

## Capital Formation, Technology, and Economic Policy

---

*Barry P. Bosworth*

The sharp deterioration in productivity growth since the early 1970s has been a major motivation behind the renewal of interest in economic policies to expand aggregate supply. The public discussion has emphasized an accelerated accumulation of physical capital as a major goal of policy, and particular importance has been attached to increased tax incentives for private saving as a primary means of achieving that objective. Yet in several respects, the attention directed both to the slowing of physical capital accumulation as a cause of the previous shortfall in productivity growth and the importance attached to tax incentives to promote private saving as the cure seem misplaced. It has also contributed to an excessively narrow view of the actions that could be taken by government to accelerate the growth of productivity. In fact, it can be argued that the net outcome of the policy actions to date will likely be to retard rather than to promote future growth.

The first section of this paper reviews the empirical studies of the productivity growth slowdown with particular emphasis on the role of capital. The second section examines the behavior of saving and investment and trends in capital income taxation. The third section is directed toward the policy actions that might be taken to promote a faster rate of productivity growth in the future.

## Capital and the productivity slowdown

There are several problems in attributing to capital a major role in the slower growth of productivity.<sup>1</sup> First, since 1973 the contribution of slower growth in the capital-labor ratio accounts for only a few tenths of a percentage point of the shortfall of multifactor productivity growth (output per unit of labor and capital input).<sup>1</sup> That fact is very apparent in the new data on multifactor productivity prepared by the Bureau of Labor Statistics and reproduced in Table 1.

The contribution of capital to output is a product of two factors: the rate of accumulation of capital and its share of total factor income. The slower growth of the capital input that has occurred has been as much due to a fall in its share of income as to a slower rate of physical accumulation. That highlights the second problem: the average before-tax rate of return on capital fell sharply throughout the 1970s. Even after adjusting for the influence of recession, the real return on business capital has fallen by 3 percentage points — from 11 percent to 8 percent — since the mid-1960s. That is not consistent with the usual notion of growing capital scarcity. It also casts doubt on the usual argument that the effective tax rate on capital income increased during the 1970s, a situation which would be expected to produce a higher before-tax rate of return.

The major conclusion that emerges from the growth-accounting studies of recent years is that the productivity slowdown is, in large part, a mystery. Those studies have achieved important results in quantifying the contribution of a large number of potential explanations for the slowdown. Among the contributing factors identified are a younger and less experienced workforce, government regulation,

1. There is a large literature on this subject. I have relied most heavily on the following articles: Martin Neil Baily, "Productivity and the Services of Capital and Labor," *Brookings Papers on Economic Activity (BPEA)*, 1:1981, pp. 1-50; Edward F. Denison, "The Interpretation of Productivity Growth in the United States," paper presented at the Conference of the Royal Economic Society, London, July 22, 1982; Barbara M. Fraumeni and Dale W. Jorgenson, "The Role of Capital in U.S. Economic Growth, 1948-76," in George M. von Furstenberg, ed., *Capital, Efficiency and Growth*, Cambridge: Ballinger, 1980, pp. 9-250; John W. Kendrick, "International Comparisons of Recent Productivity Trends," in William Fellner, ed., *Essays in Contemporary Economic Problems*, 1981-82 edition, American Enterprise Institute, 1981, pp. 125-70; and J. R. Norsworthy, Michael J. Harper, and Kent Kunze, "The Slowdown in Productivity Growth: An Analysis of Some Contributing Factors," *BPEA*, 2:1979, pp. 387-421.

2. Capital is defined to include land, plant, equipment, and inventories.

3. Barry P. Bosworth, "Capital Formation and Economic Activity," *BPEA*, 2:1982, pp. 291-95.

higher energy prices, and reduced research and development. Each of these factors, however, can contribute only a few tenths of a percent annually. Other common explanations, such as a shift to a service-based economy, have been dismissed. Studies of productivity growth in other countries reach similar conclusions. In many of these countries the decline in multifactor productivity is greater than in the United States.<sup>4</sup>

Another hypothesis is that the 1970s were an unusual period of economic disruptions, and as a result much of the capital stock became obsolete.<sup>5</sup> That is, a measure of the capital stock calculated by cumulating past investments overstates the effective stock during the 1970s. The evidence on the obsolescence hypothesis is, at best, ambiguous, but it appears unlikely that it can account for such a large and sustained slowing of productivity growth.

Unexpected obsolescence does offer an appealing explanation for the decline in the rate of return on capital — the value of the denominator is overstated. But the decline in the rate of return began in the early 1970s. Even if as much as 25 percent of the equipment stock became obsolete in the 1973-74 period, normal depreciation and retirements would reduce its effect on the value of capital stock, and thus the rate of return, to about 2 percent by 1981, which would increase the rate of return only by a few tenths of a percentage point. Thus, accelerated obsolescences would have to be very large and continuing to explain the behavior of the return on capital.

More recently, studies have focused on a slowing of advances in knowledge, rather than changes in the quality or quantity of the inputs, as the most likely cause of the productivity slowdown. The term "knowledge" is used in a general sense to include improvements in management skills as well as the introduction of new technology. Dale Jorgenson in particular has argued that reallocations of output among sectors (such as might follow a period of economic dislocation) actually made a small positive contribution to growth after 1973, and that the decline thereafter was caused by slower rates of technical change in individual industries.<sup>6</sup> The difficulty with such an

---

4. Kendrick, "International Comparisons."

5. Baily, "Productivity and the Services of Capital and Labor."

6. See, for example, Dale W. Jorgenson, "Taxation and Technical Change," *Technology in Society*, vol. 3 (1981), pp. 151-71, and the references cited there.

**TABLE 1**  
**AVERAGE ANNUAL RATES OF GROWTH IN OUTPUT, LABOR AND CAPITAL INPUTS, AND PRODUCTIVITY, BY MAJOR SECTOR, 1948-81**  
 (percent)

Measure	Private business*			Nonfarm business			Manufacturing		
	1948-73	1973-81	Slow-down	1948-73	1973-81	Slow-down	1948-73	1973-81	Slow-down
Output per hour of all persons	3.0	0.8	-2.2	2.5	0.6	-1.9	2.9	1.5	-1.4
Minus contribution of capital/hour†	1.0	0.7	-0.3	0.8	0.6	-0.2	0.7	1.1	0.4
equals:									
Multifactor productivity‡	2.0	0.1	-1.9	1.7	0.0	-1.7	2.2	0.4	-1.8
Output	3.7	2.2	-1.5	3.9	2.1	-1.8	4.0	1.2	-2.8
Hours of all persons	0.7	1.4	0.7	1.3	1.5	0.2	1.1	-0.2	-1.3
Capital services	3.6	3.2	-0.4	3.6	3.3	-0.3	3.5	4.0	0.5
Combined capital and labor inputs	1.7	2.0	0.3	2.1	2.1	0.0	1.8	0.9	-0.9

Source: Bureau of Labor Statistics, U.S. Department of Labor.

\* Excludes government enterprises.

† Change in capital per unit of labor weighted by capital's share of total output.

‡ Output per unit of combined labor and capital input.

explanation is that the contribution of advances in knowledge is only a residual measure in the growth accounting, which makes it difficult to analyze in any systematic fashion.

The results of a recent study of trends in output and productivity growth in different regions of the U.S. add to the argument for a general change in the residual. While rates of output growth have varied substantially among the regions, those differences are almost fully explained by different rates of growth in the capital and labor inputs, and there are not major differences in the growth of multifactor productivity. Multifactor productivity has grown at least as rapidly in the Snow Belt as in the Sun Belt, despite a significantly slower rate of capital accumulation. Furthermore, the slowdown in productivity growth after 1973 is common to *all*.<sup>7</sup>

At times, it is argued that technological innovation is embodied in new capital in order to support a view that capital is of greater importance in the growth process than is implied by the growth accounting studies. However, several authors, in examining the importance of the embodiment hypothesis, have pointed out that there is insufficient variation in the age structure of the capital stock to make it an important source of change in the nation's growth rate.<sup>8</sup> Under such circumstances gross investment is the relevant concept, rather than the net capital stock, and gross investment has increased as a share of GNP during the 1970s.

It is also important to avoid confusion between the argument that new technology may require new capital, and a different argument that increased investment will significantly alter the pace of a technological innovation. In any period there is always a large volume of investment with substantial variation in the expected returns on the individual projects. Those that are most profitable, supposedly embodying the most significant technical advances, will be undertaken first. In each period, investment will be undertaken to the point where the expected return on the marginal investment, inclusive of any return on embodied technology, is equal to the cost of funds. Thus, the embodiment of technology does not imply any extraordinary return on an additional unit of investment at the margin.

Investment was heavily concentrated in areas of rapid technologi-

---

7. Charles R. Hulten and Robert M. Schwab, "Regional Productivity Growth in U.S. Manufacturing: 1951-78," February 1983 (*American Economic Review*, forthcoming).

8. Denison, *Accounting for Slower Economic Growth*, pp. 57-58.

cal innovation during the 1970s. Expenditures (measured in 1972 dollars) on computers and communication equipment rose from 12 percent of total equipment purchases in 1960 to 17 percent in 1970 and 32 percent in 1981. Nonetheless, there is little evidence that these high-technology investments had a significant impact on any economy-wide measure of productivity. The increase in productivity should be even more evident if, as is often claimed, investment in such equipment is understated by the use of price deflators based on resource cost. The investments in information systems were supposed to improve business decisionmaking, but there is little evidence that they have done so.

### **Saving and investment**

The previous section outlined some reasons for skepticism about the degree of emphasis being placed on physical capital accumulation as a cause of the slowdown in productivity growth.

It is not necessary, however, to argue that reduced capital formation was the cause of the productivity slowdown in order to advocate increased investment as a means of accelerating productivity growth in the future. Although the before-tax return on capital has declined, it has remained in the range of 8-10 percent. An increase in the share of net investment in net output of one percentage point would, in the near term, raise the growth of output by about 0.1 percentage point annually. If the share of net business output going to investment could be doubled (from an average of 4-5 percent in the 1970s) the growth of output would rise by about 0.4-0.5 percentage points annually. A rise in the net investment share does not have a permanent effect on the rate of productivity growth, but in the long run the *level* of output is increased by about 5 percent for each one percentage point rise in the investment share. These gains are substantial, but they also imply that truly heroic actions would be required to restore the postwar trend in productivity by an expansion of capital formation **alone**.<sup>9</sup>

---

9. The hypothesis of a slower rate of technical change has ambiguous implications for future capital formation. Under some circumstances, a slower rate of labor-augmenting technical change reduces the benefits of capital investment. Capital that embodies old technology lasts longer, and less capital is required to equip future entrants to the workforce. On the other hand, a continued slow growth of technology lowers future income and that could argue for a compensating reduction of current consumption and increase of Investment in order to shift consumption to future periods.

There are, however, several significant issues of how best to achieve that objective. The policy conflicts are particularly evident in the tax area, where major new initiatives have been undertaken to expand incentives for both private saving and investment, and additional actions are under consideration for the future.

The main issues can be highlighted by asking whether government policies should focus on expanding incentives for saving or for investment. In an idealized world of full employment, competitive markets, and no foreign trade there would be little relevance to such a distinction. Saving and investment can be viewed as opposite sides (supply and demand) of the same market, with the interest rate serving as the equilibrating price. In the idealized world it makes little difference whether incentives are extended to savers or investors, since the interest rate adjusts to maintain a balance. In practice, there are many pitfalls in this process.

### *Saving*

Much of the discussion concerning the need for expanded incentives for saving implied that private saving has declined in the United States. Yet the private saving rate has remained very stable throughout the postwar period at about 16-17 percent of GNP, and there is no evidence of a decline during the 1970s (Table 2). What has changed is the composition of that saving: corporate saving (retained earnings and capital consumption allowances) has increased, while saving attributed to the residual sector of households, nonprofit institutions, and unincorporated business has declined. In part, this compositional change may be associated with the sharp fall in income of noncorporate business, but any interpretation is complicated by the problems of allocating interest income among sectors of the economy during a period of high variable inflation, and accounting for capital gains and losses in estimating net wealth." In any case, it is not clear that it has any particular significance for the issue of capital formation. The composition of government saving has also changed as a tendency toward larger deficits at the federal level is offset by larger surpluses of the state and local governments' employee retirement funds.

---

10. Some of the ambiguity of **emphasizing** trends in saving of individual sectors is illustrated by the argument of some economists that state and local pension funds should be assigned to personal savings as is done with private employee pensions. That simple change would **raise** personal saving by over 20 percent and shift the private saving rate from a historical constant to a rising **trend**. Government dissaving would rise by an offsetting amount.

**TABLE 2**  
**Saving and Investment Shares of Gross National Product, 1951-82**  
 (average annual percentage share)

Period	Private saving		Government saving			Investment			Net saving and investment*		
	Total	Personal	Total	Federal	State and local	Nonresidential	Residential	Net Foreign	Private saving	Private investment	Capital consumption
1951-60	16.2	4.7	-0.3	-0.2	-0.2	10.4	5.2	0.3	8.0	7.3	8.9
1961-70	16.3	4.7	-0.4	-0.5	0.1	11.1	4.3	0.5	8.6	7.6	8.4
1971-75	17.2	5.6	-1.2	-1.8	0.6	11.1	4.6	0.3	8.7	7.0	9.3
1976-80	17.1	4.2	-0.7	-2.0	1.2	11.9	4.6	-0.2	7.4	6.7	10.5
1981	17.1	4.4	-1.0	-2.0	1.1	12.5	3.6	0.1	6.6	5.4	11.2
1982	17.4	4.6	-3.8	-4.9	1.0	10.6	3.1	-0.2	6.5	2.4	11.6

Source: U.S. Department of Commerce, *National Income and Product Accounts of the U.S.*

\* Percent of net national product



Some economists prefer to deduct from gross saving the flow of depreciation on capital to get net saving, and they observe that the net saving rate has declined (see Table 2). But the rise in depreciation that led to the decline reflects a shift in the pattern of investment rather than saving behavior. The composition of business investment has moved toward shorter-life capital — equipment relative to structures — with a consequent rise in depreciation, and the stock of depreciable capital has grown more rapidly than output. Whether that shift provides a basis for increasing private saving incentives depends upon the factors that caused it. If it is due to a distorting change in the relative taxation of short- and long-life capital or if it reflects the often-discussed short-term planning horizon of U.S. business, the shift is not desirable. On the other hand, it may simply reflect the changing nature of current investment opportunities — less need for offices, shopping centers, and industrial plants relative to short-life assets such as computers. We are passing on a smaller capital stock to future generations, but if the social return on that type of capital is declining, the reduction is appropriate. Either way, it is not clear that new incentives for saving are the appropriate response to a changing mix of domestic investment — particularly when that increased saving could flow to many other uses.

The United States is one of a group of countries that stands out in any international comparison as having relatively low rates of private saving (Table 3). Those differences, however, do not appear to be related to differences in the rate of after-tax return on capital.<sup>11</sup> Many of the empirical studies have emphasized the importance of differences in rates of income growth, and, in fact, that explanation was appealing in comparing the United States, Europe, and Japan in the 1960s. However, private saving rates have remained relative constant in these countries despite a large deceleration of growth in Europe and Japan after 1973. Substantial differences remain that may be related to differing social and institutional arrangements. In any case, the international differences in business investment rates are significantly less than those for private saving. There is a substantial variation in rates of government saving or dissaving that tend to offset differences in private saving, and other countries devote more resources to homebuilding than does the United States.

---

11. For a survey of the work in this area, see "International Differences and Trend Changes in Saving Ratios," unpublished paper prepared by the Secretariat for Working Party No. 1 of the Economic Policy Committee, Organization for Economic Cooperation and Development (CPE/WP1 (81) 9, October 1981).

**TABLE 3**  
**Private Saving and Its Uses in Major Industrial Countries, 1970-79**  
 (percent of gross domestic product, half-decade averages)

Country	Period	Private saving	Uses of private saving					Inventory change	Statistical discrepancy
			Business investment	Government deficit	Net foreign investment	Residential construction			
Canada	1970-74	17.8	13.0	-0.8	-0.2	5.3	0.9	-0.4	
	1975-79	19.6	13.9	2.0	-2.4	5.8	0.5	-0.2	
United States	1970-74	16.4	10.5	0.6	0.1	4.6	0.9	-0.2	
	1975-79	17.3	10.9	1.3	0.0	4.6	0.7	-0.1	
Japan	1970-74	31.5	22.3	-1.8	1.0	7.6	2.1	0.3	
	1975-79	29.3	18.1	3.0	0.6	7.5	0.6	-0.6	
France	1970-74	20.9	13.1	-1.2	-0.3	7.0	2.2	n.a.	
	1975-79	20.4	12.4	0.7	-0.3	6.7	0.9	n.a.	
Germany	1970-74	21.1	13.6	-1.7	1.1	7.3	0.9	n.a.	
	1975-79	21.0	11.9	1.5	0.7	6.0	1.0	n.a.	
Italy	1970-74	26.8	11.4	7.0	-0.4	5.7	2.1	n.a.	
	1975-79	27.2	11.1	8.5	0.7	5.2	1.8	n.a.	
Netherlands	1970-74	22.3	13.8	-0.9	1.7	5.8	1.9	n.a.	
	1975-79	19.9	11.7	1.2	0.8	5.5	0.6	n.a.	
Sweden	1970-74	14.2	11.1	-4.0	0.7	5.1	1.2	n.a.	
	1975-79	14.0	11.6	-1.2	-1.5	4.3	0.8	n.a.	
United Kingdom	1970-74	14.8	10.7	-0.1	-0.8	3.5	0.9	0.5	
	1975-79	17.3	11.4	3.2	-0.9	3.5	0.5	-0.4	
Australia	1970-74	20.5	15.3	-1.2	-0.5	4.9	1.0	0.9	
	1975-79	19.5	13.9	1.8	-1.8	4.8	0.5	0.4	

Source: Computed by the author from Organization for Economic Co-operation and Development, *National Income Accounts of OECD Countries, 1962-1979*, vol. II (Paris, 1981).

The question of adequate saving to support a specific level of investment is only relevant to a fully employed economy in which resources for increased investment must be achieved by foregoing private or public consumption. In the presence of unemployment, an increase in investment can be financed by utilizing idle resources. The increase in investment raises production and incomes, providing higher levels of both saving and consumption.

Even commencing from a situation of full employment, it is paradoxical that an increase in planned saving may not lead to an increase in investment — at least in the short run. The increased supply of saving will lower interest rates and serve as a positive inducement to investment. At the same time, the decline in consumer spending will reduce current demand and business perceptions of the need for additional capital. The increased planned saving will translate into increased investment only if wages, prices, and interest rates adjust quickly to offset the initial decline in demand. Under normal circumstances adjustment lags will lead to a transitional period of depressed output. If that transition is to be avoided, it will be necessary to coordinate changes in saving incentives with direct actions to raise investment.

While both of these concerns about an exclusive emphasis on saving incentives raise only short-run issues of transition, the longer-term view that Americans save too little and that the low saving rate constrains domestic investment ignores the important role of world capital markets. In a situation of international capital markets, domestic saving and domestic investment are not necessarily equal: an increment to private saving could easily flow abroad if the return on foreign investment is above that of domestic investment, and domestic investment can draw on a pool of world-wide saving." In fact, the sharp rise in world saving rates, embodied in the surplus of the OPEC countries after 1973, provides an illustration of the mechanism as the funds flowed primarily through U.S. financial institutions to finance investment in the developing countries. Therefore, the adequacy of domestic private saving is not necessarily relevant to answering the question of why investment in the United States is so low relative to other countries.

---

12. A more extensive discussion of the issues, with citations, is given in Bosworth, "Capital Formation and Economic Policy," pp. 313-17.

There are, of course, political and institutional limits on a country's ability to finance domestic investment on a sustained basis from foreign capital inflows. In view of these constraints, while higher domestic saving may not be sufficient to ensure increased domestic investment, it is an appropriate long-term element of a program that does do so. Government can increase national saving either indirectly by reducing taxes in such a way as to expand private saving incentives or directly through reducing its own dissaving. The difficulty with an emphasis on tax incentives for private saving is that the policy relies on an aspect of economic behavior about which economists are very uncertain of the likely effects.

A reduction in tax rates affects private saving behavior in two ways. First, it increases the attractiveness of future relative to current consumption — the substitution effect. But the tax reduction (higher after-tax return) also raises expected future income from previously planned saving and individuals may actually increase current consumption in anticipation of the higher lifetime income — the income effect. This offsetting income response is of particular importance in the short run because of the increased income from previously accumulated wealth of older generations (they receive a windfall gain on prior saving which stimulates consumption). The net effect on saving is ambiguous from a theoretical perspective and the empirical evidence is not convincing on either side of the issue.<sup>13</sup>

In any case, much of the discussion of tax incentives to promote saving ignores the role of the government budget. In a fully employed economy a tax reduction to expand private saving, if not matched by an equal reduction of government expenditures, requires the private sector to save the entire tax cut simply to leave the national saving rate unchanged.

Given the uncertainties surrounding private saving behavior, direct actions to shift the government budget toward a surplus are a

---

13. The long-term effect on saving is less uncertain for a shift in the structure of the tax system. A change from an income to a consumption tax that raises the same total revenue, for example, is very likely to raise the private saving rate. The income effect is of limited relevance, and the important point is that the price of future consumption is reduced. But a consumption tax is effectively the same as a wage tax and it will change the supply of labor and total wage income. In addition, while there is a small aggregate income effect associated with a shift in the tax structure, the distribution of the tax burden is altered dramatically between earners of wage and capital income. If their saving behavior is disparate, there may be a significant aggregate effect. As a result, there is some uncertainty about the effect on total saving.

more certain means of increasing saving. Yet there is not complete agreement that a rise in government saving will augment national saving. Some economists argue that variations in the government debt, a negative bequest to future generations, lead to compensatory adjustments in private saving and investment.<sup>14</sup> The empirical evidence on the more extreme versions of this hypothesis is not very convincing, however. The general conclusion is that national saving would rise, although probably not on a one-for-one basis.<sup>15</sup>

### *Investment*

The evidence that government policies can have a direct effect on business investment is significantly stronger than the evidence for private saving incentives. One reason is that the direction of the effect of a change in taxes or interest rates is not ambiguous from a theoretical point of view. The major issue under dispute is the potential for substitution between capital and labor in production. For example, given the decision to build a new plant, as determined by expectations of future demand, to what extent will business choose a more capital-intensive process in response to a reduction in the cost of capital relative to that of labor. For more than 20 years the discussion has been led by Dale Jorgenson, who believes that the possibilities for substitution are high, and Robert Eisner, who believes they are low. To date, neither has convinced the other, but I think it is fair to summarize the consensus of the profession that the truth is roughly an average of the two extremes. One convenient rule of thumb that emerges from the major econometric models is that the investment induced by a tax incentive limited to new investment (such as the investment tax credit) is roughly equal to the loss of tax revenue — a bang-for-the-buck of about unity.

A second major finding of the empirical studies is that a change in the cost of capital has a bigger effect on residential construction and consumer durables than on business investment. Thus, a decline in

---

14. Robert J. Barro, "Are Government Bonds Net Wealth?" *Journal of Political Economy*, vol. 82 (November-December 1974), pp. 1095-1117. A second variant of the argument is that public expenditures financed by taxes substitute for private consumption and debt-financed expenditures substitute for private investment. Paul A. David and John L. Scadding, "Private Saving: Ultrarationality, Aggregation, and Denison's Law," *Journal of Political Economy*, vol. 82 (March-April, 1974), pp. 225-50.

15. Willem H. Buiter and James Tobin, "Debt Neutrality: A Brief Review of Doctrine and Evidence," in George M. von Furstenberg, ed., *Social Security Versus Private Saving*, Cambridge: Ballinger Press, 1979, pp. 39-63.

interest rates, for example, increases total investment but shifts it in the direction of housing and consumer durables. That is a significant issue that I will return to in a later discussion of policy options.

If we accept the hypothesis that government policy can significantly affect investment demand through changes in the after-tax price of capital, the evaluation of past government support for investment depends upon trends in the taxation of capital income and the cost of funds. To date, the public discussion has concentrated on the tax issue. Yet, the economic analysis tends to argue that, if there was an increase in the cost of capital in the 1970s, it was the result of increased financing costs rather than higher taxes.

*Taxes and investment.* On the tax side, the discussion seems to have been confused by the failure to distinguish adequately between average tax rates on capital income and the marginal tax rate relevant to investment. While the various studies seem contradictory, I believe they are consistent once we adjust for differences in what is being measured.

First, the *average* tax rate on the income from corporate capital was high and increased due to inflation in the 1970s.<sup>16</sup> Inflation affected tax liabilities in several distinct ways. The effective tax rate increased because depreciation allowances were not adjusted for inflation within the corporate tax system. Additionally, corporation taxes were reduced by the deduction of nominal interest payments, which were also not adjusted for inflation. While the inflated interest payments were taxed under the personal income tax, the tax rate on corporate income is higher than that on personal capital income; so that the value of the deduction to corporations exceeded the tax paid by individuals, the treatment of interest actually reduced the net cost of debt finance during the 1970s. Thus, while the effects of inflation on the taxation of interest largely canceled in an integrated view, the failure to adjust depreciation remains a significant source of variation in the tax on the income from corporate capital. Finally, there was a large nominal capital gain on the revaluation of physical assets that potentially may raise tax payments in future years if it is realized in higher earnings.

---

16. Martin Feldstein, James Poterba, and Louis Dicks-mireaux, "The Effective Tax Rate and the Pretax Rate of Return," Working Paper No. 740, National Bureau of Economic Research, 1981.

Second, the *average* tax rate on all capital income (calculated at the margin above labor income) within the personal tax system alone is quite low — about 10 percent — because so much of the income is exempt from taxation (residential housing) or deferred (pensions and capital gains.)<sup>17</sup>

For investment, it is more relevant to examine trends in the effective *marginal* tax rates on an additional unit of capital. That has been done in several studies of the corporate tax and the general conclusion is that effective rates of taxation fell throughout the 1970s because of liberalization of depreciation allowances, the investment tax credit, and the deductibility of nominal interest payments. A recent study reports a fall in the effective tax rate from 53 percent in 1960 to a low of 26 percent in 1965, a rise to 55 percent in 1969, and a subsequent decline to 33 percent by 1980.<sup>18</sup> As a result of the 1981 and 1982 tax acts, that rate will continue to fall about 15 percent in the 1983-86 period. It also is apparent that the effective tax on equipment is substantially lower and has declined more than that for structures; it is thus consistent with the previously mentioned shift toward short-term assets.

These analyses of the effective tax on new corporate investment did not, however, take account of property and personal income taxes. That issue has been examined in a recently completed study of capital income taxation in four countries.<sup>19</sup> The study found that the overall marginal tax on capital income from the corporate sector was about 32 percent in 1983, and that it had declined from 48 percent in 1960 and 47 percent in 1970. As reported for studies of the corporate tax alone, equipment is taxed much less heavily than other types of investment. The study also concluded that elimination of the corporate tax would, in its present configuration, have very little effect on the expected tax for the average new investment. One interesting result of the study was the finding that the marginal tax rate on capital income is lower in the United States than in Germany, about the same

---

17. Eugene Steuerle, "Is Income from Capital Subject to Individual Income Tax?" *Public Finance Quarterly*, vol. 10, July 1982, pp. 283-303.

18. Charles R. Hulton and James W. Robertson, "Corporate Tax Policy and Economic Growth: An Analysis of the 1981 and 1982 Tax Acts," unpublished working paper, the Urban Institute, Washington, D.C., December 1982. They assume a 4 percent real after-tax return in making their calculations and a 6 percent inflation rate for 1983-86.

19. Don Fullerton and Mervyn A. King, eds., *The Taxation of Income from Capital: A Comparative Study of the United States, United Kingdom, Sweden, and West Germany*. University of Chicago Press, forthcoming.

as in Sweden, and far higher than in the United Kingdom.<sup>20</sup> The differences in capital taxation certainly do not correlate well with differences in rates of capital formation for these countries.

Thus, the conclusion drawn from the analysis of tax rates is not so much that the tax on capital income has increased but that tax rates are highly variable by type of capital asset and owner. Corporate capital is one type that is particularly heavily taxed. That is a potentially serious source of a misallocation of capital. Yet one has to ask why the corporate share of capital has grown so rapidly if it is so disadvantaged by the tax system? Apparently, the tax doesn't exceed the value that incorporation extends to the owners of capital.

One conclusion that emerges from these studies is, regardless of whether the tax on capital income is too high or too low, the effective tax on new investment has declined throughout the 1970s. That is to say, tax policy has generally been stimulative to private investment, and at least in some studies, the implication is that there is little more that government can do at the corporate level unless it wishes to provide a tax subsidy. There is, however, a wide *disparity* of tax rates on different types of capital.

*Cost of funds.* The uncertainty about the net direction of change in investment incentives results from questions about what happened to the real cost of funds. That cost is a weighted average of the cost of equity and debt finance. The real cost of debt finance appears to have declined as the studies agree that market interest rates did not rise in step with any available measure of expected inflation of capital goods prices. There is greater uncertainty about the cost of equity finance or, in other words, the risk premium, on investment during the 1970s. The price-earnings ratio fell very sharply, which implies a sharp increase in the cost of equity finance. **However**, some interpret the decline in market value as a reflection of unexpected obsolescence of existing capital and not as an implication of an increased cost of financing new investment. That is, the present value of future income from existing capital really had declined and existing stockholders were not surrendering large amounts of future income to obtain new equity financing.

Others have interpreted the decline in share values as reflecting confusion by investors in valuing future earnings in an inflationary

---

20. The major reason for the low tax rate in the United Kingdom is immediate expensing of depreciation combined with the full deductibility of nominal interest payments.



TABLE 4  
Effective Marginal **Tax** Rates on Income  
From Corporate Capital, **1960-83**  
(percentage)

Category	1960	1970	1980	1983
<b>Asset</b>				
Machinery	59.3	48.5	17.6	11.0
Buildings	45.0	47.1	41.1	33.2
Inventories	45.6	46.3	47.0	47.0
<b>Finance</b>				
Debt	- 3.6	- 0.2	- 16.3	- 23.5
New share issues	96.5	92.9	91.2	87.7
Retained earnings	73.1	69.7	62.4	57.3
<b>Overall</b>	48.4	47.2	37.2	31.5
Zero inflation	44.9	43.8	32.0	28.7
10% inflation	48.3	47.4	38.4	33.0
Contribution of: *				
Property tax			6.2	
Corporate tax			1.9	
Personal tax			29.5	

Source: Fullerton and King, *The Taxation of Income From Capital*, chapter 6. The basic calculations assume a constant 10 percent before-tax real rate of return for all investment projects with a 6.8 percent inflation rate. Alternatively, if the real rate of return before tax to the saver is equal for all projects, the effective tax rates for the four years are 59, 57, 50, and 45 percent, respectively.

\* Because of interrelationships between the taxes, such as deductibility of property taxes, the components do not add to the total. Instead, they show the decline in the tax rate that would occur if the specific tax were eliminated.

situation. According to this view, the 1970s might have been a period of high financing costs, but I would then expect the policy issues to revolve around means of strengthening investor confidence — controlling inflation in an economic environment of sustained expansion.<sup>21</sup>

This issue takes on even greater importance in interpreting events of recent years. The 1981-82 tax changes sharply lowered the effective tax on new investments. At the same time, however, the rise in the real interest rate appeared to offset fully any net stimulus to domestic investment.

21. An example of the importance of stock market conditions for the financing of new issues is provided by the recent explosion of new stock issues from \$82 million in July of 1982 to \$1.6 billion in June of 1983. See Mark Potts, "New Issues," *Washington Post*, July 17, 1983, p. H1.

## Policy options

The decline in productivity growth is an issue that should be of great concern to public policy. While the concept is often confusing to the general public and carries with it negative connotations of automation and robots destroying jobs, it is the source of the rise in real incomes. If the post-1973 slowdown had never occurred, the real income of the average worker would today be over 20 percent higher than it is.

The discussion of potential policy actions reflects two extremes. In focusing so heavily on tax incentives for private saving, the supply-side debate in the United States has ignored actions in other areas that would make important contributions. Furthermore, the pressure for tax reductions, without a coordinated scaling back of expenditures, has led to large deficits that are likely to discourage investment in future years.

Alternatively, much of the current public discussion reflects a belief that the United States needs to develop an industrial policy. That would require the government to develop an explicit plan of what the future structure of the economy ought to be, and to adopt a combination of tax, loan, trade, and regulatory policies to channel investment and output in the desired direction.

A more conventional view of a pro-growth strategy would give greater weight to the traditional responsibilities of government policy. Stabilization policies are the subject of another paper at this conference. Yet the resolution of those issues is likely to be of greater importance to the future growth of the economy than any of the more microeconomic policies that might be suggested. The creation of a favorable environment for domestic investment and innovative activity involves more than tax policy alone. It is equally important that government restore business confidence in sustained future expansion of the overall economy, reasonable availability of financing, and exchange rates that are reflective of underlying competitive conditions relative to other nations.

Beyond these macroeconomic policy concerns, there are two major areas where changes in government policies might have significant benefits. First, the wide variation in effective tax rates on different types of investments indicates that the current tax system could be seriously distorting the allocation of capital. Second, there is evidence that research and development earns a private rate of return substantially above that of physical capital. And, evidence that the

full benefits of R&D are not captured in private returns, such that the social return exceeds the private return, creates an argument in favor of some public role to increase **R&D**.

### *Stabilization policy*

Government could make a substantial contribution to the potential for future growth if it performed better in managing the overall economy so as to avoid the extremes of inflation and recession. This is an obvious point but it is often overlooked in current discussions. For example, the expected return on new capital is a function of its expected utilization as much as of taxes and the cost of funds. A sustained expansion would increase the utilization and thus the return of existing capital, and raise expectations of future needs. Thus, restoring private-sector confidence in a sustained expansion of overall economic activity is a strong pro-investment measure.

In addition, there is substantial evidence that the mix of fiscal and monetary policies has important effects on the allocation of output between investment and consumption. In recent years there has been a shift toward a more expansive fiscal policy with a consequent increase in the burden placed on monetary policy as a restraining anti-inflation influence. In future years, this pattern is expected to be accelerated as the budget deficit is projected to rise even with economic recovery.

This mix of policy may have an impact on capital formation in several ways. As the economy recovers there will be an increasing tension between the fiscal stimulus and the inflation concerns of the monetary authorities with a consequent upward pressure on interest rates. That is, if concerns about inflation on the part of the monetary authorities place a ceiling on national output, similar to that which would exist at full employment, government borrowing in capital markets could crowd out private investment. Thus, it is argued that a shift in the mix of policy toward fiscal restraint with an offsetting easing of monetary policy would lower interest rates, raise investment, and provide the required financing through higher government saving.

This argument is tempered by noting that both residential construction and consumer durables spending appear to be more sensitive to interest rates than business investment. Therefore, if personal taxes were raised, with an offsetting change in monetary policy in order to keep the path of GNP unchanged, most of the increment to national

saving would be reflected in housing and durables. If the tax increase were concentrated in areas that directly affect investment, nonresidential capital formation might actually decline.

The conflict between an expansionary fiscal policy and a restrictive monetary policy will also affect the foreign balance and the competitive position of U.S. goods in world markets. High domestic interest rates will attract foreign capital and maintain a high value of the dollar. In part, the large government deficit will be offset by a substantial foreign account imbalance. The direct effect of the budget deficit and tight money on business investment is reduced, but the depressive effects on U.S. export and import-competing industries would limit their demand for investment goods.

### *Capital income taxation*

Views about the appropriate rate of taxation of capital income relative to labor income are heavily influenced by equity considerations — how tax burdens should be distributed. But the recent studies have highlighted other less controversial issues. First, the system may seriously distort the allocation of investment because of widely disparate effective tax rates for investment of different durabilities, methods of financing, and ownership. For corporations, some categories of equipment investment, financed by debt, are heavily subsidized under the current tax system, while equity-financed structures are taxed at a very high rate. Under the personal tax system, many forms of capital income escape taxation altogether, while others pay very high rates. Second, within both the corporate and personal tax systems, the rate of taxation on capital income is highly sensitive to variations in the rate of inflation. Third, the value of the investment tax incentives is dependent upon the individual firm having sufficient tax liabilities from other operations against which to charge deductions and tax credits. That means that the system may discriminate against investments by new firms. And, fourth, the problems of measuring the income from capital are responsible for most of the administrative complexity of the current tax system. While recent changes in the tax laws have reduced the effective tax on the average new investment, they have aggravated some of the distortions in the allocation of investment.

There have been two major lines of suggested reform. The first would attempt to fix up the system by moving back toward a comprehensive income tax with inflation adjustments and economic depreci-

ation. The second would abandon efforts to tax capital income and move to a consumption tax, which is equivalent to a tax on wage income alone under some circumstances.<sup>22</sup>

At the corporate level these contrasting views are reflected in two proposed reforms. The first, suggested by Jorgenson and Auerbach, would continue to tax capital income, but would give firms the full present value of depreciation, based on economic useful lives, at the time the investment is undertaken, thus, eliminating the problem of adjusting depreciation for inflation.

The alternative plan, suggested by Robert Hall, among others, would convert to a system of current expensing for all investments, thus eliminating the administrative machinery of depreciation accounting. In addition, the tax would be applied to the total income of corporate capital: interest expenses would no longer be deductible. Current expensing does not imply the elimination of the corporate tax. Taxes would still be paid on any income in excess of the cost of capital — infra-marginal returns. It does imply a zero tax on the opportunity cost of capital. Current expensing also results in a substantial increase in the tax on interest income unless it is combined with a consumption tax concept at the personal level.

Both proposals would create a corporate tax that is neutral in its treatment of investments of differing durability and the elimination of the interest deduction under current expensing would remove any distorting effects induced by variations in the method of financing — equity versus debt. Firms would earn the full before-tax return on assets and they would pay the full before-tax cost of funds. The Jorgenson-Auerbach proposal would retain the interest deduction at the corporate level, however, because the underlying concept is still that of a tax on income. Thus, there would still be a difference in corporate taxation of capital financed by different means.

Both proposals still encounter the possibility that a firm may have negative tax liability in some years. Thus, there would be a possibility of a variation in the tax on investments of different firms. One solution would be to provide an unlimited carry-forward of unused deductions.<sup>23</sup> Alternatively, firms would be paid out of the Treasury

---

22. These two contrasting approaches are outlined in more detail, with citations, in Harvey Galper, "Tax Policy," in Joseph A. Pechman, ed., *Setting National Priorities: The 1984 Budget*, Brookings Institution, 1983, pp. 173-200.

23. To maintain equal treatment, the amount of negative tax liability carried forward to future years should earn a market rate of interest.

for the amount of any negative tax liability, or they could sell unused credits to other firms as with the current system of safe-harbor leasing.

These alternative proposals for reform of the corporate tax illustrate an issue that is confronted more directly in discussions of the personal tax system: should tax liabilities be based on income or consumption? The Jorgenson-Auerbach proposal maintains income as the tax base, but it adjusts the measure of capital income for the effects of inflation. Current expensing of investment at the corporate level, with elimination of the interest deduction, is equivalent to a consumption tax for individuals.

The current personal tax system is a hybrid between an income and a consumption-based tax, and it is responsible for much of the variation in effective tax rates on different types of investment. On the one hand, many forms of capital income are either exempt from taxation (housing) or the tax liability can be deferred to the point where the effective tax rate is near zero (capital gains and pension funds). On the other hand, interest income is taxed at high and variable rates because of the failure to index the tax base for inflation.<sup>24</sup>

There are two alternative means of implementing a consumption tax. The first would simply exclude the income of capital from the tax base and eliminate the deduction of interest expenses. The second approach would measure total income (capital plus labor) on a cash-flow basis but allow a deduction for saving. The two concepts are equivalent for investments which earn the market rate of return: it makes little difference whether the funds are excluded from taxation when they are put into the savings account (the deduction approach) or when the income is earned (the exclusion approach). Thus, in the simplest case, any consumption tax is a wage tax. The approach of deducting saving, however, maintains taxation of the inframarginal returns to capital — similar to the treatment of business investment as a current expense. In addition, the deduction of saving involves fewer transitional problems when it is introduced because the exclusion of capital income completely would involve large windfall gains to existing wealth holders.

The deduction of saving is not as simple as the exclusion of capital

---

24. The severity of this problem is reduced for corporate capital when the interest payment is deducted, but there are many situations when the tax rates are not equivalent for the payment and receipt of interest.

income, but it still results in a simplification of tax reporting because it would use cash-flow accounting. There is no need to measure capital gains or losses because if the funds are not withdrawn from the account they are saved and can be excluded from the measure of income. The use of cash-flow accounting also eliminates the need to adjust the income measure for inflation.

If the United States were to shift from its current personal income tax to a consumption or wage tax of equivalent revenue, there would be an increase in private saving incentives. The greater gain, from the perspective of domestic capital formation, however, is likely to result from the equalization of taxation on different types of capital.

Nonetheless, the consumption tax is controversial. It would initiate a substantial redistribution of tax burdens and the increased effective tax on labor income may cause offsetting reductions of labor supply and work effort. In addition, the consumption-tax advocates assume that wealth has no value beyond its ability to support future consumption. Others believe that wealth confers power, security, and access to opportunities that are not reflected in consumption. Therefore, on equity grounds they prefer to use income as the basic measure of tax liability. One compromise is to combine the consumption tax with an inheritance tax aimed at preventing the concentration of wealth among a few. Because such a combined tax system does imply a positive tax on capital income, we cannot be certain of the net effect on saving.

The opponents of the consumption tax normally advocate a broadening of the current tax base to move in the direction of a comprehensive income tax and use of the proceeds to reduce effective tax rates. In this way, they would equalize the tax on alternative investments by bringing back into the definition of income many of the components that are now excluded, and they would index the tax base to adjust for inflation. Some argue that the failure to index interest is not a major distorting factor as long as the tax rates paid by borrowers (who deduct the payments) and lenders (who include them in income) are roughly equivalent. Indexation would be required for depreciation and capital gains (which would then be taxed as ordinary income). The revenues raised by the base-broadening measures could then be used to reduce marginal tax rates.

The income tax that emerges may be more complex than a consumption tax; but that is a compromise its advocates accept to achieve their equity objectives. Moreover, the consumption tax is

unlikely to emerge, in practice, in the pure form that has been suggested. Most of the tax preferences that exist under the current system are likely to exist under either a consumption or an income tax. These preferences reflect explicit decisions to favor specific groups and activities, rather than difficulties of measurement or concept. Likewise, a consumption tax would encounter its own problems of distinguishing between saving and consumption, education being a particularly important example.

In summary, either a consumption tax or a comprehensive income tax could eliminate most of the distortions in the current treatment of different types of capital income. The comprehensive-income tax is aimed at eliminating tax preferences; the consumption tax extends them to all forms of capital income. The consumption tax would increase saving incentives, but the magnitude of the effect on actual saving is uncertain. More important, an increase in national, rather than private, saving should be the major objective of policy, and that goal could be achieved with greater certainty by simply reducing government dissaving.

### ***Research and development***

A large number of studies over the last two decades have provided strong evidence of a high return to R&D expenditures. Those studies have utilized a variety of different techniques. Griliches has used a production function framework to estimate the contribution to output from time series data of individual firms and industries. He finds a significant effect on output that would correspond to a gross private rate of return (that is, including depreciation) of about 20-25 percent.<sup>25</sup> Mansfield and his associates evaluated the return on specific innovations. They also found an average private before-tax rate of about 20-25 percent, and then went on to estimate the social return, which appears to be much higher.<sup>26</sup> The social return would be expected to be higher because of the ability of competitors to imitate

---

25. See, for example, Zvi Griliches, "Returns to Research and Development Expenditures in the Private Sector," in John W. Kendrick and Beatrice N. Vaccara, ed., *New Developments in Productivity Measurement and Analysis*, University of Chicago Press for the National Bureau of Economic Research, 1980, pp. 419-54.

26. See Edwin Mansfield, et al, "Social and Private Rates of Return from Industrial Innovations," *The Quarterly Journal of Economics*, vol. 91, May 1977, pp. 221-40. They report average private and social rates of return of 25 and 56 percent for a sample of 17 innovations. The variability of the estimated returns also illustrates the high risk associated with such investments.



the innovations. There is less evidence of a high return for publicly-financed R&D, but that may be because of its concentration in defense and basic research where the link to output are less immediate and direct.

The magnitude of the gap between the social and private return does create a strong argument for a public role in R&D, but the large difference between the private return for R&D and that for physical capital raises a question about why the private sector does not spend more on R&D. In part, the explanation may involve the riskiness of such investment, but it should be possible to pool R&D projects so as to reduce the risk associated with the individual project.

There are also many questions about the most effective form that public incentives for R&D should take. Before 1981, the tax laws allowed firms to deduct all R&D costs as a current expense." The 1981 tax act assigned all capital used for R&D to the three-year recovery class regardless of its expected rate of economic depreciation.\* Furthermore, qualified R&D expenditures (essentially labor and other nondepreciable costs) in excess of a base period amount are eligible for a 25 percent tax credit. The net effect of these changes is to provide a net tax subsidy to labor and other nondepreciable costs of R&D, a net tax subsidy to capital expenses that are financed by debt (because of the deduction of interest costs) and an effective tax of 5-10 percent on the opportunity costs of R&D capital that is equity financed.<sup>29</sup> It is too early to evaluate the effect of these measures, but there is a concern that firms will simply inflate the category of expenditures that they classify as R&D because of the tax advantages.<sup>30</sup>

The tax system may favor investment in risky activities such as R&D, but the magnitude of the effect, and even its direction, are subjects of continuing controversy. The simple view is that income taxation shifts the distribution of investments toward more risky projects

---

27. Capital equipment used for an R&D project was subject to normal depreciation, but that is equivalent to expensing of the R&D asset.

28. Because the investment tax credit is limited to 6 percent in the three-year recovery category compared to the 10 percent credit on longer life assets, this change had a minor effect on the net incentive for R&D equipment with an economic useful life of 7-8 years.

29. This assumes an after-tax required real return of 4 percent and that the firm has sufficient tax liabilities from other activities to absorb the tax deductions.

30. As an illustration, preliminary analysis of 1982 tax returns indicates that the biggest reported increase in R&D expenditures was in the advertising industry.

because the government shares in the losses as well as the gains — reducing the variance of after-tax returns. Government thereby becomes a partner in the activity. In practice, however, the situation is more complex for several reasons. First, firms (particularly new firms) may not have sufficient tax liability from other sources to absorb the tax deductions. Second, the progressivity of the personal tax yields an asymmetric treatment of income gains and losses. Third, in a situation where individuals can diversify their portfolios to avoid all but social risk (business cycles, for example) they don't need the government as partner. And fourth, the analysis depends upon individual attitudes toward risk."

The special treatment of capital gains provides a more clear-cut example of a positive tax incentive. For these purposes R&D constitutes a natural deferral activity in the sense that the costs can be passed through to the partners in the venture and be offset immediately against ordinary income. Meanwhile, the return can be translated into a capital gain, delayed, and then taxed at 40 percent of the rate on ordinary income. Problems arise because the law applies equally well to a wide range of other activities, and it is difficult to design a capital gains incentive for R&D that is not subject to abuse.

Finally, it is sometimes argued that tax incentives for physical investment are an indirect means of encouraging innovation because an expansion of demand in the capital goods industry stimulates its R&D activity.<sup>32</sup> This demand-pull argument should apply equally to increases in the demand of any industry, and, as far as I know, there is little evidence that R&D in the capital goods industry has a higher return than elsewhere. The argument should reinforce the observation that a sustained economic expansion raises productivity. In fact, a reduction in the tax on physical capital alone reduces the relative advantage of R&D and may equally well lead to a reduction of such efforts.

It may be a mistake, however, to focus so heavily on tax incentives for private R&D. While total R&D expenditures have fallen as a share of GNP since the 1960s, the decline was due solely to cutbacks in federal government outlays for defense and space (see Table 5).

---

31. These issues are elaborated on and citations provided in Anthony B. Atkinson and Joseph E. Stiglitz, *Lectures in Public Finance*. New York: McGraw Hill, 1980, pp. 97-127.

32. J. Smookler, *Invention and Economic Growth*, Cambridge: Harvard University Press, 1979.

Although that research did benefit the civilian economy, the benefits were less than if the funds had been spent directly on civilian R&D. Both total civilian and private R&D have steadily risen as a share of GNP over the last two decades. Government still accounts for half of all R&D funding and the defense and space component has declined from about 80 to 60 percent of its spending. If the divergence between social and private returns is the primary justification for a government role, the case is strongest for an expansion of funding for basic research where there is little direct value to the supporting firm. Private industry directs only 15-20 percent of its spending to basic research while it represents 40-50 percent of the federal outlays and two-thirds of the spending by universities and other nonprofit institutions.

TABLE 5  
SHARES OF GNP DEVOTED TO RESEARCH AND DEVELOPMENT, 1961-81  
(percent)

Period	R&D expenditures by source		
	Total	Civilian*	Private
1961-70	2.8	1.4	1.0
1971-75	2.4	1.5	1.1
1976-80	2.3	1.6	1.1
1981	2.4	1.7	1.2

  

Period	Type of research†		
	Basic research	Applied research	Development
1961-70	0.4	0.6	1.9
1971-75	0.3	0.5	1.5
1976-80	0.3	0.5	1.5
1981	0.3	0.5	1.5

Source: National Science Board, *Science Indicators*, 1980.

\* Includes private and government civilian expenditures.

† Applies to total R&D.

## Conclusion

For future growth it is important to enhance the rate of capital formation, but the definition of capital should be a broad one that encompasses investments in human capital and research as well as in physical capital. The major barrier to increased physical capital seems to be the lack of demand for new investment rather than a lack of available resources in the form of saving. The poor environment for investment is in turn a reflection of the chaotic state of current fiscal and monetary policies — high financing costs and an appreciation of the exchange rate that has sharply reduced the competitiveness of U.S. products in world markets. A shortage of saving at levels of resource utilization acceptable to the monetary authorities is an element in the high financing costs, but the shortage is the result of a sharp rise in government borrowing rather than a decline in private saving. This issue is best addressed by stabilization policy rather than an attempt to achieve an offsetting rise in private saving.

Second, tax incentives for private saving should not be the focus of the current policy discussion. For the short term, the existing level of idle resources can finance a substantial increase in investment. For the longer term, there is room to increase national saving by reducing the government deficit and, even beyond that, by increasing the financing of public pension programs.

Third, the discussion of capital income taxation has focused heavily on the average or average marginal tax rate, with too little concern for the distorting influences of the variation in tax rates for different types of investment. The wide variations in effective tax rates on different types of capital potentially result in a substantial waste and misallocation of existing investment. These allocative issues could be addressed within either a consumption-wage tax or a comprehensive income tax. The choice between the two is a very complex issue that involves equity and other concerns. It is not clear that advocates of either proposal actually address the basic issue of what to do about tax preferences; yet it is the tax preferences, rather than conceptual differences over the appropriate tax base, which is responsible for much of the variation in effective tax rates.

Fourth, the evidence on rates of return supports the advocates of an increased national effort on research and development. Private R&D spending, however, has been steadily increasing, and the 1981 tax law changes introduced several new incentives. The reduction in

overall R&D investment is the result of cutbacks in federal financing. Tax incentives to private firms are unlikely to be effective in encouraging basic research where the discrepancy between social and private **returns** is expected to be most significant. Thus, any increased public effort should probably take the form of direct expenditures rather than tax incentives.