

# How Fast Can the U.S. Economy Grow?

By C. Alan Garner

The pace of economic growth is frequently a source of concern to policymakers, economists, and the general public. Economic growth creates business opportunities, generates new jobs, and raises the standard of living. When growth is too slow, the economy loses valuable output of goods and services, and the unemployment rate rises. When growth is too fast, pressures on the labor market and industrial capacity often lead to higher inflation. Thus, either excessively slow growth or excessively rapid growth can have undesirable effects.

How can policymakers know whether economic growth is too slow or too fast? Policymakers cannot base their decisions solely on current economic conditions, such as inflation and unemployment, because there is no

guarantee these conditions will continue into the future. And current policy actions can only change future economic conditions because the effects of policy actions build gradually over time. Rather than basing policy only on current conditions, therefore, policymakers need to ask whether future growth is likely to be faster or slower than the economy's sustainable growth rate. This sustainable rate is the growth rate of potential real output, a measure of the economy's ability to produce goods and services.

However, economists differ on the outlook for potential real output growth over the next several years. Some analysts believe sluggish labor force growth and poor productivity gains will allow potential output to grow only 2 percent annually. Other analysts believe strong investment spending and structural changes in the economy will produce faster potential output growth, possibly as fast as 5 percent annually. Such diverse projections create substantial uncertainty for monetary and fiscal policymakers.

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This article argues that a reasonable working assumption for policymakers is that potential real output will grow between 2 percent and 3 percent annually over the next five years. The first section of this article explains why potential output growth is relevant to policy decisions affecting both short-run economic performance and long-run improvement in the standard of living. The second section shows that increases in the labor force and labor productivity are the major sources of potential output growth, and explains how these factors combined in the 1970s and 1980s to slow potential output growth. Finally, the third section argues these sources are likely to produce potential real output growth in the specified range over the next several years, implying little or no change from the growth experience of the 1970s and 1980s.

## **I. POTENTIAL OUTPUT GROWTH AND ECONOMIC POLICY**

Achieving a growing output of goods and services has always been a major goal of U.S. economic policy. However, economists have learned that growing output is not always consistent with price stability, another major policy goal, because the inflation rate rises when a high level of economic activity strains the nation's productive capacity. The concept of potential real output has been useful to monetary and fiscal policymakers in reconciling the goals of growing output and price stability.

### **What is potential output?**

Potential output is the level of real output at which there is no tendency for the inflation rate to change. When actual real output rises

above potential output, labor markets tighten and less efficient plant and equipment are brought into operation. As a result, production costs rise, leading to higher inflation rates for finished goods and services. Conversely, when actual real output falls below potential output, labor markets become less tight and inflationary pressures moderate.

Potential real output has trended upward historically. This has occurred because the nation's ability to produce rises with growth in labor input and improvements in labor productivity. Growth of labor input is best measured by the change in total hours worked but can be approximated by growth in the labor force. Labor productivity refers to the output of goods and services that can be achieved with given labor input. Labor productivity has generally increased throughout U.S. history because of improvements in the quality of labor and increases in the quantity and quality of capital.

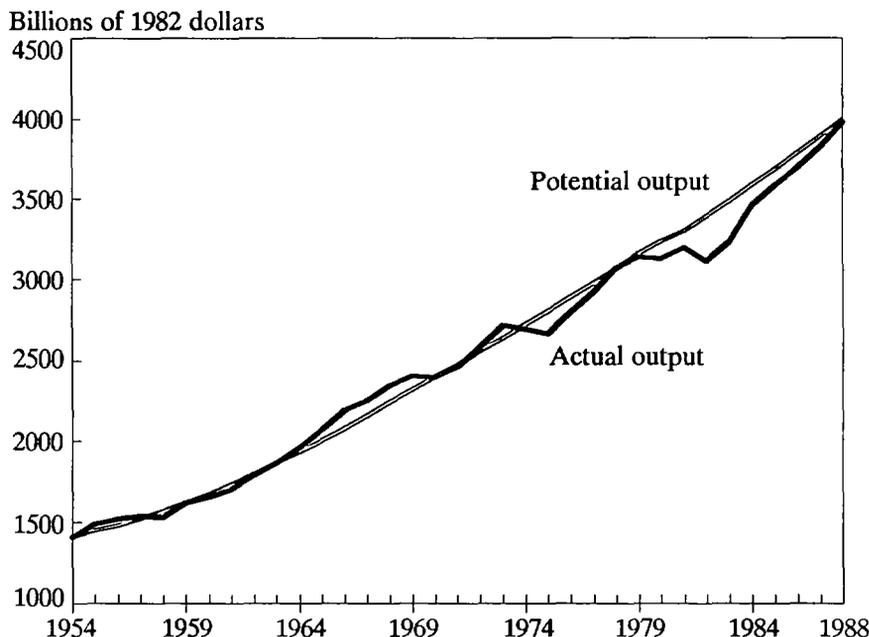
Estimates of potential real output by the Congressional Budget Office (CBO) along with actual real output for 1954-88 are presented in Chart 1.<sup>1</sup> Such estimates reveal an important fact about potential real output: cyclical fluctu-

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<sup>1</sup> The Congressional Budget Office estimates potential output using Okun's law, a statistical relationship first proposed by Arthur Okun (1962). This procedure estimates potential real output by removing purely cyclical fluctuations from observed output using deviations in the unemployment rate from full employment.

The CBO measures real output by gross domestic product in constant 1982 dollars. Gross domestic product measures output by factors of production located in the United States, whether or not U.S. residents own these factors. Thus, gross domestic product differs from gross national product in that net factor income from abroad is excluded. The CBO methodology for estimating potential output is described in Congressional Budget Office 1987.

**CHART 1**  
**Actual and potential real output**



Note: Real output is measured by gross domestic product in 1982 dollars.

Sources: Congressional Budget Office, Department of Commerce.

tuations can cause actual real output to differ from potential real output for sustained periods.<sup>2</sup> Real output exceeded its potential

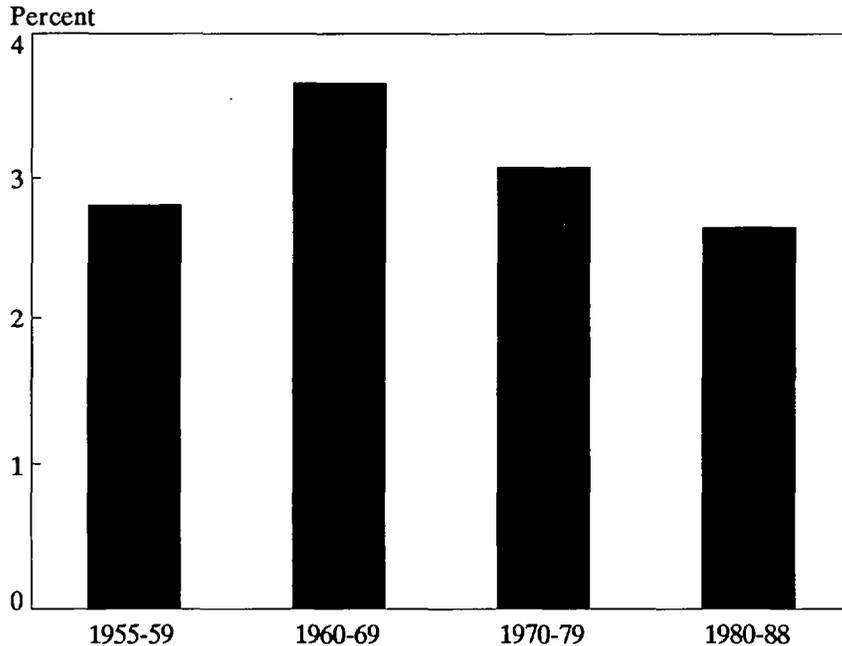
level in 1964-69 and 1972-73 but fell well below its potential level in 1974-76 and 1980-87. By 1988, the long expansion of the 1980s had brought real output close to its potential level.

<sup>2</sup> This article assumes that fluctuations in real output can be usefully characterized in terms of a cyclical component and a trend component. Some recent macroeconomic studies—for example, Campbell and Mankiw 1987, and Nelson and Plosser 1982—have challenged this traditional view of the business cycle. However, the traditional view has also received support from such studies as Clark 1987 and Cochrane 1988.

As shown in Chart 2, the CBO estimates indicate the nation's productive capacity has grown more slowly in the 1970s and 1980s than in the 1950s and 1960s. Potential real output grew at a 3.1 percent average annual rate from 1954 to 1988. But the annual growth rate of potential real output fell from 3.7 percent in

## CHART 2

### Potential output growth, selected period averages



Note: Real output is measured by gross domestic product in 1982 dollars.

Sources: Congressional Budget Office, Department of Commerce.

1960-69, to 3.1 percent in 1970-79, and to 2.7 percent in 1980-88.

### Short-run policy considerations

Recent interest in potential output growth has partially been due to short-run concerns about business cycle policies. With the economy operating near its potential output in 1988, policymakers and business forecasters became concerned that further rapid growth might cause inflation to accelerate. But after a gradual

tightening of monetary policy reduced the economic growth rate, concern shifted in mid-1989 to whether growth was too slow. Episodes like this point out the need for a reliable estimate of the growth rate of potential output. Such an estimate would help monetary and fiscal policymakers judge the appropriateness of the strength in economic activity.

Policymakers can use potential output as a guide to adjust monetary and fiscal policy. Potential output is a useful benchmark for policymakers because it is the highest output

that can be achieved without inflation accelerating. Thus, if the economy is initially operating far below potential output, policymakers may ease policy for a while to gain valuable production of goods and services. But as the economy approaches and exceeds potential output, policymakers may tighten policy to keep inflation from accelerating. However, monetary and fiscal policy cannot guarantee the economy will always operate at its potential output because economic growth also depends on a wide range of factors that U.S. policymakers cannot control, such as a change in world oil prices or in the economic policies of foreign governments.

Reliable estimates of the growth rate of potential output are also useful to monetary policymakers in setting monetary growth ranges that are consistent with sustainable growth and price stability. The Federal Reserve currently sets growth ranges for the M2 and M3 measures of the money supply. To set money growth ranges that will be consistent with price stability, policymakers must adopt growth ranges that allow total spending to grow at the same rate as potential output of goods and services, thereby avoiding excessive demand that would bid up product prices and wage rates. In recent years, however, money growth rates have not always been related dependably to the growth rate of total spending. Thus, policymakers have found it necessary to monitor a wide range of other economic information, including interest rates, exchange rates, business activity, and inflation.<sup>3</sup>

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<sup>3</sup> Partly because the monetary aggregates have not been related as closely to economic activity as in the past, some economists have argued that policymakers should stabilize

## Long-run policy considerations

Recent interest in potential output growth has also been due to a growing concern about long-run policies to improve the standard of living. Achieving potential output growth is necessary if Americans are to enjoy a rising living standard in the future. Because the living standard can be measured by real output per person, potential real output must grow faster than the population in order for living standards to improve. The slowdown of potential output growth in the 1970s and 1980s did not reduce the U.S. living standard but did slow its rate of improvement. As a result, some observers have asked whether economic policies should be changed to increase the nation's productive capacity (Garner 1988).

Policy proposals to improve the living standard focus on government taxation and spending, regulatory policies, and institutional reforms. Monetary policy cannot raise the standard of living over the long run because monetary policy has only short-run effects on real output. But various tax and spending policies could permanently raise potential real output per person. For example, reducing the large federal budget deficit would make more domestic savings available for private investment in plant and equipment. Reducing the

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the growth rate of nominal GNP, GNP measured in current-dollar terms. Knowing the growth rate of potential output would be useful to advocates of this approach. For a nominal GNP target to be consistent with price stability, total spending must grow at the same rate as potential real output so that additional demand for goods and services is promptly met by additional production without creating inflationary pressures. Thus, the estimated growth rate of potential real output ultimately would determine the target for nominal GNP growth. For a more detailed analysis of nominal GNP targeting, see Kahn 1988.

budget deficit would also improve the U.S. trade deficit, thereby encouraging domestic firms to expand their productive capacities. And cuts in the tax rate on interest income and corporate profits might provide greater incentives for domestic saving, also making more resources available to increase private investment and, therefore, potential real output.

In summary, recent interest in the growth rate of potential output has been motivated by both short-run policy concerns about the business cycle and long-run policy concerns about the living standard.

## II. SOURCES OF POTENTIAL OUTPUT GROWTH

To provide policymakers with useful estimates of potential output, economists must examine the sources of real output growth. These sources became a major policy issue in the 1970s and 1980s because of the slowdown in potential output growth, which occurred not only in the United States but also in other industrial countries (Maddison 1987). Economists still disagree to some extent about the explanation for this worldwide slowdown in growth. But economists agree that increases in the labor force and improvements in productivity are the primary sources of potential output growth.

### Analyzing economic growth

A useful way of analyzing economic growth is to determine the contributions from changes in the quantity of labor and changes in labor productivity. Growth of labor input primarily reflects growth in the labor force, the number of people who are either employed or

seeking employment. However, labor productivity growth reflects various factors.

Labor productivity grows because of improvements in the quality of labor, increases in the amount of capital, and improvements in the quality of capital.<sup>4</sup> An increase in the quantity of capital goods raises potential real output because workers are more productive when they have additional equipment and structures with which to work.<sup>5</sup> Increases in the quality of labor and capital typically reflect improvements in knowledge about how to produce and distribute goods and services.

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<sup>4</sup> The effect of these factors on real output can be seen from the equation

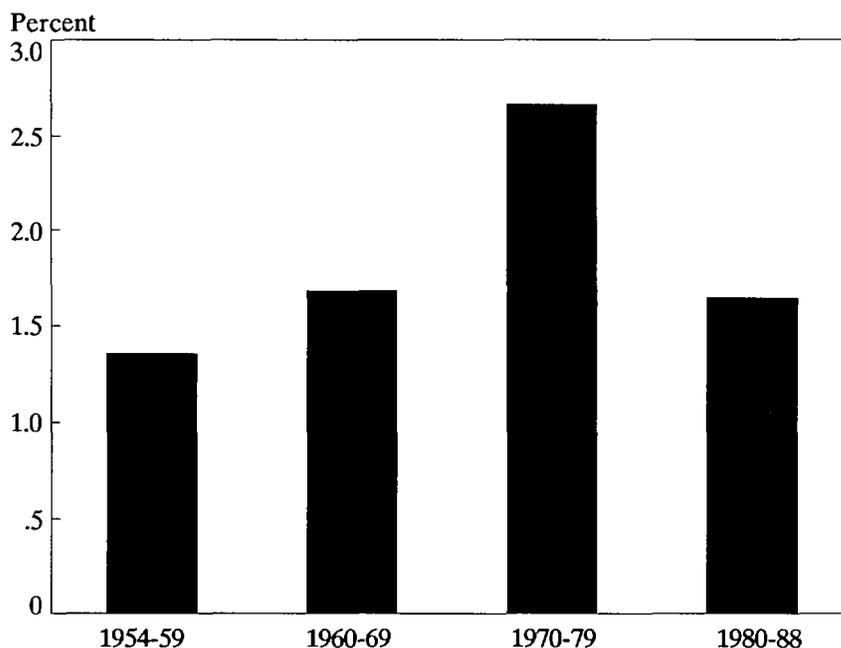
$$Y = L (E/L) (K/E) (Y/K),$$

where  $Y$  is real output,  $L$  is labor hours,  $E$  is labor input in units of constant efficiency, and  $K$  is the capital stock.  $L$  and  $E$  differ because labor hours is an imperfect measure of labor input. For the same number of hours, a worker's true labor input could differ depending on the worker's skill, training, and effort.  $L$  is the usual measure of labor input because efficiency measures of labor input are not readily available. Such efficiency measures have been constructed in some academic studies, however. The ratio  $K/E$  reflects the amount of capital per efficiency unit of labor. The ratios  $E/L$  and  $Y/K$  reflect the quality of labor and the quality of capital, respectively.

Although this decomposition is a useful way of organizing a discussion of the sources of growth, some factors may affect more than one of these terms. For example, some kinds of technological change may improve both the quality of labor and the quality of capital. In addition, new technology is sometimes embodied in new capital goods, thus requiring higher investment spending.

<sup>5</sup> Another framework for analyzing economic growth, known as growth accounting, includes an explicit measure of capital input. Thus, growth accounting treats capital and labor symmetrically as sources of output growth. Other influences on potential output growth are then viewed as increasing total factor productivity, the productivity of a composite unit of capital and labor. Applications of growth accounting include Denison 1985 and Maddison 1987. Some studies, such as Rasche and Tatom 1977, also treat energy as a separate factor of production.

**CHART 3**  
**Labor force growth, selected period averages**



Source: Bureau of Labor Statistics.

### **Growth in the quantity of labor**

A primary source of U.S. potential output growth in recent years has been expansion of the labor force. Chart 3 shows the annual growth rate of the civilian labor force from 1954 to 1988. The labor force grew at a strong 2.7 percent annual rate in the 1970s—the fastest in any decade since the 1900s—before declining to a 1.7 percent rate in the 1980s (Caton 1989).

Labor force growth during this period

reflected two major factors: the maturing of the postwar baby-boom generation and greater labor force participation by women. Although the baby-boom generation began entering the labor force in the late 1960s, the peak effect occurred in the 1970s. However, the maturing of the baby-boom generation continued to swell the labor force into the 1980s. In addition, women entered the labor force in growing numbers in the 1970s and 1980s. The percentage of women in the civilian labor force increased from 43 percent in 1970 to 57 per-

cent in 1988.<sup>6</sup>

## Growth of labor productivity

The strength of labor force growth in the 1970s and early 1980s was largely offset, however, by sluggish growth of labor productivity. The poor performance of labor productivity cannot be blamed entirely on any one factor but, instead, reflects adverse developments in each of the major sources of productivity growth.

*Changes in labor quality.* Slower improvements in labor quality may have contributed to the sluggish productivity growth of the 1970s and early 1980s. Labor quality depends on both the educational level and experience level of workers. To some extent, poor productivity growth in recent years may have reflected a declining experience level in the U.S. labor force. Increasing numbers of baby boomers and females entered the work force in the 1970s and 1980s. Such workers are less experienced than veteran workers and, therefore, tend to be less productive. Some observers have argued that educational attainment has also declined in recent years, dampening worker productivity.<sup>7</sup>

*Growth in the quantity of capital.* Weaker growth in the quantity of capital may also have

contributed to the slowdown in productivity growth. Workers are generally more productive when they have a greater quantity of equipment and structures with which to accomplish their tasks. The total quantity of business equipment and structures at a given point in time is called the capital stock. Thus, an increase in the capital stock per worker raises potential real output of goods and services. But the capital stock can increase only if net investment—the difference between total investment spending and the depreciation of existing capital goods—is positive.

Sluggish net investment spending has probably been an important cause of the slowdowns in productivity growth and potential real output growth. Chart 4 shows that real net investment slowed in the 1970s and slowed even more sharply in the 1980s. The slower growth of net investment spending coincides roughly with the slowdown of potential real output growth in the 1970s and 1980s.<sup>8</sup> In addition, investment in the United States has been relatively weak compared with other industrial countries. Cross-country comparisons of economic growth suggest that countries with strong investment spending also have strong growth rates of potential real output. For example, Hatsoopoulos, Krugman, and Summers (1988) found Japan's high growth rates were partially due to the country's high rate of investment per worker.

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<sup>6</sup> Female labor force participation has increased throughout the postwar period. The effect of higher female participation has been offset to some degree by a decline in male labor force participation, reflecting a trend toward earlier retirement. In addition, a decline in the average workweek slightly reduced the growth rate of total labor hours.

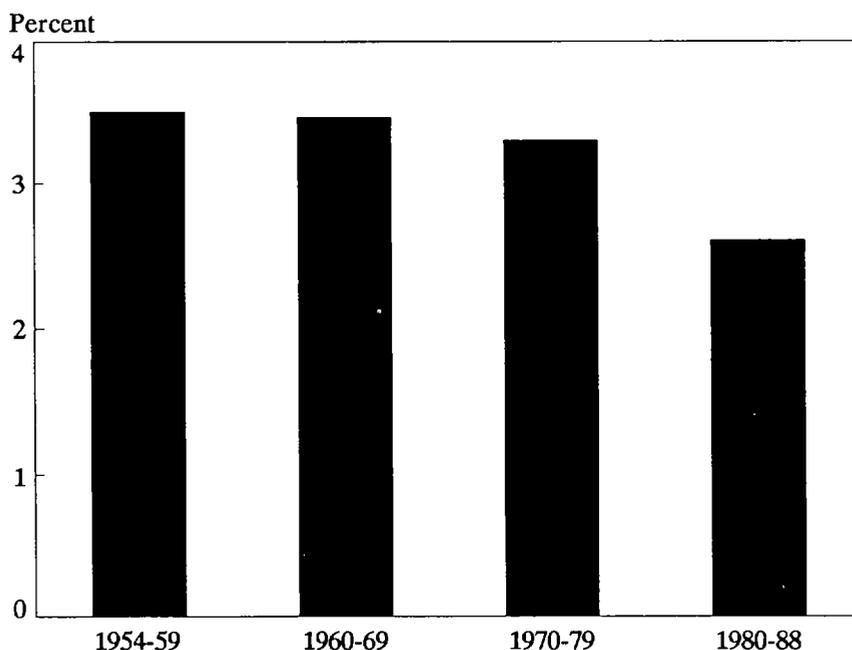
<sup>7</sup> Denison 1985 discussed the contribution of education to economic growth and computed an education index for the business sector. However, similar indexes are not available for other sectors of the economy.

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<sup>8</sup> Gross investment, total investment spending without subtracting depreciation, has been more stable over time. Some economists argue that the ratio of gross investment to GNP gives a more accurate picture of investment trends because depreciation is difficult to measure. However, Faust (1989) found the conclusion that investment has been weak in the 1980s would not be overturned even if there are large errors in measuring depreciation.

CHART 4

**Net investment as a percent of GNP, selected period averages**



Note: The chart shows net nonresidential fixed investment as a percent of GNP. Net investment and GNP are measured in 1982 dollars.

Source: Department of Commerce.

The weak growth of U.S. real net investment in recent years reflects a variety of causes. The severe recession in the early 1980s and strong import competition in the mid-1980s discouraged investment in new plant and equipment by U.S. manufacturers. Moreover, a low national saving rate and strong credit demands have kept real interest rates, interest rates adjusted for expected inflation, high by historical standards. Some research also suggests the United States has had relatively high taxes on the income from capital, thereby reducing after-tax returns and thus the incentive to invest in

plant and equipment.<sup>9</sup>

Another possible explanation for the slowdowns of productivity growth and potential output growth in the 1970s and early 1980s is that a large part of net investment in this period may not have actually increased the nation's productive capacity. For example, investment in pollu-

<sup>9</sup> The arguments that the U.S. tax system discourages saving and investment are summarized in Hatsopoulos, Krugman, and Summers 1988. A cross-country comparison of capital income taxes by King and Fullerton (1984) found the United States had high taxes on the manufacturing sector.

tion control equipment was included with fixed investment in the government statistics but did not directly increase the capacity to produce goods and services that are counted in GNP. In addition, Baily (1981) argued that the large increases in oil prices in the 1970s made much of the existing U.S. capital stock obsolete. Some of the measured net investment in the 1970s and early 1980s may, therefore, have gone to replace obsolete equipment rather than increase the capital stock.

Reduced government outlays on roads, airports, and other infrastructure projects also may have slowed the growth of labor productivity and potential real output in the 1970s and 1980s. Capital goods owned by the government often provide services to private firms and households, thereby increasing the efficiency and potential real output of the private sector. For example, government expenditures on a new road reduce transportation delays, increasing the productivity of business travelers and speeding the delivery of finished products and spare parts. However, public works outlays have declined from around 2.3 percent of GNP to around 1.0 percent over the past two decades (Koretz 1989).<sup>10</sup> Thus, both government and private investment have been relatively sluggish in recent years and may have contributed to the slower growth of labor productivity in the 1970s and early 1980s.

*Changes in the quality of capital.* Technological progress can improve the quality of capital goods and thereby increase labor productivity even when the quantity of capital is unchanged. Scientific discoveries and inven-

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<sup>10</sup> Aschauer 1988 provided statistical evidence that an increase in government infrastructure investment would raise private sector productivity.

tions sometimes transform basic production processes or create new kinds of goods and services. For example, semiconductor technology spawned new industries and revolutionized many existing products. But besides such major technological breakthroughs, labor productivity also benefits from a stream of lesser innovations, such as small improvements in machinery design and in the organization of the workplace. Although some innovations require investment in new plant and equipment, others—for example, a new agricultural chemical—may boost productivity without substantial investment spending.

A slowdown in the pace of technological innovation in the 1970s may have reduced productivity growth and, thus, potential output growth in the 1970s and early 1980s. Research and development expenditures peaked as a percentage of real GNP in the mid-1960s and declined through much of the 1970s. Such a decline would be expected to reduce productivity growth with a time lag because several years may be necessary to incorporate new technologies into the production process. Moreover, the effectiveness of industrial research and development spending may have declined during this period, with the result that a given amount of research and development expenditures produced fewer or less important innovations.<sup>11</sup>

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<sup>11</sup> Some economists argue that the decline in research and development spending probably had little effect on productivity growth, since the spending declines were mostly in defense and space research rather than private industrial research. Empirical estimates of the effect of research and development spending on productivity growth vary substantially. For a survey of studies on this issue, see Wolff 1985. Evidence supporting a decline in the effectiveness of research and development spending can be found in Baily and Chakrabarti 1988, and Englander, Evenson, and Hanazaki 1988.

In summary, potential real output grows because of increases in the quantity of labor and improvements in labor productivity. Labor productivity can improve because of a higher quality of labor, more capital per worker, or a higher quality of capital. The strong expansion of the labor force in the 1970s and early 1980s was a major source of potential output growth. However, poor labor productivity gains caused potential output growth to slow during this period.

### **III. PROJECTIONS OF POTENTIAL OUTPUT GROWTH**

Policymakers need projections of potential real output growth in order to put the economy on an appropriate growth path. But future potential output growth is uncertain because unexpected changes in the size of the labor force and in labor productivity can alter the nation's future productive capacity. For example, an unexpected increase in taxes could reduce the profitability of net investment spending and thus slow future growth of labor productivity. For policy planning purposes, a useful projection period for potential output might be about five years—long enough to include most foreseeable effects of current policy actions yet short enough to keep other sources of uncertainty within reasonable bounds. Policymakers and their staffs, therefore, must anticipate changes in the underlying sources of growth to produce reliable projections of potential output.

#### **Factors affecting future growth**

Over the next five years, the major sources of potential output growth are likely to have somewhat different effects than in the 1970s and

early 1980s. The growth of labor input is expected to slow because of demographic factors, but growth of labor productivity may improve somewhat.

Slower growth of the labor force will probably reduce potential real output growth over the next five years. Fewer young people will be reaching working age in this period because the baby boom was followed by a sharp decline in fertility rates in the late 1960s and early 1970s.<sup>12</sup> Thus, about 3.2 million people will turn 18 years of age in 1994, down from 4.3 million people in 1979. In addition, the labor force participation rate of women is unlikely to grow as fast in coming years as in the 1970s and 1980s. For many age groups, the participation rate of women is already approaching the participation rate of men. As a result, labor input—a major source of potential output growth in the recent past—will probably grow more slowly over the next five years.

Stronger growth of capital input, however, may boost labor productivity and potential output growth over the next five years. Net investment spending has recovered recently because the improvement in the U.S. trade balance has raised industrial output and capacity utilization. As a result, a larger capital stock will be available to produce real goods and services. In addition, the growth of capital input may increase because of a shift in the composition of business investment. In recent years, firms have been spending relatively more on producer durable equipment, such as computers and trucks, and relatively less on industrial struc-

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<sup>12</sup> The number of births per thousand females in the 15-44 age bracket fell from 117.8 in 1960 to 87.1 in 1970 and 66.1 in 1975.

tures, such as factories and warehouses. The former provide a larger immediate input of capital services per dollar invested.<sup>13</sup> And, finally, capital input growth may be boosted by a higher saving rate, which could arise if the maturing baby-boom generation begins to save more in preparation for retirement.<sup>14</sup>

Potential real output growth also may benefit from other factors affecting labor productivity growth. For example, as the baby-boom generation ages, the average experience level of the U.S. work force will rise, possibly increasing labor productivity.<sup>15</sup> In addition, the competitive pressures from imported goods and a wave of mergers and acquisitions are causing U.S. industry to restructure and become more efficient. Increased use of computers in design and manufacturing could also increase productivity growth. And the apparent decline in the effectiveness of research and development spending in the 1970s may have been a temporary phenomenon that will be reversed in the

future. Thus, there is some basis for expecting a recovery in productivity growth in the years ahead.

However, recent statistics do not offer clear evidence that labor productivity growth will improve over the next five years. Productivity growth in the manufacturing sector has rebounded from the sharp slowdown in the 1970s. Moreover, the United States has recently been one of the leaders in manufacturing productivity growth among the major industrial countries.<sup>16</sup> But productivity growth remains anemic in other large sectors of the economy, such as services and construction. Thus, although some recent developments have been encouraging, the outlook for economy-wide labor productivity growth over the next five years remains uncertain.

## Projections through 1994

Monetary and fiscal policymakers need more than just a qualitative discussion of the future sources of growth to do their jobs correctly. For example, monetary policymakers need numerical projections of potential real output if they are to put the economy on an appropriate growth path and establish monetary growth targets consistent with this path. Such projections can be obtained by extrapolating past trends in potential real output or by adding up the anticipated effects of movements in the various sources of output growth.

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<sup>13</sup> For example, a company could spend \$10 million on machinery that yields \$2 million worth of capital services each year but wears out after only a few years. Or the company could spend the same \$10 million on a factory that yields \$1 million worth of capital services each year over a longer period. Either project might be a good investment depending on the circumstances, but the machinery would provide a larger amount of capital services in the years immediately after the investment.

<sup>14</sup> The maturing of the baby-boom generation has not yet had any clear effect on the saving rate, however, and it is possible that any future effects will be small.

<sup>15</sup> Some growth-accounting studies have found that changes in the average age of the work force have relatively little effect on potential real output, however. For example, Denison 1985 concluded that changes in the age-sex composition of the labor force did not contribute much to the productivity slowdown in the 1970s.

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<sup>16</sup> According to Neef and Thomas (1988), manufacturing productivity grew at a 3.3 percent annual rate over the 1979-87 period, up substantially from the 1.4 percent annual rate in 1973-79. Moreover, the United States and Japan had about equal average rates of manufacturing productivity growth in the 1984-87 period.

TABLE 1  
**Projected potential real output growth, 1990-94**  
 (percent)

<u>Real GDP</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>
Congressional Budget Office	2.5	2.4	2.4	2.4	2.4
<u>Real GNP</u>					
Data Resources (DRI)	2.4	2.4	2.3	2.3	2.2
Council of Economic Advisers (CEA)	3.2	3.3	3.2	3.2	3.2
Difference between CEA and DRI projections	0.8	0.9	0.9	0.9	1.0

Note: GDP is gross domestic product. GNP is gross national product. For an explanation of the difference between these two output measures, see footnote 1.

Sources: Congressional Budget Office, Data Resources/McGraw-Hill, 1989 *Economic Report of the President*.

Alternative projections of potential real output growth over the next five years differ substantially. Table 1 presents three alternative projections of potential real output growth over the 1990-94 period.<sup>17</sup> Both the Congressional Budget Office and Data Resources Incorporated (DRI) project that potential real output will grow by slightly less than 2.5 percent annually over the next five years.<sup>18</sup> In contrast, the

Council of Economic Advisers (CEA) under the Reagan administration projected that potential real output would grow by about 3.2 percent annually over this period. Such differences clearly are large enough to be important to policymakers. For example, the difference between the CEA and DRI growth rate projections averages 0.9 percent annually and would result in a 4.6 percent difference in the level of potential real output after five years.

The reasons behind these differences become clearer if the DRI and CEA projections of potential output growth are contrasted in greater detail. The CBO projections will not be considered here because the CBO obtains its numbers by extrapolating recent trends in potential output, making no assumptions about future movements in the underlying sources of growth. Because the remaining two projections

<sup>17</sup> The CBO projections were obtained directly from the Congressional Budget Office. The other projections for potential output growth were taken from Caton 1989 and Council of Economic Advisers 1989.

<sup>18</sup> The CBO projections are for gross domestic product in 1982 dollars. In contrast, the DRI and CEA projections are for gross national product in 1982 dollars. The differing definitions of real output are unlikely to affect the basic facts that the CBO's projections are quite similar to DRI's and quite different from the CEA's.

are derived by somewhat different methods, even the assumptions by DRI and the CEA about underlying sources of growth cannot always be compared precisely. However, a major area of disagreement between the two projections can be identified.

Growth of labor input does not appear to be the major source of disagreement between the DRI and CEA projections. DRI projects that nonfarm labor hours will grow at a 1.3 percent annual rate over the 1990-94 period. In contrast, the CEA projects nonfarm hours will grow at a 1.6 percent annual rate from the third quarter of 1988 to the fourth quarter of 1994. Because these projections are reported over different time periods, it is difficult to compare the figures exactly. However, the labor input projections appear to be relatively close and would account for a small part of the difference between the DRI and CEA potential output projections.

Most of the difference between the DRI and CEA projections is due to a large difference in the anticipated growth rate of labor productivity. DRI projects that output per hour will grow at an average rate of 1.3 percent annually over the 1990-94 period. In contrast, the CEA expects a 2.0 percent average annual change in output per hour. This difference of 0.7 percent annually in labor productivity growth is the primary source of disagreement between the two potential output projections.

The two alternative views about labor productivity growth do not reflect major disagreements about contributing factors. Although the CEA does not provide a numerical breakdown of the sources of productivity growth, a variety of factors are mentioned, including the aging of the baby-boom generation, an increase in the amount of capital per worker, tax reform to

reduce distortions in investment decisions, and government initiatives to encourage education and research. DRI has noted many of the same factors but apparently has assigned them less quantitative significance.

Which set of labor productivity growth projections is more plausible? A reasonable test is how the projected productivity growth compares with historical productivity growth. The CEA projections assume labor productivity growth will return to its average rate over the 1948-81 period. However, it may be more reasonable to assume labor productivity will grow at roughly the same rate as in the recent past rather than an average rate over a long historical period. The next five years will more closely resemble the recent past with respect to such factors as the educational system, the regulatory climate, and technology. By the CEA's own figures, output per hour rose at a 1.4 percent annual rate from the third quarter of 1981 to the third quarter of 1988. Therefore, recent labor productivity growth has been much closer to the DRI assumption than that of the CEA.

The DRI potential output projection thus appears somewhat more plausible than the CEA projection because of a more realistic assumption about labor productivity growth. As noted in the previous section, there are some reasons to expect better productivity performance over the next five years than in the 1970s and early 1980s. However, there is also little reason to expect a dramatic departure from the productivity performance of the mid-to-late 1980s. Such reasoning also casts doubt on the projections of MacReynolds (1988) and others, who expect rapid labor productivity gains to ignite potential output growth of 5 percent or more annually.

## How trustworthy are such projections?

Any projection of potential output growth is subject to uncertainty. One reason is that the economy is occasionally hit by unpredictable shocks. Although some of these shocks have only temporary effects on output growth, others might well change potential output growth over a five-year period. A second reason is that many sources of potential output growth are difficult to measure accurately. As a result, economists have imperfect estimates of the historical contributions of these sources to output growth and may even have an incorrect impression of recent changes in these factors.

Because of the uncertainty, policymakers and business planners should think in terms of a likely range of growth rates for potential output. As noted earlier, projections of potential output growth vary from around 2 percent annually to as high as 5 percent annually. But potential output growth exceeding 3 percent annually is unlikely, given the outlook for labor productivity growth. Thus, a reasonable working assumption is that potential real output will grow between 2 percent and 3 percent annually over the next several years. The reasonableness of this assumption is evidenced by the fact that both the DRI and CBO projections lie near the center of this range.

Even though a range from 2 percent to 3 percent may seem fairly wide, average potential output growth over the next five years might be outside these bounds. Potential output growth might average less than 2 percent annually if slower growth of labor input were accompanied by a slump in productivity growth similar to that in the 1970s. Growth might be above 3 percent annually if, instead, the supply-

oriented tax cuts and tax reforms of the 1980s produced much faster growth of labor productivity. However, recent economic performance offers little support for either of these possibilities.

Policymakers can feel reasonably confident that average potential output growth will be between 2 percent and 3 percent annually over the next five years. Such estimates can be useful to monetary policymakers in gauging the sustainability of current economic growth rates and in setting growth ranges for the monetary aggregates. In addition, such estimates can help fiscal policymakers establish long-run policies that will improve the standard of living. But because of the uncertainty, policymakers should monitor actual growth and inflationary pressures to make sure that projections of potential output growth are correct. And policymakers should be prepared to modify their policies if it becomes clear in the future that potential real output growth is substantially weaker or stronger than expected.

## IV. CONCLUSION

Projections of potential real output growth can be useful to policymakers because these projections help show when inflation is likely to accelerate or decelerate. But projections of potential real output growth vary primarily because of differing views about the outlook for labor productivity growth. Some of the most optimistic projections of potential output growth assume a high rate of future labor productivity growth that is unlikely to be realized, considering recent moderate productivity gains. A more reasonable working assumption is that potential real output will grow between 2 percent and 3 percent annually over the next five years.

Such a range is consistent with either a continuation of recent labor productivity growth or mild future improvement. However, because such projections are always subject to uncertainty, policymakers should consider other real and financial indicators when assessing the strength of economic growth and inflationary

pressures. And, looking further ahead, policymakers will need to adopt policies—for example, balancing the federal budget and increasing incentives to save—that enhance labor productivity so as to ensure an adequate future standard of living.

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