

PANEL DISCUSSION TRENDS IN PRODUCTIVITY GROWTH

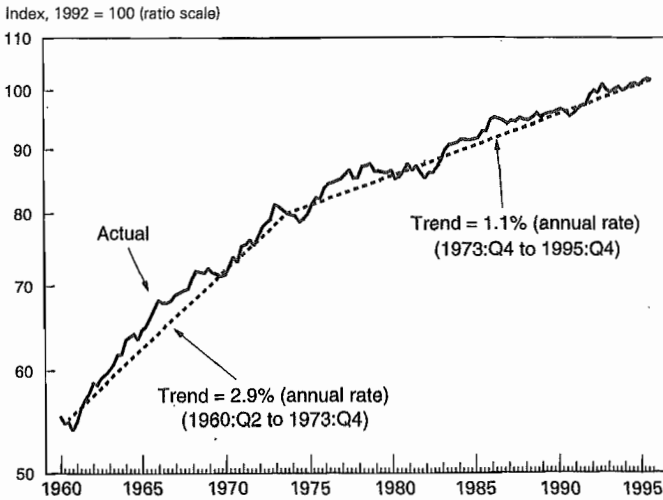
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According to Administration estimates, potential GDP growth is 2.3 percent per year. That growth rate is based on three elements: the growth of labor input, the productivity growth trend, and capital growth. Labor input now is growing at a rate of about 1.1 percent, more slowly than in recent years because of the slowing increase in female participation in the work force and the continued decline in male participation. In addition, the baby boom generation has moved into the work force and now begins to approach retirement. The second element in potential growth is productivity. The historical trend of productivity growth in nonfarm business has been about 1.1 percent per year since 1973 (Figure 1). Prior to 1973 the growth rate was substantially higher. In the first quarter of 1996, productivity indicators looked fairly good, but after benchmark revisions to labor input, the trend still appears to be about 1.1 percent growth per year. In the forecast, however, we anticipate a 0.1 percent gain in productivity growth resulting from the increase in capital accumulation associated with balancing the federal budget.

The part of productivity growth we can explain has been remarkably constant since about 1960 at about 1.1 percent. We also got a growth bonus, or extra residual, prior to 1973 (Figure 2) but we did not know where it came from then, and now we do not know where it has gone. Another puzzle is that the most recent time period has been associated with a sharp bias in the effect of technological change on workers' returns to skill and education. The return to education has risen considerably, as shown by the rising difference between earnings of college- and high-school-educated workers (Figure 3). One of the most important explana-

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Figure 1
Actual and Trend Labor Productivity



Source: Council of Economic Advisers.

tions for the rise in wage inequality points to the effect of technology. As writers like Robert Lawrence of Harvard and Dan Sichel of the Federal Reserve have noted, the recent period is unusual because it couples so much bias in the returns to education with so little apparent technological change as indicated by the productivity growth trend. No consensus has developed in the profession as to what could explain either this biased impact of technological change or the apparent absence of technological gains in measured productivity growth.

What, therefore, are the policy implications? Few, for monetary policy. Although I would not necessarily make this statement about other countries, monetary policy in the United States is not seen as a significant restraint on faster growth over the next few years. Macroeconomic disturbances may change things, of course, but our estimated growth rate of 2.3 percent is essentially based on the supply side of the economy, with no expectation that an absence of aggregate demand will act as a constraint on growth. Policy must therefore address ways to improve the supply side of the economy.

As illustrated in both Figure 2 and Figure 4, one of the declining contributors to productivity growth has been capital investment, or the increase in the capital stock per worker hour. The declining contribution

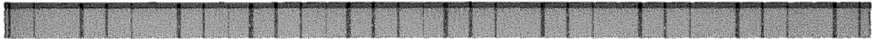
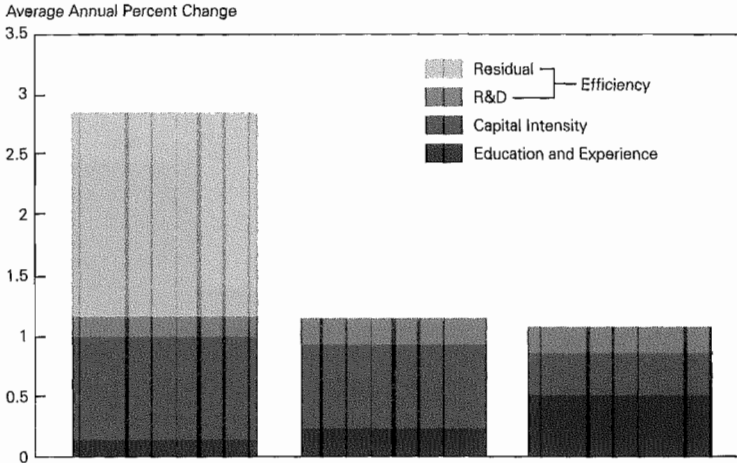


Figure 2
Growth of Output per Hour



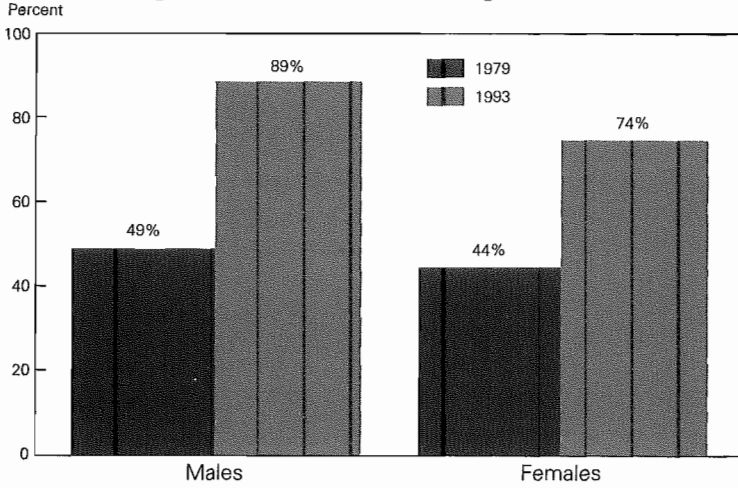
Source: Council of Economic Advisers.



of capital as shown in Figure 4 is somewhat misleading, however. When the growth rate of output slows, even if the same share of output is saved and invested, the capital stock will not grow as rapidly as before. To some extent, therefore, the decline in the contribution of capital investment is itself a consequence of the decline in the growth bonus, or the growth residual. Over and above that effect, the contribution from capital has fallen because of the decline in the share of output devoted to saving and investment. An important way to improve growth, therefore, is to reduce the federal budget deficit, which was one of the main causes of the low national savings rate in the 1980s. I know Richard Cooper is concerned about this point, so let me hasten to add that as we reduce the budget deficit, we will reduce the current account deficit as well as increasing domestic investment. The best rule of thumb may be 50 percent of any increase in saving goes to reduce the current account deficit and 50 percent goes into investment. Not all of the increase in domestic investment will be in business equipment. Quite a bit will be in structures and in housing. Nevertheless, one benefit of reducing the federal budget deficit will be some increased business capital formation, an important growth-enhancing result.

The second important element in the Administration's program to

Figure 3
Differences in Mean Annual Earnings:
High School Graduates vs. College Graduates

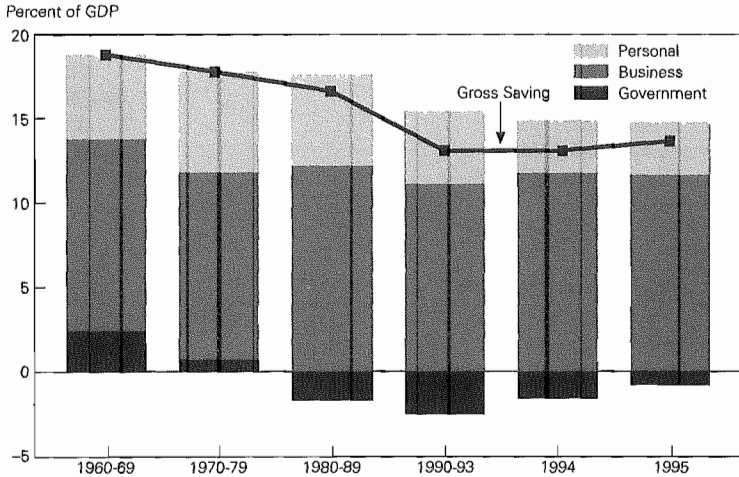


Note: Data are for year-round, full-time workers, age 25 and over.
Source: U.S. Department of Labor.

increase growth involves the various education initiatives the President has emphasized. Figure 2 groups together education and experience into one category. This is somewhat misleading, because the increased contribution to output growth from that combination results from the aging of the baby boom generation. More experience, rather than more education, caused the rise in the contribution from experience and education shown in Figure 2.

One thing we do know from recent years is that the returns to skill and education have increased. The bad news from that is that the wage distribution is widening as a result. The good news is that an opportunity for investment emerges; if we can increase the amount of education and training in the work force, that gain should translate into improved productivity. In particular, the return to computer literacy appears to be strong. As Alan Krueger's work has shown, the ability to use computers is an important contributor to wages and, therefore, should be a contributor to productivity. Accordingly, one of the President's education initiatives focuses on improving the technological literacy of our work force. The federal government can have only a limited direct impact on education because most expenditures are state or local. But the President believes that federal leadership in this area and seed money for experi-

Figure 4
Components of Gross Saving



Source: Council of Economic Advisers.

mentation could help state and local authorities to improve their own programs.

Tables 1 and 2 and Figures 5 to 7 draw on different strands in the literature to show the very substantial return to the economy from both public and private R&D. The studies of Edwin Mansfield and other econometric studies have shown a substantial social return as well as a private return to private R&D. Programs that encourage private R&D,

Table 1
Sources of Funds for R&D in 1995
Percent

	All R&D		Basic Research	Applied Research	Development
	\$ Billions	Percent			
Federal Government	60.7	35	58	36	29
Industry	101.7	59	25	57	70
Universities and Colleges	5.5	3	12	4	^a
Nonprofits	3.2	2	5	3	^a
Total	171.0	100	100	100	100

^a less than 1 percent.

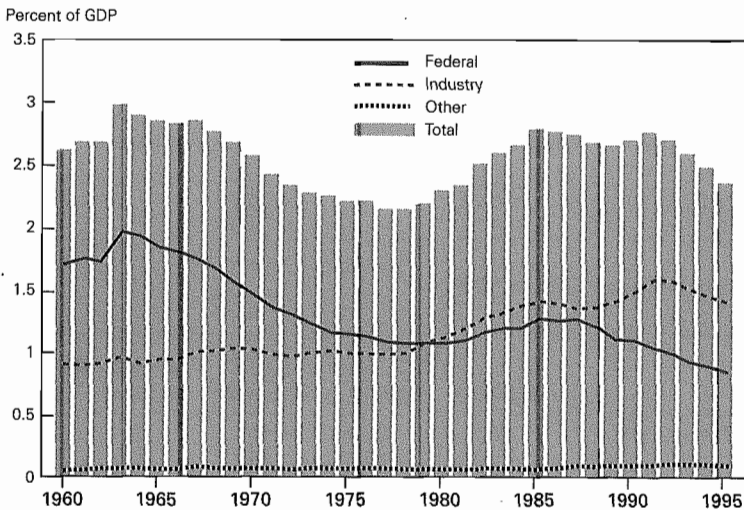
Table 2
Private and Social Rates of Return to Private R&D
Percent

Author (year)	Estimated Rates of Return	
	Private	Social
Nadiri (1993)	20-30	50
Mansfield (1977)	25	56
Terleckyj (1974)	29	48-78
Sveikauskas (1981)	7-25	50
Goto-Suzuki (1989)	26	80
Bernstein-Nadiri (1988)	10-27	11-111
Scherer (1984)	29-43	64-147
Bernstein-Nadiri (1991)	15-28	20-110

Note: Table adapted from Zvi Griliches, "The Search for R&D Spillovers," *Scandinavian Journal of Economics*, 1992 Suppl., pp. 29-47, and Nadiri (1993).

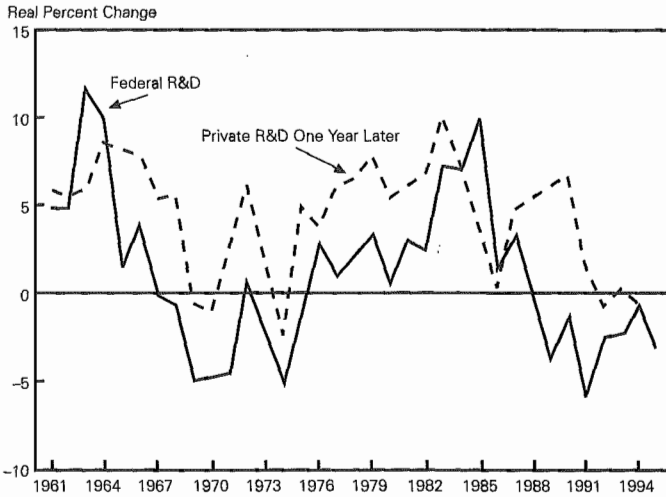
therefore, will add to productivity growth and, thus, to the growth residual. We can foster private R&D by giving tax incentives and also by supporting public R&D. Figure 6 shows that private R&D appears to be correlated with prior federal R&D and suggests some spillover effects from federal government spending to private sector spending. Since

Figure 5
Expenditures for Research and Development



Source: Council of Economic Advisers.

Figure 6
Change in Federal R&D Expenditures and
Change in Private R&D Expenditures One Year Later

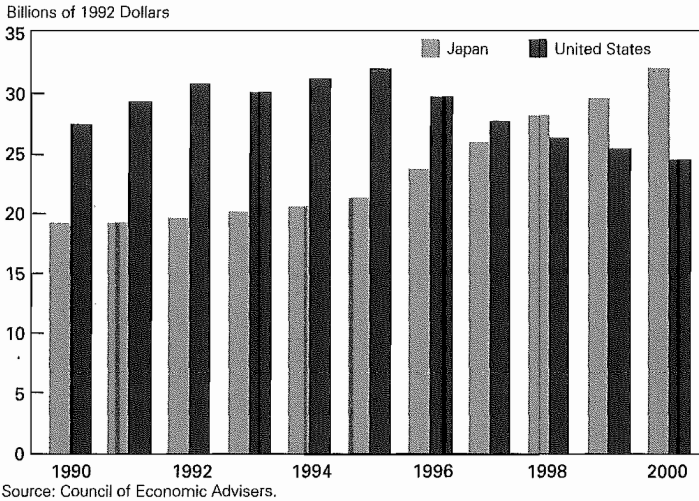


public R&D does give productivity benefits, efforts to sustain or increase it should be a focus for policy. Figure 7 illustrates that under current congressional proposals, the rate of public nondefense R&D spending would decline over time. I do not believe this is good policy for growth. If anything, we should be trying to increase the public contribution to R&D.

I will turn now to the question of how the economy might get back some of its growth bonus. But before doing this I should warn that we may have to live with the fact that we cannot get back all of it. Some of the residual growth that occurred in the early part of this century may have resulted from a burst of innovation and industrialization, from automation, and from a shift from craft production to mass production, and that period now is over. We have exhausted many of the simpler ways of moving to mass production, shifting from corner grocery stores to large supermarkets, from telephone operators to electronic switches, and so on. From a policy perspective, therefore, we must learn to live in an economy where it is harder to find ways to increase productivity. Such an economy generates an environment with winners and losers, and requires attention to policy dimensions such as the provision of safety nets.

On the more positive side, however, we may actually be getting more

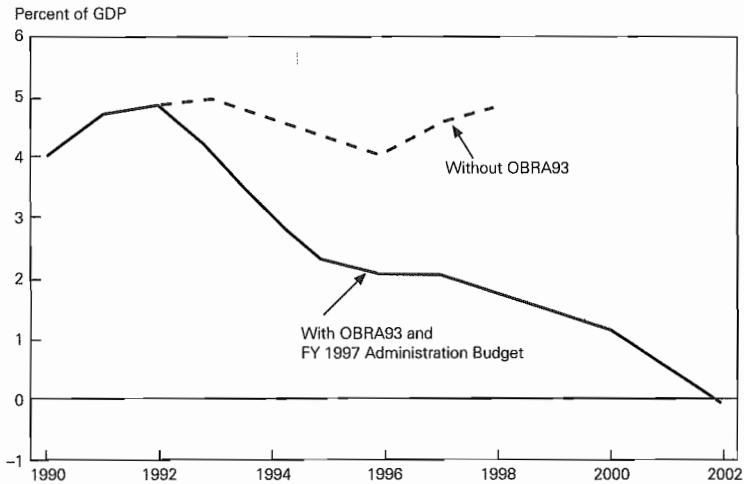
Figure 7
Estimated Japanese Governmental Expenditures on
Non-Defense R&D Compared with Projected Congressional Allocations



of a growth bonus now than is apparent from the figures I have shown here because of measurement problems, an issue brought up earlier in the conference. There are substantial problems in the way we measure productivity growth. In many areas of the economy—from accounting for the convenience factor in services to measuring nonphysical capital such as software—we do not pick up output and, consequently, we do not pick up productivity growth. That may not explain the apparent slowdown, as presumably there were problems before 1973 as well. However, it would be nice to know if productivity growth were faster than the current measurements indicate. It would change our thinking about policy and the economy. One recommendation I would make, therefore, is to improve the quality of our statistics to get a better handle on productivity growth. At the moment, we are starving our statistical agencies. We should instead be investing more in them, as a cheap way of getting better information and, as a result, better policy.

There may be a growth bonus from increased investment in education. Much of the literature notes that education contributes a social as well as a private return. This externality is difficult to judge. The statement that one person will be more productive working with other educated and productive people certainly is true, but it does not in itself

Figure 8
Federal Budget Deficit



Note: The GDP measure used is pre-January 1996 benchmark revision.
Source: Office of Management and Budget and Congressional Budget Office.

prove an externality. But despite this reservation about the economics literature in this area, I have some hope that there is a positive externality from education that would boost growth if we succeed in raising the growth rate of human capital.

Another way to get a growth bonus is through increased competition. To a certain extent we already are doing that by deregulating our markets, opening them to foreign competition, and increasing our access to foreign markets. In a number of industries, such as railroads, deregulation has led to substantial productivity growth. Before I joined the Council, my research comparing productivity rates across countries suggested that competition provides an important impetus towards the adoption of more productive technologies. Maintaining an open economy, therefore, is an important part of improving productivity growth and getting a growth bonus.

I am a productivity and technology optimist. We have overcome those afflictions of the 1970s and 1980s—high unemployment and high inflation and very large budget deficits. We now have a full employment economy without much inflation, and a budget deficit that is lower and heading towards zero (Figure 8). If we can recreate the economic climate of the 1950s and 1960s, we may get back some of the mysterious growth bonus.

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