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PROSPECTS, PROBLEMS, AND PATTERNS

Volume 3—Capital

STUDIES

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LETTERS OF TRANSMITTAL

NOVEMBER 12, 1976.

To the Members of the Joint Economic Committee:

Transmitted herewith is the third volume of the Joint Economic Committee study series entitled "*U.S. Economic Growth from 1976-1986: Prospects, Problems, and Patterns.*" This series of over forty studies forms an important part of the Joint Economic Committee's Thirtieth Anniversary study series, which was undertaken to provide insight to the Members of Congress and to the public at large on the important subject of full employment and economic growth. The Employment Act of 1946, which established the Joint Economic Committee, requires that the committee make reports and recommendations to the Congress on the subject of maximizing employment, production and purchasing power.

Volume 3 comprises four studies which are focused on the contribution of capital to economic growth. Questions addressed are whether a capital shortage threatens to curtail growth in the next decade, whether adequate funds from corporations and the public will be available to finance capital needs and requirements, and how capital as a source of economic growth varies in different industrialized countries.

The authors are Dr. Barry Bosworth, Professor Robert Eisner, Professor Gerard Brannon and Dr. Edward Denison.

The committee is indebted to these authors for their fine contributions which we hope will serve to stimulate interest and discussion among economists, policymakers and the general public, and thereby to improve public policy formulation.

The views expressed are those of the authors and do not necessarily represent the views of the members of the committee or the committee staff.

Sincerely,

HUBERT H. HUMPHREY,
Chairman, Joint Economic Committee.

NOVEMBER 8, 1976.

HON. HUBERT H. HUMPHREY,
*Chairman, Joint Economic Committee,
U.S. Congress, Washington, D.C.*

DEAR MR. CHAIRMAN: Transmitted herewith are four studies entitled "The Issue of Capital Shortages" by Dr. Barry Bosworth, "The Corporate Role in Financing Future Investment Needs" by Prof. Robert Eisner, "The Impact of Federal Taxation on Aggregate Savings and Investment" by Prof. Gerard Brannon and "The Contribution of Capital to the Postwar Growth of Industrial Countries" by Dr. Ed-

ward Denison. These four studies comprise Volume 3 of the Joint Economic Committee's study series *U.S. Economic Growth from 1976-1986: Prospects, Problems and Patterns*. This series forms a substantial part of the Joint Economic Committee's Thirtieth Anniversary study series.

The role of capital as a major source of economic growth has long been recognized. These papers were commissioned to examine the extent to which capital can continue to be a major stimulant to economic growth over the next decade. This question is addressed to several aspects, e.g., funding for capital formation from within corporations; aggregate saving for investment purposes; whether there is a national capital shortage that would inhibit growth; and how capital formation in the United States compares to other industrialized countries.

Dr. Bosworth addresses a critical question: Will the U.S. experience a capital shortage that will lead to unfulfilled needs and slower growth? His primary conclusion is that the U.S. does not face an aggregate capital crisis. Instead, capital formation problems are symptomatic of the inflation and recession that has afflicted the economy. Thus, the resolution of the "capital crisis," he asserts, is the maintenance of a stable, non-inflationary expansion of aggregate demand as a means of stabilizing the environment within which investment plans are made. He states that the assertions of a "capital crisis" reflect four different areas of concern which are not or need not be as serious as they may seem. For example, instead of a sudden magnification of the volume of desired capital formation, which might well generate its own problems, there is likely to be a one percent increase in the share of GNP devoted to investment by 1980 compared with the early 1970's. Similarly, he believes there is no problem of a pattern of declining savings to finance investment since aggregate savings of the private sector have been a constant share of GNP over several decades.

Professor Eisner's basic idea is that corporate capital expenditures will contribute to economic growth to the extent that they are undertaken on the basis of free and unbiased calculation of their expected returns. Corporate investment and its contribution to economic growth, he maintains, will be maximum if employment and real aggregate demand for output are full. Thus, the greatest threat to future capital spending is excess capacity and underutilization of existing human and capital resources. Like Dr. Bosworth, he maintains that there should be no capital shortage. He reasons that if the Nation chooses to have high proportions of full employment income, our financial markets and institutions should prove fully able to finance corporate investment.

Professor Brannon's basic thesis is that whether the U.S. should have more or less growth is a matter of choice which can be influenced by the way in which government tax policy affects private decisions. He argues that if society wants a faster growth policy, it is possible to achieve this without tax policies that undermine progress. What is needed, Brannon maintains, are policies which increase the savings of low and middle income taxpayers. He discusses three ways to change the present tax structure: (1) Change part of the present income tax into a value added tax or general sales tax; (2) integrate the corporate income tax with regard to retained earnings; and (3) convert the Social Security system to more reserve financing.

Dr. Denison's paper provides a very thorough analysis of the role capital has played in the postwar growth of industrial countries. His primary conclusion is that capital accumulation is one of several major sources of output growth and that differences in rates of capital accumulation represent one, but only one among several of the main determinants of international differences in growth rates. He helps to demonstrate this by showing that to raise the growth side of U.S. net output by a single percentage point solely by increasing private capital would mean saving and investing about two and one-half times as much as in the past.

He feels that this alone suggests that it would be quite impossible to explain international differences of several percentage points in growth rates solely or mainly by differences in investment. His analysis also reveals that significant changes in the U.S. growth rate cannot be ascribed to changes in the private propensity to save and that policymakers should therefore be cautious in appraising their ability to influence private savings behavior. He also maintains that it is probable that any program to stimulate capital stock growth over an extended period would have to rely on strengthening incentives to invest rather than to save.

The committee wishes to thank these four authors for their excellent contributions to the economic growth study series. Drs. Bosworth and Denison are both with The Brookings Institution, while Professors Eisner and Brannon are economics professors at Northwestern University and Georgetown University respectively.

Dr. Robert D. Hamrin of the committee staff is responsible for the planning and compilation of this study series with suggestions from other members of the staff. The administrative assistance of Beverly Mitchell of the committee staff is also appreciated.

The views expressed are those of the authors and do not necessarily represent the views of the Members of the committee or the committee staff.

Sincerely,

JOHN R. STARK,
Executive Director,
Joint Economic Committee.

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THE ISSUE OF CAPITAL SHORTAGES

By BARRY BOSWORTH*

SUMMARY

The conclusion of this paper is that the United States does not face an aggregate capital crisis. Instead, problems in the area of capital formation are simply symptomatic of the difficulties in more fundamental areas of inflation and recession. The assertions of a capital crisis reflect four different areas of concern which will be summarized in this introduction.

First, problems might result if the United States was faced with a sudden magnification of the volume of desired capital formation. A review of the likely demands in different sectors of the economy indicates that the upward trend of business investment is likely to continue with about a 1 percent increase in the share of GNP devoted to investment by 1980 compared with the early 1970s. This can be traced to higher capital needs in the areas of energy development, pollution abatement, and expansion of capacity in the basic materials industries. But, much of this rise will be offset by declining capital needs as a share of GNP in the areas of highways, education, and residential construction. This magnitude of investment demand would be comparable to that of the early 1950s and does not create serious difficulties. Instead, it should be a positive factor in generating the demand required to get the economy back to full employment.

Second, problems would result from a pattern of declining savings to provide the resources for investment. However, there is no evidence of such a trend as aggregate savings of the private sector have been a constant share of GNP over several decades. Instead, the impression of declining savings has resulted from a shift in its composition between households and business. Over the last decade there has been a pronounced rise in household savings rates and falling business saving rates. The decline in business saving can be traced largely to declining profit margins; or, in effect, a lower return to capital. Such a decline in the return to capital suggests excess capital in the aggregate rather than a shortage. In any case, the evidence of the recent years indicates that this decline of business saving has stopped and may have been reversed. Finally, a shortage of saving can only be of concern in a fully employed economy. At present, idle resources for investment are in plentiful supply and the time required to return to high employment extends beyond the period for which reasonably accurate projections of savings rates can be made. Thus, at best, this is an issue of relevance only at some future date.

*The views expressed here are solely those of the author and should not be attributed to the Brookings Institution, to its trustees, or other staff members, or to the organizations that support its research.

Third, problems have developed in the capital markets in providing for the orderly transfer of resources from savers to investors. Most of these structural disruptions can be traced to inflation and the monetary policies adopted to control it. Steps can be taken to develop more flexible capital markets with less reliance upon fixed interest rate securities and more equity financing but the fundamental corrections lie in the area of controlling inflation.

Fourth, significant problems of capacity shortages do exist in some basic materials industries, where the economic instability of the last decade has disrupted capacity expansion plans and investment incentives. Some special temporary measures may be desirable to prevent these industries from becoming bottlenecks to the continuation of the economic recovery.

Finally, the paper concludes that the key to resolution of the "capital crisis" is the maintenance of a stable, non-inflationary expansion of aggregate demand as a means of stabilizing the environment within which investment plans are made. In that sense, problems of capital formation are derived from the more general failure to resolve the inflation-unemployment dilemma.

The chain of a capital crisis in the United States has developed into a debate over a wide range of issues and proposals for changes in tax laws and financial institutions. Certainly, the demand for industrial output is intensified by our new energy requirements, by capacity shortages in some raw materials processing industries, and by the need for pollution abatement facilities. Widely accepted national goals require the construction of 25 million new homes in a decade, and in the public sector new capital will be required for water treatment and mass transit. But, these needs must be kept within the context of a growing economy with increased capacity to supply savings, and within the context of total capital requirements where declining needs in some sectors offset the more readily identified growth areas.

The basic conclusion of this paper is that the United States does not face a general capital shortage. Instead, most of the problems are symptomatic of more fundamental difficulties in the areas of inflation and recession. However, the cyclical instability of the last decade has contributed to a wide dispersion of capacity relative to needs. Thus, there are significant potential problems for individual industries. In addition, the higher inflation rates of the last decade have indicated some problems in the structure of U.S. capital market institutions in terms of their ability to transfer efficiently income from savers to investors. Most of the problems could most effectively be "solved" by a return to sustainable economic growth and the dampening of inflation. In addition, higher rates of capital formation could most effectively be stimulated by a shift in the mix of stabilization policy toward an easier monetary policy and smaller fiscal deficits. This would channel a larger proportion of private savings into investment.

The assertions that a capital crisis exists seems to reflect four different areas of concern with drastically different policy implications. First, is there a shortage of available resources or savings to finance a clearly recognizable need for a specific amount of capital formation? Second, is there some problem in our financial institutions that

unduly impedes the transfer of income claims from savers to investors? Third, if a more rapid rate of economic growth is desirable, and if capital formation is essential to that process, should we seek to stimulate more investment? Finally, are there problems in specific industries, such as public utilities, energy, and raw materials processing, which require government actions?

A SAVINGS SHORTAGE

There is little disagreement among the existing studies that investment as a percentage of GNP will have to increase somewhat over the next decade if previous rates of productivity growth are to be maintained with high employment and if the nation is to meet the special capital requirements in areas of energy and pollution abatement.

Business Investment

One of the most specific reviews of capital requirements within the business sector was undertaken by the Bureau of Economic Affairs (BEA).¹ In this study, capital-output ratios were developed for 80 industry groups and projected to 1980. When combined with projections of total GNP in 1980 and its composition, these ratios can be used to estimate the required stock of capital in 1980.²

The BEA projections for investment as a share of GNP are summarized in Table 1. As shown in the final column, the investment share is projected to average about 11.4 percent over the decade of the 1970s. This is about 1 percentage point above the rate of the last decade but it is consistent with a gradual rise in the investment share over the post-war period. Most of the increase is accounted for by increased capital requirements for energy and pollution abatement.

TABLE 1.—PROJECTED INVESTMENT REQUIREMENTS; 1971-80 AND HISTORICAL PERIODS (1972 DOLLARS)

	Projected 1971-80 (billions)	Percent of GNP
Constant 1970 capital-output ratios.....	\$1,283.0	9.9
Additional investment due to:		
(a) Trends in capital-output ratios.....	82.0	0.6
(b) Pollution abatement (1970-72 laws).....	50.0	0.4
(c) Energy independence.....	5.80	0.4
Total investment.....	1,483.0	11.4
Actual investment 1965-74.....	1,110.2	10.4

Source: Bureau of Economic Analysis, *A Study of Fixed Capital Requirements of the U.S. Business Economy*.

The BEA estimates of business investment needs appear to be highly representative of recent capital projections of other studies.³ In fact, the magnitude of the investment requirements is not a significant area

¹ *A Study of Fixed Capital Requirements of the U.S. Business Economy*, Bureau of Economic Analysis, U.S. Department of Commerce (December 1975).

² The 1980 GNP of the BEA study appears to be consistent with an unemployment rate goal of 4.7 percent in 1980. Annual investment requirements to achieve this 1980 capital stock were obtained by estimating the pattern of discards from historical experience.

³ Similar projections of capital needs are provided in B. Bosworth, J. Duesenberry, and A. Carron, *Capital Needs in the 1970s* (Brookings Institution, 1975); Allen Sinal and Roger Brimmer, *The Capital Shortage* (Data Resources, Inc., 1975); and *The Capital Needs and Saving Potential of the U.S. Economy* (The New York Stock Exchange, September 1974).

of dispute. They are higher than in the recent past, but not out of line with past trends.

Homebuilding and State and Local Government Construction

The upward trend in business investment as a share of GNP will be partially offset by a declining magnitude of needs in other sectors. Completion of a large proportion of the interstate highway program and the slower growth of the school age population will significantly reduce needs in two major categories of state and local government construction. This moderation of needs will be partially offset by sharp increases in spending for sewage treatment plants and mass transit systems. However, the shift in the mix of construction towards areas which are heavily financed by direct federal government grants (sewage treatment as opposed to education buildings, for example) should moderate their demands upon the capital markets. In addition, sharply increased rates of bond rejections by voters raises questions as to whether or not the projected growth in needs will be realized.

In a previous study a level of homebuilding consistent with the goals of the 1968 Housing Act was shown to result in a declining share of GNP going to the housing industry between 1973 and 1980. Since that time severe monetary restraint has sharply reduced construction activity (from \$60 billion in 1973 to \$37 billion in 1975 at constant 1972 prices). Continuation of this rate of construction would imply a substantial accumulated deficit relative to the original goals. Thus, it would seem reasonable in a projection of "needs" to expect less of a decline as an offset to rising business investment.⁴

In summary, the basic conclusion of our original study with regard to the magnitude of the "capital needs" does not seem to be changed significantly by the recent recession. A consideration of needs would still seem to imply a rise in the share of GNP going to investment (including business, residential, and state and local government) of about 1 percent of GNP.

The Supply of Savings

Savings rates are very difficult to forecast over long periods of time, but some useful observations can be made. First, there can be no question of a savings shortage in a recession economy such as we presently have. Savings and investment are always equal. The issue really is whether resources are available to allocate to investment without initiating inflation pressures. At full employment, such resources can only be made available by reducing other claims such as current consumption (implying a rise in saving) or government expenditures (implying a budget surplus). But, when resources are idle and unemployed, they can be allocated to investment with no reduction in other demands. Consumption does not have to be reduced to free resources for investment. Since it is difficult to foresee a return to full employment in the near future, the severity of the current recession has really

⁴ A more detailed consideration of capital requirements for homebuilding and residential construction is present in B. Bosworth, J. Duesenberry, and A. Carron, *Capital Needs in the Seventies*.

killed any immediate concern with this issue. Since saving is not a restraining influence on investment today, an increase in saving rates would simply lower demand and intensify unemployment problems. Thus, a concern with stimulating saving is of relevance to a fully employed economy and direct actions might be postponed until the economy more closely approximates this target (a time near the end of the current decade).

Inadequate saving can be alleged to be a current problem if the present degree of unemployment of available resources is viewed as desirable—as a “necessary” cost of dampening the inflation. However, even in this case, large government deficits have been required to absorb the excess of private savings above investment demands. The immediate problem has been too much private saving relative to private investment and the need would be to stimulate investment rather than saving. But it is difficult to stimulate new capital formation when the existing stock is not being used.

Second, private saving has not declined in the U.S. as alleged by some. In fact, household saving rates have steadily increased over the postwar period. Some of the highlights of the pattern of private saving are shown in Table 2. The total rate of saving out of GNP has been very stable at 15–16 percent of GNP throughout the postwar period, and has risen slightly during the 1970s. All of this rise in the total saving rates is accounted for by the household sector as the rate of business saving has declined sharply for the last decade. Thus, within a relatively constant total there has been a sharp shift in the mix of saving toward the household sector. One implication of this shift has been a need to rely more heavily upon the capital markets as a means of transferring income claims between savers and investors since business receives less of its financing needs in the form of its own saving. This point will be examined more fully in the section on financial market problems.

The decline in business savings rates is illustrated more fully in the bottom section of Table 2 where business saving is shown to have declined from 5 percent of corporate product during the high growth years of 1961–65 to an average of 2 percent in the 1971–75 period. This decline can be traced to three factors. First, there has been a sharp acceleration of the historical trend of a declining share of income going to capital. The total share of capital income (profits, interest and depreciation) fell 1.8 percentage points between 1961–65 and 1971–75 (from 24.9 to 22.1 percent). Only about one-third of this decline can be attributed to a slower growth of the economy between the two periods.

The decline in the corporate profit share, however, was more pronounced—5.6 percentage points to 11 percent of corporate product. This decline reflected, in part, a small increase in the share of income allocated to capital consumption—consistent with a gradual rise in the overall capital output ratio. But, primarily, the reduced share of profit income results from a shift in the proportion of capital financed by debt versus equity: a larger share of capital income is paid out in the form of interest instead of profits.

The third major factor in the decline in business saving has been the interaction of the tax structure and inflation. As shown in the

TABLE 2.—PERCENTAGE DISTRIBUTION OF PRIVATE SAVINGS (SELECTED PERIODS 1956-75)

	1956-60	1961-65	1966-70	1971-75	1971-75 (billions) ¹
Total domestic economy (percent of GNP):					
Domestic saving	15.9	15.8	15.8	16.2	\$209.3
Personal	4.2	3.9	4.6	5.3	68.9
Business	11.6	11.9	11.2	10.9	140.6
Capital consumption	(9.5)	(8.8)	(8.7)	(9.4)	(121.1)
Retained earnings	(2.1)	(3.1)	(2.5)	(1.5)	(19.5)
Domestic corporate sector (percent of corporate product):					
Capital income ²	24.7	24.9	23.8	22.1	172.5
Corporate profits ³	15.9	16.6	14.6	11.0	86.0
Taxes	8.3	7.5	6.9	5.8	45.4
Dividends	4.2	4.2	3.8	3.2	25.2
Retained earnings	3.4	4.9	3.9	2.0	15.4
Addenda (percent distribution of corporate profits):					
Taxes	52.2	45.3	47.2	52.8	45.4
Dividends	26.7	25.2	25.9	29.3	25.2
Retained earnings	21.2	29.5	26.9	17.9	15.4
Effective tax rate on reported profits	0.477	0.462	0.470	0.442	
Impact of inflation on taxes (billions) ⁴	\$1.9	\$0.5	\$0.2	\$7.4	

¹ Five-year annual average.

² Includes profits, interest, and capital consumption.

³ National income accounts definition of corporate profits. It excludes capital gains on inventories and adjusts capital depreciation to a current cost basis with constant service lines rather than using tax return depreciation which reflects changes in depreciation costs and values capital on an historical cost basis.

⁴ Effective tax rate on reported profits multiplied by the sum of the inventory valuation adjustment and capital consumption adjustment of the national income accounts.

addenda to Table 2, the share of profits going to taxes increased sharply between 1961-65 and 1971-75 to 53 percent—the effective rate reached a peak of 65 percent in 1974. This rise in the rate is due solely to the interaction between inflation and the definition of taxable income as the effective rate on reported profits fell by 2 percentage points and depreciation allowances were liberalized to lower the taxable definition of profits.

Reported profits differ from the economic definition of the national income accounts used in Table 2 in two respects. First, a significant number of firms continue to use FIFO accounting for inventories. During periods of inflation reported profits include a capital gain on inventory stocks—for example, reported profits in 1974 included \$38.5 billion of such gains. Since firms are free to use LIFO accounting if they wish, the major reasons for continued use of FIFO would seem to reflect: (1) tradition, (2) simplicity of accounting for small firms, and (3) a desire to show large reported profits to stockholders.

The second distinction between economic and reported profits results from the treatment of capital depreciation for tax purposes on an historical cost basis. During periods of inflation the amount of income allocated to depreciation is inadequate to replace the capital which was consumed in current production, thus inflating reported profits. In the past the effect of inflation was largely offset by periodic revisions of the tax code to liberalize depreciation allowances and to shorten the definitions of useful lives. Until 1974 the tax definition of depreciation exceeded the economic estimates of the national income accounts by several billion dollars, but the difference switched to a —\$5.5 billion in 1975 because of sharp price increases for investment goods.

Several caveats must be added to the previous review of corporate saving patterns. First, the 1961-65 period was one of more rapid economic growth with higher utilization of capital than in the most recent period. These cyclical differences were minimized by using five-

year averages, but they still influence slightly the decline in the share of income going to capital; and, because depreciation and interest are largely fixed costs, the cyclical differences amplify the decline in the profits share. Second, the question of whether business gains or losses from inflation is a very complex issue.⁵ A redefinition of depreciation for tax purposes at replacement cost would also require adoption of more meaningful measures of equipment-useful lives and adjustment for the deduction of interest payments. The previous paragraphs are only intended to reflect the impact upon the corporations' cash flow. Third, the return on capital can be expected to fluctuate because of changes in the costs of supplying capital. Changes in tax laws, nominal interest rates, and anticipations of inflation have been numerous between the two periods and their effect is complicated by consideration of the shifting incidence of taxes.⁶

In recent years several empirical studies have found a strong positive correlation between inflation and rising household saving rate—increased uncertainty is alleged to reduce the willingness to buy durables.⁷ If this explanation is correct, a moderation of inflation in future years could lead to a reduction in household saving. At the same time, not enough is known about the causes of the declining return on corporate income to be able to predict the future trend of corporate saving. However, moderating inflation would reduce the impact of the tax structure on retained earnings and thus lead to a rise in corporate saving to offset the decline in household saving.

The declining return to capital also raises questions about the notion of a capital shortage. One would expect the return on capital to rise if it was in short supply, but this has not occurred. Nor can the decline be attributed to price controls since it began before any controls were introduced. One explanation for the declining share going to capital is that there is a general surplus of capital—reducing its return. This could be true even though some special industries have a shortage—the capital shortage is a problem of composition rather than aggregate size. An additional factor has been the general overvaluation of the dollar prior to 1971. This artificially held U.S. prices high relative to foreign prices and import competition reduced profit margins in some import competing basic industries. If this explanation is of major importance, the problem should be self-correcting with the move to flexible exchange rates. In addition, past tax reductions such as the investment tax credit and accelerated depreciation have lowered the cost of investment. This would be expected to lower the measured return. Finally, the decline in the capital return may simply reflect mistakes by business in estimating true economic costs in an inflation environment so that they have not raised prices enough to cover higher costs.

⁵ The complexity of the issues is well illustrated by the study by John Shoven and Jeremy Bulow, "Inflation Accounting and Nonfinancial Corporate Profits," *Brookings Papers on Economic Activity*, 3:1975 and 1:1976 (Washington, D.C., 1976); and William Fellner, Kenneth Clarkson, and John Moore, *Correcting Taxes for Inflation* (American Enterprise Institute, 1975).

⁶ A study by William Nordhaus examines some of the sources of the decline in the reported return on capital in "The Falling Share of Corporate Profits," *Brookings Papers on Economic Activity*, 1:1974 (Brookings Institution, 1974).

⁷ See, for example, Tom Juster and Paul Wachtel, "Inflation and the Consumer," *Brookings Papers on Economic Activity*, 1:1972, pp. 71-114.

Policy Implications

None of these views is consistent with near-term problems of a savings shortage. Instead, they raise questions about investment—why will business continue to invest in the face of a falling return? But for policy purposes it is crucial to distinguish between a saving shortage or a weakness of investment incentives. In the first case measures are desired which will stimulate saving without increasing investment; but if the problem is a weakness of investment, incentives to increase saving will reduce total demand or require larger government deficits.

If the objective is to strengthen investment incentives the most effective government measures would focus upon maintaining a stable overall economic environment of rapid but sustainable demand growth. Consistent full utilization of existing capital stock would provide the incentives and the funds for new investment. Greater stability of the expansion reduce the problem of estimating future capacity needs and moderate the problems of sectoral imbalances of capacity.

Within a given overall total GNP capital formation could be stimulated by a shift in the mix of fiscal and monetary policy toward less reliance upon monetary policy for restraint with a compensating reduction in the government budget deficit. An example of a change in the policy mix toward more government spending is shown in Table 3. The sharp shift in the mix of consumption and investment is particularly marked.

TABLE 3.—DISTRIBUTION OF THE IMPACT ON DEMAND OF A \$10 BILLION INCREASE IN FEDERAL EXPENDITURES, OFFSET BY A DECREASE IN UNBORROWED RESERVES, BY MAJOR CATEGORY

[In billions of constant dollars]

Demand category	Distribution of change in gross national product ¹		Net effect
	Increase in Federal purchases	Reduction in unborrowed reserves	
Personal consumption.....	13.5	-11.3	2.2
Business investment.....	5.9	-12.4	-6.5
Residential construction.....	-1.1	-2.4	-3.5
Net exports.....	-1.3	1.3	0.0
Purchases, state and local governments.....	0	-2.2	-2.2
Purchases, federal government.....	10.0	0	10.0
Gross national product.....	27.0	-27.0	0.0

¹The results shown here are the third-year multiplier effects of a \$10,000,000,000 stimulus to constant dollar Government purchases and a reduction in unborrowed reserves (calculated as \$1,250,000,000) sufficient to leave GNP unchanged. The bond rate would increase by 200 basis points.

Finally, reduced taxes could be used as a means of stimulating increases in investment. While there is near unity of agreement among empirical studies that a one percent increase in expected output raises the desired business capital stock by one percent, there is no such unity with regard to the effect of taxes and interest rates, which change the price of capital relative to labor costs. The effectiveness of these measures depends upon the range of processes available with different capital intensities and the extent to which firms are limited by their ability to borrow in the capital markets.

These issues are well presented in a recent paper by Andrew Brimmer and Allen Sinai.⁸ They compare the effectiveness of three alternative tax measures: (1) increasing the investment tax credit, (2) reducing the corporate profits tax rate, and (3) adjusting depreciation to a current cost basis. Per dollar of revenue loss these measures are estimated to raise nonfinancial corporate investment over a five-year period by \$.5, \$.25, and \$1.3 respectively. This particular ranking of the measures, with a strong preference for current cost depreciation reflects a model of investment behavior which emphasizes internal versus external funds. Other models which stress the price of capital relative to labor would place greater emphasis upon the investment tax credit. In addition, some studies find little evidence that tax changes stimulate investment through either relative prices or internal cash flow. Precise estimates of the impact of tax measures upon business investment remain controversial, but most recent studies do conclude that there is a significant response.

The growing size of the government deficit in recent years has been in response to a problem of too much saving relative to private investment. The total of investment plus consumption generated too low a level of demand in terms of employment objectives and the government has sought to stimulate the economy. If such stimulus had come from an easier monetary policy, private investment would have been larger and the Federal deficit smaller. But conflict between the Congress and the Federal Reserve Board with regard to the appropriate level of demand—reflecting different viewpoints about how to deal with the problems of inflation and unemployment—prevented such a policy mix from being achieved.

In summary the notion of a shortage of saving does not appear reasonable for the near future; but, if it were possible, there are specific implications of policy. The need would be to increase saving without further investment. Thus actions like an investment tax credit seem very inappropriate as they would add to investment demands. One would favor high interest rates to induce saving and restrict borrowing. The government could increase saving incentives or run its own budget surplus. This later policy is the standard recommendation for such an economic situation where demand exceeds available supply. It seems implausible mainly because high demand or a shortage of saving has been a very infrequent problem for the U.S. economy. It has been common in European countries which have had frequent periods of excess demand.

PROBLEMS OF FINANCING INVESTMENT

The past decade of intensive reliance on monetary policy has clearly highlighted the need to reform the structure of the financial intermediary system in the United States. This problem has been heavily discussed elsewhere with regard to the housing industry and I will not detail the issues again.⁹ But additional problems have become evident in the area of business financing of investment.

⁸ Andrew Brimmer and Allen Sinai, "The Effects of Tax Policy on Capital Formation," American Economic Association Conference, December 1975.

⁹ See, for example, The Board of Governors of the Federal Reserve, *Ways to Moderate Fluctuations in Housing Construction* (Washington, D.C., 1972).

First, inflation rates have been higher and more variable than in the past. Inflation and expectation of continuing inflation raise questions about the viability of a financial system which has become very dependent upon long-term securities with a fixed nominal yield. In addition, many regulatory measures restrict the extent to which nominal yields can adjust to rising inflation. These regulations have been criticized by some who perceive a discriminating effect on small savers. If inflation is allowed to offset nominal interest rates, there can also be large unanticipated changes in the distribution of wealth. These are important consequences of inflation about which very little is presently known. If the pattern of high inflation continues, it will be necessary to develop a wider range of savings instruments which can offer small savers a degree of protection against inflation equivalent to that of larger savers. But, at present, government regulations severely restrict efforts to do so.

Second, an active monetary policy has emerged as a major tool of economic stabilization efforts. In combination with varying inflation rates, this new monetary policy has resulted in far wider swings in interest rates in the post-1965 period compared to earlier years. This is a serious challenge to the viability of a financial intermediary system which grew out of earlier experience with relatively stable interest rates. In particular, the structure of financial claims in the U.S. emphasized the issuance of highly liquid short-term claims by intermediaries to savers and the purchase of illiquid long-term debt instruments from investors. Several times in the past decade, sharp increases in market rates have induced a degree of disintermediation, as savers exchanged low rate deposits at the institutions for higher yield direct market claims, which threatened collapse of several major mortgage lending firms and did disrupt the housing market. While this problem of cyclical instability of short-term rates has attracted considerable attention with respect to the housing industry, it will become of increasing importance for business investment. Continued large fluctuations in interest rates will require significant changes in a financial system which formerly placed a low price on liquidity of financial claims.

Some progress has already been made by institutions in diversifying the composition of their assets and liabilities so as to reduce their vulnerability to periodic liquidity crises. Savings institutions, for example, now offer a broad range of saving instruments. But further steps in this direction will be strongly affected by future changes in regulatory controls. Current regulations restricting portfolio composition would have to be changed before a significant diversification could occur on the asset side. Shifts in the maturity composition of financial claims involve important issues about how the risks of future rate fluctuations should be allocated among savers, the intermediaries, and investors. Such changes will have major effects also upon the competitive position of different types of financial institutions.

Third, private savers and investors have become increasingly disparate over the last decade. While aggregate private saving has remained stable as a share of total income, household saving rates have increased and corporate savings has declined. As a result a larger proportion of total investment is financed through the capital markets

rather than with internally generated funds. Thus far, this financing has been accomplished primarily with fixed yield securities (bonds and bank loans). However, the higher level of contractual financing, as reflected in rising corporate debt-equity ratios, creates problems of inadequate cash flow during recessions. Other countries have relied even more heavily upon external financing of business investment, but they have also developed a much closer relationship between nonfinancial firms and commercial and investment banks and between commercial banks and the monetary authorities. The vulnerability of business balance sheets has led in these countries to a monetary policy which emphasizes credit rationing and selective credit controls in contrast to the emphasis in the U.S. on controlling broad monetary aggregates.

The greater importance of external financing and the primary role commercial banks in that process may also have significantly changed the distribution of economic power in the U.S. as access to credit markets has become a major discriminating factor among firms. On the surface it would seem to favor the large companies over the small and to provide a major inducement to mergers for the purpose of diversification. Yet, if improvements could be made in the markets for new equity issues to make the cost of such issues comparable to bonds, this increased external financing would be accomplished without greater emphasis upon fixed payment debt. For example, elimination of the interest deduction in computing profits would leave the tax structure neutral with regard to the method of financing and make possible a large reduction in the overall corporate tax rate.

It is evident that not all of the financing problems require government action: markets and institutions do adapt to changing circumstances. But some of the trends may not be desirable and in many ways government regulations and tax laws have a perverse effect upon the process. Also, there is some evidence of a reversal of the previous trend of a lower share of income going to profits. Profits appear to have fallen less in the 1974-75 recession and risen more rapidly during the expansion that would be expected from historical experience.¹⁰

CAPITAL FORMATION AND ECONOMIC GROWTH

The issue of whether or not the U.S. should attempt to achieve a higher rate of full employment output growth involves many issues and value judgments which will not be examined in this note. But if such a goal were desired, the issue would remain of whether or not accelerated capital formation should play a major role. Studies by Edward Denison, Robert Solow, and others have done much to improve our understanding of the complex process by which growth occurs. The data of Table 4 illustrates the wide range of factors that contribute to the growth process. The comparisons of sources of growth in various industrial countries indicate that capital formation has not been the dominant source of economic growth in the past. Advances in knowledge, economies of scale, education, improved resource alloca-

¹⁰ See, for example, Charles L. Schultze, "Falling Profits, Rising Profit Margins, and the Full-Employment Profit Rate," *Brookings Papers on Economic Activity*, 2:1975 (Washington, 1975).

TABLE 4.—SOURCES OF GROWTH OF STANDARDIZED GROWTH RATE OF NATIONAL INCOME, WHOLE ECONOMY, VARIOUS COUNTRIES AND TIME PERIODS

[In percentage points]

Item	Japan, 1953-71	United States, 1948-69	Canada, 1950-67 ¹	Belgium, 1950-62	Denmark, 1950-62	France, 1950-62	West Germany, 1950-62	Italy, 1950-62	Nether- lands, 1950-62	Norway, 1950-62	United Kingdom, 1950-62
Standardized growth rate.....	8.81	4.00	4.95	3.03	3.63	4.70	6.27	5.60	4.07	3.43	2.38
Total factor input.....	3.95	* 2.09	3.02	1.17	1.55	1.24	2.78	1.66	1.91	1.04	1.11
Labor.....	1.85	1.30	1.85	.76	.59	.45	1.37	.96	.87	.16	.60
Employment.....	1.14	1.17	1.82	.40	.70	.08	1.49	.42	.78	.13	.50
Hours of work.....	.21	-.21	-.20	-.15	-.18	-.02	-.27	.05	-.16	-.15	-.15
Age-sex composition.....	.14	-.10	-.13	-.08	-.07	.10	.04	.09	.01	-.07	-.04
Education.....	.34	.41	.36	.43	.14	.29	.11	.40	.24	.24	.29
Unallocated.....	.02	-.03	0	0	0	0	0	0	0	0	0
Capital.....	2.10	* .79	1.14	.41	.96	.79	1.41	.70	1.04	.89	.51
Inventories.....	.73	.12	.10	.06	.15	.19	.33	.12	.22	.13	.09
Nonresidential structures and equipment.....	1.07	.36	.87	.39	.66	.56	1.02	.54	.66	.79	.43
Dwellings.....	.30	* .28	.30	.02	.13	.02	.14	.07	.06	.04	.04
International assets.....	0	.03	-.12	-.06	.02	.02	-.08	.03	.10	.07	-.05
Land.....	0	0	0	0	0	0	0	0	0	0	0
Output per unit of input, standardized.....	4.86	* 1.91	1.96	1.86	2.08	3.46	3.49	3.94	2.16	2.39	1.27
Advances in knowledge and n.e.c. ²	1.97	1.19	.66	.84	4.75	1.51	4.87	4.30	4.75	.90	.79
Improved resource allocation.....	.95	.30	.64	.51	.68	.95	1.01	1.42	.63	.92	.12
Contraction of agricultural inputs.....	.64	.23	.54	.20	.41	.65	.77	1.04	.21	.54	.06
Contraction of nonagricultural self-employment.....	.30	0	.10	.15	.18	.23	.14	.22	.26	.23	.04
Reduction of international trade barriers.....	.01	0.07	0	.16	.09	.07	.10	.16	.16	.15	.02
Economies of scale.....	1.94	.42	.66	.51	.65	1.00	4.61	1.22	.78	.57	.36
Measured in U.S. prices.....	1.06	.42	.63	.40	.42	.51	.70	.62	.55	.45	.27
Income elasticities.....	.88	.....	.03	.11	.23	.49	.91	.60	.23	.12	.09

¹ Details may not add to totals because of rounding.

² The -0.01 percentage point contribution of the "dwellings occupancy ratio" is included in the contribution of "dwellings" for comparability with other countries.

³ Not elsewhere classified.

⁴ Estimate for 1955-62 period.

Source: Edward Dennison and William K. Chung, "Economic Growth and Its Sources," Hugh Patrick and Henry Rosovsky, Asia's New Giant (Brookings Institution, 1976).

tion, and increased employment—all factors which do not necessarily increase with higher capital formation—accounted for 80 percent of U.S. growth between 1948 and 1969 with increased capital inputs contributing 20 percent. Thus, it would require very large increases in capital formation in order to significantly influence the rate of economic growth. Growth of physical capacity sufficient to avoid bottlenecks and shortages is one thing. It is quite another to go beyond these levels and obtain significant benefits.

Alternatively, it has been argued that the U.S. investment rate has been deficient in the sense that investment is declining as a share of national output and the capital stock is getting older. But this is not evident from the available data. Investment has been very stable as a share of GNP over the postwar period and actually rose slightly during the 1960s. Department of Commerce data indicate a steady decline in the average age of the capital stock throughout the postwar period. The average age of the gross capital stock fell from 14.2 years in 1950 to 11.6 years in 1960 and 9.8 years in 1973.

On the other hand, there are those observers who point to higher shares of GNP going to investment in other countries (true) and higher growth rates in those countries (also true). From this they infer that the high capital formation caused the higher growth rates. However, as shown in Table 4, the sources of the differences are more complex. The most important factors for other countries were the adoption of new technology—technology already being used in the United States—economies of scale associated with expanded international markets and the shift of employment from agriculture to industry. Business fixed capital formation accounted for only 16 percent of Germany's economic growth in the 1950–62 period, and 12 percent in France, compared with 9 percent for the United States. The study of Japan implies that capital formation accounted for only 12 percent of the growth between 1953 and 1971. Nor is it true that these countries have now caught up to the United States in terms of technology and adoption of production techniques. The recent practice of comparing living standards by use of exchange rates is a completely misleading exercise. Average income per capita when valued in terms of real living standards remains sharply below the U.S.; and, on average, U.S. industry remains far more efficient than that of other countries.¹¹ Since they have access to the same technology and resources as the United States, we should expect the differences to continue to narrow; but this process does not imply that the U.S. is falling behind. Artificial differences arising out of World War II cannot be maintained forever.

Nor should one assume that the causation in other countries runs from higher savings to higher investment. An increase in savings without a matching rise in investment can only lead to reduced total demand and recession. In trying to catch up with the postwar technology of the United States, European countries have had strong pent-up demands in the investment area. While they have been economies with high private demand and continuing need for government restraint, the U.S. has more frequently been an economy of weak private demand and a need for stimulus.

¹¹ See, for example, Irving Kravis et al. *A System of International Comparisons of Gross Product and Purchasing Power* (Johns Hopkins Press, 1975); and Ed Denison and W. K. Chinn, "Economic Growth and Its Sources" in H. Patrick and H. Rosovsky, eds., *Asia's New Giant* (Brookings Institution, 1976).

Finally, it should be kept in mind that the U.S. comparative advantage lies in industries with low physical capital requirements and high human capital needs. In a nonagricultural sector, our exports reflect high levels of human capital while our imports are more intensive in physical capital. We import cars and steel, but export computers and other more advanced capital goods.

In conclusion, the process of economic growth is much more complicated than suggested by a view whereby greater physical capital formation leads to an accelerated growth rate. Capital is but one of the inputs. To be effective, a stimulus to capital formation would have to be coordinated with efforts in several other areas to expand supply and to insure an adequate growth in demand.

SPECIFIC INDUSTRY SHORTAGES

The events of 1972-74 did reveal a particular serious aspect of capital adequacy in connection with the problem of composition and specific industry shortages. Severe bottlenecks were encountered in some basic materials despite relatively high levels of indicated excess capacity on average. The problem became less evident during the general recession, but it may occur again in the future expansion.

In part, the problems of 1972-74 were the result of an unusual combination of special factors. First, the devaluation of the dollar sharply changed the competitive position of the U.S. in world markets. Industries where domestic production was declining because of increased imports were suddenly faced with the need to expand capacity. While normal market mechanisms of higher returns raising the incentive to investment were operating, this additional capacity could not be created overnight. Second, the prior recession of 1969-70 had sharply reduced investment incentives during that period. New capacity that would have normally been available in 1973-74 was not undertaken during those recession years. Third, the abrupt introduction of new environmental standards made obsolete some capacity without the provision of adequate time to phase in new plants. Fourth, in several industries long lags in the approval of licensing requests had drastically lengthened the time required to create additional capacity. If firms are to be required to anticipate demand far into the future, mistakes will be made and shortages must be expected. Fifth, the Arab oil embargo disrupted the normal flow of component parts based upon petroleum by-production into the manufacturing sector. Sixth, price controls did contribute to supply shortages in some industries where prices were held down despite the existence of excess domestic or foreign demand. Seventh, an extreme shift of monetary policy between 1969 and 1972 toward expansion contributed to an excessive boom in construction activity. Such a rapid rise in the demand for construction materials would not be quickly met and shortages of lumber, cement, and other products were widespread. Finally, sharp realignments of the world exchange rate system, the food crisis, and the oil embargo, led to extreme speculation in other international markets for raw materials in 1973-74.

Many of these specific bottlenecks seem to be correctable by normal market forces and do not necessitate special measures. If greater atten-

tion was devoted to maintaining a steady, sustainable rate of real demand growth, planning errors and uncertainty would be reduced. If decisions on licensing were speeded up, the lags in producing new capacity would be shortened substantially. Changes in regulation also should take more account of the disruptive influence of sudden changes. Greater use should be made of effluent taxes in the pollution area so that the transfer to alternative technologies could be accomplished more smoothly.

The supply shortage and extreme price movements which occurred during this period of severe economic change should not be viewed as a permanent state of affairs. But, they did clearly indicate that the United States is part of a world economy which it cannot fully control, and that supply disruptions of basic commodities can have a major inflationary impact.

In addition, it can be very expensive in terms of capital costs to attempt to construct an adequate margin of capacity in the capital-intensive materials industry sufficient to meet all potential transitory surges in world demand or temporary supply disruptions. Over the long term it would seem to be more effective to meet these problems by encouraging the accumulation of reserve stocks and cooperating with other nations to develop programs to stabilize the more volatile markets.

In several respects this problem of capacity imbalances among industries and transitory market disruptions would seem to be the most serious aspect of the capital shortage issue. Yet, very little information is available on a detailed basis about capacity in such basic industries as steel. Many of the available indicators are based on projections of past trends or indirect indicators such as capital expenditures. The lack of information is even more severe for commodities whose prices are determined in world markets.

For the domestic economy significant improvements in coordinating the expansion of capacity could be made by a greater emphasis of stabilization policy on maintenance of sustainable growth in aggregate demand. In addition, more attention should be paid to coordinating our regulatory programs, speeding up the decision process on licensing requests, and more careful introduction of new regulatory measures.

The problem of raising new capital for the public utilities is a frequent illustration of these special problems. But the difficulties in this area result from poor policies of state regulatory agencies rather than a failure of the capital markets. The focus of public policy should be on attempts to improve the regulatory process rather than distorting the process further with incentives to encourage energy consumption with special tax measures or loan guarantees. In addition, because of large price increases, the future demand for energy is very uncertain and difficult to forecast. If efforts were made to shorten construction delays, the importance of these uncertainties would be greatly reduced.

THE CORPORATE ROLE IN FINANCING FUTURE INVESTMENT NEEDS

By ROBERT EISNER*

1. SUMMARY

Corporate investment, like all capital accumulation, contributes to future *gross* output. In many situations more rapid capital accumulation raises the rate of growth of output. The law of diminishing returns reminds us, however, that capital may ultimately be accumulated beyond the point where it adds to output as much as its own cost of production. Investment beyond that point contributes nothing to net output and brings not growth but decline.

Tax concessions and subsidies, accompanied by other government interventions, may foster overinvestment in particular forms of business capital. This may have been partly responsible for decreasing rates of return to capital observed in the last decade.

Corporate capital expenditures will contribute to economic growth to the extent that they are undertaken on the basis of free and unbiased calculation of their expected returns. Corporate investment and its contribution of economic growth will then be maximum if employment and real aggregate demand for output are full.

Rates of return in the corporate sector did decline in the last decade but have most recently recovered. What is relevant to attracting new amounts of equity investment is not, however, existing rates of return but the expected return on new capital. There is no reason to doubt that if aggregate demand is full and growing, the corporate sector will offer profitable investment opportunities which will attract a significant and fair share of what people are willing to save.

A falling rate of expected return would inhibit companies' desire to invest. The greatest threat by far to future capital spending is excess capacity and underutilization of existing human and capital resources. These lower the expected return on capital additions.

Current debt-inquiry ratios and their likely trend in the future are not a general threat to corporate growth and capital accumulation. They do create particular complications in regulated industries where minimum earnings-debt coverage requirements are imposed. Existing tax laws, which favor both debt-financing and purchase of equity on which likely taxed capital gains can be anticipated, offer government encouragement to corporate and certain other forms of investment at some expense in distorted allocation of resources.

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It is doubtful whether corporations do or should act as a major catalyst to economic growth. They should be free, without the strait-jackets of government controls and repressive taxes or the lures of tax credits, to contribute to the economic growth which flows out of the free decisions of those participating in a full employment economy.

That rate of growth will depend then upon the saving decisions among all of our population and the decisions to invest, in all kinds of capital—residential and non-residential construction, equipment, inventories, education, training, research and development—by corporations, unincorporated enterprises, government and households.

Projections of business investment into the 1980's are generally high, but not clearly outside the historical range of saving ratios. If the nation does choose to have high proportions of full employment income our financial markets and institutions should prove fully able to finance corporate investment.

Federal budget deficits do not generally crowd out private investment. Rather, as indicated by proper analysis of economic behavior within the framework of the fundamental identity between saving and investment, cutting the budget deficit either by raising taxes or reducing transfer payments to the public may reduce saving and investment. Whether government expenditures for goods and services divert resources from private investment depends upon the extent of employment and capacity utilization in the economy. At full employment, such increased government spending may decrease private investment. It also may increase *public* investment, as in education, health or transportation, at the expense of private consumption. With conditions of less than full employment, increased government purchases for goods and services are likely to stimulate increases in both private consumption and private investment.

Corporate investment should be viewed as part of a broad category of current activity which results in increases in future production. The corporate investment proportion of this total capital accumulation, reasonably estimated, comes to probably less than one-sixth. Monetary policies and tax incentives directed toward affecting business investment, to the extent that they are successful in their narrow purpose, may merely change the mix of broadly defined investment, without significantly influencing the total.

At full employment, measures to increase corporate investment can only succeed at the expense of other investment, unless people are persuaded to save a larger proportion of their income. It is not clear that the aggregate propensity to save is easily moved by measures affecting return to corporate investment. Neither is it clear that it should be government policy to attempt to alter by these means the proportion of their incomes that people would freely decide to allocate to anticipated future needs as opposed to current consumption. A policy of always providing for one's great-grandchildren, or jam tomorrow and jam the next day but never jam today, is not necessarily commendable.

A basic if rarely expressed issue in the financing of investment is the question of ownership of capital. Tax incentives which consist of lowering taxes on current owners of capital convey increased capital claims to these current owners. Easier monetary policy or stimuli to

bond financing mean that claims to capital will go more to lenders. A general income tax cut, by contrast, which might stimulate investment in response to a general increase in aggregate demand, would convey ownership of additional capital to those who increase their saving out of increases in after-tax income. Governmental measures to increase investment in human capital such as education and health, since we are not a slave society, would essentially give title to an increase in capital and hence increased sources of future income to the individuals acquiring the increased "stocks" of education and health.

Policy recommendations are consistent with a general approach of leaving investment decisions to the free market and free choice unless there are clear market imperfections which require correction. It does not appear that business firms should be persuaded by government tax incentives to purchase additional plant and equipment which would not, without such government intervention, appear profitable. We conclude, therefore, that rather than increase the investment tax credit or the extent of acceleration of depreciation for tax purposes or further enlarge the capital gains tax exclusions and deferrals, these interferences with free business decision-making should be removed.

An important measure from the standpoint of freeing capital markets, and improving equity in our tax system, would be elimination of a separate corporate income tax and the inclusion of corporate earnings in stockholders' taxable incomes. Corporations would then have every incentive to pay out dividends and would compete for their reinvestment on the basis of expected profitability. This would not necessarily raise the total of capital investment but it would contribute to a more efficient and productive allocation of such capital as is invested.

In the realm of monetary policy, all saving and financing might be made more efficient by removal of the prohibition of interest payments on demand deposits as well as restrictions on interest payments on savings accounts. Such action would enable small savers to secure the full benefit of returns stemming from competitive forces. As interest rates received would generally rise with expected rates of price increases, savers would then have a significant measure of protection from the ravages of inflation.

2. PROJECTED NEEDS FOR INVESTMENT

It has been widely alleged that future productivity, prosperity and growth as well as critical needs in the United States economy depend upon major corporate investment. It has been further alleged that erosion of corporate profits has impeded and will impede investment and that increased tax advantages are necessary and desirable to stimulate corporate investment. We shall examine these allegations and associated propositions in light of the historical record and economic analysis. This will lead to recommendations suggesting measures at considerable variance with current policy.

There have been many recent efforts to project "investment needs." A New York Stock Exchange study pointed to a "shortage" of some \$650 billion by 1985. Treasury Secretary William E. Simon, comparing his estimates of capital requirements in current dollars over the next decade with capital expenditures in current dollars over the last decade, came out with a gap of over two and one-half trillion dollars. without

however noting the noncomparability of prices. We also have estimates by Bosworth, Duesenberry and Carron, Chase Econometrics, Data Resources Incorporated, The New York Stock Exchange, Reginald Jones, Benjamin Friedman, the Wharton School, the Federal Reserve Board, Allan Sinai and Roger Brinner (DRI), a special study group of the Bureau of Labor Statistics, and the National Planning Association. Projections of gross private domestic investment as a ratio of gross national product over the years 1974 to 1985, or various subsets of that period, range from 13.9 percent (Chase Econometrics, 1975-80) to 19 percent (Chase Bank, 1975-85, and Wharton, 1982). A major study, prepared for the Council of Economic Advisers under the direction of Beatrice N. Vaccara of the Bureau of Economic Analysis, projected a need for \$986.6 billion in business fixed investment from 1975 to 1980, or 12.0 percent of cumulative gross national product, "in order to insure a 1980 capital stock sufficient to meet the needs of a full employment economy, and the requirements for pollution abatement and for decreasing dependence on foreign sources of petroleum."

Some of the figures in this set are not out of line with past experience. Indeed, the 15.8 percent ratio of gross private domestic investment to gross national product projected for 1980 by Bosworth, Duesenberry and Carron is just about the mean for that variable in the 1950's as well as in the pre-recession year of 1973. It was however greater than the mean of those ratios for the 1960's. If we eliminate residential construction and restrict ourselves more narrowly to business investment we find projections for 1980 higher than the historical record of the fifties, as the share of residential construction falls.

3. THE RECORD AND PROSPECTS FOR FINANCING CORPORATE INVESTMENT

Not only is business investment merely part of conventionally defined gross private domestic capital formation. It is a much smaller part of total investment or capital accumulation in the economy, a matter to which we will return later. Corporate investment though is only part of business investment, in that some capital expenditures are of course undertaken by unincorporated business.

Nevertheless, it is instructive to compare the cash flow of corporations alone with total business expenditures for plant and equipment. If we take cash flow net of dividends—undistributed corporate profits plus capital consumption allowances—after both inventory valuation adjustment and the new capital consumption allowance adjustment of the Bureau of Economic Analysis,¹ we find that there has not been a uniform shortfall of these gross undistributed profits against business expenditures for plant and equipment. As shown in Table 1, in recent years there was a significant shortfall in 1970, and similarly in 1974 as the onset of recession caught profits while business plant and equipment spending, reacting with a lag to the economic downturn, was still high. By the first quarter of 1976, however, gross undistributed corporate profits, at an annual rate of \$133.6 billion, were sharply in excess of \$114.7 billion of business expenditures for plant and equipment.

¹ As noted below (p. 13), this adjustment does not change the total of gross profits, since profits before taxes are reduced by the amount that capital consumption allowances are raised and the BEA's adjustment has no effect on the IRS imposition of taxes.

TABLE 1.—CORPORATE CASH FLOW, WITH INVENTORY VALUATION AND CAPITAL CONSUMPTION ALLOWANCE ADJUSTMENTS, AND BUSINESS EXPENDITURES FOR PLANT AND EQUIPMENT

Year and quarter	Profits after taxes ¹	Undistributed corporate profits ¹	Capital consumption allowances ²	Profits after taxes plus Capital consumption allowances	Undistributed corporate profits plus Capital consumption allowances	Business expenditures for plant and equipment
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1955.....	\$22.5	\$12.2	\$19.5	\$42.0	\$31.7	\$29.53
1960.....	23.9	11.0	27.5	51.4	38.5	36.75
1965.....	46.2	27.1	33.7	79.9	60.8	54.42
1970.....	33.4	10.5	55.1	88.5	65.6	79.71
1971.....	39.5	16.5	60.6	100.1	77.1	81.21
1972.....	50.5	25.9	65.4	115.9	91.4	88.44
1973.....	51.9	24.1	71.9	123.8	96.0	99.74
1974.....	38.7	7.6	82.1	120.8	89.7	112.40
1975.....	55.1	22.3	94.0	149.1	116.3	113.49
1973-I.....	54.2	27.7	68.6	122.0	96.3	96.19
1973-II.....	50.7	23.5	70.7	121.4	94.2	97.76
1974-III.....	51.1	23.0	72.5	123.6	95.5	100.90
1975-IV.....	51.7	22.3	75.6	127.3	97.9	103.74
1974-I.....	50.2	20.2	77.5	127.7	97.7	107.27
1974-II.....	42.3	10.8	80.1	122.4	90.9	111.40
1974-III.....	30.0	-1.8	83.4	113.4	81.6	113.99
1974-IV.....	32.8	1.1	87.2	120.0	88.3	116.22
1975-I.....	41.4	9.3	89.1	130.5	98.4	114.57
1975-II.....	55.0	22.4	91.6	146.6	114.0	112.46
1975-III.....	62.4	28.9	95.5	157.9	124.4	112.16
1975-IV.....	60.5	27.4	97.7	158.2	127.1	111.80
1976-I.....	66.8	33.5	100.1	166.9	133.6	114.72

¹ Including inventory valuation adjustment and capital consumption adjustment.

² Including capital consumption adjustment.

Sources: Survey of Current Business, January 1976, tables 1.13, 5.1; June 1976, tables 5, 10, 11. Economic Report of the President, 1976, tables B-12, B-38. Economic Indicators, February 1976, pp. 3, 7, 9.

If we take all of gross profits, before distribution of dividends, we find the total almost uniformly considerably higher than business fixed investment. A look at the sources and uses of funds for non-farm, non-financial corporate business reveals in fact that while there has been a substantial increase in external relative to internal funds, that is, the undistributed gross profits, there has also been substantial use of funds to increase financial assets. Major fluctuation of purchase of physical assets and financial assets has been associated with major fluctuations in external financing. Internal financing has dipped in recessions but considerably less than external financing.

Benjamin Friedman, in a paper on "Financing the Next Five Years of Fixed Investment," (*Sloan Management Review*, Spring 1975, p. 52) writes, "To an unusually great extent, financial considerations may act during this period [1977-81] as effective constraints on the amount of fixed investment which the economy in aggregate is able to do." Projecting a 3.7 percent real growth and 5.0 percent inflation, he foresees a ratio of gross private domestic investment to GNP equal to 15.8 percent and of plant and equipment expenditures to GNP of 11.5 percent, the latter considerably higher than the 9.5 percent ratio for 1950 to 1964 and the 10.5 percent from 1965 to 1974. Yet, Friedman argues, "were it not for financial constraints, the investment share would be even greater" (p. 56). In his reasoning he points to huge energy investment projects of \$6 billion for the Trans-Alaska Pipeline System and \$10 billion for the Canadian Arctic Gas Project, along with massive investments for expansion and innovation in the production of coal and in pollution control.

Moving more closely to the question of financing, we may note, in Table 2, projections by Bosworth, Duesenberry and Carron as to proportions of internal and external financing and the breakdown of external financing of business investment. It does become apparent that the proportion of business investment to be financed externally was expected to grow in the 1974-80 period to over one-quarter as compared to little over 10 percent in the 1961-75 period. What is more, the proportion of external funds raised by corporate bonds as opposed to corporate stock is expected to rise again after relative decline in the early 1970's.

TABLE 2.—INVESTMENT, FINANCING, AND ASSETS OF THE BUSINESS SECTOR,¹ SELECTED PERIODS, 1961-80
(ANNUAL AVERAGES)

(In billions of dollars)

Description (1)	1961-65 (1)	1966-70 (3)	1971-73 (4)	1974-80 (5)
Business investment:²				
Total.....	72.3	110.6	146.5	251.5
Internal financing.....	64.6	86.5	112.6	186.9
External financing.....	7.7	24.1	33.9	64.6
External funds raised:				
Long-term.....	14.4	28.0	54.3	75.3
Corporate bonds.....	5.7	15.4	18.4	33.2
Corporate stock.....	0.8	2.8	10.4	12.3
Commercial mortgages.....	4.4	5.6	13.8	15.3
Residential mortgages.....	3.5	4.3	11.7	14.5
Short-term.....	8.0	14.8	25.5	35.5
Bank loans.....	6.8	10.3	23.0	28.9
Open market paper.....	1.2	4.7	2.5	6.6
Assets accumulated:⁴				
Liquid.....	3.1	2.3	11.9	6.0
Consumer credit.....	2.9	2.4	5.9	7.3
Residual ⁵	8.7	14.2	27.9	32.9

¹ The business sector includes all nonfinancial business and finance companies.

² Projected.

³ Investment and internal financing follow the definition of BDC table 2-13, with the addition of direct foreign investment.

⁴ Total external financing minus assets equals external financing needed.

⁵ Residual assets include net trade credit, residual financial asset items, and statistical discrepancy.

Source: Barry Bosworth, James S. Duesenberry, Andrew S. Carron (BDC), Capital Needs in the Seventies, Brookings, 187 table 3-3, p. 60.

Looking more narrowly at the total sources and uses of funds by nonfinancial corporate business, as estimated by Friedman, we may note in Table 3 that of \$301 billion per year of net funds projected to be taken by corporate business in 1977-81 some two-thirds would go to plant and equipment investment but about one-sixth would go to financial investment, building up liquid assets and in particular extending trade credit to firms with less ready access to money markets.

If we turn to sources of funds, we note that Friedman's projections for 1977-81 suggest a continuation of the large role of external funds. As in 1970-74 they would come to close to half of the total, a considerably larger proportion than in earlier years. Corporate bonds and bank loans are projected to rise somewhat more than proportionately, equity issues somewhat less. Among internal funds, there is an increase in the relatively small share attributable to repatriated foreign earnings, with undistributed profits and the major item of capital consumption allowances roughly keeping pace. Were capital consumption allowances revised to allow for replacement cost but not for accelerated depreciation related to tax advantages, as in the new National Income Accounts,

TABLE 3.—NONFINANCIAL CORPORATE BUSINESS, SOURCES AND USES OF FUNDS—AVERAGE ANNUAL NET FLOWS

[In billions of current dollars]

	1970-74	1977-81
	(1)	(2)
Total sources.....	146.9	301.0
Internal funds.....	74.4	155.1
Undistributed profits.....	21.6	44.2
Profits before tax.....	80.1	163.0
Profits tax accruals (—).....	35.3	72.7
Net dividends paid (—).....	23.3	46.1
Repatriated foreign earnings.....	4.0	11.5
Inventory valuation adjustment.....	-14.0	-19.6
Capital consumption allowances.....	62.9	119.0
External funds.....	72.5	145.9
Equity issues.....	7.8	12.0
Corporate bonds.....	15.8	32.0
Mortgages.....	11.8	23.5
Commercial.....	9.3	19.5
Other.....	2.6	4.0
Bank loans.....	16.3	36.5
Trade debt.....	13.4	26.0
Open market paper.....	1.1	4.5
Other sources.....	6.3	11.4
Total uses.....	135.2	282.0
Physical investment.....	104.2	222.5
Plant and equipment.....	91.0	198.0
Residential construction.....	4.5	9.0
Inventory accumulation.....	8.7	15.5
Financial investment.....	31.0	59.5
Liquid assets.....	6.6	14.0
Trade credit.....	17.2	33.5
Other financial.....	7.2	12.0
Sector discrepancy.....	11.7	19.0
Total uses and discrepancy.....	146.9	301.0

Source: Benjamin M. Friedman, "Financing the Next Five Years of Fixed Investments," Sloan Management Review spring 1975, tables 6 and 70, p. 70, 72.

capital consumption allowances would be larger, at the expense of undistributed profits, but the total would of course be the same.

The data on financing do not suggest critical problems in this area. In general, past patterns and trends are expected to continue. Even if they did not, however, it is difficult on analytical grounds to see serious constraints to investment which are at root financial. To do so would be to deny the essential efficiency of our capital markets, a major indictment indeed of some of the most fundamental operations of our economic system.

One might well argue that tax laws, particularly regarding corporate profits and capital gains, should be altered to encourage freer flow of funds to the most profitable investment opportunities. This could be accomplished by integrating the corporate and individual income tax so that individuals are taxed on their share of corporate earnings whether distributed or not. If, along with this, individuals' shares of capital gains were taxed as accrued, there would be every incentive for firms to distribute earnings and then go back into the market on a competitive basis to finance investment. In such a situation, firms with less profitable investment opportunities would do less investing and might prove less likely to use undistributed profits for the acquisition of other existing companies and assets.

Individual firms may well believe themselves pinched by financial shortages in the face of what appear to them to be attractive investment opportunities. But in any economy where resources are not free, there are opportunity costs to investment. Costs to an individual firm, financial and non-financial, reflect market valuation of alternative uses of desired resources. If an individual firm finds that it cannot obtain

funds at a sufficiently low cost to warrant their use in investment, this in principle implies that there are other uses of those funds which are deemed more valuable.

Where in the aggregate, firms feel that they cannot profitably finance as much investment as they wish, households, non-profit institutions and governments and government enterprises apparently have exercised superior claims to the additional resources which business might elect to have for more investment. This, ultimately, is not a financial constraint but a real constraint imposed by the limitation of resources on the one hand and society's preferences, expressed both individually and socially, on the other.

4. THE RATE OF RETURN TO CAPITAL

Probably of more moment than the distribution of financing as between internal and external funds and debt and equity is the rate of return on capital. A study by William Nordhaus, "The Falling Share of Profits," *Brookings Papers Economic Activities*, I: 1974, suggests a drop in the "genuine" rate of return on non-financial corporate capital. It fell fairly steadily from its high of 10.0 percent in 1965 to a plateau of around 5½ percent in the 1970's, before the current or recent recession, as shown in Table 4. This genuine rate of return involves a depreciation adjustment akin to that now incorporated in the National Income Accounts and the inclusion of net interest in the numerator and the total value of non-financial corporate capital rather than net worth in the denominator.

TABLE 4.—RATES OF RETURN ON NONFINANCIAL CORPORATE CAPITAL, BEFORE AND AFTER TAXES, 1948-73
[In percent per year]

Year (1)	"Genuine" rate of return ¹	
	Before tax (r ₁) (2)	After tax (r ₂) (3)
1948.....	17.3	9.7
1949.....	14.5	8.8
1950.....	16.7	7.5
1951.....	16.5	6.4
1952.....	13.8	6.0
1953.....	13.3	5.5
1954.....	12.5	6.2
1955.....	15.5	7.9
1956.....	13.4	6.5
1957.....	12.2	6.1
1958.....	10.4	5.4
1959.....	13.0	6.8
1960.....	12.0	6.3
1961.....	11.8	6.3
1962.....	13.5	7.9
1963.....	14.0	8.1
1964.....	15.0	9.1
1965.....	16.3	10.0
1966.....	16.1	9.9
1967.....	14.0	8.8
1968.....	14.0	8.1
1969.....	11.6	6.4
1970.....	9.1	5.3
1971.....	9.6	5.7
1972.....	9.9	5.6
1973.....	10.5	5.4

¹ The "genuine" rate of return is the "genuine" capital income, including net interest and a depreciation adjustment, divided by the net stock of capital. All values are undeflated. The denominator for all calculations is the net stocks of all nonfinancial corporate capital, including an adjustment for valuation of Government surplus assets in current prices. The data are from John A. Gorman, "Nonfinancial Corporations: New Measures of Output and Input," *Survey of Current Business*, Vol. 52 (March 1972), table 3.

Source: William D. Nordhaus, "The Falling Rate of Profit," *Brookings Papers on Economic Activity*, I: 1974, table 5, p. 180.

Part of the decline in the rate of return may be attributed to an increase in the effective rate of corporate taxation on genuine income. For while the widening of tax loopholes, particularly accelerated depreciation and the equipment tax credit, tended to reduce the nominal tax rate on corporate income, the effect of inflation was to add to taxes a large share of inventory appreciation not included in genuine profits.

Inflation also had the effect of increasing the attractiveness to business of debt-financing. The higher interest rates associated with inflation meant increased deductions from taxable income while the erosion of real value of principal, a major loss to bondholders, contributed to a capital gain on the part of holders of business equity.

Evidence of a secularly declining rate of return on non-financial corporate capital may be questioned. The 1973 rate was still by Nordhaus' calculations approximately equal to the returns for 1953 and 1958, both recession years. The rapid upsurge of corporate profits in 1976 may, however, be signalling a new boom in the rate of return on capital, following upon some years of recession and pre-recession sluggishness. Further, what may be most relevant to investment decisions is the expected rate of return on equity. For many highly levered corporations real losses to owners of corporate bonds corresponded to substantial capital gains on equity.

To the extent that the rate of return on capital has been declining, however, it may well relate to the "deepening" of capital brought on by a tax structure which, contrary to views expressed by some business spokesmen, has been heavily weighted in recent years in favor of business investment in plant and equipment. For one thing, beginning in a major way with the introduction of sum-of-years digit and double-rate declining balance in the tax code in 1954 and extending through guideline depreciation, asset depreciation range "liberalization," general shortening of lives, and introduction of the equipment tax credit beginning in 1962 and recently increased to 10 percent, there have been substantial new tax incentives for business investment. In addition, interest costs have continued to be tax deductible and capital gains exclusions have proved relatively more attractive with higher nominal individual income tax rates associated with inflation.

The tax treatment—or non-treatment—of capital gains invites major distortions in the allocation of resources to investment. More important than the exclusion of half of realized capital gains from ordinary taxable income is the lack of any tax on capital gains as they are accrued or even when realized in gifts or bequests. Substantial tax advantages are thus offered to investment and reinvestment in assets which yield appreciation rather than taxable income.

This has clearly been an important motivation for investment in corporate equity. Particularly in times of general prosperity and stock-market boom, it would operate to distort the economy in the direction of considerably greater corporate investment than would be undertaken aside from tax considerations.

The capital gains exclusions do also affect other forms of investment, which may sometimes be at the expense of corporate capital expenditures. For one thing, of course, homeowners, particularly if they have benefitted in periods of rising prices from fixed-interest long-term mortgage debt, have learned that the real cost of investing in residences can be quite small, even negative. The capital gains exclusions have also

encouraged major investment in land and other resources. To the extent that such investment has resulted in capital gains of which the proceeds have gone to consumption, it may be argued that current capital gains tax treatment has diverted resources from productive investment both to consumption and to the conduct of real estate and financial transactions which add nothing to final output.

It would certainly appear, however, that on balance the absence of substantial, effective taxation of capital gains has offered significant incentive to investment, and particularly corporate investment where gains from appreciation are immediately apparent in marketable securities and are hence available as collateral for borrowing or for direct realization.

The equipment tax credit and accelerated depreciation are of course specific tax advantages directed to the stimulation of business investment. There has been considerable dispute as to their effectiveness. They may be viewed as supplements to capital gains exclusions and indeed interact with them to enhance the possibilities for avoiding or deferring taxation on ordinary income. Whatever the total magnitude of the effects of the various tax advantages for business investment, it should be recognized that if the demand for additional capital has in fact been relatively inelastic, even modest increases in investment might have in a relatively short period created an over-supply of capital which would lower its rate of return.

5. THE FUNDAMENTAL IDENTITY BETWEEN SAVING AND INVESTMENT

All projections of future investment are constrained by a fundamental identity between saving and investment, the nature if not the very existence of which is sometimes forgotten. It may be instructive, to note, in our Table 5, projections of an increase of gross private domestic investment of some \$100 billion for 1975 to 1977, and how they square with the fundamental identity. We see that gross private domestic investment always equals what we may call gross private domestic saving, or gross private saving plus the government budget surplus (or minus the deficit) minus net foreign investment, with a relatively small statistical discrepancy.

TABLE 5.—SAVING AND INVESTMENT, WHARTON ESTIMATES AND PROJECTIONS,¹ 1975, 1976, AND 1977

[In billions of dollars]

	Year			Change from 1975-77
	1975	1976	1977	
Gross private domestic investment (GPD) ²	170.7	226.9	271.4	100.7
Personal saving.....	19.7	103.9	108.8	17.1
Undistributed corporate profits.....	41.8	62.2	73.3	31.5
Inventory valuation adjustment.....	-10.0	-9.1	-8.1	1.9
Capital consumption allowances.....	123.7	139.0	153.4	24.7
Gross private saving (GPS).....	252.2	296.0	327.4	75.2
Federal budget surplus or deficit (-) (NIA basis).....	-73.6	-77.1	-72.6	1.0
State and local budget deficit (-) (NIA basis).....	2.0	12.8	16.7	14.7
Total Government budget surplus or deficits (-) (GBS or D).....	-71.6	-64.3	-55.9	15.7
Statistical discrepancy (SD).....	-0.5	0.2	0.2	.7
Net foreign investment (NFI) ³	9.3	5.1	0.4	-8.9
Gross private domestic saving (GPDS=GPS+GBS or D+SD-NFI).....	170.8	226.8	271.3	100.5

¹ Wharton mark IV quarterly model, January 30, 1976, premeeting control solution.

² Equals net exports minus net Federal Government transfers to foreigners minus net personal transfers to foreigners (and also minus Government interest payments to foreigners in the newly revised income and product accounts).

The identity is sometimes forgotten. At other times it is endowed mistakenly with behavioral significance. Thus, it is correct to observe that gross private saving may go to finance gross private domestic investment, to finance net foreign investment, or to finance federal or state and local budget deficits. It is improper, however, to hold all but two of the aggregates constant and then to conclude *from the identity* how varying one would vary the other. Thus, it may be correct but quite misleading to say that with given gross private saving (and budget deficit), increasing net foreign investment will decrease gross private domestic investment. For the increase in net foreign investment may result in greater output, income and saving and hence *more* gross private domestic investment.

Similarly, and perhaps more central to public discussion, it is correct but misleading to state that with a given rate of gross private saving, an increase in the federal budget deficit would reduce investment, or that a decrease in the deficit would raise investment.

First, it may be noted that if the federal budget deficit is increased by transferring more funds to state and local governments, there may merely be an increase in the federal budget deficit matched by a decrease in state and local budget deficits or increases in state and local budget surpluses. Second, if an increase in the federal budget deficit is accomplished by a cut in personal income taxes, the immediate effect would be an increase in after-tax personal income and in personal saving. If some of the increase in after-tax income goes into consumption spending, this may further increase income and personal saving or perhaps increase corporate profits and undistributed corporate profits. If the federal budget deficit is increased by a cut in the corporate profits tax, it is readily apparent that the immediate effect is an increase in undistributed corporate profits. Quite similar arguments would apply to increases in transfer payments, such as for social security benefits.

This analysis should make clear that widely expressed arguments that large federal budget deficits are threats to investment or, by absorbing private saving will "crowd out" investment, at least to the extent they are based upon the saving-investment identities, are quite fallacious.

Working behind the saving-investment identity are real factors of resource allocation. These relate not to budget deficits, transfer payments or taxes per se. If taxes and transfer payments merely redistribute income or purchasing power, they have no *prima facie* effect upon investment, corporate or otherwise. They will affect the distribution of consumption and the distribution of ownership of assets, both of which may be politically sensitive issues. But, frequent loud arguments to the contrary notwithstanding, they are of uncertain direction in their influence, if any, on the aggregate of investment.

However, government actions that affect directly the allocation of resources, such as government purchases of goods and services or categorical transfer payment, as for health care, may affect the composition and even the aggregate of saving and investment. Where the government takes more resources for defense or education or health services, fewer resources are available elsewhere. The remaining resources may still be divided in the same proportions among production of current consumption goods and services and production of capital

goods but the total of each may be less than if the government had not reserved some resources elsewhere.

This, of course, applies to a situation of full employment. With less than full employment, government purchases of goods and services or transfer payments to bring about their production may actually increase total production, consumption and saving in the rest of the economy. And finally it should be noted, in connection with the broader view of investment to be considered below, that certain government expenditures, as for education, health, or transportation may involve significant and major public investment.

6. A BROADER VIEW OF INVESTMENT

These considerations should lead us to a much broader view of basic determinants and costs of corporate investment. One may be seriously misled by too narrow a view, particularly that of an individual firm. Here it may appear that the availability of funds is a simple, overwhelming determinant of the rate of capital expenditures. Even in this instance, one may readily document the fact that most large firms make capital expenditures to the extent that they appear sufficiently profitable. For the giants of American industry that do the bulk of capital spending, funds are available. The question is whether the profitability of their use is sufficient. And the expected profitability of use of funds varies considerably more than their cost.

Where profitable opportunities dwindle it may appear that the high cost of funds is discouraging investment. But were profitability high, that same high cost would not discourage investment. Even availability may be an evidence of expected profitability. Banks and other investors will be reluctant to make funds available if investments do not appear sound, that is, profitable.

Ultimately the total amount of saving and investment in the economy may be seen to depend upon total income and output on the one hand and proclivities to save for future consumption instead of consuming now. As long as employment is less than full and output and income are hence less than the total of which the economy is capable, saving and investment can and would be increased by coming closer to full employment. Given a situation of less than full employment, virtually any increase in output, whether of consumer goods or goods and services produced by or purchased by government, would also generate more saving and investment. The underlying economic relation indicating that higher income implies more saving and investment is relatively unassailable.

The financial counterparts to this underlying real relation may be varied. With a higher national income, there may be greater personal saving, more in the way of undistributed corporate profits, elimination of dissaving by the unemployed and financial flows in one way or another from the savers to those requiring real capital, to the extent those in these categories are not identical.

Once full employment is attained, the story is a different one. Any attempts now to increase investment, that is output not contributing to current consumption, must involve a reallocation of resources rather than merely the utilization of previously idle people and productive capacity. In such a situation, difficulties experienced by corporations

in financing more investment may reflect simply the reluctance of consumers or government, or investors other than corporate business, to give up their shares of output.

While fiscal and monetary measures may well bring about some alteration in the mix of output for current consumption and investment for the future, much of their effect is rather to alter the composition of investment itself. Investment may properly and usefully be viewed more broadly as all current output or productive activity which contributes to future output. Alongside of the traditionally included business acquisition of plant, equipment and additional inventories, we should then place similar acquisitions by government, federal, state and local, and by non-profit institutions. We might also note that acquisition of automobiles by households are as much investment as similar acquisitions by taxi companies or firms. Washing-machines and dishwashers acquired by households are as much investment as those acquired by laundromats or restaurants.

Not only are durable goods of households, government and non-profit institutions investment; so too are education and training, whether on-the-job, in school, or in the home. For these also contribute to future output. By many measures, the last dollars spent in education and training have been more productive than the last dollars spent on plant and equipment. In addition, we should include in investment child rearing expenses and provision for health and mobility, all of which make possible future output. And of course few deny that expenditures for research and development have contributed mightily to productivity. Our stock of knowledge is in many ways more valuable than our stock of brick and mortar. Much of the brick and mortar, of course, is conventionally counted as part of gross private domestic investment in the form of residential construction, but relatively little of this residential construction will be included in corporate investment.

Hence we find corporate investment a quite minor proportion of total capital accumulation in the economy. In connection with certain on-going research on extended concepts of national income and output, utilizing in large part recent estimates by John Kendrick, we take total capital accumulation in the United States economy during 1969, excluding "net revaluations" or capital gains, to be \$671 billion. Against this we may note that all non-residential business investment, corporate and non-corporate, amounted to only \$98.5 billion for structures and equipment and \$7.8 billion more for change in inventories. Non-residential business investment was thus less than 16 percent of all investment in the economy.

7. EFFECTS OF MONETARY POLICY AND TAX INCENTIVES

With corporate investment such a small proportion of total capital accumulation, measures intended to affect investment, either in terms of financing or expected rates of return, are frequently poorly judged if one concerns oneself exclusively with corporate investment. For example, the conventional view is that tight money, presumably leading at least in the short run to higher interest rates, will reduce investment. In fact, there is little evidence that tight money and higher interest rates discourage corporate investment. They do, however, have profound effects, in large part because of various governmental restrictions and institutional arrangements in mortgage markets, on in-

vestment in residential housing. Tight money may also choke off investment by relatively smaller and less credit-worthy unincorporated business. It may have very drastic effects on investment by state and local government and school districts. It may also make purchases of some consumer durables more difficult and, at least by its impact on the general level of income and output may also seriously affect investment in human capital. Yet, paradoxically, to the extent construction resources are freed from residential housing and government building, they may become more readily available for the erection of new business plant. It is possible then that tight money intended to discourage investment may actually increase corporate investment. Corporate fund raisers may well lament the higher interest rates that they pay and yet not note that lower construction costs (or less rapid rise in construction costs) or shorter delivery times are a consequence of the impact of tight money elsewhere in the economy.

Somewhat similar consequences may flow from tax incentives to encourage corporate investment. To the extent that tax cuts bring us closer to full employment by increasing demand they are likely to raise corporate investment and other investment as well. The casual chain may be somewhat more complicated, though, than often imagined. Thus an investment tax credit may influence business investment in considerable part by raising the value of corporate stock, hence increasing the net worth of stockholders, thus leading stockholders to buy more as consumers. This in turn creates pressure on capacity for the production of consumer goods and stimulates investment to meet this pressure.

But given full employment and full utilization of resources, tax incentives to stimulate corporate investment can only increase total investment if they increase the proportion of income saved. If the public is loathe to save more, higher after-tax expected returns to corporate investment will tend to raise interest rates and the opportunity cost of capital generally. They will thus lure resources into corporate investment at the expense of non-corporate investment, residential construction, investment by state and local government, and investment in human capital as well as those forms of corporate investment, such as expenditures for research and development or executive or employee training, which are not benefitting from the particular tax advantages accorded.

A prime issue in financing corporate investment, not often stated squarely, is that of ultimate ownership of new capital. Deductibility of interest payments for tax purposes, for example, encourages financing of investment by borrowing. The owners of additional capital then tend to be new bondholders. Accelerated depreciation and investment tax credits generate additional funds to corporations which enable them to undertake investments with less resort to the market, which means that current stockholders become the owners of the additional capital. Proposed measures to make dividend payments deductible on corporate income taxes would themselves raise after-tax corporate profits and hence increase the value of equity holdings by current stockholders. They would also encourage raising of funds by selling additional equity, so that the owners of additional capital would be both new and old stockholders.

At the other end of the spectrum, a general cut in income taxes, which stimulates investment by raising the demand for output, would

make some of those who save more out of their increased after-tax income owners of the additional capital acquired by business.

There has been considerable concern that relatively favorable tax treatment of interest expense has induced business to increase debt-equity ratios and decrease earnings-interest coverage to danger points. It is not clear that this has been a major factor either in determining the rate of corporate investment or in the bankruptcies or near-bankruptcies of large enterprises such as Penn Central and Lockheed. Particular strains are apparent in regulated industries such as electric power, which is highly capital-intensive. Here regulations on the required amount of earnings coverage for interest obligations have in some instances prevented utilities from raising funds by the sale of bonds, while the required yield on equity financing has been prohibitive.

8. POLICY RECOMMENDATIONS

Altering the corporate role in financing investment would seem to call for less rather than more in the way of government tax intervention and banking controls.

On the tax side, the major current subsidies of the investment tax credit, accelerated depreciation and capital gains exclusions should be eliminated rather than extended. If there is any place in the economy where free market forces should be allowed to operate without bias it is certainly in the field of business investment. If business investment appears profitable it should be undertaken. Otherwise it should not. There is no reason why a tax credit of \$10 should be used to convert a \$100 investment with an unprofitable \$95 after-tax payoff to one with a profitable \$105 payoff. Similar arguments apply to accelerated depreciation.

The current exclusion of half of realized capital gains from taxable income and the complete exclusion of unrealized capital gains along with capital gains passed on in estates in fact offers a major incentive to investment in corporate equity, along with other kinds of appreciable instruments and property. This tax treatment has the effect of unduly stimulating business investment while biasing resources and productive activity into channels which can create untaxed or lightly taxed capital gains as opposed to ordinary income. The failure to tax unrealized capital gains and capital gains passed on in estates is also a major source of the so-called "lock-in" effect which reduces the mobility of capital and the freedom of operation of our capital markets.

The six-month holding requirement to qualify for the capital gains exclusion would appear to be a minor consideration in restricting sales as compared to the tax liability on appreciated assets at any time after six months. Proposed changes in capital gains treatment that would reduce still further the tax rate on realized capital gains for assets held longer would have the perverse effect of increased lock-in. The holder of appreciated securities who knows that the tax rate will decline if he holds his securities longer would be all the more dissuaded from selling. Indeed he would only sell if he expected his securities to decline by more than the tax saving resulting from selling later. This lock-in tends to restrict the movement of capital from less profitable to more profitable firms and thus reduces overall productivity in the economy.

Some correction to these distortions would be found in at least taxing capital gains at death. Indeed further measures might well be taken to tax unrealized capital gains as they accrue. In the case of listed corporate securities it would be a simple matter for owners to report the last quotation of the year and the capital gain or loss from the previous year. To the extent that capital gains taxes were so extensive as to cause financing problems for their payment, the Treasury could permit delayed payment with, of course, appropriate interest charges. In fact, it is doubtful that such Treasury financing would be necessary, as loans on corporate securities are readily available from private banks as well as brokers.

Full taxation of capital gains as accrued should, if we are to restrict ourselves to taxing income rather than capital, permit deductions from taxable gains of the amount of capital appreciation associated with general price inflation. It should also permit full loss offsets as well as averaging to prevent progressive tax rates from unduly penalizing those whose gains are concentrated in time.

A further measure in the direction of improved financing of investment as well as a more equitable tax structure would be integration of the corporate and individual income taxes. The corporate tax itself would be abolished but individuals would include in taxable income their share of corporate earnings, whether paid out in dividends or not. The payment of dividends would thus be encouraged, all the more so if there were effective taxation of capital gains resulting from undistributed profits. Stockholders would have immediate access to corporate earnings. Businesses with the most profitable investment opportunities would prove the successful bidders for reinvestment of earnings. It may be added, in terms of equity, that inclusion of corporate earnings in individual taxable income would mean a more progressive rather than a less progressive tax structure. Marginal tax rates would be based upon individual earnings rather than set essentially at a flat 48 percent which is in turn at least partly passed on to all stockholders, the poor widow and orphan and the multi-millionaire alike.

In terms of monetary policy, a number of banking restrictions should be eliminated. Most important, the prohibition of interest payments on demand deposits should be eliminated and restrictions of interest payments on savings accounts should be removed. This would offer small investors the opportunity to earn market rates of interest and hence protect themselves against expected inflation. It should contribute as well to equalizing and stabilizing the availability of savings to corporate and non-corporate investors.

Finally, in terms of balanced growth, there should be every effort to make up for the inherent market imperfections in investment in human capital. Since we are not a slave economy, it does not pay businesses to invest adequately in human capital of employees. For however valuable that capital, it is difficult for firms to prevent employees from enjoying the return to this capital with new employers.

The one major role of government in assisting the financing of investment is the indirect one of maintaining a level of aggregate demand sufficient to attain full employment. This may be done by keeping tax rates sufficiently low and transfer payments or government expenditures for goods and services sufficiently high. The historical record as well as sound economic analysis should be absolutely clear. It is not

budget deficits or federal debt that create problems in financing or implementing corporate investment. The greatest deterrents of corporate capital expenditures are the excess of capacity and general unemployment of resources associated with inadequate aggregate demand. From the beginning of 1974 to the third quarter of 1975, while unemployment rose from 5.2 percent to between 8½ and 9 percent, real non-residential business fixed investment fell 17.8 percent, from 134.5 to 110.6 in billions of 1972 dollars. The attainment and maintenance of full employment is certainly the greatest possible governmental contribution to the long run health and growth of corporate capital expenditures.

Corporate capital expenditures will contribute to economic growth to the extent that they are undertaken on the basis of unbiased calculation of their expected returns. It is correct that capital accumulation contributes to future output. In many situations more capital accumulation raises the rate of growth of output.

But this is not necessarily always so. Even in the aggregate, capital may be accumulated beyond the point where it adds to output as much as its own cost of production, that is, beyond the point where, with diminishing returns, the marginal net product turns negative. It is certainly true that distortion of the allocation of resources to particular forms of investment may bring negative net returns. At the least, the tax expenditures and subsidies or other forms of government intervention may lead to a substitution of less productive for more productive investment, thus reducing the rate of economic growth.

Finally, it must be recognized that growth has fuller dimensions than market output. Capital expenditures to abate pollution, reduce noise, and generally improve the environment may not add to market output. They may indeed prove to be substitutes for market output. Various public expenditures as well may lead to the production of services not valued or undervalued in conventionally measured gross national product. Such expenditures should also be undertaken only so long as the value of their marginal return is greater than or at least equal to their marginal cost. But where this is true, these capital expenditures, by government, households, and non-profit institutions, as well as business, should be recognized as contributing to the maximization of social welfare.

Ultimately, it should be recognized that economic growth is not a good in itself. It is not necessarily desirable that we have more in the future than in the present. It is not axiomatic that all of us should sacrifice now in the prospect that our great-grandchildren should live better in the future or that any of us should be forced to sacrifice more when we are young in order to live better when we are older. Unless some countervailing public imperative can be found, it seems best to leave these decisions to individual free choice.

It remains overwhelmingly important that our choice be made within the freedom to work as much as we wish and to realize our full potentials in the way of developing all of our capital, physical and human. Within that context and with proper attention to the "externalities" of the environment in which we all live, corporate business, so far as it is freely competitive, yet neither shackled by inappropriate government controls nor lured by tax loopholes, may be expected in its investment decisions to contribute optimally to economic growth.

THE IMPACT ON FEDERAL TAXATION ON AGGREGATE SAVINGS AND INVESTMENT

By GERARD M. BRANNON*

SUMMARY

People who tell you some rate of savings or some rate of economic growth is "required" are frauds. Whether we should have more, or less growth is a matter of choice. Tax policy is a way that government can influence the private decisions which constitute our growth rate.

Heretofore our tax policy has incorporated a number of highly progressive features which could, if allowed to operate, bring about much income redistribution. The government, Congress and Administration, have built into this many growth incentive devices nearly all of which serve to reduce the taxes of the rich, who get the largest tax incentives.

The paper demonstrates that if the society wants a faster growth policy it is possible to achieve this without tax policies that undermine progressivity. The proper direction in which to go is to seek policies which increase the savings on low and middle income taxpayers.

One specific way to change the present tax structure is to change part of the present income tax into a value added tax or general sales tax. It is demonstrated that this change does not make the tax system more regressive. (That the sales tax is regressive is a bit of cultural lag that is emphasized by people who don't bother to think about the total tax system.)

Another important way to change the present tax structure is to integrate the corporate income tax with regard to retained earnings. The widely held view that the only thing wrong with the corporate income tax is the double taxation of dividends is quite inadequate. The present treatment of retained earnings under taxes rich investors and over taxes poor investors.

Both of these proposals rely on a judgment that *at lower wealth levels* savings increase in response to higher rates of return after tax. We think the inconclusive evidence from studies of the response of aggregate savings to rate of return pick up an income effect which operates only on large wealth holders. Raising their rate of return substantially increases their permanent income and could lead to higher present consumption. This effect should not operate on people whose initial wealth is small.

A third way to increase savings of low income investors is to convert the Social Security System to more reserve financing which would permit liquidation of some publicly held federal debt with those funds

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going into private investment. Since government will, through taxes, enjoy a gain from the higher private investment, the rate of return on reserves held by the Social Security System should be considerably above the long term government bond rate.

This paper does not attempt to recommend particular tax rates. This is inherently a cooperative enterprise. Other papers in this series will offer quantitative estimates on how much additional income will flow from more investment. Still others will relate to the response of savings. Still others will relate to the welfare analysis of exchanging future income for present consumption. Specific recommendations depend on judgments about these issues. The present paper only demonstrates that growth can be achieved in ways that do not undercut progressivity in the tax system.

1. CHOICE

Thinking about tax policy in relation to a social problem emphasizes the dimension of choice. We can invest and grow at one rate or another. It is certainly not the case that we will achieve happiness at a real growth rate of $4\frac{1}{2}$ percent, and misery at rates of $3\frac{1}{2}$ percent or $2\frac{1}{2}$ percent. It is not obvious that $4\frac{1}{2}$ percent would produce more happiness than $2\frac{1}{2}$ percent.¹

The special insight that the economist should contribute to the analysis of social problems is the clarification of the choices that are open. Certainly one of the most deceptive phrases in common use in connection with growth policy is the phrase "investment needs." Whether the real U.S. GNP in the year 2,000 is two or two and a half times the present level, we do not expect the United States to disappear.

Logically, the concept of necessity, or needs, refers to an "if" statement. "If the real GNP in the U.S. in the year 2,000 is to be 256 percent of the 1976 level, then the geometric mean growth rate over the next 24 years needs to be 4.0 percent per year." This is a logically correct sentence because the mathematics of 4 percent growth rate for 24 years produces an increase of 156 percent.

In common speech, however, people use the word "needs" without specifying the if clause, as in "The U.S. needs to grow faster." There is no explanation of what will happen if the U.S. doesn't grow faster. The analogy is very close to the notorious use of the absolute comparative in advertising. "This soap is better." They don't say better than what.

The explanation is that in this common speech "needs" is a hortative word. It is used by a speaker to encourage the listeners to adopt the speaker's viewpoint. Most commonly it is used to cover up the absence of logical arguments as to why this viewpoint should be adopted.²

Putting aside exhortation, the choice involved in economic growth policy is that if we devote more resources to growth this year we will

¹ We are using the annual percentage rate of growth as an off hand way of referring to alternative growth policies in the short run. In the long run it is well known that the percentage rate of growth is quite ambiguous.

² For a general discussion of the use of hortative words see C. Stevenson, *Ethics and Language*.

reduce the consumption (public or private) that we would otherwise enjoy this year and increase consumption in some future years.³

Since the whole society will be richer in the future than it is now, it is not obvious that we should sacrifice more to make our children richer still. Nor is it obvious that we should not. This is the choice. Hopefully, other papers in this symposium will give us better information on the size of future pay-offs from devoting more resources to growth, as well as forecasts of the future situation if we don't grow faster. The function of such analyses is to lead to a more enlightened choice.

The economic insight on choice goes further. It is not the case that the level of GNP in some future year will alone determine the level of poverty, or the level of environmental degradation or the level of national defense. Within a growth policy we can pursue alternative income distribution policies, or alternative environmental policies. The important thing in studying growth is to find connections between growth and income distribution, growth and quality of life and so forth. There is no reason to expect that these connections are simple; that is, that more growth necessarily means a more unequal income distribution or a poorer quality of life.

2. THE PRESENT TAX CHOICES—A CASE OF SCHIZOPHRENIA

The Federal government does not make choices for the society no matter how severe the level of controls enacted, but it does influence private choices. (A most interesting current development is the increasing reliance on market mechanisms in the Communist world which can be seen as a move toward influencing private choice as a reaction to the failure of exclusive reliance on central planning.⁴)

Private choices can be influenced by the system of law which defines private rights and responsibilities in certain ways, and by the system of governmental regulation of particular activities. Of immediate interest is the fact that in a modern economy where from a quarter to two-fifths of the GNP is spent by government, private choice is greatly influenced by government expenditures and taxes. In order to permit this level of expenditures government must take a large share of private income, and in so doing it will inevitably bring about large changes in relative prices. Neutrality in taxation is practically impossible so we have no alternative but to decide on tax policy in terms of how we want to influence private choice.

In summary fashion we can point out that tax effects can be listed under three headings: they involve the short run level of employment and price stability; they involve the distribution of income; and they involve the allocation of real resources between alternative uses, saving and consumption, pollution and anti-pollution, using and conserving scarce resources and the like.

For the present problem the use of tax policy to affect short run levels of employment and prices is not of prime interest since growth is primarily a long run issue. (We will have some incidental comments

³ It is irrelevant that we could get greater output by being more efficient. The increased output from greater efficiency could be used for consumption or growth.

⁴ See, e.g., J. Wilczynski, *Socialist Economic Development and Reforms*.

to make on the choice of short run tax policy instruments in the light of our long run analysis.)

So far as long run tax policy is concerned most political debate in the U.S. revolves around income distribution goals and resource allocations relating to economic growth. In capsule fashion, we offer two judgments. In the first place, the U.S. has committed itself to a tax system which, so far as the basic structure and rates are concerned, is highly redistributive. At the same time, the political consensus regards this basic system as involving an excessive growth inhibition and we more or less continually undercut the progressivity of the system by special treatments to encourage growth.

The balance of this section will elaborate this view of the present tax system, what we judge to be the schizophrenia of our tax system which we think underlies what has been called the "impossible dream" of tax reform.⁵

In the first place the present individual income tax system bears heavily on saving. Whether or not the catch phrase "double taxation of saving" is appropriate, it is clear that an income tax with no exemption for saving or for investment income changes the trade-off between consumption and saving in favor of consumption. With no tax an individual might be indifferent between consuming income of 100 now or investing it for 10 years and then consuming 200. Introducing a 50-percent income tax reduces the current consumption alternative to 50, but it reduces the future consumption alternative to 75, since the taxpayer will have only half as much to invest and it will grow only half as fast (actually a little less than half as fast).⁶

It is somewhat uncertain that a penalty rate on saving will reduce the aggregate volume of saving. The point at issue is whether the elasticity of savings with respect to the interest rate is positive. We think that at this point the evidence is in favor of the proposition that the effect of reducing the after tax rate of return on investment is to reduce the volume of investment.⁷

In addition to the basic income tax structure with its savings impact, the U.S. tax system involves a heavy tax on the corporation which is the principal vehicle for reinvesting profit income.⁸

The principal issue about the effect of the corporation income tax on saving and investment has to do with the assertion that the corporation income tax may be shifted. To some extent this involves a definition of shifting. If the corporation tax reduces the level of saving and investment we would expect that the resulting relative capital "shortage" would cause the rate of return on capital to be higher,

⁵ J. Pechman and G. Break, *Tax Reform—The Impossible Dream*, Washington, D.C., Brookings, 1974.

⁶ A good discussion of the historical debate in the public finance literature is provided by W. Andrews, "A Consumption-Type or Cash Flow Personal Income Tax" *Harvard Law Review*, 87:1113, esp. pp. 1113-1123, 1165-1177, (April, 1974).

⁷ M. Boskin, *Taxation Saving and the Rate of Interest*, OTA Paper No. 11, Department of the Treasury, 1976; P. David and J. Scadding, "Private Saving: Ultrarationality, Aggregation and 'Denison's Law'" *Journal of Political Economy*, 1974; C. Wright, "Saving and the Rate of Interest" in A. Harberger and M. Bailey eds., *The Taxation of Income from Capital*, Washington, D.C., Brookings, 1969. The view that the interest elasticity of savings with respect to interest is zero or negative is developed by W. Weber "The Impact of Interest Rates on Aggregate Consumption", *American Economic Review*, September, 1970, and "Interest Rates, Inflation and Consumer Expenditures", *American Economic Review*, December, 1975.

⁸ For a general discussion of the unintegrated corporate income tax see C. McLure, Jr., "Integration of the Income Taxes: Why and How" *Journal of Corporate Taxation* 2:429, 1976; J. Shoven and J. Whalley, "A General Equilibrium Calculation of the Effects of Differential Taxation of Income from Capital in the U.S.", *Journal of Pub. Econ.* 1:281, 1972.

which some may choose to call shifting of the corporate tax.⁹ From our standpoint this process, whatever it is called, is not such as to overcome the presumption that an extra tax burden on corporate income reduces the level of investment and growth.

To argue that the corporate tax is shifted in a way that offsets its impact on growth and investment, one would have to argue that corporations are able to increase their share of income before tax so that a decline in the level of investment is foreclosed. We think this is unlikely.¹⁰ Further one would expect that even in the shortrun price shifting model that the decline in demand would reduce the level of investment.¹¹

Another feature of the U.S. tax system taken as a whole is the heavy reliance on the property tax which is the mainstay of local finance. Although this has been popularly regarded as a regressive tax, the contemporary view of most public finance economists is that the tax is primarily borne by capital. There is implicit in this problem of property tax effects the same kind of long run-short run distinction that is involved in the corporation income tax. A tax which reduces the builders income should reduce the quantity of structures, increase their price in the long run. From our standpoint this is a reduction in the amount of capital.¹²

Finally we have a highly progressive structure of taxes on property transfers by death or gift which serve as a penalty on capital and which probably inhibits capital formation and growth.¹³

These four features of the basic U.S. tax system, the double tax on savings, the unintegrated corporate income tax, the property tax and the wealth transfer taxes are, we believe, in the tax law because they are thought to be progressive.¹⁴ Clearly wealth is more unequally distributed than income and extra taxes on wealth holding serve to impose extra, progressive taxes on the rich.

We think that there are other features of U.S. tax law which suggest that the society has serious reservations about a tax system that bears so heavily on savings and investment.

Our income tax law is honey-combed with special provisions which moderate the implication of the basic structure to burden investment. The list of exceptions hardly needs elaboration. We have low tax rates on a major type of investment income, capital gains and for a large part of capital appreciation, individual income tax can be completely avoided by holding an appreciated asset until death. We have an investment tax credit which rebates part of the tax on capital income

⁹ See A. Harberger, "The Incidence of the Corporate Income Tax", *Journal of Political Econ.* 70 :215, 1962.

¹⁰ See R. Gordon, "The Incidence of the Corporation Income Tax in U.S. Manufacturing 1925-62", *American Economic Review*, 57 :731, 1967.

¹¹ G. Break, "The Incidence and Economic Effects of Taxation" in A. Blinder, et al, *The Economics of Public Finance*, Washington, D.C., Brookings, 1974.

¹² For a general discussion of property tax incidence see H. Aaron "Who Pays the Property Tax" Washington, D.C. Brookings 1975. For further discussion of the long run supply effect on structures see R. Grieson "The Economics of Property Taxes and Land Values: The Elasticity of Supply of Structures" *Journal of Urban Economics* 1 : 367-81 (1974) also S. LeRoy "Urban Land Rent and the Incidence of Property Taxes" *Journal of Urban Economics* 3 : 167-179 (1976).

¹³ See R. Wagner, *Death and Taxes*, American Enterprise Institute, Washington, D.C., 1973, pp. 23-25. For a view that transfer taxes have no net impact on saving. See S. Rickowsky, "The Effect of Saving on the U.S. Estate and Gift Tax" Appendix F. in C. Shoup Federal Estate and Gift Taxes, Washington, D.C. Brookings, 1966.

¹⁴ This assertion as applied to the property tax is doubtful on historical grounds since that tax has been widely considered regressive. The progressivity of a property tax on capital is, however, part of the modern defense of the tax. See Aaron, *op. cit.*

when it is used for more capital formation. Similarly the accelerated depreciation rules constitute an exception to the income tax on capital. We have a variety of more specialized tax incentives for particular kinds of investment, mining, shipbuilding, timber, investment in State and local bonds, housing, and so forth.

In addition to direct tax advantages for investing, we provide various encouragements for savings, especially through the favorable treatment of pension and profit sharing plans and through the favorable treatment of financial intermediaries.

3. INEFFICIENCY OF PRESENT CHOICES

Our judgment of the present expression of policy choices in the U.S. tax system is that we are inconsistent between (1) our basic structure, which puts progressivity above growth as an objective and (2) the special exceptions within that structure which put growth ahead of progressivity.

In this sort of a structure we think neither goal is efficiently served.

So far as the progressivity objective is concerned, the approach of first imposing highly progressive taxes and then allowing relief from these taxes for investment or for particular forms of savings amounts to extending a differential subsidy with the biggest subsidy going to the richest taxpayers, that is the ones who, absent incentive provisions, would be in the highest tax brackets.

The way in which a provision like accelerated depreciation for real estate investment works to the advantage of high bracket taxpayers is well known. This has developed a modest industry of tax shelters which try to maximize the tax advantages for an investment by diverting the excess deductions to a high bracket investor.¹⁵

It is less obvious but still the case that the investment credit as it is presently designed works to the advantage of the high bracket taxpayer because the credit equivalent to an amount of tax free income is greater the higher the tax rate of the recipient.¹⁶

The systematic way in which the investment incentive features in our tax law help high bracket taxpayers is the basis of the political movement for tax reform.¹⁷ In the popular sense "tax reform" is a liberal program, a major object of which is to make the tax system more progressive. A standard complaint of the tax reformer is that the tax system is not finally very progressive.¹⁸

While the tax system fails the designers of the basic structure in not being very progressive, we think that this patch-work approach of grafting investment incentives on a basic anti-investment structure is also an inefficient way to improve investment performance.

The defect is involved in the selective character of the investment incentives. To see that this is inefficient and not just unfair it is necessary to keep in mind the way in which tax incentives work when they are used to influence market outcomes.

¹⁵ See S. Surrey, *Pathways to Tax Reform*, Cambridge, Mass., Harvard University Press, 1974, esp. Chapter IV.

¹⁶ This feature of the tax credit could be avoided if the credit were required to be a deduction from basis. The basis adjustment would "cost" the high bracket taxpayer more.

¹⁷ For a somewhat partisan view of the extent to which these incentives undercut progressivity see P. Stern, *The Rape of the Taxpayer*, New York, Vintage, Also, Brandon, Rowe and Stanton, *Tax Politics*, Pantheon, 1976.

¹⁸ See J. Pechman and B. Okner *Who Bears the Tax Burden*, Washington, D.C., Brookings, 1973.

If investment decisions were left to the market place, they would reflect investor judgments about the probable return on a particular investment and the cost of capital. (The cost of capital is, of course, the opportunity cost, what can be obtained in alternative employments, adjusted for risk differentials and so forth). Assume, for simplification that investors generally consider that the cost of capital is 10 percent.

If government introduced a universal investment credit of 10 percent, with basis adjustment, this could be described as reducing the required rate of return to 9 percent.¹⁹ It would not turn out that a number of potential investments with prospective rates of return between 10 percent and 9 percent (averaging 9.5 percent) would move from the category of submarginal into the category of providing at least the required rate of return.

Consider alternatively that the investment credit is extended not to all investments, but is extended to about half of the potential investments at a rate of 20 percent instead of 10 percent. It will develop now that in the favored class of investments, projects that previously offered a prospective return of 8-10 percent (average 9 percent) will because of the 20 percent credit meet the standard 10 percent return to the investor.

Comparing the two results it can be seen that the broad investment incentive induces new projects which have an average before tax rate of return of 9½ percent while the double rate selective credit induces new investment with an average rate of return of 9 percent. This is a somewhat oversimplified demonstration that an investment incentive that is as uniform as possible will be more efficient than a selective credit per dollar of revenue loss, because the uniform credit being smaller per project will only induce investments that were close to the margin of profitability to start with. A selective credit involving the same revenue loss will be larger per project and will induce investments that were to start with further away from the margin of profitability.

Essentially the same process occurs when the investment incentives is limited by being applicable only to certain classes of investors, rather than being limited to only certain types of investment. The well known case here is the matter of tax exemption for State and local bond interest. The nature of tax exemption is to be of maximum advantage to the highest bracket taxpayer. Any particular investor will have some sort of diversified portfolio objectives and will be increasingly reluctant to put a larger and larger portion of investible funds into this vehicle. In view of the volume of State and local borrowing, the bonds are sold to marginal investors who get less advantage from tax exemption than high bracket individuals. The outcome is situation where a considerable portion of the Federal revenue loss becomes not an interest saving to states and localities but a windfall gain to rich investors.

There is reason to expect a similar result from, say, accelerated depreciation on real estate as a construction incentive. Again assume that in a free market there would be a marginal return of 10 percent. By

¹⁹ Previously an investment costing 100 with an expected return of 9 would have been submarginal. The investment credit reduces the investor's cost to 90 and the prospective return is 10 percent.

concentrating incentives on half of the potential investors we could make investments attractive to them at marginal returns of, say, 6 percent before tax. This would drive investors out of the market when their benefit from the accelerated deductions were equivalent to less than a 4 point improvement in the rate of return.

On the supply side the inefficiency arises from the amount of revenue loss that must be used up to induce investors to carry unbalanced portfolios.

Conceivably, the inefficiencies of selective investment incentives could be overcome if there was evidence that the Congress was giving carefully consideration to the external benefits of particular kinds of investment. It is clear that nothing of the sort occurs in the political process and the outcomes are a response to something closely akin to graft.²⁰

Not the least of the disadvantages of the present schizophrenic tax policy is the taxpayer demoralization in the face of what is a pattern of political favoritism.

4. AN EFFICIENT CHOICE SYSTEM

The most striking thing about the schizophrenia of the present tax system is that it is quite unnecessary. The idea that objectives of progressivity and more saving are contradictory is pure myth.

The archetype of this myth is the old chesnut that a sales tax should be rejected because it is regressive. This is a pure irrelevancy because we could enact a sales tax without any change in regressivity. All we would have to do is refund to each family the amount of sales tax payable on some minimum amount of expenditure, say the level of income that we exempt from income tax. At higher levels we could reduce the income tax in each bracket so as to decrease the income tax liability by precisely as much as the sales tax increased the tax burden at each income bracket.

This makes plain that what is involved in the question of "do we want a general sales tax, or better a value added tax?" is do we want, at each income level, to increase the tax burden on families that spend more than average and reduce the income tax penalty on saving.

We think that it is a viable option for growth policy to be oriented toward increased savings by low and middle income people. We also think that direct incentives for investment are unnecessary provided that we get an increased flow of savings. Through the mechanism of interest rate reductions, increased savings have the effect of making investment more attractive. The investment incentives of lower interest rates have the technical efficiency advantage of pushing investment at all the margins.

An increased savings policy targeted at low and middle income recipients has considerable political viability in the proper sense of political. It is ultimately important for the Congress to enact policies that will be supported by a large portion of the people. The policy preferences of one or even a few professors are not very important. On the face of it, things are not working now when we try to make a basic anti-business tax structure less anti-business with loopholes. (By not

²⁰ See P. Stern, *op. cit.*

working, I mean they are not working economically. It could be argued that they are working politically. You are able to point to symbols that have great attraction for both sides.)

As to the techniques for making savings more attractive to low and middle income taxpayers, I think of two that are particularly viable. One of the transfer of part of our income tax into a general tax on consumption such as a sales tax or a tax on value added. There is now an extensive body of experience with value added taxes in Europe. The value added tax is in effect very much like a general sales tax but it tends to be more uniform in application to various kinds of consumption. It would also be reasonably simple to administer. It would be collected by return from businesses and nearly all of the information needed for the value added return would be information of a type used for income tax returns.

The unique problem in the value added tax as I have proposed it would be the necessity for creating a mechanism for refunds. This problem has already been tackled in about half of our States that employ the so-called "circuit-breaker," a device for refunding sales or property taxes to poor people. The technical difficulty in this is establishing contact with those poor people who don't generally file tax returns. This sort of thing we do on a large scale already in the food stamp plan, and the welfare programs.

The other important technique for making savings more attractive to low and middle income people is to integrate the corporate and individual income tax.

In the popular view the problem with our corporate income tax is the double taxation of dividends. It is true that at present the net extra burden generated by our corporate income tax structure is about equivalent to the individual income tax on dividends. This was the thinking behind President Ford's proposal of last year to eliminate the double tax on dividends.

From my own viewpoint, there is a more serious defect of the present income tax, viz, the way in which it overtaxes the retained earnings attributable to low income investors and undertaxes the retained earnings attributable to high income investors.

Consider a corporation that pays no dividends. Ostensibly, it is taxable at a marginal rate of 48 percent on its income in excess of \$50,000. With the various business investment incentives this effective rate works out to a little less than 40 percent, so let us specify for discussion a 40 percent rate.

For a high income taxpayer this amounts to considerable tax relief. If that taxpayer received business income directly it would be subject to tax, at the margin, at a rate of 70 percent. If the income is left in the corporation a rate of only 40 percent applies. It is not economically meaningful to say that, because the income has not been distributed, it is not really the income of the shareholder.

In general, the value of corporate shares will reflect at least the value of retained earnings. The fact of retained earnings represents a profit that the firm can re-invest to make more profit and further increase its net worth. Any particular reinvested dollar may be later wiped out by losses but the aggregate business system is efficient and successes far outweigh losses.

If it sounds strange to say that the corporate income tax arrangement really helps high income investors, recall that some high salaried people try to incorporate simply to save taxes.

Now let us look at a low income taxpayer who owns shares in a non-dividend paying corporation. The individuals own marginal rate may be, say 20 percent, or even zero. The income retained for this individual is, however, taxed at a typical rate of 40 percent. The contrast is striking. The retained earnings of rich investors are undertaxed and the retained earnings of low income investors are over taxed.

(This stark contrast is only moderated if we take into account a typical dividend policy of 40 percent of the retained earnings. For the top bracket investor the dividend on 100 of income after 40 percent tax will be only 24 which if taxable at 70 percent will involve an additional tax of 17. When this is added to the 40 percent the effective tax rate is still only 57 percent, which is less than the individual's 70 percent marginal rate. It is still striking that the corporate tax system undertaxes rich investors and overtaxes poor investors.)

The way to reform this system is to move toward a partnership system of taxing corporations. There should be a withholding tax of something like 50 percent on corporations. The corporation would then report to shareholders their share of the retained earnings along with their share of the tax paid. The shareholders would report income in the usual way and take credit for the withholding (just like they take credit for tax withheld on wages.) For low income investors, there would be a refund of part or all of the corporate tax. For high income investors there would be additional tax to pay.

It is a problem that in this country there has been inadequate discussion of the mechanics of full corporate integration. Canada, at the time of Carter Commission Report in the mid-1960's, developed a fairly complete approach to integration. There has been a limited amount of discussion of corporate integration with specific reference to the U.S. tax law.²¹

A great deal of the discussion over integration in the U.S. has been directed at what seems to me the limited problem of the high income investor who may have nearly all his investment in a non-dividend paying corporation. In this case reporting the share of retained income and taking the credit for the tax paid at the corporate level would leave a cash problem. The Carter Commission dealt with this by reducing the top individual income tax rate to the same level as the corporate rate. Pechman and Break have pointed out that doing this in the U.S. would wipe out the gain in progressivity related to the corporate tax.²²

The cash problem does not appear to me to be critical. High income investors would do well to not hold stock in non-dividend paying corporations. To cover special problems provision could be made for some stock liquidation (by sale to the corporation) to cover the tax. The essential case for having integration in the first place is to avoid the concentration of wealth that has been abetted heretofore by arrangements that reduce tax on high income investors who are investing heavily, i.e., accumulating more wealth.

²¹ See McLure *op. cit.*, also a symposium in the *National Tax Journal*, 1975.

²² Pechman and Break, *op. cit.*, pp. 90-104. Under the Carter Plan this reduction in progressivity was removed by other base broadening reforms that affected high income taxpayers.

It is tempting to say that a promising approach to reconciling our redistributionist and our growth objectives is to enact a progressive expenditure tax. This approach would directly serve to increase the concentration of wealth since the tax differential in favor of saving becomes enormously high as income levels rise. With sufficiently severe estate and gift taxes this concentration of wealth reownership may prove tractable but a more cautious judgement would be to start by looking for programs that avoided large savings incentives for the very wealthy.²³ (The same can be said for the devices in the income tax for allowing deductions for savings, such as Employee Stock Ownership Plans.)

Rather closely related to the two tax policies that we prefer would be the possibility of increasing the savings of low and middle income people by shifting to a policy of reserve building within the Social Security Trust Fund. In this approach the economic function of the reserve would be to permit the government to liquidate debt held by the public in the expectation that more of the publicly held debt would flow into private investment where the rate of return must be considerably more than the rate on government bonds. Out of the extra tax receipts attributable to profits from private investment the government would be in a position to, and should, credit social security reserves with more than the market rate on government bonds.

The difference between the normal tax proposals (of introducing a consumption tax and integrating the corporate tax) and the social security reserve suggestion is the degree of influence being exerted. The tax proposals makes saving more attractive and the social security proposal is close to compulsory saving.

If it is the case that the interest elasticity of savings is close to zero, the mere device of reducing tax penalties on savings would have little to do with increasing the volume of saving. We cited earlier some recent research that suggests (on the basis of aggregate analysis) that the savings rate does increase with higher returns.

It is more significant for our proposal that increased rates of return on the savings of low and middle income people should be particularly effective in increasing savings rates. An increased interest rate has both an income effect and a price effect. The price effect would tend to make future consumption more attractive relative to current consumption. This should go in the direction of increasing future consumption and reducing present consumption. The income effect is that a person's lifetime income is increased by a rise in after tax interest rates and this income effect is positively related to the amount of current wealth and expected future wealth. The general result of the income effect is to increase the level of permanent income which could increase consumption in all periods, present and future. An increase in present consumption is, of course, the same as a decrease in savings.

For a person with much wealth, the income effect could easily offset the price effect. This may predominate the aggregate studies which show near-zero interest elasticity for savings. Typically low and middle income people have low wealth levels and for them the income

²³ The argument that estate taxation alone is not a sufficient protection against very large property concentration is made by L. Thurow "Net Wealth Taxes" *National Tax Journal* 25: 417-423. Thurow's argument would be even stronger in a system that provided additional savings rewards.

effect should not be very strong and an increase after tax return on savings should have significant effects in increasing savings.

If the voluntary savings effect is weak, however, it would make sense to rely on the stronger device for increasing savings of low and middle income people, viz., of higher reserve financing in social security.

ADDENDUM. "HOW SHOULD THE TAX LAW BE CHANGED?"

This note explains why we have not answered this question. The answer depends on—

- (1) Your growth objective;
- (2) The evidence on how more investment would change growth; and
- (3) The evidence on how savings would change in response to a tax differential.

We submitted an overview of the evidence on (2) and (3) to this Committee in 1972 (G. Brannon "The Effects of Tax Incentives for Business Investment: A Survey of the Economic Evidence" *Economies of Federal Subsidy Programs* Pt. 3 Tax Subsidies pp. 245-268 Joint Economic Committee). At that time the evidence was quite ambiguous. Hopefully the present compendium will throw more light on these questions.

The present paper primarily discusses ways in which the tax system could be changed to achieve more growth and simultaneously achieve the distribution goals which the Congress has also sought. It is analogous to a repair job on the steering mechanism on a car. If you want advice on whether to drive the repaired car to the mountains or the seashore for a vacation, the repair manuals won't help you; you need other kinds of advice. The advice about steering mechanisms, the tax law, which this paper offers stands whether one wants to drive our economic automobile to the mountains of faster economic growth or to the seashore of zero economic growth.

If one persists in asking our opinion about where we should drive the car, our personal preference is for a somewhat higher ratio of investment to GNP and a lower ratio of consumption to GNP provided it is done in a distribution neutral way. We might favor a lower level of government expenditures to GNP, qualified by reservations about which expenditures were cut.

In the matter of tax changes, we think that a very large effort should be put on integrating the corporate tax with regard to retained earnings. We also think that part of the income tax should be converted in a distribution-neutral way into about a 5% value added tax. To deal with long term savings accumulations the taxes at death should be increased, especially on unrealized appreciation. Social Security involves too many other considerations to specify a particular rate of reserve accumulation, and this would in any case involve much political negotiation. We would only urge that we try to provide more accumulation than there is now.

THE CONTRIBUTION OF CAPITAL TO THE POSTWAR GROWTH OF INDUSTRIAL COUNTRIES

By EDWARD F. DENISON*

SUMMARY

Growth rates of net output vary substantially among industrial countries. The United States has experienced one of the lowest growth rates in the period since World War II. Capital accumulation is one of several major sources of output growth, and differences in rates of capital accumulation represent one, but only one among several, of the main determinants of international differences in growth rates.

International differences in growth rates span six or seven whole percentage points. To raise the growth rate of United States net output by a single percentage point solely by increasing private capital would require that an extra 11 percent of net output be invested annually. This would mean saving and investing about 2½ times as much as in the past, since net private investment averaged only 7.2 percent of the nation's net output in the postwar period. This alone suggests that it would be quite impossible to explain international differences of several percentage points in growth rates solely or mainly by differences in investment.

Estimates of the sources of growth in eleven countries in various time periods permit international differences in growth rates to be divided among determinants on the basis of a full breakdown of growth sources. In 1948-69 the adjusted growth rate of the United States was 4.0 percent, of which 0.8 percentage points were contributed by increases in the amount of business capital and 3.2 percent by other growth sources. In the periods compared five of the other ten countries, all of them relatively large, had growth rates well above the United States. In two of them, Italy and France, capital contributed the same or a slightly smaller amount than in the United States and hence explains none of the differences in growth rates. In the other three capital contributed more to growth than in the United States. The difference in the size of the capital contribution equaled just over one-fourth of the difference in growth rates in the cases of both Japan and West Germany, and just over one-third in the case of Canada. The other large country, the United Kingdom, had a lower growth rate than the United States and a capital contribution which was smaller by an amount equal to less than one-fifth of the difference in growth rates. The sources of the remaining differences in growth rates are detailed in the article.

The United States has had a higher national income per worker, and more capital per worker in the business sector, than the other countries. Nearly all determinants of output per worker, except length

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of working hours, have been more favorable to high output in the United States than elsewhere. Growth rates of neither output nor capital stock can be properly understood or interpreted without consideration of the levels of output and capital prevailing in different countries, and of the reasons for differences in output per worker.

Because Japan has had the fastest growth of capital stock it is given special attention. The importance to its fast capital stock growth of a high and rising saving rate is stressed, but so are the importance of fast output growth that occurred for reasons other than capital accumulation but served to stimulate investment, and the importance of a sharp decline in the price of investment goods relative to other prices.

Capital has contributed to the changes that have occurred from time to time in the growth rates of potential national income in the United States itself. Thus the growth rate of potential national income (in 1958 prices) was 2.75 percent in 1929-48 and 4.02 percent in 1948-69. More than half the difference is ascribable to capital. This comparison is unusual, but capital contributed about one-fourth of one percentage point to the higher growth rates experienced in 1948-53 and 1964-69 than in 1953-64.

The ratio of private saving to national product has been stable in the United States despite major changes in rates of inflation, interest rates, the level and structure of taxes, real per capita income, retirement programs, and many other aspects of the economic environment. This suggests both that significant changes in the United States growth rate cannot be ascribed to changes in the private propensity to save and that policymakers should be cautious in appraising their ability to influence private saving behavior. There is no similar difficulty in raising government saving if investment demand is known to be sufficiently strong to assure that a more stringent fiscal policy will not simply reduce demand, production, and investment—and tax revenues as well. But much of the time, I suspect, this condition is not met. Major changes in the growth of capital have stemmed from the investment side of the investment-saving equation. It is probable that any program to stimulate capital stock growth over an extended period would have to rely on strengthening incentives to invest rather than to save.

I. INTRODUCTION

Growth rates of output vary substantially among industrial countries. The United States has experienced one of the lowest rates in the period since World War II. This paper draws upon my previous research into the sources of economic growth to try to indicate the part that capital has played in differential growth experience of advanced countries.¹ I shall seek to avoid two defects of many discussions of

¹ This consists chiefly of the following books, all of which fully describe the data drawn from them. Edward F. Denison, *The Sources of Economic Growth in the United States and the Alternatives Before Us* (Committee for Economic Development, 1962). Edward F. Denison, assisted by Jean-Pierre Poullier, *Why Growth Rates Differ: Postwar Experience in Nine Western Countries* (Brookings Institution, 1967). Edward F. Denison, *Accounting for United States Economic Growth, 1929-1969* (Brookings Institution, 1974). Edward F. Denison and William K. Chung, *How Japan's Economy Grew So Fast: The Sources of Postwar Expansion* (Brookings Institution, 1976). The original source of Canadian estimates I have used is two studies by Dorothy Walters, conducted in close collaboration with Poullier and me: *Canadian Income Levels and Growth: An International Perspective* (Economic Council of Canada, 1968) and *Canadian Growth Revisited, 1950-1967* (Economic Council of Canada, 1970). Material from these sources should not be further reproduced without permission from their publishers. I am currently engaged in a study for the Brookings Institution, with support from the National Science Foundation, which will extend United States estimates through 1975 and restate them in terms of 1972 prices. Material from this study too is used in this paper.

growth : focusing on some one output determinant as the key to growth rates, and ignoring international differences in levels of output when differences in growth rates are explored.

In my studies the national income, which is also known as net national product valued at factor cost, is used to measure the value of the nation's output. When expressed in constant prices, national income (NI) is the value of the net output of goods and services produced by the nation's economy when each component of final output is valued at its factor cost in a base year.

The factor cost of a product—the earnings of labor and property derived from its production—differs from its market price in two ways: indirect business taxes incorporated in its market price are excluded and subsidies (which are not part of its market price) are included. It does not matter much whether net output is valued at factor cost (as in national income) or at market price (as in net national product) for analysis of growth and productivity changes but the former is, in principle, a little more convenient.

However, it is important to use a measure of net output. Gross national product differs from NI not only because products are valued at market price but also because capital consumption is not deducted from business purchases of durable capital goods. Consequently, as its name implies, gross national product (GNP) is a partially duplicated measure of production not suitable for growth analysis. Insofar as a large output is a proper goal of society and objective of policy, it is net output that measures success in achieving this goal. There is no more reason to wish to maximize the capital consumption incurred in producing, say, television sets than there is to maximize the metal used in their production, and no more reason to include it in the output measure to be adopted for growth analysis. It is television sets, not the metal or capital used up in its production, that is sought.

Because growth rates of gross and net product are only moderately different the choice between these measures might not appear to be very important, but in a study of the sources of growth this is not so. An increase in depreciation must be regarded as a contribution to GNP growth that is entirely ascribable to capital. Capital will therefore always be responsible for a larger fraction of the growth rate of gross product than of net product if capital consumption increases at all.

II. CAPITAL AND GROWTH IN THE UNITED STATES

I shall begin with United States experience, and try first of all to provide perspective on the relationship between changes in capital, saving and output.

Relationships Among Capital, Saving, and Output

In 1969, the last year covered by my most recent study of the United States, the value of the national income in current (1969) prices was \$764 billion. Of this amount, by my estimates, some \$132 billion represented the earnings of capital, \$24 billion the earnings of land, and \$608 billion earnings of 86 million persons from their labor. Earnings are measured before deduction of direct taxes. The net (depreciated) capital stock from which capital earnings were derived

had a reproduction value in current (1969) prices of \$1,650 billion, 2.16 times the national income. The earnings of capital came to 8.0 percent of its value.

The capital of the nation, as I shall use the term, consists of the privately owned structures, equipment, and inventories available for use in domestic production, together with the nation's net claims upon foreign countries. Government and consumer property, except owner-occupied homes, are excluded. In 1969 the earnings and value of capital were divided among four major components, as follows:

	Earnings (billions)	Value (billions)	Ratio (percent)
Nonresidential business:			
Structures and equipment.....	\$72	\$664	10.7
Inventories.....	23	220	10.5
Dwellings.....	133	698	4.7
International assets.....	4	67	6.4
Total.....	132	1,650	8.0

¹Includes earnings of residential sites.

What is the relationship between an increase in capital and an increase in national income? A first approximation can be obtained by a simple calculation. Suppose the United States were to save and invest an additional one percent of NI. This would be a considerable increase in saving, nearly one-seventh, since net national saving equaled 7.4 percent of national income in 1969 and averaged 7.2 percent in 1948-75.² At 1969 levels, this extra one percent would add \$7.64 billion to saving. If it were allocated like existing capital, and if the ratio of net earnings to value were the same for the new as for the existing capital, this would raise the annual national income by \$611 million or 0.08 percent.

A different form of the same calculation may bring out its logic a bit better. Capital earned 17.23 percent of the national income, land 4.06 percent, and labor 78.71 percent.

To minimize costs, enterprises must combine the factors of production in such proportions that their earnings will be proportional to their marginal products. This proportionality will prevail if enterprises succeed in minimizing costs, or if errors in proportions utilized are random and offsetting. In that case, if a one percent increase in the quantities of all the factors used in production would raise national income by x percent, a one percent increase in capital alone would raise national income by 17.23 percent of x , a one percent increase in land alone by 4.06 percent of x , and a one percent increase in labor alone by 78.71 percent of x . A one point increase in the percentage of national income saved would have raised saving by \$7.64 billion, or by 0.463 percent of the capital stock of \$1,650 billion. The national income would be raised by 17.23 percent of 0.463 percent if the economy operates under constant returns to scale so that x is equal to one. This is 0.08 percent of NI, the same result as before. This assumes that additional new investment is allocated like existing capital. If, instead,

²This statement which is based on Table 6 below assumes, reasonably, that the percentage is the same for national income as for net national product.

it were all allocated to nonresidential structures, equipment, and inventories the increase would be 0.11 percent of NI.

The assumption that the economy operates under constant returns to scale is satisfactory only for dwellings and international assets. I have estimated—very roughly, indeed—that the nonresidential business sector of the economy operates under increasing returns of such a magnitude that a one percent increase in total inputs raises NI in that sector by 1.15 percent. If this is so, the percentage increase in national income to be expected from raising the net saving rate by one percent of national income should be changed from 0.08 percent to 0.09 percent if additional investment is allocated like the existing capital stock, and from 0.11 to 0.12 percent if all the additional investment was made in nonresidential business.

These calculations have obvious implications for international differences in growth rates, which span six or seven whole percentage points. It is not plausible that capital alone can be responsible for all or most growth rate differences. If the nation needs to save an extra one percent of NI to raise NI by 0.09 percent, to raise the growth rate of NI by one percent over a period of several years would require saving an extra 11 percent of NI each year, to raise the growth rate by three percent would require saving an extra 33 percent of NI, and so on. If extra investment were allocated entirely to nonresidential business, these percentages would only be cut to about 8 and 25.

Actually, substantial differences in saving rates would affect *long term* growth rates much less than these calculations suggest, for two reasons. First, the shift to a higher saving rate would progressively raise the ratio of the capital stock to NI, so that one percent of NI would represent a progressively declining percentage of capital stock. A permanently higher saving rate would eventually cease to yield a higher percentage change in capital than the old rate, and cease to would represent a progressively declining percentage of capital stock. would be permanently higher than otherwise, but the growth rate would be the same. Second, a really large addition of capital, in the absence of similarly enlarged additions to the quantities of labor and land, would reduce the relative marginal product of a unit of capital and reduce the rate of return.³

Sources of Growth of Actual and Potential NI

The contribution of capital to growth is understood best in the context of a complete analysis of growth sources. Table 1 provides my estimates of the sources of growth of national income in 1948–69 and three subperiods. National income is measured in 1958 prices. Table 2 provides similar estimates of the sources of growth of potential national income in the same periods.

I define potential national income in 1958 prices in any years as the value that national income (in 1958 prices) would have taken if (1) unemployment had been at 4 percent; (2) the intensity of utilization of employed resources had been that which on the average would be associated with a 4 percent unemployment rate; and (3) other con-

³ A number of qualifications of, and adjustments to, illustrative calculations like those just given have been described in Denison, *The Sources of Economic Growth*, Chapter 12. In general, further refinements only intensify the thrust of the results.

TABLE 1.—SOURCES OF GROWTH OF TOTAL ACTUAL NATIONAL INCOME, UNITED STATES, 1948-69—
CONTRIBUTIONS TO GROWTH RATE

[In percentage points]

	1948-69	1948-53	1953-64	1964-69
National income.....				
Total factor input.....	3.85	4.54	3.23	4.54
Labor.....	2.10	2.95	1.30	3.08
Employment.....	1.30	2.07	.60	2.15
Hours.....	1.17	1.63	.51	2.26
Age-sex composition.....	-.21	-.08	-.24	-.27
Education.....	-.10	.07	-.09	-.31
Unallocated.....	.41	.38	.43	.40
Capital.....	.03	.07	-.01	.07
Inventories.....	.80	.88	.70	.93
Nonresidential structures and equipment.....	.12	.18	.08	.18
Dwellings.....	.36	.38	.29	.45
International assets.....	.29	.31	.27	.29
Land.....	.03	.01	.06	.01
Output per unit of input.....	0	0	0	0
Advances in knowledge and n.e.c.....	1.75	1.59	1.93	1.46
Improved resource allocation.....	1.19	1.34	1.13	1.15
Farm.....	.30	.41	.24	.34
Nonfarm self-employment.....	.23	.33	.21	.19
Dwellings occupancy ratio.....	.07	.08	.03	.15
Economies of scale.....	-.01	-.03	-.01	.01
Irregular factors.....	.42	.48	.32	.56
Weather in farming.....	-.15	-.61	.25	-.60
Labor disputes.....	-.01	-.03	-.02	-.02
Intensity of demand.....	.00	.00	.00	-.01
	-.14	-.58	.27	-.61

Source: Edward F. Denison, Accounting for United States Economic Growth, 1929-69, The Brookings Institution, 1974 tables 9-4 and 9-9.

TABLE 2.—SOURCES OF GROWTH OF TOTAL POTENTIAL NATIONAL INCOME, UNITED STATES, 1948-69—
CONTRIBUTIONS TO GROWTH RATE

[In percentage points]

	1948-69	1948-53	1953-64	1964-69
National income.....				
Total factor input.....	4.02	4.99	3.20	4.85
Labor.....	2.11	2.84	1.52	2.79
Employment.....	1.31	1.94	.83	1.85
Hours.....	1.15	1.40	.81	1.81
Age-sex composition.....	-.19	-.06	-.24	-.24
Education.....	-.10	.13	-.14	-.22
Unallocated.....	.42	.40	.41	.43
Capital.....	.03	.07	-.01	.07
Inventories.....	.80	.90	.69	.94
Nonresidential structures and equipment.....	.12	.18	.07	.18
Dwellings.....	.36	.39	.28	.46
International assets.....	.29	.32	.28	.29
Land.....	.03	.01	.06	.01
Output per unit of input.....	0	0	0	0
Advances in knowledge and n.e.c.....	1.91	2.15	1.68	2.06
Improved resource allocation.....	1.19	1.36	1.12	1.17
Farm.....	.31	.36	.28	.30
Nonfarm self-employment.....	.24	.32	.22	.18
Dwellings occupancy ratio.....	.07	.04	.06	.12
Economies of scale.....	-.01	-.03	-.01	.01
Irregular factors.....	.43	.49	.31	.57
Weather in farming.....	-.01	-.03	-.02	.01
Labor disputes.....	-.01	-.03	-.02	.02
	0	0	0	-.01

Source: Edward F. Denison, Accounting for U.S. Economic Growth, 1929-69, The Brookings Institution, 1974, tables 9-4 and 9-10

ditions had been those which actually prevailed in that year. To conform with current labor force definitions, "4 percent" refers to the percentage of the civilian labor force 16 years of age and over that is unemployed. The term "on the average" refers to the average of a hypothetical random sample of years in which unemployment is 4

percent but output is changing by amounts larger than, the same as, or smaller than the trend rate of change.

The subperiods shown in the tables distinguished two five-year periods, 1948-53 and 1964-69, in which potential national income grew unusually fast—close to 5 percent—from an intervening 11-year period in which growth was at the rate of 3.2 percent, about the average rate over the last half century.

CLASSIFICATION OF GROWTH SOURCES

For estimates of the sources of growth to be useful, the user must understand the classification adopted. The classification has the characteristic, of course, that the sum of the contributions of the sources equals the growth rate. The same change cannot be credited to two output determinants. It also has the characteristics that the contribution of each determinant is measured against a no-change situation. If a determinant does not change, its contribution to growth is zero. Accounting for United States Economic Growth, 1929-1969 fully describes each determinant. For readers who are not familiar with the classification a brief description is provided here in Appendix 1.

THE CONTRIBUTION OF CAPITAL BY SECTOR AND TYPE

To estimate the sources of economic growth, including the contribution of capital, the economy was first divided into four parts or sectors.

The first sector consists of labor services purchased directly by four groups regarded in the national accounts as final purchasers of the nation's output. They are government (except government enterprises), nonprofit organizations serving individuals, private households (as employers of domestic servants), and, of trivial importance, foreign governments and international organizations as employers of U.S. citizens within the United States. Production in the sector is the work of the individuals it employs. To value the output of these employees in constant (1958) prices, the Bureau of Economic Analysis simply extrapolated, by components, the 1958 compensation of employees in current prices by the quantity of labor used. Thus it can be stated unequivocally that in this sector changes in output, as measured, are due exclusively to changes in labor. Out of the increase of \$328.1 billion in the value of real national income in 1958 prices from 1948 to 1969, for example, \$23.8 billion was the changes in the value placed upon labor performed in this sector. This was wholly a contribution of labor; there is no capital contribution in this sector.

The second sector is the "services of dwellings" industry, which provides housing services. "Establishments" in this industry are owner-occupied and tenant-occupied nonfarm and farm dwellings. By definition, all residential structures and residential land in the country are used in this industry, and the industry had no other factor inputs.⁴

The net value in constant prices placed on the output of this industry can be isolated from the details of the national income and product accounts.

⁴ The small amount of labor employed in apartment houses is classified in nonresidential business.

Because the output of residential capital and land in the whole economy and the output of the dwellings industry are one and the same, the contribution of residential capital and land to the increase in total NI can be computed directly from these values. Of the increase of \$328.1 billion in real NI from 1948 to 1969, for example, \$27.1 billion are from this source. NI in the housing sector depends mainly upon the supply of dwellings and the costs associated with their maintenance and operation but is also affected by the division of the housing stock between units that are occupied and those that are vacant. In the sources of growth tables the "dwellings occupancy ratio" measures the effect of changes in the proportion of vacant dwellings, which turns out to be trivial, while the line labeled "dwellings" measures the contribution made to growth by changes in the quantity of dwellings.

I stress that the contribution made to the growth rate of NI by changes in the stock of dwellings—which represent a big part of the capital stock—is obtained from the NI statistics themselves rather than from an indirect estimating procedure. This guarantees statistical consistency between the contribution and the growth rate.

The third part of NI that I isolate is the excess of property income received by U.S. residents from abroad over property income paid by the United States to foreign residents. It is included in NI, viewed as an output measure, in order to count the value of foreign output that is attributable to U.S. capital and to exclude the value of U.S. output that is attributable to foreign capital.⁵ This series is directly available from the NI data so statistical consistency between the growth rate of NI and the contribution of internationally owned assets is assured. Thus, of the \$328.1 billion increase in national income in constant (1958) prices from 1948 to 1969, \$1.7 billion represents the increase in net property income from abroad and hence the contribution of international assets. The contribution to the growth rate of national income is shown in the "international assets" lines of Tables 1 and 2.

The contributions of the two types of capital discussed so far to growth rates of actual NI valued in 1958 prices (Table 1) are repeated in the first two rows of Table 3. These two types of capital together contributed 0.32 percentage points to the growth rate of NI from 1948 to 1969, which was 3.85 percent.⁶ The Bureau of Economic Analysis recently restated its measure of real output in 1972 prices. The change in base years alters the growth rate itself and the contributions of all sources to the growth rate. The Bureau of Economic Analysis also revised its data and introduced some minor conceptual changes. Preliminary estimates of the contributions of these types of capital to the growth rate of national income in 1972 prices based on the new data are shown in the two lower rows of Table 3. Use of the new data will reduce their combined contribution in 1948–69 from 0.32 to 0.28 percentage points. The new data show that the contribution was 0.30 points

⁵ The actual statistical series for net property income from abroad does not conform to the definition very well because only earnings actually remitted between countries are counted (except in the case of branch profits). Consequently, the series is affected not only by earnings but also by decisions as to the amount of earnings that are to be remitted.

⁶ Contributions are shown to two decimal points to permit comparisons and combinations without introducing rounding errors, and because many figures are small. The practice has no implications as to the accuracy of the data.

in 1948-53 and 0.31 in 1953-64. Unlike the previous data, the new estimates show that the contribution fell appreciably in 1964-69, to 0.21 points. An estimate for 1969-75, available for the first time, shows a further slippage to 0.18 percentage points.

TABLE 3.—CONTRIBUTION OF DWELLINGS AND INTERNATIONAL ASSETS TO GROWTH RATE OF ACTUAL NATIONAL INCOME IN THE UNITED STATES

	[Percentage points]				
	1948-69	1948-53	1953-64	1964-69	1969-75
National income in 1958 prices:					
Dwellings	0.29	0.31	0.27	0.29	NA
International assets .....	.03	.01	.06	.01	NA
National income in 1972 prices: ¹					
Dwellings .....	.25	.29	.25	.22	0.20
International assets .....	.03	.01	.06	-.01	-.02

Preliminary estimates.

Source: 1st 2 rows, table 1. Last 2 lines, estimates based on Bureau of Economic Analysis data.

The fourth sector of the economy, which had an average weight equal to 82.6 percent of the total in 1948-69 when output was measured in 1958 prices, is nonresidential business. Nonresidential business covers the entire domestic business sector of the economy, as defined by the Bureau of Economic Analysis, except for the services of dwellings. The distinguishing feature of the sector as a whole is that it sells its products for a price. Output in this sector is, with minor exceptions, measured directly. It is not inferred from the behavior of labor, capital, or land input.

Output in nonresidential business is affected by nearly all the determinants listed in Table 1. Two types of capital are present: nonresidential structures and equipment, and inventories. To measure changes in their input into production, I used the value in constant 1958 prices of the stock of privately owned capital of each type in the sector. All data were from the Bureau of Economic Analysis.

Inventory input was measured by the average value of the stock at the beginning and end of the year.

Two series were obtained for the stock of nonresidential structures and equipment: the gross (undepreciated) value and the net (depreciated) value. These series were based on the use of Bulletin F service lives, the Winfrey distribution of retirements, and (for the net value) straight-line depreciation. Values at the beginning and end of the year were averaged. Given these series, how should input of fixed capital be measured? If all capital goods were like the "wonderful one horse shay," their ability to perform services would not change during their service lives. The gross stock, which places an unchanging value on each item throughout its useful service life, would then provide the correct capital stock series for capital input measurement. This procedure probably would lead to no great error, but the assumption implied by its use is extreme. The performance of at least some types of capital goods deteriorates unless maintenance and repair costs (which are deducted to obtain net output) are increased as a good ages; it may deteriorate in any case. Also, newer capital goods are more likely to be in the place and use where they are most advantageous to production.

To allow for rising maintenance expense and deterioration of capital services with the passage of time, I adopted the expedient of using a weighted average of indexes of the gross stock and net stock based on straight-line depreciation, with the gross stock weighted three and the net stock one. The procedure implies that, on the average, a capital good with one-half of its useful service life exhausted can contribute seven-eighths as much to net output as an otherwise identical good that is unused, and three-fourths as much shortly before its retirement.

The top panel of Table 4 shows growth rates of the two types of capital. Over the whole 1948-69 period inventories grew 3.46 percent a year while the input of nonresidential structures and equipment (estimated as the weighted average of growth rates of gross and net stock) grew 3.68 percent a year.

The next panel shows the contributions of these types of capital to the growth of national income originating in the nonresidential business sector of the economy, estimated as the products of the growth rates of capital inputs and their shares of earnings in the sector.⁷ The two types of capital contributed 0.58 percentage points to the 1948-69 growth rate of output in nonresidential business, which was 3.72 percent a year (3.92 percent for potential NI).

These types of capital contribute less, of course, to the growth of total national income, which also includes the other three sectors. The third panel of Table 4 (like Table 1) shows these contributions, calculated as the product of contributions to the growth rate of nonresidential business national income and the weight of that sector in the total. The combined contribution was 0.48 percentage points in 1948-69.

TABLE 4.—GROWTH RATES OF INVENTORIES AND OF NONRESIDENTIAL STRUCTURES AND EQUIPMENT AND THEIR CONTRIBUTIONS TO GROWTH RATES OF ACTUAL NATIONAL INCOME, UNITED STATES, VARIOUS PERIODS

[Data in percentage points]

	1948-69	1948-53	1953-64	1964-69	1969-75
DATA IN 1958 PRICES					
Growth rates:					
Inventories.....	3.46	4.11	2.38	5.24	NA
Nonresidential structures and equipment:					
Gross stock.....	3.52	3.60	3.05	4.49	NA
Net stock.....	4.15	4.80	3.31	5.36	NA
Capital input.....	3.68	3.89	3.12	4.71	NA
Contribution to growth rate in nonresidential business sector:					
Inventories.....	.15	.21	.10	.22	NA
Nonresidential structures and equipment.....	.43	.47	.36	.56	NA
Contribution to growth rate in entire economy:					
Inventories.....	.12	.18	.08	.18	NA
Nonresidential structures and equipment.....	.36	.38	.29	.45	NA
DATA IN 1972 PRICES					
Growth rates:					
Inventories.....	3.54	4.18	2.43	5.34	2.76
Nonresidential structures and equipment:					
Gross stock.....	3.48	3.61	2.96	4.51	3.92
Net stock.....	4.17	4.73	3.28	5.58	3.79
Capital input.....	3.64	3.89	3.04	4.78	3.89

Source: Data in 1958 prices, Edward F. Denison, "Accounting for United States Economic Growth, 1929-1969," tables 5-2, 5-5, 8-2, 8-5, 9-4, and 9-9. Data in 1972 prices, based on Bureau of Economic Analysis data.

⁷ The calculations are actually made annually, but this refinement has little effect on the results. A trivial interaction term is included.

The Bureau of Economic Analysis has recently replaced its estimates of capital stock in 1958 prices with estimates in 1972 prices, and incorporated some statistical improvements. It has also adopted the use of service lives equal to 0.85 of Bulletin F lives in calculating depreciation for the computation of net product and NI, and in measuring capital input I shall follow suit by adopting capital stock series based on the same service lives. Growth rates of the two types of capital input based on these new data in 1972 prices are shown in the bottom panel of Table 4. Comparison with the top panel shows that incorporation of the new data would have little effect.

The new series are also available for 1969-75. Structures and equipment input grew appreciably faster in 1969-75 than in 1948-69—by 3.92 percent a year as compared with 3.48.⁸ The growth rate of inventory input in 1969-75, at 2.76 percent, was less than in 1948-69, when it was 3.54, but this was almost entirely due to curtailment during the 1975 recession. From 1969 to 1974 the rate was 3.44, barely below the 1948-69 rate.

TOTAL CONTRIBUTION OF CAPITAL

Let us now consider the total contribution of all private capital to the growth rate of national income in the whole economy. As indicated in Tables 1 and 2 the increase in capital was responsible for 0.80 percentage points of the growth of both actual and potential national income in 1948-69. Because potential national income in any year measures the output that could be obtained with actually existing labor and property resources under standardized conditions, the same capital stock data are appropriate for analysis of both measures and the capital contribution is the same.⁹

Estimates of contributions presented up to this point were computed as if the economy operated under constant returns to scale, because gains from economies of scale are classified as a separate growth source. However, most determinants of output in nonresidential business, by contributing directly to an increase in output, also contribute to expansion of market size. This, in turn, leads to higher output per unit of input as a result of economies of scale. It is therefore useful to provide an alternative classification in which contributions of the other determinants of nonresidential business output include their effect on economies of scale. Economies of scale then vanish as a separate growth source. For the 1948-69 period Table 5 presents estimates for potential national income in the whole economy on both bases.

With economies of scale regarded as a separate source of growth, capital contributed 0.80 points to the 4.02 percent growth rate of potential national income from 1948 to 1969, or 19.9 percent of the

⁸ The net stock, it is true, grew less than in 1948-69 but this is not a satisfactory indicator of capital services available for production.

⁹ The line "intensity of demand" in Table 1 measures the effect on the growth rate of output per unit of input of fluctuations in the intensity with which labor, capital, and land are used as a result of changes in the strength of demand. Separate estimates for capital alone are not attempted.

TABLE 5.—TOTAL POTENTIAL NATIONAL INCOME: DISTRIBUTIONS OF GROWTH RATES AMONG SOURCES WITH ECONOMIES OF SCALE ISOLATED AND ALLOCATED AMONG OTHER SOURCES, UNITED STATES, 1948-69

	Estimates with economies of scale			
	Isolated		Allocated	
	Percentage points (1)	Percent (2)	Percentage points (3)	Percent (4)
National income.....	4.02	100.0	4.02	100.0
Total factor input.....	2.11	52.5	2.31	57.5
Labor.....	1.31	32.6	1.44	35.8
Employment.....	1.15	28.6	1.26	31.3
Hours.....	-.19	-4.7	-.22	-5.5
Age-sex composition.....	-.10	-2.5	-.11	-2.7
Education.....	.42	10.4	.48	11.9
Unallocated.....	.03	.7	.03	.7
Capital.....	.80	19.9	.87	21.6
Inventories.....	.12	3.0	.14	3.5
Nonresidential structures and equipment.....	.36	9.0	.41	10.2
Dwellings.....	.29	7.2	.29	7.2
International assets.....	.03	.7	.03	.7
Land.....	0	0	0	0
Output per unit of input.....	1.91	47.5	1.71	42.5
Advances in knowledge and not elsewhere classified.....	1.19	29.6	1.37	34.1
Improved resource allocation.....	.31	7.7	.36	9.0
Farm.....	.24	6.0	.28	7.0
Nonfarm self-employment.....	.07	1.7	.08	2.0
Dwellings occupancy ratio.....	-.01	-.2	-.01	-.2
Economies of scale.....	.43	10.7	-----	-----
Irregular factors.....	-.01	-.2	-.01	-.2
Weather in farming.....	-.01	-.2	-.01	-.2
Labor disputes.....	0	0	0	0

Source: Edward F. Denison, "Accounting for U.S. Economic Growth, 1929-1969," the Brookings Institution, 1974, tables 9-4, 9-5, and R-7.

total. If the contribution of economies of scale is allocated, the capital contribution becomes 0.87 percentage points or 21.6 percent of the total.¹⁰ It is evident that capital has been one of the major growth sources.

Capital contributed heavily to a rise in the growth rate of potential national income from 2.75 percent in 1929-48 to 4.02 percent in 1948-69. The contribution of capital, including its share of scale economies, was 0.14 percentage points in 1929-48 and 0.87 points in 1948-69. The increase of 0.73 percentage points was 57 percent of the 1.27 point increase in the growth rate of potential NI. Advances in knowledge and n.e.c. accounted for 0.65 points of the increase in the growth rate from 1929-48 to 1948-69; all other sources combined contributed 0.11 points less in the later than in the earlier period.

The dominance of capital in this change was unusual; capital formation was extraordinarily small from 1929 to 1948 because of the Great Depression and World War II. But capital has been responsible for a significant part of the differences in growth rates between postwar periods. Potential national income grew much faster in 1948-53 and 1964-69 than in the intervening 1953-1964 period. The 1948-53 growth rate was 1.79 points above the 1953-64 rate; the 1964-69 rate was 1.65 points above the 1953-64 rate. Labor was responsible for the bulk of these differences but, with economies of scale allocated, capital con-

¹⁰ It is theoretically and sometimes practically possible to change the classification in other ways that would change the capital contribution, and these are discussed in *Accounting* and elsewhere. They need not be reviewed here.

tributed 0.24 percentage points to the first of these differences and 0.29 points to the second.¹¹

Savings and Investment Ratios

The section on the United States will conclude with saving and investment ratios. In the framework of the national income and product accounts, gross private investment is equal to gross private saving plus government saving defined as the government surplus on income and product account. Similarly, net private investment is equal to net private saving plus government saving. These equalities are a matter of definition.¹²

In actual statistics, they may not hold because estimates are statistically inconsistent. In the construction of Table 6, which shows aggregate saving and investment ratios, statistical equality was obtained by adding one-half of the statistical discrepancy in the national accounts to private investment and subtracting the other half from private saving.

The most stable ratio is that of gross private saving to gross national product (Table 6, column 1). In the twenty-seven years from 1948 through 1974 gross private saving averaged 15.78 percent of GNP. The mean deviation of the annual percentages from this average was only 0.51 percent of GNP, and in only two years (1967 and 1969) was the deviation more than one percentage point.¹³

There is no indication of a rising or falling trend. The percentage averaged 15.7 in 1948-61 and 15.9 in 1962-74 (16.0 in 1962-75). Last year's percentage was unusually high, at 17.0, according to the estimates available now.

The average ratio of net private saving to net national product was, of course, much lower, averaging 7.60 percent in 1948-74. The net saving ratio was also less stable, but not notably so. The mean deviation of the annual percentages from their mean was 0.69 percent of NNP. Fluctuations, like those in the gross rate, seem largely random. Again, there is no appreciable trend; the percentage averaged 7.5 in 1948-61 and 7.7 in both 1962-74 and 1962-75. The net private saving ratio, in contrast to the gross saving ratio, was moderately *below* average in 1975.

Saving available for private investment is augmented by a government surplus while a government deficit absorbs part of private saving and thus reduces the amount available for investment. Over the 1948-74 period governments absorbed private saving, though not to a major extent. The surplus or deficit averaged -0.16 percent of gross national product and -0.18 percent of net national product. The 1975 deficit was so big that extending the period to cover 1948-75 almost

¹¹ Without allocation of gains from economies of scale, capital was responsible for 0.21 and 0.25 points, respectively, of the differences, as can be calculated from Table 2.

¹² What the Bureau of Economic Analysis terms "capital grants received by the United States (net)" appear in the accounts in four years. When they do, they must be added to saving or subtracted from investment to secure equality.

¹³ The national accounts permit two estimates of gross private saving, which differ by the statistical discrepancy. The statistical discrepancy averaged 0.41 percent of GNP, not much less than the average deviation of the saving rate from its average. In only about one-half of the years do *both* saving estimates indicate the saving rate was above, or below, the 1948-74 average.

TABLE 6.—AGGREGATE SAVING AND INVESTMENT RATIOS, UNITED STATES, 1948-75¹

Year	Percent of gross national product			Percent of net national product			Net private domestic investment as percent of net national product	
	Gross private saving	Government surplus	Gross national saving and gross private investment ²	Net private saving	Government surplus	Net national saving and net private investment ²	Current prices	Constant (1972) prices
							(7)	(8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
1948.....	15.4	3.3	18.7	8.2	3.5	11.8	10.7	9.7
1949.....	15.0	-1.3	13.6	7.1	-1.4	5.7	5.6	5.4
1950.....	14.9	2.8	17.8	7.2	3.1	10.3	11.4	10.2
1951.....	15.7	1.8	17.5	7.9	2.0	9.9	10.4	9.1
1952.....	15.7	-1.1	14.6	7.9	-1.2	6.6	7.1	6.4
1953.....	15.5	-1.9	13.7	7.5	-2.1	5.4	6.5	6.1
1954.....	15.9	-2.0	14.0	7.5	-2.2	5.4	5.9	5.5
1955.....	16.0	.8	16.8	7.8	.9	8.7	9.1	8.2
1956.....	16.1	1.2	17.4	8.8	1.6	10.3	8.4	7.5
1957.....	16.2	.2	16.4	7.4	.2	7.7	6.8	6.1
1958.....	16.5	-2.8	13.6	7.4	-3.1	4.1	4.4	4.3
1959.....	15.7	-3	15.5	7.1	-4	6.7	7.1	6.8
1960.....	14.9	.6	15.5	6.0	.7	6.7	6.3	6.1
1961.....	15.5	-8	14.7	6.7	-9	5.8	5.3	5.4
1962.....	15.9	-7	15.2	7.6	-7	6.9	6.8	6.8
1963.....	15.3	.1	15.4	7.1	.1	7.3	7.0	7.1
1964.....	16.3	-4	16.0	8.4	-4	8.0	7.2	7.4
1965.....	16.8	.1	16.8	9.2	.1	9.3	8.6	8.7
1966.....	16.7	-2	16.6	9.3	-2	9.1	9.1	9.0
1967.....	17.1	-1.8	15.2	9.4	-2.0	7.4	7.4	7.4
1968.....	15.7	-6	15.0	7.8	-7	7.1	7.2	7.4
1969.....	14.4	1.1	15.6	6.2	1.2	7.4	7.5	7.6
1970.....	15.3	-1.0	15.4	6.7	-1.0	5.8	5.6	5.8
1971.....	16.3	-1.7	14.7	7.8	-1.9	5.9	6.3	6.5
1972.....	15.5	-3	15.2	7.1	-3	6.9	7.8	7.8
1973.....	16.2	.5	16.7	7.9	.5	8.5	8.6	8.5
1974.....	15.2	-3	14.8	6.1	-3	5.6	6.1	5.9
1975.....	17.0	-4.3	12.8	7.1	-4.8	2.4	1.6	1.5

¹ Ratios computed from data in which gross and net national product and gross and net investment have been raised, and gross and net private saving reduced, by $\frac{1}{2}$ of the value of the statistical discrepancy in the national income and product accounts.

² Percentages shown are for gross and net investment. Percentages for gross and net saving are the same except in the 4-yr indicated, when there is a difference not exceeding 0.1 percentage points because of capital grants paid or received by the United States.

Source: Computed from Bureau of Economic Analysis national income and product accounts.

doubles these percentages, to -0.35 and -0.30 , respectively. The government surplus or deficit has fluctuated widely, mainly because of the effect of the business cycle on tax liabilities and government expenditures although the full-employment surplus or deficit has also varied.

Because of the pattern of government saving, private investment ratios have averaged a little lower and fluctuated more than twice as much as private saving ratios. From 1948 through 1974 gross private investment averaged 15.60 percent of GNP, and the mean deviation of the annual percentages from this average was 1.08 percent of GNP. Net private investment averaged 7.42 percent of NNP in 1948-74 and the mean deviation was 1.44 percent of NNP. Both percentages fell to postwar lows in 1975.

Columns 1 through 6 of Table 6 are based on output, saving, and investment data expressed in current rather than constant prices. This is appropriate for consideration of saving and investment decisions because in any year such decisions are necessarily based on price and income relationships prevailing in that year, not those prevailing in some future or past "base" year. However, it is investment in constant,

not current, prices that is related to the growth of the capital stock and hence of capital input and of output measured in constant prices.

Columns 7 and 8 of Table 6 compare current and constant price data for net private domestic investment as a percentage of net national product.¹⁴

The comparison shows that the constant-price net investment ratio rose relative to the current-price ratio. From the average of 1948-52 to the average of 1970-74 the ratio of the implicit deflator for NNP to that for net private domestic investment rose by 11.5 percent. This was helpful to growth in that an investment ratio that was stable in money terms would have risen in real terms. Insofar as relative price movements can be used to judge relative productivity movements, the difference implies that output per unit of input in the production of investment goods rose by more than an average amount. The size of the differential is unimpressive, however, when it is recalled that the total product includes a large segment (government, households, and institutions) in which the method of measurement precludes any change in measured productivity. It should also be noted that the relative decline in investment prices was confined to the years before 1961.

Even on a constant-price basis, the relationship between investment ratios and growth of capital input is not a simple one. Net investment does, to be sure, measure the dollar change in the net capital stock, but it is the ratio of investment to capital stock, not to output, that determines the growth rate of the capital stock and is pertinent to growth of output. Moreover, if my judgments are correct, the change in the gross stock, which is equal to gross investment minus retirements, is more closely related to growth of services of fixed capital than the change in the net stock, which is equal to gross investment minus capital consumption. Growth rates of gross and net stock tend, to be sure, to converge in the long run, and rates tend to be high or low for both in any particular place and period, but rates already cited show that they often diverge considerably.

Any effort to raise the American growth rate by increasing investment would require a judgment as to whether the problem would be to stimulate incentives for investment, incentives for saving, or both.

In this century, at least, the impetus to past major changes in the growth of capital have come from the investment side. The general stability of private saving ratios throughout the postwar period—and, indeed, for a much longer time span if we discard periods of major wars and major depressions—suggests that significant changes in the United States growth rate in this century cannot be ascribed to changes in the private propensity to save. This stability, it is to be noted, prevailed over a period in which there were major changes in rates of inflation, interest rates, the level and structure of taxes, real per capita income, government and private retirement programs, other forms of public and private insurance against contingencies, and many other aspects of the economic environment. It suggests that policymakers should be cautious in appraising their ability to influence private saving behavior. There is no similar difficulty in raising government

¹⁴ Net private domestic investment differs conceptually from net private investment only in that net foreign investment (often negative) is omitted. However, column 7 differs from column 6 for the additional reason that, for comparability with column 8, the statistical discrepancy was omitted from both numerator and denominator in computing column 7.

saving by raising tax rates or reducing expenditures *if* investment demand is known to be sufficiently strong to assure that a more stringent fiscal policy will not simply reduce demand, production, and investment—and tax revenues as well. But much of the time, I suspect, this condition is not met.

It is probable that any program to stimulate capital stock growth over an extended period would have to rely on strengthening incentives to invest rather than to save. In making this statement, however, I do not want to suggest that I or anyone else knows of acceptable measures that can be counted upon with confidence to stimulate investment enough to raise the growth rate by any considerable amount.

III. INTERNATIONAL DIFFERENCES IN LEVELS AND GROWTH RATES OF OUTPUT

In a study published in 1967 I developed, with the assistance of Jean-Pierre Poullier, estimates of the sources of growth in eight Western European countries and the United States during the period 1950–62. I later extended the estimates for the United States to cover 1929–69. Dorothy Walters prepared similar estimates for Canada, initially for 1950–62 and later for 1950–67. In 1976 William Chung and I published estimates for Japan that cover 1953–71.¹⁵ The studies cited also analyzed the sources of difference in *level* of national income per person employed between the other countries and the United States. The Japanese-American comparison was for 1970, all the others for 1960. I shall describe results of the comparisons of levels first, since growth rates can be misleading in their absence.

Sources of Difference in Levels of Output Per Person Employed

Table 7 summarizes these “level” estimates. The top line shows the percentage by which national income per worker in each of the other countries fell below the United States. The rest of the table divides this percentage among sources, showing the number of percentage points ascribed to each source.

Actually, two equally valid comparisons can be made of national income in the United States and each other country. In the first comparison, the output of both countries is valued in United States prices. In the second, the output of both countries is valued in the other country’s prices. Table 8 shows such data for 1960 and/or 1970. For 1970, data refer to gross domestic product. Output levels in other countries are invariably higher, compared to the United States, when comparisons are based on United States prices than when they are based on other-country prices. Table 7 analyzes only differences in output measured in U.S. prices, which minimizes the gap between output per worker in the United States and abroad. It should also be noted that in the United States 1960 and 1970 were both recession years in which productivity was unusually low and this adversely affected the position of the United States relative to the other countries (except Canada, which was even more severely affected by the 1960 recession). The amount is measured in Table 7 in the line, “irregularity in pressure of demand.”

¹⁵ See footnote 1 for citations to these studies.

TABLE 7.—CONTRIBUTIONS TO SHORTFALLS FROM THE UNITED STATES IN NATIONAL INCOME PER PERSON EMPLOYED, 1970 OR 1960¹

[Percentage of U.S. national income per person employed]

Sources of difference	Northwest Europe ²	Belgium	Denmark	France	West Germany	Netherlands	Norway	United Kingdom	Italy	Canada	Japan
Total difference.....	41.0	33.0	42.0	41.0	41.0	35.0	41.0	41.0	60.0	18.3	45.2
Total factor input.....	11.3	8.5	11.0	11.0	14.0	2.8	5.3	11.0	18.7	.7	10.6
Labor.....	1.1	1.0	2.8	1.0	2.5	-4.7	-.4	-.6	4.4	0	1.0
Hours of work.....	(-3.9)	(-3.2)	(-3.5)	(-4.1)	(-3.9)	(-5.9)	(-3.4)	(-3.1)	(-4.9)	(-2.8)	(-3.9)
Age-sex composition.....	(1.2)	(.1)	(2.2)	(1.1)	(2.3)	(-.9)	(.1)	(.7)	(.8)	(-1.6)	(2.3)
Education.....	(3.8)	(4.1)	(4.1)	(4.0)	(4.1)	(2.1)	(2.9)	(3.0)	(8.5)	(4.4)	(2.6)
Capital.....	9.7	6.9	7.7	9.6	11.0	7.0	5.2	9.9	13.8	1.3	8.4
Dwellings.....	(1.9)	(2.1)	(1.8)	(2.1)	(1.9)	(1.9)	(2.1)	(1.6)	(3.2)	(.2)	(2.9)
International assets.....	(.4)	(.3)	(.5)	(.5)	(.7)	(.2)	(1.0)	(0)	(.6)	(2.0)	(.6)
Nonresidential structures and equipment.....	(6.6)	(3.5)	(4.8)	(6.1)	(7.4)	(4.8)	(1.5)	(7.5)	(8.7)	(-.7)	(3.6)
Inventories.....	(.8)	(1.0)	(.6)	(.9)	(1.0)	(.1)	(.6)	(.8)	(1.3)	(-2)	(1.3)
Land.....	.5	.6	.5	.4	.5	.5	.5	.5	.5	-.6	(1.2)
Output per unit of input.....	29.7	30.5	31.0	30.0	27.0	32.2	35.7	30.0	41.3	17.6	34.6
Overallocation to agriculture.....	2.3	.2	3.1	5.8	3.7	-.2	6.1	-1.1	12.3	1.5	6.0
Overallocation to nonagricultural self-employment.....	.3	2.7	1.5	1.9	.4	1.1	2.1	-1.7	4.6	-.6	3.3
Use of shift work.....	.1	.1	.1	.1	.1	.2	.2	0	0	NA	.2
Economies of scale ³	4.9	5.9	5.7	4.8	4.7	5.9	6.2	4.6	4.5	5.2	3.5
Labor disputes.....	4 NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Irregularity in pressure of demand.....	-1.6	-1.8	-1.8	-1.7	-1.7	-1.8	-1.8	-1.3	-1.4	1.4	-4.3
Irregularity in agricultural output.....	0	0	0	0	0	-.5	0	0	0	0	0
Lag in the application of knowledge, general efficiency, and errors and omissions.....	23.7	23.4	22.4	19.1	19.8	27.5	22.9	29.3	21.3	10.1	26.0

¹ Data for Japan are for 1970. Those for all other countries refer to 1960. All data are based on comparisons in U.S. prices of the year compared.

² Includes Belgium, Denmark, France, West Germany, the Netherlands, Norway, and the United Kingdom.

³ Includes size of local markets and national markets, and effects of barriers to international trade.
⁴ Not available.

Source: Edward F. Denison and William K. Chung, "How Japan's Economy Grew So Fast," the Brookings Institution, 1976, pp. 96-97.

TABLE 8.—NATIONAL INCOME OR PRODUCT PER PERSON EMPLOYED AS PERCENT OF NATIONAL INCOME OR PRODUCT PER PERSON EMPLOYED IN THE UNITED STATES

	1960 national income		1970 gross domestic product	
	U.S. prices	Other country prices	U.S. prices	Other country prices
United States.....	100	100	100	100
Canada.....	85	82	NA	NA
Belgium.....	61	53	NA	NA
Denmark.....	58	45	NA	NA
France.....	59	46	79	66
West Germany.....	59	45	73	62
Netherlands.....	65	48	NA	NA
Norway.....	59	45	NA	NA
United Kingdom.....	59	46	60	51
Italy.....	40	24	62	49
Japan.....	NA	NA	55	44

Sources: Edward F. Denison, "Why Growth Rates Differ: Postwar Experience in Nine Western Countries", Brookings Institution, 1967, p. 22; Denison and William K. Chung, "How Japan's Economy Grew So Fast", Brookings Institution, 1976, p. 5; Dorothy Walters, "Canadian Income Levels and Growth: An International Perspective", p. 20, and "Canadian Growth Revisited", 1950-67, p. 46, Economic Council of Canada, 1968 and 1970.

The Importance of Capital As a Determinant of Output Levels

Based on United States price weights, national income per worker was 35 to 60 percent below the United States in 1960 (1970 for Japan) in all the countries with which comparisons are made in Table 7 except Canada. Lack of as much capital as in the United States was responsible for 5 to 14 percentage points of these foreign shortfalls.

The international comparisons for the single years become more typical of periods centered at that date if contributions of irregular factors to differences in output are deleted. The following relationships are then observed. In the seven countries of Northwest Europe adjusted NI per person employed averaged 42.6 percent below the United States in 1960 and capital accounted for 9.7 percentage points or 23 percent of the gap. In the three large countries in this group—France, West Germany, and the United Kingdom—capital accounted for 9.6 to 11.0 percentage points or 22 to 26 percent of a gap of 42.3 to 42.7 percent of United States NI per worker. In Italy the gap in 1960 was 61.4 percent, of which capital accounted for 13.8 percentage points or 22 percent. In Japan the gap in 1970 was 49.6 percent, and 8.4 percentage points or 17 percent was ascribable to capital. (The gap had been much larger in 1960). Canada was much more similar to the United States than the other countries. The gap was only 16.9 percent and capital accounted for only 1.3 percentage points, or 8 percent, of it.

Thus capital is estimated to have been responsible for about one-sixth to one-fourth of the adjusted income gap in all countries except Canada and Norway, where the fraction was smaller. All four types of capital that are distinguished contributed to the gap between the United States and all other countries except Canada. Canada had more inventories and nonresidential structures and equipment per person employed than the United States.

The sources responsible for the rest of the gaps will be found in Table 7. The only output determinant more favorable to all or even most other countries than to the United States (apart from irregular factors) was working hours, which were longer abroad. The importance of the factors generally favorable to the United States varied

with the country compared. Labor had more education in the United States than in any of the other countries. It was more concentrated in demographic groups where productivity is highest than in any of the other countries except the Netherlands and Canada. Land was more ample than elsewhere with the sole exception of Canada. Overallocation of labor to farming and to self-employment in nonfarm establishments too small for efficiency reduced output per worker less in the United States than in most other countries. Exceptions were the United Kingdom and the Netherlands with respect to farm employment, and the United Kingdom and Canada with respect to nonfarm self employment. At the dates compared these types of misallocation were especially important in explaining the gaps in the cases of Italy (17 percentage points), Japan (10 percentage points), Norway (8 points), and France (8 points). For Italy, Japan, and Norway these percentages exceeded those for capital. Economies of scale provided another important advantage to the United States, which has by far the largest economy and domestic markets.

The biggest part of the difference between levels of output per worker in the United States and other countries is ascribed to the residual, labeled "Lag in the application of knowledge, general efficiency, and errors and omissions" in Table 7. This is the gap that remained after the effects of all separately measured factors had been eliminated. It contributed 19 to 29 percentage points to the gaps in NI per person employed except in the case of Canada, where it was 10 points. In this method of presentation efficiency gaps are reduced by the interaction with other determinants that make NI per worker lower abroad. Computed directly, residual efficiency was 28 percent lower in Northwest Europe than in the United States when output is measured in U.S. prices. Residual efficiency in individual European countries ranged from 23 percent lower in France in 1960 to 34 percent lower in the United Kingdom. Japan was 30 percent below the United States in 1970.

The study from which the European estimates are drawn put residual efficiency in Western Europe in 1960 much below that in the United States 35 years earlier. It expressed the opinion that the difference in residual efficiency between the United States in 1925 and the United States in 1960 is ascribable to new knowledge developed in the interim but that the larger difference between Western Europe in 1960 and the United States in 1960 could not reasonably be laid to differences in the knowledge available to the two areas.¹⁶ Knowledge is a worldwide commodity. Lags in its availability are at most a few years, not several decades. Especially is this so when the leading country is the United States, where nearly all knowledge circulates freely and where productivity teams sent from other countries for the express purpose of observing American practices were not only welcomed but sponsored. What applies to the gap between the United States and Europe applies also to the gap between the United States and Japan.¹⁷

¹⁶ *Why Growth Rates Differ*, p. 335.

¹⁷ Japan's payments for foreign (mostly American) technology do not qualify this discussion materially. They were largely confined to late developments in high-technology manufacturing industries, for the most part were required only because foreign firms were barred from direct entry to Japan, and at their peak scarcely exceeded one-fourth of 1 percent of the Japanese national income.

One would like to know what the determinants of international differences in residual productivity are, how they arise, and, most of all, how it is possible for them to persist for long periods. Why have other countries been unable to close the efficiency gap? Many possible reasons for the large and persistent gap in residual efficiency have been suggested but there is no firm evidence as to which are correct.

After this brief digression I return now to capital. To prepare Table 7 international comparisons of the nonresidential business components of the capital stock were required, but they refer mainly to a year that is now some time back.¹⁸ Data for such international comparisons, it should be realized, are hard to obtain. In *How Japan's Economy Grew So Fast* the net stocks of fixed capital in the nonresidential business sectors of the major industrial countries at about the end of 1971 were estimated to be roughly proportional to business expenditures on nonresidential structures and equipment from 1960 through 1971. As with national income, two equally valid comparisons of the United States and each other country are obtained—one values components of investment in both countries at United States prices, the second in the other country's prices.

The first two columns of Table 9 compare the net stock of fixed capital in the nonresidential business sector per person employed in that sector in 1971. If the estimates based on the two sets of price weights are averaged, it appears that West Germany had 84 percent as much capital per worker as the United States and Japan only 48 percent as much.¹⁹

TABLE 9.—ESTIMATED NET STOCK OF FIXED CAPITAL IN NONRESIDENTIAL BUSINESS,
PER PERSON EMPLOYED, 1971

	[Percent of United States]			
	Stock per worker employed in nonresidential business		Stock per civilian employed in whole economy	
	U.S. prices	Other country's prices	U.S. prices	Other country's prices
	(1)	(2)	(3)	(4)
United States.....	100	100	100	100
France.....	NA	NA	103	92
West Germany.....	91	77	103	88
United Kingdom.....	NA	NA	55	50
Italy.....	NA	NA	57	49
Japan.....	51	44	64	56

Source: Edward F. Denison and William K. Chung, "How Japan's Economy Grew So Fast," the Brookings Institution, 1976, pp. 73-74.

Similar data for other countries are absent because of the lack of data for employment in nonresidential business but their general level can be inferred. In columns 3 and 4 the net fixed capital stock in nonresidential business is divided by total civilian employment in the

¹⁸ They are not reproduced here but appear in Denison, *Why Growth Rates Differ*, pp. 165-74 and 177-78, and Walters, *Canadian Income Levels and Growth*, pp. 82-86, 88-89.

¹⁹ Perpetual-inventory type estimates of capital stock, prepared only for Germany and the United States, yield figures for the ratio of West German to United States stock that are slightly (less than 3 percent) below those obtained by simply cumulating 1960-71 investment.

whole economy Because the proportion of civilians who were employed in general government, households, and nonprofit institutions was much higher in the United States than in Germany, and much higher in Germany than in Japan, the percentages in columns 3 and 4 for Germany are substantially higher relative to the United States than the corresponding percentages in columns 1 and 2, and those for Japan are higher relative to both the United States and Germany. Proportions of civilian employment in general government, households and institutions in the other countries are believed to lie between those in the United States and Japan. If they were the same as in Germany, the percentages for capital per worker employed in nonresidential business, based on the average results of using United States and other-country prices, would be: United States, 100; France, 86; West Germany, 84; Japan, 48; Italy, 47; and the United Kingdom, 46 Thus it appears that, among large industrial countries, the United States still had the most capital per worker in nonresidential business as of the early 1970's. Based on average price weights, the margin over France and West Germany appears to have been 15 to 20 percent and the margin over Japan, Italy, and the United Kingdom more than 100 percent. The United States margins are uniformly smaller if United States price weights are used and larger if the other country's price weights are used.

The United States is believed also to have more inventories per worker in nonresidential business than any of the other countries, although recent quantitative comparisons of most of the countries have not been made. The United States has much more residential capital than the other countries. The international comparison study by Kravis, Kenessey, Heston, and Summers provides 1970 comparisons of the "quantity" of gross residential rents entering into consumption in 1970. The figures serve equally well for a comparison of gross stocks of dwellings. On a per capita basis, when the stock in the United States is taken as 100 the stock was 64 in West Germany, 62 in France, 55 in the United Kingdom, 51 in Italy and 37 in Japan.²⁰ On a per worker (as distinguished from per capita) basis the percentages are even lower for all the foreign countries except Italy.

Comparisons of annual gross investment are more favorable to most the foreign countries in recent years than are comparisons of capital stock. This is because annual investment rose faster abroad than in the United States and the stock lags behind investment. The recent year for which the best data are available (from the study by Kravis and his associates) is 1970, a recession year in the United States. Based on the average of United States and other-country weights, gross fixed nonresidential business investment per person employed in nonresidential business was 93 percent as large in West Germany and 67 percent as large in Japan as in the United States. Corresponding percentages would have been 99 in France, 48 in Italy, and 45 in the United Kingdom if nonresidential business employment were the same percentage of total civilian employment in these countries as in West Germany.²¹ Residential construction per person em-

²⁰ Irving B. Kravis, Zoltan Kenessey, Alan Heston, Robert Summers, *A System of International Comparisons of Gross Product and Purchasing Power*, United Nations International Comparison Project: Phase One (Johns Hopkins University Press for the World Bank, 1975), p. 251, line 52.

²¹ Derived from Denison and Chung, *How Japan's Economy Grew So Fast*, pp. 73-74.

ployed was larger in some of these countries than in the United States.²²

In considering growth experience, discussed in the next section, the reader should remember that throughout the postwar period levels of capital stock and all its four main components were lower, per worker, in all of the other countries than in the United States—except for nonresidential business capital in Canada. They were *far* lower in Japan, Italy, and the United Kingdom in all of the period and in the continental countries of Northwest Europe in most of the period, including the entire time span (1950–62) for which sources of growth have been estimated for these countries. Capital was responsible for one-sixth to one-fourth of the gap between NI per worker in the United States and the other countries except Canada and Norway, for which the fraction was less. A number of determinants which varied from country to country were responsible for the rest of the gap; in every case a much lower level of general efficiency was very important.

Growth and Its Sources in Eleven Countries

Table 10 presents estimates of the sources of growth in eleven countries. They were obtained from the studies already cited. Three points about this table should be noted.

First, growth rates were adjusted to a “standardized” basis in order to improve statistical comparability of the output measures, to eliminate effects of irregular factors on output per unit of input, and to screen out some of the effects during the early 1950’s of recovering from wartime distortions.²³ The purpose was to eliminate sources that would complicate or impair the validity of comparisons.

Second, time periods are not uniform. For the United States itself data are shown for both the 1948–69 period, which will be emphasized, and for 1950–62, the period to which the European data refer.

The following listing shows growth rates based on net national product at market prices in a uniform period, 1953–71; however, these are unadjusted rates.

Japan	9.3
West Germany	5.5
France	5.4
Italy	5.3
Netherlands	5.0
Canada	4.9
Belgium	4.2
Denmark	4.1
Norway	4.0
United States	3.2
United Kingdom	2.6

²² Total gross investment and government purchases of structures and equipment, combined (a grouping sometimes used for international comparisons), was larger per capita in three of these countries than in the United States. Kravis and his associates report (p. 234) that on the basis of “international” prices per capita expenditures as a percent of the United States were as follows: West Germany, 135; France and Japan, 124; United States, 100; United Kingdom, 68; Italy, 60. The advantage of Germany, France, and Japan was confined to construction, especially residential construction. Only West Germany matched per capita expenditure for producers’ durable equipment in the United States. In the recession year to which these estimates pertain, 1970, per capita expenditures in the United States, measured in constant prices, had fallen 9 percent from the previous year. It should also be stated that percentages in all the foreign countries, except Italy, are substantially lower per person employed than per capita.

²³ See Denison and Chung, *How Japan’s Economy Grew So Fast*, Table 4–7, for the detail of the adjustments.

TABLE 10.—SOURCES OF GROWTH OF STANDARDIZED GROWTH RATE OF NATIONAL INCOME, WHOLE ECONOMY, BY COUNTRY, VARIOUS PERIODS, 1948-71

[Percentage points]

Item	United States		Canada, 1950-67 ¹	Belgium, 1950-62	Denmark, 1950-62	France, 1950-62	West Germany, 1950-62	Italy, 1950-62	Nether- lands, 1950-62	Norway, 1950-62	United Kingdom, 1950-62	Japan, 1953-71
	1948-69	1950-62										
Standardized growth rate.....	4.00	3.68	4.95	3.03	3.63	4.70	6.27	5.60	4.07	3.43	2.38	8.81
Total factor input.....	* 2.09	1.83	3.02	1.17	1.55	1.24	2.78	1.66	1.91	1.04	1.11	3.95
Labor.....	1.30	1.11	1.85	.76	.59	.45	1.37	.96	.87	.15	.60	1.85
Employment.....	(1.17)	(.89)	(1.82)	(.40)	(.70)	(.08)	(1.49)	(.42)	(.78)	(.13)	(.50)	(1.14)
Hours of work.....	(-.21)	(-.19)	(-.20)	(-.15)	(-.18)	(-.02)	(-.27)	(.05)	(-.16)	(-.15)	(-.15)	(.21)
Age-sex composition.....	(-.10)	(-.03)	(-.13)	(.08)	(-.07)	(.10)	(.04)	(.09)	(.01)	(-.07)	(-.04)	(.14)
Education.....	(.41)	(.42)	(.36)	(.43)	(.14)	(.29)	(.11)	(.40)	(.24)	(.24)	(.29)	(.34)
Unallocated.....	(.03)	(.02)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(.02)
Capital.....	* .79	* .72	1.14	.41	.96	.79	1.41	.70	1.04	.89	.51	2.10
Inventories.....	(.12)	(.10)	(.10)	(.06)	(.15)	(.19)	(.33)	(.12)	(.22)	(.13)	(.09)	(.73)
Nonresidential structures and equipment.....	(.36)	(.31)	(.87)	(.39)	(.66)	(.56)	(1.02)	(.54)	(.66)	(.79)	(.43)	(1.07)
Dwellings.....	* (.28)	* (.26)	(.30)	(.02)	(.13)	(.02)	(.14)	(.07)	(.06)	(.04)	(.04)	(.30)
International assets.....	(.03)	(.05)	(-.12)	(-.06)	(.02)	(.02)	(-.08)	(-.03)	(.10)	(-.07)	(-.05)	(0)
Land.....	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Output per unit of input, standardized.....	* 1.91	* 1.56	1.96	1.86	2.08	3.46	3.49	3.94	2.16	2.39	1.27	4.86
Advances in knowledge and n.e.c. ²	1.19	1.15	.66	.84	.75	1.51	.87	* 1.30	* .75	.90	.79	1.97
Improved resource allocation.....	.30	.32	.64	.51	.68	.95	1.01	1.42	.63	.92	.12	.95
Contraction of agricultural inputs.....	(.23)	(.27)	(.54)	(.20)	(.41)	(.65)	(.77)	(1.04)	(.21)	(.54)	(.06)	(.64)
Contraction of nonagricultural self-employment.....	(.07)	(.05)	(.10)	(.15)	(.18)	(.23)	(.14)	(.22)	(.26)	(.23)	(.04)	(.30)
Reduction of international trade barriers.....	(0)	(0)	(0)	(.16)	(.09)	(.07)	(.10)	(.16)	(.16)	(.15)	(.02)	(.01)
Economies of scale.....	.42	.38	.66	.51	.65	1.00	1.61	1.22	.78	.57	.36	1.94
Measured in U.S. prices.....	(.42)	(.38)	(.63)	(.40)	(.42)	(.51)	(.70)	(.62)	(.55)	(.45)	(.27)	(1.06)
Income elasticities.....			(.03)	(.11)	(.23)	(.49)	(.91)	(.60)	(.23)	(.12)	(.09)	(.88)

¹ Details may not add to totals because of rounding.
² The contribution of the "dwellings occupancy ratio" is included in the contribution of "dwellings" for comparability with other countries.

³ Not elsewhere classified.

⁴ Estimate for 1955-62 period.

Sources: Edward F. Denison and William K. Chung, "How Japan's Economy Grew So Fast," the Brookings Institution, 1976, pp. 42-43, except United States, 1950-62, from Denison, "Accounting for United States Economic Growth, 1929-69," p. 345.

If United States deflation procedures were uniformly followed, the Japanese rate would be reduced from 9.3 percent to 8.9 percent and rates for West Germany, France, Canada, Belgium, and perhaps other countries would be a little lower. The rates also are affected by different cyclical positions of the countries in 1953 and 1971. The U.S. rate, for example, would be raised from 3.2 percent to about 3.7 percent if it were calculated on the basis of potential rather than actual net national product.

The fact that time periods in Table 10 vary is not, in itself, a serious problem for our purpose, which is to examine the characteristics of growth differences. It would, of course, be useful to have more recent European data.

Third, a line appears in Table 10 that was not present in tables confined to the United States: gains from economies of scale associated with "income elasticities." Where per capita consumption abroad has risen markedly toward the U.S. level, the increase in consumption has been concentrated in products such as consumer durables for which demand is income elastic and relative prices abroad have been high (in comparison with United States prices) because relative quantities used have been small (in comparison with United States quantities). Consequently, the greater is the rise in per capita consumption in a country and the lower its initial level, the larger tends to be the amount by which the rise in consumption in each country measured in its own constant prices exceeds the rise measured in U.S. constant prices. The "income elasticities" entry represents the difference that this systematic pattern introduces between the growth rate of NI when the components of consumption are weighted by U.S. prices and the rate when they are weighted by national prices. This difference reflects concentration of increases in consumption in products where potential gains from economies of scale are particularly large.²⁴

Inspection of Table 10 shows that the standardized growth rate was much higher in Japan than in the other countries. Rates elsewhere ranged from 2.4 percent in the United Kingdom to 6.3 percent in West Germany, while the rate in Japan was 8.8. The 1948-69 rate in the United States was 4.0 percent, which was below all the larger of the industrial countries except to United Kingdom; that is to say, it was below Japan, West Germany, Italy, Canada, and France. It was also slightly below the 1950-62 rate in the Netherlands, but above the rates in Belgium, Denmark, and Norway. (All of these smaller countries probably had higher adjusted growth rates in 1953-71, it can be inferred from the preceding text table.) Capital contributed to these growth rates amounts ranging from 0.41 percentage points in Belgium to 1.41 points in West Germany and 2.10 points in Japan.

CONTRIBUTION OF CAPITAL TO GROWTH RATE DIFFERENCES

How important to international growth rate differences was capital? Table 11 summarizes the findings.

²⁴ For a more adequate explanation and a description of the estimates see Denison, *Why Growth Rates Differ*, Chapter 17, and Denison and Chung, *How Japan's Economy Grew So Fast*, Chapter 10 and Appendix I.

TABLE 11.—DIFFERENCES FROM THE UNITED STATES IN GROWTH RATE AND CAPITAL CONTRIBUTIONS, 10 COUNTRIES, VARIOUS PERIODS

[Percentage points]

Country of period	Difference from United States, 1948-69				Difference from United States, 1950-62			
	Capital contribution				Capital contribution			
	Growth rate (1)	Total (2)	Nonresidential business (3)	Dwelling and international assets (4)	Growth rate (5)	Total (6)	Nonresidential business (7)	Dwelling and international assets (8)
Japan, 1953-71	4.81	1.31	1.32	-0.01	5.13	1.38	1.39	-0.01
West Germany, 1950-62	2.27	.62	.87	-.25	2.59	.69	.94	-.25
Italy, 1950-62	1.60	-.09	.18	-.27	1.92	-.02	.25	-.27
Canada, 1950-62	.95	.35	.49	-.13	1.27	.42	.56	-.13
France, 1950-62	.70	0	.27	-.27	1.02	.07	.34	-.27
Netherlands, 1950-62	.07	.25	.40	-.15	.39	.32	.47	-.15
Denmark, 1950-62	-.37	.17	.33	-.16	-.05	.24	.40	-.16
Norway, 1950-62	-.57	.10	.44	-.34	-.25	.17	.51	-.34
Belgium, 1950-62	-.97	-.38	-.03	-.35	-.65	-.31	.04	-.35
United Kingdom, 1950-62	-1.62	-.28	.04	-.32	-1.30	-.21	.11	-.32

Source: Table 10.

In 1948-69 the adjusted growth rate of the United States was 4.00 percent, of which 0.79 percentage points were contributed by capital and 3.21 points by other growth sources. Of the capital contribution, 0.48 points were contributed by nonresidential business capital (inventories and nonresidential structures and equipment) and 0.31 points by dwellings and international assets. The first four columns of Table 11 show the amounts by which the corresponding data for the other countries are above or below these figures. The countries are ordered by the size of their adjusted growth rates.

The first five countries listed had growth rates well above the United States. All were relatively large economies. In two of them, Italy and France, capital contributed the same or a slightly smaller amount than in the United States and hence explains none of the difference in growth rates. In the other three, capital contributed more to growth than in the United States. The difference in the capital contribution amounted to 27 percent of the difference in growth rates in the cases of both Japan and West Germany, and to 36 percent in the case of Canada. The other large country, the United Kingdom, had a lower growth rate than the United States and a capital contribution which was smaller by an amount equal to 17 percent of the difference in growth rates. These percentages would be moderately higher if part of the contribution of economies of scale were imputed to capital. The four smaller countries show no particular pattern. The growth rate in the Netherlands was slightly above that in the United States, and the capital contribution larger by a bigger amount. Denmark and Norway had slightly larger capital contributions but lower growth rates. Both growth rate and capital contribution were smaller in Belgium, with capital accounting for 39 percent of the growth rate difference.

Differences in the contributions of nonresidential business capital, shown in column 3, were more favorable to other countries than differences in the total capital contribution. As shown in column 4, the United States obtained more growth than any other country by increasing the housing stock and net earnings from abroad. (This was also true of both types of asset separately except that Japan and Canada received slightly larger contributions from housing.)²⁵

The relationship between capital contribution and growth rates is not surprising inasmuch as capital is one but only one of several important determinants of output that change over time by amounts that vary from place to place. Bigger contributions from capital—like those from almost any other source—tend to be associated with higher growth rates because the contribution of capital is part of the growth rate. But in no case where growth rates of the United States and another country differ considerably does capital account for as much as two-fifths of the difference. Usually it accounts for much less than that, and in important cases it accounts for none at all.

CONTRIBUTIONS OF OTHER SOURCES TO GROWTH RATE DIFFERENCES

At least one main growth source has been much more systematically associated with growth rates than has capital. This is the gain achieved

²⁵ The last four columns of Table 11 show differences from the United States figures in 1950-62, when its adjusted growth rate (at 3.68 percent), the total contribution of capital (at 0.72 percentage points), and the contribution of nonresidential business capital (at 0.42 points), were all lower than in 1948-69. These columns, included to permit comparison with European countries for the same period, add little to the latter derived from the 1948-69 comparison.

from the reallocation of labor into nonfarm wage and salary employment from farming and from self-employment in nonfarm establishments that were much too small for efficiency. Where the fraction of the labor force initially allocated to farming and nonfarm self-employment was large, the proportion that shifted was also large and the contribution to growth from reallocation was big. Among the countries of Europe and America contributions from reallocation had a wider range than the contribution of capital and corresponded to growth rates more closely. The contribution in the United States was small because misallocation was small.

Other sources were important to the high growth rates of particular countries, for example, employment in Germany and Canada, and an especially large increase in general efficiency in France. Economies of scale were also important. Their role, moreover, was not confined to widening international differences that would be present in any case. Because growth rates (unlike the comparisons of output levels) refer to output series computed by using each country's own relative prices, rather than any uniform set of price weights, accounting for international differences in growth rates requires the "income elasticities" line in Table 10. The contribution of this source is greater the lower is the initial level of per capita consumption and the larger its rise. Contributions of economies of scale associated with income elasticities ranged from nothing up to 0.60 percentage points in Italy, 0.88 points in Japan, and 0.91 in West Germany.

SOURCES OF JAPAN'S HIGH GROWTH RATE

Japan's very high growth rate was obtained by securing big contributions from many sources. In *How Japan's Economy Grew So Fast* contributions of groups of determinants to Japanese growth from 1953 to 1971 were compared with the simple average of their contributions to adjusted growth rates in the other ten countries appearing in Table 10. The Japanese growth rate (8.8 percent a year) exceeded the average of the other ten (4.2 percent) by 4.6 percentage points. Of this difference 0.9 percentage points are accounted for by an above-average contribution from changes in employment, hours of work, and the distribution by age and sex of total hours worked, 1.2 percentage points by a greater contribution from capital, 1.0 percentage point by a greater contribution from the application of new knowledge to production, and 0.3 percentage points by greater than average contributions from the reallocation of resources away from agriculture and from nonagricultural self-employment. The contributions of these determinants (as well as of others whose contributions are not exceptionally large) are computed as if countries operate under conditions of constant returns to scale which is by no means the case; economies of scale are important. Markets were growing much faster in Japan than the average for the other countries as a result of the growth sources already enumerated. Economies of scale, including those associated with income elasticity, contributed 1.2 percentage points more to growth in Japan than to the average growth rate of the other ten countries.

The pervasiveness of the Japanese advantage is striking. All of the five groups of sources enumerated in the preceding paragraph made

a larger contribution to growth in Japan in 1953-71 than to growth in *any* of the other ten countries in the periods analyzed, with the sole exception that Italy (1950-62) is estimated to have gained more from the reallocation of resources away from agriculture and nonfarm self-employment.

It may be noted that Japan gained only about an average amount from one of the principal remaining growth sources, increased education of the labor force, and a lower than average amount from another, the relaxation of barriers to international trade. Four countries gained more than Japan from education and eight gained more from the reduction of trade barriers. But the margins are not large.

Not only did Japan stand first in the contributions from most of the important growth sources; other countries tended not to stand high or low in all major determinants but rather to have a mixed ranking. The latter feature helps to explain why the Japanese growth rate exceeded others by so wide a margin.

GROWTH OF STOCKS OF BUSINESS CAPITAL

International differences in the contributions of nonresidential structures and equipment and inventories to economic growth are mainly reflections of the rates at which these inputs increase.²⁶ Table 12 shows these rates for the periods in which growth sources were analyzed. As in Table 11, countries are ordered by the size of their adjusted NI growth rates. What can be said about the reasons that capital grows at different rates in different times and places?

TABLE 12.—GROWTH RATES OF NONRESIDENTIAL BUSINESS CAPITAL STOCK, 11 COUNTRIES, VARIOUS PERIODS

Country and period.....	[percent]		
	Nonresidential structures and equipment		Inventories
	Gross stock	Net stock	
Japan, 1953-71.....	9.2	9.2	11.9
West Germany, 1950-62.....	5.5	6.9	7.0
Italy, 1950-62.....	13.6	4.0	2.7
Canada, 1950-67.....	5.2	6.3	3.8
France, 1950-62.....	3.6	4.3	4.8
Netherlands, 1950-62.....	14.2	5.0	5.1
United States, 1948-69.....	3.5	4.1	3.5
Denmark, 1950-62.....	14.8	6.0	4.0
Norway, 1950-62.....	14.2	5.1	2.7
Belgium, 1950-62.....	2.9	2.9	1.6
United Kingdom, 1950-62.....	3.0	4.2	2.6

¹ Growth rate of gross stock inferred from net stock; see source.

² Approximated from data in source.

³ Refers to 1950-64.

Sources: Denison, "Why Growth Rates Differ," tables 12-2 and 13-2, and "Accounting for United States Economic Growth," table 5-2. Denison and Chung, "How Japan's Economy Grew So Fast," tables 1-1 and 1-2, Walters, "Canadian Income Levels and Growth," pp. 76, 87 and "Canadian Growth Revisited" p. 19.

²⁶ They also reflect differences in the shares of NI originating in nonresidential business that these assets earn, and differences in the weight of the nonresidential business sector in the whole economy.

In the computation of the indexes used to measure changes in the input of nonresidential structures and equipment in Europe and Canada, net stock was given half the weight (instead of only one-fourth) because the gross stock indexes were statistically less satisfactory. The Winfrey distribution was not used in their construction, which made them sensitive to differences in assumed service lives, and in four countries direct estimates were not available at all but had to be inferred from net stock series.

Capital combines with labor to produce output, and each of these inputs is subject to diminishing returns if it increases relative to the other. We might therefore expect increases in the capital stock of nonresidential business to be stimulated by increases in employment—which, in turn, are determined by demography, immigration and emigration, shifts in labor force participation rates of a mostly long-term character, and unemployment. Such a relationship is apparent in the data. We have already seen that in the United States periods of rapid increase in employment—potential as well as actual—have also been periods of rapid capital stock growth. Foreign countries with big contribution to growth from employment also had big contributions from nonresidential business capital according to Table 10. Moreover the relationship between employment growth and capital stock growth is improved if for total employment we substitute a measure of effective employment in which reduced weight is assigned to farm workers and nonfarm self-employed and unpaid family workers with low earnings. (In addition, employment outside the business sector should be completely excluded.) Thus the data support the view that the rate of increase of business capital is strongly influenced by that of employment.²⁷

Fast growth of total output, whatever its cause, stimulates investment and makes it easy to increase saving. Consequently it too is conducive to rapid growth of capital stock.

A high rate of utilization of resources is also a stimulus to investment and growth of capital in the short run but whether it is also important in the long run is uncertain. Would the United States, for example, have a much large capital stock today if the 1930's had been a period of prosperity instead of depression?

The importance of the rate of return as an influence on international differences in capital stock growth rates is highly uncertain. Comparable estimates are hard to come by, but such comparisons as have been made suggest there are differences in rates of return but they are not huge. In *Why Growth Rates Differ*, for example, I estimated that, for nonresidential business capital (inventories and nonresidential structures and equipment), the ratio of before-tax earnings to one-half the value of the gross stock was 13.1 percent in Germany, 11.8 percent in the United States, 11.0 percent in France, and 9.5 percent in the United Kingdom.²⁸

The interpretation of nearly all international comparisons of rates of return, capital-output ratios, and investment ratios, is greatly complicated by the fact that the ratio of the prices of goods entering into the business capital stock, including inventories, to the prices of other

²⁷ The rationale for the relationship seems to imply that capital-labor ratios in difference countries should converge toward a ratio that is natural or optimal (given the state of knowledge and other conditions prevailing at a given time). Although there is a tendency toward such convergence—as between Japan and the United States, for example—when I last investigated this subject the tendency did not seem strong. However, that examination was made in an appraisal of growth in the United Kingdom, which has had both a low level and low growth rate of capital per worker, and that country may have been given too much emphasis in this negative appraisal. Also, the data were for 1950-62; and countries other than the United Kingdom might conform better to the expectation in subsequent years.

²⁸ This was considered a better comparison than ratios of earnings to net stock, which were 10.9 percent in the United States, 10.4 percent in Germany, 10.2 in France, and 8.6 in the United Kingdom. Both sets of ratios were believed to exceed true rates of return.

components of the national product varies greatly from country to country. Capital has been cheapest relative to other prices in the United States. This produced the result that in 1962, for example, the ratio of expenditures for nonresidential structures and equipment to gross national product was lower in both Northwest Europe and Italy than in the United States when all expenditures were expressed in United States prices even though the ratios were 12.1 percent in the United States, 16.6 percent in Northwest Europe, and 17.4 percent in Italy when (as is customary) the ratio for each area was calculated on the basis of its own prices.²⁹ The study by Kravis and his associates for 1970 showed the relative price of capital goods continued to be lowest in the United States. This was because of producers durables; nonresidential construction was expensive in this country.

The difference in price ratios is one of several reasons that international differences in ratios of investment to national product are extremely difficult to interpret, and almost impossible to relate to growth.³⁰

This discussion of the growth of capital has been rather general. To be more specific one must deal with a particular growth experience. Japan is of special interest in that it is the largest free market economy except for the United States, it has had the highest growth rate of output, and it has had the most rapid increase in capital. *How Japan's Economy Grew So Fast* describes the Japanese record of investment, saving, and capital stock growth and it is summarized in Appendix 2.

IV. FINAL OBSERVATIONS

Why Growth Rates Differ, published in 1967, ended with "An Epilogue for American Readers." It showed that the relatively low American growth rate was not an indication of poor economic performance but came about because similar changes produce larger percentage increases in national income in Europe than they do in the United States and, in addition, there were opportunities to increase efficiency in European countries that did not exist to the same degree in the United States. The European countries had higher growth rates but they had not, on balance, done more in any relevant sense to obtain growth.

After some of the findings of the book that supported the latter generalization were recapitulated, I continued as follows:

The conclusion, I believe, is clear. Although most of the European countries have achieved higher growth rates than the United States, this was not because they were doing more to obtain growth. They were able to secure higher growth rates only because they were operating in a different environment. Conditions were very different with respect to factor proportions; to misallocation of resources; to the existing level of technology, management, and general efficiency in the use of resources; and to economies of scale. Some have supposed that the United States could have matched the growth rates of European countries if only Americans had done as the Europeans did. I conclude that this is simply not so.

Comparisons with the postwar growth rates of European countries, therefore, do not provide grounds for dissatisfaction with the American growth record. The point needs stressing because the conditions that enabled Europe to obtain higher growth rates are not exhausted. Aside from short-term aberrations Europe

²⁹ Edward F. Denison, *Why Growth Rates Differ*, p. 161.

³⁰ See Denison, *Why Growth Rates Differ*, Chapter 10, for a discussion of such ratios.

should be able to report higher growth rates, at least in national income per person employed, for a long time. Americans should expect this and not be disturbed by it. Nothing in this analysis suggests that the conditions making for higher European growth would continue to operate if the European countries were to reach American levels of national income per person employed. . . .

The performance of the American economy is not, of course, all that it might be. I doubt that inability to produce and distribute a large and rising total of goods and service—the aspect of economic life with which this book is concerned—should be listed among its defects. But an appropriate evaluation would have to be based on a comparison of United States achievements with United States possibilities. It cannot be based on casual comparisons of the United States growth rate with the rates of countries having quite different opportunities for growth.

The situation remains the same today. Our economy has problems, tough problems—above all the inability to reconcile price stability with high employment, but possibly even a problem of maintaining a satisfactory future growth rate. But the fact that output and capital have grown less than in many other countries is no more a reason for dismay—or to suppose that other nations have found roads to success that we have overlooked—than the fact that our productivity is the highest of all large countries and our capital the most abundant is a reason for complacency.

Should we try to raise our investment ratio or capital stock growth rate to levels that have been achieved by some foreign countries? From what I have said it should be clear that I regard this as unnecessary. In my opinion it is also impractical, at least by any means that would be at all efficient. We should not try to provide more generous investment incentives because some other countries may do so. We should not imagine that investment would be raised radically if we did. And we should not imagine that the growth rate of output would jump up to foreign rates if investment could be so raised. If in the future we find major foreign countries that have higher productivity than we do, produce with more capital per worker than we do, and still continue to add capital faster, we may wish to reexamine their experience to see if there are lessons for us. But that is not the present position.

None of this implies that we should not encourage investment. Certainly we wish to do so by operating a healthy economy, and one which does not overburden business unnecessarily. We would be getting more investment than we are right now if our production were closer to potential, and within limitations imposed by price restraints we all want that. In the short run we might want special aids to investment in order to support economic recovery. Even in the long run it is possible that we might want more investment than a well functioning economy, neutral as between consumption and investment, would provide. But the purpose would be to raise future living standards, including protection of the environment, and perhaps to enhance energy independence. These reasons would stem from our own desires and wants, not from international comparisons.

APPENDIX 1. THE CLASSIFICATION OF GROWTH SOURCES

This appendix provides a short description of the classification of growth that is used in Tables 1 and 2.

Growth of output may be obtained by using more labor and property resources or by increasing the output obtained from the same quantity of resources. The

contributions of *total factor input* and *output per unit of input* distinguish changes in output that result from increases in the quantity of labor performed by individuals with various characteristics relevant to production, in the quantity of capital, and in the quantity of land from changes that result from raising total output per unit of labor, capital, and land. To give this broad statement precision, the components of each must be described.

Labor.—The contribution to growth of the change in labor input refers to the increase in output that results from the increase in the amounts of labor of all types that are used in production in the sector. It is obtained as the sum of several components.

The estimate of the contribution of labor to growth is based upon the number and personal characteristics of workers and the amount of work that they perform. It is not, and is not intended to be, affected by the use to which labor is put nor how it is organized. I regard changes in the products workers produce, the industries in which they are employed, and the occupations in which they are classified as irrelevant to input measurement. If such changes—or changes in the use to which capital or land are put—alter the total national income in constant prices, this is regarded as a component of output per unit of input.

Changes in the intensity of work per hour worked are taken into account in the labor input measure only insofar as they result from changes in the duration of working hours. It is recognized that intensity of utilization of labor, capital, and land all vary with fluctuations in the strength of demand pressures, but the effects of such variations are measured in Table 1 in the "intensity of demand" component of output per unit of input. (The definition of potential NI precludes the possibility of its being affected by such fluctuations so there is no such entry in Table 2.) It is possible that the intensity of an average hour's work may also have changed in the longer run as a consequence of changes in attitudes, incentives, living standards, or other influences. I have no evidence that such a change occurred and regard it as unlikely that, if it did, it was of sufficient size to affect growth rates importantly in the periods examined.

Employment.—This is the contribution that the change in the number of persons employed would have made if there had been no change in the hours that employed persons worked and no change in their composition by age, sex, or amount of education; such changes, are considered in the other labor input components. Employment is not measured on a full-time equivalent basis; full-time and part-time workers are counted equally. (The reduction in labor input per worker resulting from increasing part-time employment is counted in the "hours" component of labor input.) Employment makes different contributions to actual and to potential output, as do all other components of labor input. Not only do actual and potential employment and actual and potential average hours move differently, but so do the actual and potential composition of hours worked when classified by the age, sex, or education of workers.

Hours.—This is an estimate of the net effect of changes in average working hours upon output. The probability that shortening hours of full-time workers has increased the work done in an hour, so that the percentage decline in labor input is less than that in hours, has been taken into account. Also, otherwise-similar individuals who are nonfarm wage and salary workers, nonfarm self-employed and unpaid family workers, or farm workers, are counted as the same amount of labor input if each works the average full-time hours of persons of his or her own sex in the category in which he or she is employed. Consequently, a change in average hours that results from a change in the relative numbers employed in these activities does not affect the contribution of hours changes or of labor input.

Age-Sex Composition.—Hours worked by persons who differ in age and sex are not considered to represent the same amount of labor input. Rather, the relative amounts of labor input embodied in an average hour worked by persons in each of ten age-sex groups are measured as proportional to average hourly earnings. Since the employment and average hours series make no such distinction, it is introduced as a separate entry in the age-sex composition line. The contribution of age-sex composition is positive when the proportion of total hours worked by persons in the highly weighted groups—particularly males 35 to 64 years of age—rises, and negative when the proportion worked by persons in the groups that receive low weights rises.

Education.—Full-time equivalent years of work performed by persons with different amounts of education are also regarded as different amounts of labor input. They are weighted in accordance with average earnings differentials among persons employed in the sector who differ only with respect to amount of education. The contribution of education measures the amount by which output per worker has been altered by the change in the educational background of employed persons (or potentially employed persons in the case of the tables referring to potential output). Since the educational distribution of employed persons has been steadily and strongly rising, the contribution of education is positive in all periods.²¹

Unallocated.—This last component of labor input reflects changes in the importance within employment in general government, households, and institutions of employee groups that had different earnings in the base year 1958.

Capital and Land.—The contribution of capital results from changes in the amounts of all the types of capital mentioned earlier and listed in the tables as its components. The coverage of *inventories* and *nonresidential structures and equipment* are generally self-explanatory. The main points to note are that governmental assets are excluded and that capital input is so defined and measured that changes in output which result from improvements in the design of capital goods are classified as contributions of advances in knowledge, not of capital. *Land* refers only to private nonresidential land. Its contribution is zero because the quantity of land available for use has not changed significantly.²²

Capital and land used in nonresidential business, like labor, are regarded as in use so long as they remain in establishments and available for service. Unlike labor, they are not laid off or sent home early when work is slack so, by the definition adopted here, there is no difference between actual and potential capital or land input. Consequently, contributions to the growth rates of total potential and total actual national income are the same, aside from trivial interaction terms and statistical adjustments. The effects on actual output of the variations in the intensity of use of capital, land and labor that accompany fluctuations in demand pressure are measured as a single estimate in the "intensity of demand" line of the tables.

Dwellings, as defined, include residential land, but their contribution to growth can be regarded as almost purely the result of the change in residential capital. The *international assets* line measures the contribution made by changes in the excess of the earnings of American-owned assets abroad over those of foreign-owned assets in the United States.

Advances in Knowledge and n.e.c. (not elsewhere classified) is the first of the components of output per unit of input. Statistically it is obtained as a residual, but this provides no excuse for lack of clarity as to its content.

The contribution of advances in knowledge is a comprehensive measure of the gains in measured output that result from the incorporation in production of new knowledge of any type, regardless of the source of that knowledge, the way it is transmitted to those who can make use of it, or the way it is incorporated into production. The reference to "measured" output is important. What is usually called "unmeasured" or "noneconomic" quality change in end products does not raise measured output so that advances in knowledge which lead to "unmeasured" quality change in end products (including the introduction of

²¹ A few points about the education component should be mentioned even in a brief summary. First, only regular, formal education is counted (except insofar as other types of education are systematically related to formal education). Second, the estimate is a measure of the contribution to output made by increased skills and versatility of workers as a result of additional education when the state of knowledge in the society is given. Neither the fact that advances in knowledge permit new knowledge to be transmitted in educational institutions nor the possibility that a more educated population may advance the frontiers of knowledge more rapidly is reflected in the education estimate. Both are regarded as parts of the processes by which new knowledge originates, is disseminated, and enters into the process of production. Third, the size of the contribution made by education in any time period depends upon the difference between the education of persons who left employment during the period and those who entered it. It thus reflects not only or mainly changes in the education provided to young people during that period, but also the lagged effects of changes made over many previous decades. Fourth, the education estimates, like all other labor input components except employment, are measured on a per-person basis so that the increase in school attendance required to hold the average education of a growing population constant does not enhance the contribution of education.

²² This would not be the case if we were analyzing growth rates of NI per person employed or international differences in levels of NI per person employed.

wholly new end products) make no contribution to the growth of output as measured.

Advances in knowledge might in principle be divided between new knowledge that makes increases in output possible and changes in the lag of average actual practice behind the best practice possible with the knowledge available at each date. I attempt no such division, but regard changes in the lag as unlikely to have had more than a minor effect in the United States after 1950.

The "n.e.c." portion of "advances in knowledge and n.e.c." refers to the effects of a large number of determinants that have not been quantified.³³ These are believed to be individually small and on average as likely to be favorable as unfavorable in the period covered. Because of their inclusion, the estimates provide only an approximation to the contribution made by the incorporation of advances in knowledge.

To the extent that they are not offsetting, some types of error in the estimates for other determinants also affect this estimate. This, of course, is not a matter of classification but of accuracy.

Improved Resource Allocation.—These lines refer to the gains in output that have resulted from bringing the allocation of resources within the nonresidential business sector nearer to the optimal allocation. The effects of only two types of change in resource allocation are measured, but I believe them to have been by far the most important changes. The *farm* component refers to the gains from reducing the percentage of all of the labor used in the sector that is overallocated to farming. The *non-farm self-employment* component refers to the gains from reducing the percentage that is misallocated to nonfarm self-employment and unpaid family labor. The criterion against which mis-allocation is appraised is maximum output per worker.

Dwellings occupancy ratio measures the effect on national income of changes in the proportion of dwelling units occupied.

Economies of Scale.—Gains from economies of scale refer to the rise in output per unit of input that is made possible by changes in the size of the markets that business serves. Economies of scale are realized only as production is reorganized or adapted to secure the lower costs that growing markets permit, so the estimate is based upon the size of the economy that business anticipated in organizing production. Economies of scale are not limited to those internal to firms; specialization of all sorts is covered by my use of the term. I have measured the contributions of all other sources as if the economy were operating under constant returns to scale, so that to the definition of their contributions must be added the stipulation that the size of markets is taken as given.

Growing markets are simply a reflection of a rising national income, so the size of markets business expects to serve is governed by the contributions of all the determinants that precede economies of scale in the tables. As an alternative to the classification used in Tables 1 and 2, one might therefore eliminate economies of scale as a separate growth determinant and allocate its contribution among the preceding determinants. I use this procedure in some supplementary analyses.

Irregular Factors.—Farm output and productivity in any year are affected by the weather and other natural conditions. The effect of differences between the initial and terminal years on the growth rate over each period analyzed is measured in the line, *weather in farming*. Similarly, the effect of labor disputes upon output per unit of input is measured in the line, *labor disputes*. Because potential national income is defined to differ from actual national income only with respect to demand conditions, these entries appear in potential as well as actual national income tables.³⁴

By far the most important of the irregular factors is the effect of changes in the intensity of utilization of employed resources resulting from fluctuations in *intensity of demand*. The contribution refers to the effect on the growth rate of changes in intensity of utilization of all employed inputs between the initial and terminal years of each period. In most periods shown in the tables demand-related fluctuations in intensity of utilization are the principal source of difference between the growth rates of actual and potential national income.

Two Important Characteristics.—Two features of the classification need stressing here. First, the line between the contributions of capital and of advances

³³ See *Accounting for Growth*, p. 77, for the main categories.

³⁴ However, they are eliminated from "standardized" growth rates, a concept introduced later in this paper.

in knowledge is so drawn that the former measures growth that results from saving and investment and the latter measures comprehensively growth that results from advances in knowledge that permit goods and services to be produced with less input. The distinction is basic because completely different causes govern the two determinants, and the actions that would be appropriate to influence them differ fundamentally. Capital input is, properly, so measured that capital does not capture the contribution of inventions and other advances in knowledge that are manifested in the form of improved capital goods design, and this is the principal point to be noted.

Second, my intent is to measure the contribution of each input independently of changes in the efficiency with which it is allocated among users. Gains or losses in output that result from changes in the degree to which the allocation of each resource approaches the optimum are classified in output per unit of input.

APPENDIX 2. GROWTH OF CAPITAL IN JAPAN ³⁵

The stock of private nonresidential business capital in Japan increased at a pace quite outside the range observed in other advanced countries. The growth rate of the gross stock of nonresidential structures and equipment from 1953 to 1971 was 9.2 percent and that of inventories was 11.9 percent. These rates were not only high but also rising. The following tables shows rates for two main sub-periods and four shorter periods :

Period (calendar years)	Growth rates (percent)	
	Fixed capital (gross stock)	Inventories
1953-61.....	6.0	10.8
1961-71.....	11.8	12.7
1953-55.....	3.8	8.1
1956-60.....	6.7	11.1
1960-67.....	10.8	12.2
1967-71.....	13.1	15.1

DETERMINANTS OF THE INCREASE IN INVESTMENT

To achieve the capital stock growth rates recorded, truly enormous increases were required in annual gross investment, measured in constant (1965) prices, and one may well ask how it was possible for Japan to expand investment so much. An increase in output available for division between consumption and saving, a higher saving rate, and a falling relative price for investment goods all could contribute to an increase in investment; for any particular type of investment, so could an increase in its share of total investment. To examine what actually happened to the quantity of any type of investment, its index can be regarded as the product of indexes of these four quantities or ratios that govern its behavior.

Table 12 provides such indexes for the largest component of gross private investment, fixed nonresidential investment by private business.³⁶ As shown in row 5, such investment, valued in 1965 prices, reached 280.3 percent of its 1953 level in 1960. In 1971 it reached 399.5 percent of its 1960 level and 1,119.8 percent of its 1953 level.

Consider first the change from 1953 to 1960. Row 1 shows that in 1960 gross national product in constant prices was 176.3 percent of 1953. This would have been the index of total gross private investment (of all types) valued in constant prices if there had been no change in either the proportion of the nation's gross output saved and invested or in relative prices. Actually, gross national saving (gross private investment) jumped from 18.05 percent of GNP in 1953 to 27.47 percent in 1960, an index of 152.2 as shown in row 2. This would have been

³⁵ This appendix consists of excerpts, with minor working changes, from Chapter 7 of Denison and Chung, *How Japan's Economy Grew So Fast*.

³⁶ Here we divide the 1953-71 period at 1960 rather than 1961 because some 1961 relationships were abnormal. Data in this section are based on the national accounts as reported by the Economic Planning Agency, and refer to fiscal years ending March 31 following the year named.

TABLE 12.—ANALYSIS OF INDEXES OF JAPANESE FIXED NONRESIDENTIAL BUSINESS INVESTMENT

Description ¹	1960/53 ²	1971/60 ²	1971/53 ²
1. GNP (constant prices).....	176.3	298.4	526.2
2. GPI/GNP (current prices).....	152.2	106.0	161.4
3. FNBI/GPI (current prices).....	104.3	88.1	91.9
4. Price ratio, GNP/FNBI.....	100.2	143.2	143.4
5. FNBI (constant prices).....	280.3	399.5	1,119.8

¹ GNP, gross national product at market prices; GPI, gross private investment; FNBI, fixed nonresidential business investment.

² Percentages, based on fiscal year data.

Source: Edward F. Denison and William K. Chung, "How Japan's Economy Grew So Fast," Brookings Institution, 1976, p. 65.

the index of total gross private investment of all types valued in constant prices if there had been no change in the nation's gross output or in relative prices. As is customary in the calculation of saving rates, these percentages for saving are based on current-price data because decisions as to how much to save from income are presumed to be based on prevailing price relationships, not on the relative prices of consumption good and investment goods operative in some past or (as in this case) future base year. Next, as shown in row 3, the percentage of total gross private investment (in current prices) that was allocated to fixed nonresidential business investment increased moderately, from 68.29 percent to 71.23 percent, or to an index of 104.3. Finally, as shown in row 4, the ratio of the average price of all output (GNP) to the price of fixed nonresidential business investment rose slightly, to an index of 100.2. Consequently, the quantity (constant-price value) of this type of investment would have risen slightly even if there had been no change in constant-price GNP, in the saving rate, or in the share of saving allocated to this type of investment.

Only the first two of the four indexes changed much, so that by this way of looking at the matter the rise from 1953 to 1960 in fixed nonresidential business investment was due mainly to the increase in GNP and the rise in the national saving (or total gross private investment) rate. Both changes were big.

The further rise in fixed nonresidential business investment after 1960 must be explained differently. With 1960 equal to 100, the 1971 index was 399.5. The increase in real GNP—to an index of 298.4—was again the biggest factor. But the further rise in the gross saving rate was small—from 27.47 to 29.13 percent, an index of 106.0. The share of fixed nonresidential investment in total investment actually dropped; the index was only 88.1. Although the annual share is somewhat erratic because of the volatility of two of the other components (inventory accumulation and net foreign investment), the 1960–71 drop was fairly representative of the downward trend, which stemmed from the swelling importance of residential construction.

The fourth index, the ratio of the implicit price deflator for GNP to the deflator for fixed nonresidential business investment, was 143.2 in 1971 (with 1960 equaling 100). This means that real fixed nonresidential business investment was 43 percent bigger in 1971 than it would have been if its relative price had not changed, provided that real GNP and the proportion of current dollar GNP devoted to such investment are considered to be unaffected by the change in relative prices. The drop in the relative price of fixed nonresidential business investment was persistent, and began even before 1960. A sizable drop occurred every year from 1957 to 1971. The declining relative price of investment goods was thus a major factor facilitating the sharp rise in real investment. This was not an international development, at least on any such scale. The 1960–71 index corresponding to the Japanese figure of 143.2 was only 102.7 in the United States. But the relative price of investment goods was still above that in the United States at the end of the period.

When the whole period from 1953 to 1971 is considered, increases in three of the four series—real GNP, the gross saving rate, and the ratio of the price deflator for GNP to that for fixed nonresidential business investment—are all found to have contributed greatly to the rise in this type of investment. The decline in the share of total private investment devoted to fixed nonresidential business investment provided a moderate offset.

It is unnecessary to repeat all these calculations for investment in inventories, which fluctuates widely on an annual basis. Suffice it to note that the first two indexes in Table 7-1 apply also to inventory investment, and that the price of

goods held in private business inventories fell even more, relative to the GNP deflator, than did the price of fixed nonresidential business investment. In the case of inventories the drop was important in both periods. The index of the ratio of GNP prices to prices of goods held in private inventories was 124.5 in 1960 with 1953 taken as 100, 147.5 in 1971 with 1960 as 100, and 183.6 in 1971 with 1953 as 100.

Consideration of inventories thus strengthens the conclusion that the increase in real investment by business enterprises was facilitated enormously by the decline in the relative price of investment goods.

Important as was the change in relative prices, the rates of saving and investment command the most attention. Gross private investment rose from an average of 17.2 percent of GNP in 1952-54 to 30.5 percent of a vastly increased GNP in 1970-71. The increase was nearly continuous. From 1967 through 1971 roughly two-thirds of gross private investment, equal to 20 percent of GNP, was made by private corporations; this includes their fixed investment and additions to their inventories. Similar investment by unincorporated forms was about 3.5 percent of GNP, dwellings acquired by households and investment by nonprofit organizations about 5.5 percent, and net foreign investment one percent.

THE PATTERN OF SAVING

Gross private investment is, by definition, equal to the sum of gross private saving and government saving when the latter is construed as the value of the government surplus on income and product account. Part of private saving was absorbed by a government deficit in nearly all years; although receipts of general government exceeded general government expenditures (including outlays for construction and equipment), the excess was insufficient to finance fully the excess of capital outlays by government enterprises over their depreciation charges and profits. The government deficit was usually modest, averaging only 0.82 percent of GNP from 1952 to 1971.³⁷ Hence nearly all private saving was available to finance private investment.

It was noted earlier that gross private saving in the United States has been stable at around 16 percent of GNP throughout the postwar period. In Japan it started at about the same level, 16.5 percent, in 1952-54 but then rose sharply reaching 31.9 percent in 1970-71. From 1961 through 1971 it averaged 28.8 percent (as against 15.9 percent in the United States). Both the level and increase in the Japanese gross private saving rate are extraordinary; the former exceeds the rate in any other major country.³⁸ Moreover, even though good comparable data are lacking to isolate depreciation allowances, which are included in gross saving, it is clear that the big excess of the gross saving rate in Japan over that in other major countries results from more net saving.

Both corporations and households contributed to the high rate of private saving. In 1967-71 corporations contributed just under half of gross private saving and households (including owners of unincorporated enterprises) just over half. Earlier the corporate share had been moderately smaller. Other familiar saving rates besides the percentages of GNP may be mentioned. Net corporate saving averaged no less than 85 percent of corporate profits after tax from 1967 to 1971 while net personal saving averaged an equally remarkable 19.6 percent of disposable personal income. Despite payment of only 15 percent of profits as dividends, corporate saving fell short of corporate investment by 4 or 5 percent of GNP in 1964-71. Earlier the gap was even larger.

A number of plausible partial explanations that have been suggested for the high personal saving rate may be mentioned. First, there may be a tendency to base consumption on income of the past rather than on current income. Because personal income rose so sharply, even a moderate time lag would greatly raise

³⁷ This percentage was larger than in the United States, where the deficit averaged 0.53 percent of GNP during the same period. However, investment by government enterprises was bigger in Japan, and such enterprises financed most of their investment from external sources.

³⁸ Note that the figures cited are for the gross private saving rate. National saving rates of 30 percent or thereabouts are sometimes cited for a few Western countries but these include not only private saving and the government surplus on income and product account (i.e. gross private investment) but also expenditures for construction and durable equipment by both general government and government enterprises and sometimes inventory accumulation by government enterprises. Adding such government outlays to gross private investment would bring the 1970-71 national saving or investment ratio in Japan up to 39.5 percent of GNP (or 40.5 percent when measured as the sum of components of saving). Their balancing addition to the surplus on income and product account would yield gross government saving equal to 8.5 percent of GNP.

the saving rate. Fortifying this possibility but not a requisite for its acceptance is the observation that Japan had long and recently been a low-income agrarian society; a few decades of rapid growth might not for everyone overcome a deep-seated feeling of poverty and accompanying adherence to traditional consumption habits. Second, bonuses, paid twice a year, comprise a larger fraction of wage and salary income than in other countries.

For the wide range of workers covered by the Basic Survey on Wage Structure they equaled 23 percent of annual earnings in 1971 (30 percent of earnings other than bonuses). It may be easier to save from such infrequent payments than from regular weekly or monthly paychecks. Third, proprietors' income, as well as the sum of proprietors' income and pure types of property income, are an unusually large part of personal income, and households headed by proprietors are an unusually large fraction of households; it is suggested that there is a higher propensity to save from this type of income than from wages and salaries, or by this category of households than by households headed by wage and salary earners. Fourth, the age distribution, which is unusually young, is favorable to saving if people save in order to support themselves after retirement. Fifth, meagerness of social security benefits accentuates the need to save privately for old age. Sixth, a shortage of liquid assets, relative to rapidly rising income, might exert a strong pressure to save; similarly, pressure may be exerted upon the typical family not owning land to save in order to lift a ratio of accumulated net worth to income that is exceptionally low because of the rapid rise in income. The slow development of institutions providing consumer installment credit and mortgage loans intensified the need to increase asset holdings and net worth. Finally, it has been suggested that as a result of their moral education in the past the Japanese have a predisposition toward saving as a desideratum in itself.

The high corporate saving rate seems not really very surprising when one considers that, continuously, financing needs to grasp profitable investment opportunities were ample to absorb funds available from internal sources, that balance sheets showed such high ratios of debt to net worth that the pressure to add to stockholders' equity was strong, that financial markets were not such as to permit easy sale of new common stock issues, and that profits rose so rapidly that dividends increased substantially in most years despite the high saving rate.

THE STRENGTH OF INVESTMENT DEMAND

To understand the Japanese investment experience one also needs to know why business wished to undertake so much investment. Why was business investment demand so strong? Why did the rapid increase in capital stock resulting from so enormous a flood of investment fail to drive the rate of return so low that further investment would be discouraged, if not choked off? The following circumstances seem ample to explain sustained high investment in Japan, given the availability of saving.

(1) A booming, fast-growing economy creates a strong demand for capital, and the Japanese economy grew faster than any other. The main reason investment grew so much is the obvious one: the demand for investment was derived from the expanding demand for end products which, in turn, stemmed from the rise in income created by the increase in production.

The expansion of investment from 1953 to 1971, big as it was, sufficed only to increase total capital input in the nonresidential business sector about as fast as the output of the sector. The increase was somewhat less than that of output before, and more after, 1961 and over the whole period somewhat less for fixed capital and somewhat more for inventories. Growth rates compare as follows:

	Nonresidential business national income	Input of nonresidential business capital		
		Total	Structures and equipment	Inventories
1953-71.....	10.0	10.2	9.2	11.9
1953-61.....	9.9	7.9	6.3	10.8
1961-71.....	10.2	12.0	11.7	12.7

The point is not merely that a spiral was under way in which increased investment raised output and higher output induced more investment. Output

determinants other than capital were responsible for some 78 percent of the 1953-71 growth of output in nonresidential business, and 71 percent even if a proportional share of the gains from economies of scale is transferred to capital. Had other determinants not been so extraordinarily favorable to output growth, capital would have increased less and it too would have contributed less to growth. For, with a smaller expansion of national income, the derived demand for capital would have been smaller. (Also, to revert to the determinants of saving, with lower GNP the saving to finance so much investment would not have been forthcoming.)

(2) Japanese business has sought to duplicate production conditions, including the use of capital, of efficient Western firms, particularly those in the United States. The effort to raise output per worker by adopting American practices, including the amount of capital used per worker, appears to have been pursued more consciously and energetically than in other countries. The ratio of capital input to labor input in the nonresidential business sector in fact rose greatly: it was 3.61 times as high in 1971 as in 1953, which is equivalent to a growth rate of 7.4 percent.³⁰ The point to be stressed, however, is that the capital-labor ratio was very low in 1953 and the burst of investment has by no means brought the ratio of capital to labor into unexplored territory; other countries have much higher ratios as is clear from the previous discussion of Table 9.

(3) Labor was becoming much more expensive relative to capital in Japan. Hence the incentive to increase the use of capital was great. In the nonresidential business sector current-price earnings of labor, per unit of labor input, were 6.3 times as large in 1971 as in 1953 while the comparable ratio for capital was 2.6. Prices of capital goods themselves rose little. Whereas the GNP deflator was 2.08 times as high in 1971 as in 1953, the price of private nonresidential fixed investment (which determines depreciation costs) was only 1.44 times as high, and for goods held in private inventories the 1971 price was only 1.14 times the 1953 price.

(4) General economic conditions and the political system were favorable, or at least not unfavorable, to investment. Stabilization policy was generally successful during the period considered. Prices were stable enough for efficient planning and operation, and recessions were mild and brief enough to keep production near capacity most of the time. Taxes, including those on corporate profits and upper bracket personal incomes, were not onerous and tax rates were repeatedly reduced; the absence of defense expenditures and a swiftly rising tax base helped to make this comfortable policy possible. Fairly low interest rates were maintained except in brief periods of over-expansion. This was especially important for business investment, which in Japan is financed heavily by bank loans. Capital goods could be imported as freely as the nation's foreign exchange earnings allowed, and investment shared with raw materials the first claim to whatever exchange was available. Relations between business and the governing Liberal Democratic party were amicable. Threats of nationalization or other punitive attacks on business that could jeopardize the safety of investment were confined to the opposition Marxist parties, which were always in a minority position. Foreign governments restricted Japanese exports, to be sure, but on balance restrictions were not increasing and only a small percentage of the national product was affected. In short, business operated in an atmosphere of confidence in its own and the nation's future. The Economic Planning Agency as well as private organizations repeatedly issued optimistic projections, these were surpassed, and the next projections were both higher and accepted even more confidently by business.

The preceding discussion has been concerned with nonresidential investment. Housing has been persistently insufficient and inadequate in Japan, so the strong demand for dwelling space, and hence for new construction, is not difficult to explain. The rise in real income was so rapid as to virtually guarantee that housing demand would rise faster than the capital stock of dwellings could be improved and increased. This would have been so even if there had been no shortage at the conclusion of World War II, which was of course far from the case. The rise in residential construction, relative even to total investment, has already been noted.

³⁰ The change in the ratio of capital to labor used effectively was somewhat less because the proportion of labor misallocated to agriculture and self-employment was curtailed. But even on this basis the increase was huge.