarized in a recent interview:

Question:

> But every increase in the rate of growth can lead to an expansion of imports? How long could we withstand this?

Answer:

> In this situation the only thing to do is to do the same thing which the Executive Council is doing—to tend toward a continuously stronger physical limitation of imports. There is no other solution until we succeed in developing exports. . . .[11]

Aside from balance of payments considerations, import controls also will continue to be used to protect some domestic industries. To its credit, the government has not given in to many of the pleas for protection since the liberalization of imports in 1967. Nevertheless, in view of the disruption to output caused by the last liberalization, the leadership, probably will shy away from another major relaxation of controls in the near future, even if the balance of payments should suddenly improve.

In spite of the need for controls, the government still will press for increased efficiency, relying on selective price and credit controls to prod enterprises to cut costs. In this way, Yugoslavia should be able to gradually uncover new lines of exports and modernize the more competitive areas of the economy. Foreign investment, even on a piecemeal basis, will be some help, as will cooperative production and marketing agreements of the type concluded in the past.

Given Yugoslavia's regional and economic obstacles, a key factor in future gains in efficiency will be the resolve of the government to keep the momentum going. Past reforms have to a large extent been carried through on the personal prestige of President Tito. There is some doubt that a less popular government would have waded through the wave of criticism provoked by the recession to bring off the reforms of 1965. For a new leadership, struggling to gain acceptance, the task of juggling conflicting regional and industrial interests while moving ahead on national economic programs will be far harder.

With nearly 20 years under its belt, a decentralized economic system appears to have taken firm root in Yugoslavia. The reforms of 1965, however, are by no means the last, and judging from past experience,

[11] *Privredni Pregled,* April 21, 1969, p. 3. Interview with Branko Horvat, Director of the Belgrade Institute for Economic Science.

future changes in policy will involve retreats as well as gains in economic decentralization. As practical attempts to improve the economy, future reforms undoubtedly will include some modifications that appear to bring the Yugoslav system closer to Western-type economies and further from the centrally planned systems. The changes made during the 1960's in fact, already have many observers describing Yugoslav economic trends largely in western terms—including a new breed of Yugoslav business cycle theorists. Nevertheless, the system is, and probably will continue to be, uniquely Yugoslav. The command economy was not rejected in order to adopt capitalism. As Tito recently stated in a speech to the Central Committee on 11 March 1969:

> Comrades! By deciding in favor of an economy based on goods and by accepting the inevitability of recognizing the laws of the market we did not give up planning or social intervention from the basic to the highest self-managing bodies. Anyway, we do not idealize the economy based on goods but we accept it as a necessity in the present stage of development.

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