

A Historical Perspective on the 1989-92 Slow Growth Period

by David Brauer

The National Bureau of Economic Research has determined that the recession that began in July 1990 ended in March 1991. A broad range of key output and employment measures suggest that the recession itself was moderate—roughly comparable in severity to the average of past recessions since 1960. More specifically, these indicators show the 1990-91 recession to be approximately equal in severity to the brief downturn in 1980, and although in many respects harsher than the 1960-61 and 1969-70 episodes, considerably milder than the 1973-75 and 1981-82 recessions.

Nonetheless, the United States experienced an unusually protracted period of below-normal growth between early 1989 and early 1993. During that period real gross domestic product (GDP) rose at an average annual rate of less than 1 percent, compared with a potential growth rate of between 2 and 2½ percent. This slow rise represents the weakest performance over any four-year period since the Great Depression, with the single exception of the economy's performance from early 1979 through the end of 1982.¹ Although it is not uncommon for output growth to slacken during the last several quarters before the onset of recession, the slowdown preceding the 1990-91 recession began earlier and was more pronounced than in most previous episodes. More important, the recovery since early 1991 has been unusually anemic. This article examines in greater detail both the 1990-91 recession and the longer period of slow growth in the context of earlier episodes.

¹In contrast to the moderate recession during the most recent episode, this earlier period encompassed two separate recessions, one of which was by some measures the most severe downturn of the postwar era

The 1990-91 recession

We begin by focusing on the narrowly defined recession period as designated by the National Bureau of Economic Research (NBER). Most economists would define a recession as a period during which economic activity is contracting. Typically, this involves declines in real GDP, industrial production, employment, and real income, together with a rising unemployment rate.

Table 1 reports the change in ten key measures of activity during the 1990-91 recession, as well as in six earlier recessions. Because real GDP and other output measures are reported on a quarterly basis only, and because some monthly measures at times exhibit considerable month-to-month volatility, all data are expressed as quarterly averages. Note that although the NBER-designated peak occurred during the first month of the third quarter of 1990, both real GDP and private employment declined during that quarter.² Consequently, this analysis treats the second quarter of 1990 as the peak.³

During the 1990-91 recession, real GDP declined 2.2 percent, close to the average 2.0 percent decline of the six previous recessions. The loss of output was roughly similar to that of the 1980 and 1957-58 recessions, slightly smaller than in 1981-82, much smaller than in 1973-75, but significantly greater than in the 1960-61

²The figures available to NBER when it designated July 1990 as the peak showed a small increase in output during the third quarter of 1990; they have since been revised.

³For similar reasons, the first quarter of 1960 is designated as a cyclical peak, even though the official NBER-designated peak occurred in April

and 1969-70 recessions.⁴ Other indicators suggest a more mixed picture. Industrial production fell considerably less than in past recessions.⁵ Both private employment and the unemployment rate likewise suggest that the 1990-91 recession, viewed narrowly, was among the mildest in recent decades. Nevertheless, real income growth was weaker than average during the 1990-91 recession, though not as anemic as in the 1973-75 recession. Moreover, consistent with the decline in income, consumer spending slackened more than normal during the last recession. Both commercial and residential construction also remained somewhat weaker than in most past recessions, but real spending on producers' durable equipment declined less than in any of the previous six recessions.

As measured by the standard deviation, the dispersion of employment losses across geographic regions during the 1990-91 recession roughly matched that of earlier recessions. However, in contrast to the last two recessions, the Atlantic Coast was affected to a greater

extent than the nation's midsection (Table 2).⁶ Changes in real personal income by state and region follow a similar pattern. New England's employment loss was greater than in any of the four earlier recessions and, with one exception, exceeded previous declines in other regions as well. The Mid-Atlantic also experienced above-average employment losses in 1990-91, comparable in magnitude to those suffered in 1973-75 but greater than those in 1981-82. Likewise, employment losses in the South Atlantic surpassed both the national average and the average of previous recessions within that region. However, the recession was unusually mild in the Midwest and the East South Central regions, and employment actually grew in two areas that are traditionally not very vulnerable to recessions—West South Central and Mountain.

In sum, the decline in GDP during the 1990-91 recession roughly equaled the average decline for past recessions. A broader set of indicators suggests that on the whole, the recession can be classified as moderate, with smaller than normal declines in employment and industrial production but unusual weakness in several

⁴Although real GDP measured in 1987 dollars showed no meaningful decline during the 1960-61 and 1969-70 recessions, calculations based on more contemporaneous deflators and earlier output measures indicated that real output did decline modestly in both instances.

⁵The relatively small decline in industrial production is slightly exaggerated by the use of quarterly averages. Monthly figures show a 3.8 percent decline between July 1990 and March 1991, compared with an average drop of 8.9 percent between the peak and trough months of the previous six recessions.

⁶The figures in Table 2 were first seasonally adjusted by state (but not by industry), then aggregated at the regional level. With the exception of California, they do not fully reflect recent historical revisions to payroll employment data, which indicated smaller employment declines nationally during the 1990-91 recession than had previously been reported. Consequently, for regions other than the Pacific, these declines may be somewhat overstated. Data on state and regional employment are not available for the 1957-58 and 1960-61 recessions.

Table 1

Peak-to-Trough Percentage Change in Major Economic Indicators

	1990-II to 1991-I	1981-III to 1982-IV	1980-I to 1980-III	1973-IV to 1975-I	1969-IV to 1970-IV	1960-I to 1961-I	1957-III to 1958-II	Average of Six Preceding Columns
Real GDP ¹	-2.2	-2.7	-2.5	-4.1	-0.1	0.0	-2.5	-2.0
Personal consumption expenditures [†]	-1.1	2.1	-1.0	-0.8	1.7	1.4	0.6	0.7
Producers durable equipment [†]	-4.3	-11.8	-8.3	-12.4	-5.2	-9.7	-17.2	-10.8
Nonresidential structures [†]	-7.4	-6.4	-3.5	-11.3	-3.1	5.6	-6.0	-4.2
Residential investment [†]	-18.7	-10.9	-17.3	-30.4	9.1	-10.6	-3.8	-10.7
Industrial production	-2.8	-8.0	-4.3	-12.8	-5.4	-7.5	-11.2	-8.2
Private employment [†]	-1.1	-3.2	-1.5	-2.6	-1.6	-2.3	-5.0	-2.7
Unemployment rate [§]	1.3	3.3	1.4	3.5	2.3	1.7	3.1	2.5
Real disposable income ¹	-1.0	0.7	-0.7	-4.2	3.0	1.4	0.2	0.1
Real wage and salary income ¹	-2.5	-1.5	-1.4	-4.7	-1.1	-0.4	-2.8	-2.0

¹1987 dollars

[†]Based on monthly establishment survey

[§]Percentage points

¹1987 dollars, deflated by implicit deflator for personal consumption expenditures

income measures. Employment losses were to a greater than normal extent concentrated along the Atlantic Coast. That the drop in industrial production was small relative to the decline of real GDP hints at unusual weakness in service-producing sectors, which in past recessions generally experienced merely a pause or slowdown in growth.

The extended slow growth period: 1989-93

Although the 1990-91 recession was not particularly severe when compared with earlier postwar recessions, several key macroeconomic indicators suggest that in the extended period from early 1989 to early 1993 the U.S. economy experienced greater weakness than in any other period surrounding a single recession since World War II. In fact, the periods immediately preceding and following the most recent recession were characterized by unusually weak output, employment, and income growth. As a result, as late as June 1993 (according to preliminary data), private employment was still slightly below its peak level, and most other indicators remained well below the levels reached at the same stage of earlier recoveries.

Table 3 presents the net change in the same key

indicators as in Table 1 over the period from the second quarter of 1989 (one year before the peak) through the first quarter of 1993 (eight quarters after the trough), and over five similar periods surrounding earlier recessions. (The 1980 recession is omitted because the subsequent recovery was abbreviated.) By all ten measures, the most recent period showed substantially greater economic weakness than did the average of earlier episodes. In fact, we can observe only four earlier instances—unemployment in 1968-72 and 1972-77, residential investment in 1972-77, and real spending on producers' durable equipment in 1956-60—in which any of these measures exhibited weaker performance over the corresponding period.

These extended periods can be subdivided into the year before the recession, the recession itself, and the recovery phase. During the last several quarters of a typical expansion, economic activity gradually slows. In 1989 and the first half of 1990 this slowdown was somewhat sharper than it had been in the quarters leading up to most past recessions, though not entirely unprecedented. Real output grew just 1.3 percent during the last four quarters of the 1980s expansion, compared with an average growth rate of 2.8 percent during

Table 2

Percentage Change in Employment by Region: Peak to Trough

	1990-II to 1991-I	1981-III to 1982-IV	1980-I to 1980-III	1973-IV to 1975-I	1969-IV to 1970-IV	Average of Four Preceding Columns
National	-1.1	-2.9	-1.1	-1.3	-0.8	-1.5
New England	-4.6	-1.4	-0.8	-2.6	-1.7	-1.6
Mid-Atlantic	-2.7	-2.1	-1.2	-2.8	-1.6	-1.9
South Atlantic	-1.9	-1.3	-0.1	-2.6	2.1	-0.5
East North Central	-1.1	-5.6	-3.4	-3.2	-3.4	-3.9
West North Central	-0.2	-3.4	-2.1	0.6	-1.2	-1.5
East South Central	-0.5	-4.0	-2.6	-1.8	1.2	-1.8
West South Central	1.0	-2.0	1.6	3.0	-0.3	0.6
Mountain	1.2	-1.7	-0.6	1.8	3.0	0.6
Pacific	-0.5	-3.2	-0.9	1.0	-2.2	-1.3
Standard deviation of regional changes	1.7	1.3	1.4	2.2	2.0	

Notes: Table reports changes in total employment, including government employment. Figures are based on the monthly establishment survey and are seasonally adjusted by the author. Regions are defined as follows:

New England—Connecticut, Maine, Massachusetts, New Hampshire, Vermont, Rhode Island

Mid-Atlantic—New Jersey, New York, Pennsylvania

South Atlantic—Delaware, Washington, D.C., Florida, Georgia, Maryland, N. Carolina, S. Carolina, Virginia, W. Virginia

East North Central—Illinois, Indiana, Michigan, Ohio, Wisconsin

West North Central—Iowa, Kansas, Minnesota, Missouri, Nebraska, N. Dakota, S. Dakota

East South Central—Alabama, Kentucky, Mississippi, Tennessee

West South Central—Arkansas, Louisiana, Oklahoma, Texas

Mountain—Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming

Pacific—California, Oregon, Washington (Alaska and Hawaii omitted)

the last year of earlier expansions. The only comparable earlier instance is the real output growth rate of 1.1 percent over the five quarters before the 1980 recession.

While the degree of slowdown during the final year of the 1980s expansion was unusual but not unprecedented, the anemic recovery since early 1991 has no postwar parallel. Table 4 illustrates the economy's performance during the first eight quarters of the 1991-92 recovery and of the five previous recoveries. Through the first quarter of 1993, real GDP had grown only 4.2

percent, less than half as much as in any of the previous recoveries. Industrial production and income also recovered much more slowly than in the past. In contrast with all earlier recoveries, private employment after eight quarters was only fractionally higher than at the trough, and the unemployment rate was higher.

Salient features of the slow growth period

To get a better perspective on the slow growth period, it is useful to examine several important features of the recent experience. Charts 1-4 focus on four broad

Table 3

Percentage Change in Major Economic Indicators: Four Quarters before Peak to Eight Quarters after Trough

	1989-II to 1993-I	1980-III to 1984-IV	1972-IV to 1977-I	1968-IV to 1972-IV	1959-I to 1963-I	1956-III to 1960-II	Average of Five Preceding Columns
Real GDP [†]	3.3	12.3	9.2	12.5	14.0	9.4	11.5
Personal consumption expenditures [†]	4.8	14.1	11.8	17.1	14.1	12.8	14.0
Producers durable equipment [†]	9.8	22.7	13.3	20.6	15.3	0.6	14.5
Nonresidential structures [†]	-17.6	13.2	-3.5	6.8	16.2	2.7	7.1
Residential investment [†]	-5.8	29.6	-8.4	46.3	8.1	10.8	17.3
Industrial production	2.8	13.1	7.0	14.9	17.0	11.0	12.6
Private employment [‡]	0.7	8.1	7.4	7.9	5.2	2.6	6.2
Unemployment rate [§]	1.8	-0.4	2.1	2.0	-0.1	1.1	1.0
Real disposable income [†]	5.6	14.5	8.4	19.1	13.5	10.6	13.2
Real wage and salary income [¶]	1.1	9.8	4.3	14.4	14.0	9.8	10.5

[†]1987 dollars

[‡]Based on monthly establishment survey

[§]Percentage points

[¶]1987 dollars, deflated by implicit deflator for personal consumption expenditures

Table 4

Percentage Change in Major Economic Indicators: First Eight Quarters of Recovery

	1991-I to 1993-I	1982-IV to 1984-IV	1975-I to 1977-I	1970-IV to 1972-IV	1961-I to 1963-I	1958-II to 1960-II	Average of Five Preceding Columns
Real GDP [†]	4.2	11.6	9.9	10.5	9.8	9.3	10.2
Personal consumption expenditures [†]	4.4	9.7	10.7	11.6	8.6	9.2	9.9
Producers durable equipment [†]	18.6	31.2	15.0	24.3	17.4	19.2	21.4
Nonresidential structures [†]	-13.7	9.4	0.7	3.8	-0.2	10.2	4.8
Residential investment [†]	23.7	51.5	47.3	42.6	18.8	23.3	36.7
Industrial production	6.2	16.6	16.5	17.9	18.1	20.4	17.9
Private employment [‡]	0.5	9.2	6.0	6.2	4.3	7.1	6.6
Unemployment rate [§]	0.5	-3.4	-0.8	-0.5	-1.0	-2.1	-1.6
Real disposable income [†]	4.4	10.1	7.9	11.1	8.3	7.5	9.0
Real wage and salary income [¶]	1.9	9.1	6.0	10.0	8.9	10.8	9.0

[†]1987 dollars

[‡]Based on monthly establishment survey

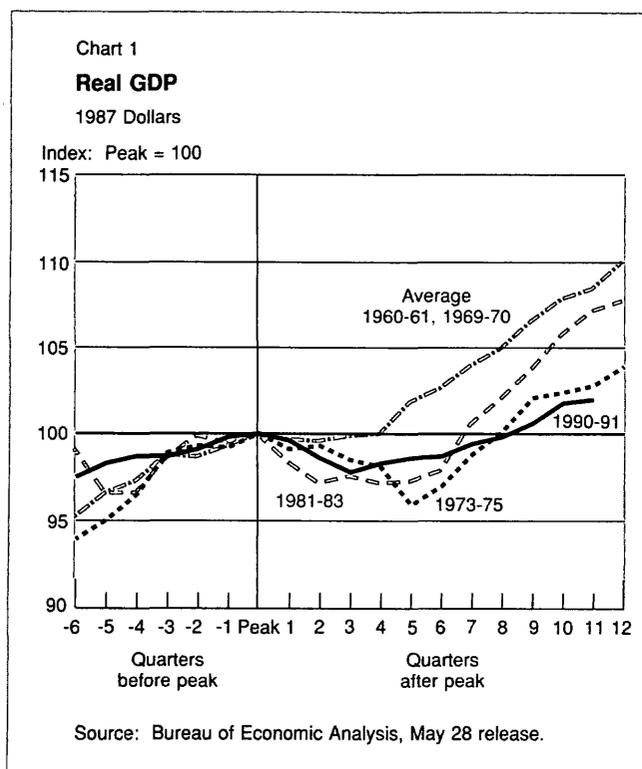
[§]Percentage points

[¶]1987 dollars, deflated by implicit deflator for personal consumption expenditures

aggregate measures—real GDP, industrial production, private employment, and real disposable income. The charts illustrate the paths taken by these variables, relative to their peak levels, over periods ranging from one and a half years before the peak to three years after the peak. Each measure is tracked for the latest episode and for the periods surrounding the severe 1973-75 and 1981-82 recessions; an average is shown for the intervals surrounding the 1960-61 and 1969-70 recessions.

Chart 1 reveals that although the 1990-91 recession itself resulted in only a modest loss of output, real GDP did not regain its earlier peak level until the third quarter of 1992 (quarter 9).⁷ In early 1993 the value of output relative to its peak level was slightly lower than at a similar stage relative to the 1973 peak and substantially below its relative level following the 1960-61, 1969-70, and 1981-82 recessions. Note too that apart from the back-to-back recessions in 1980 and 1981-82, output growth was weaker before the last recession than it had been before earlier recessions. Industrial production did not suffer as much as GDP during the slow growth

⁷Note that because Charts 1-4 are indexed to the peak, as opposed to the trough or one year before the peak, the differences between the most recent episode and earlier ones do not appear as sharp as those illustrated in Tables 3 and 4

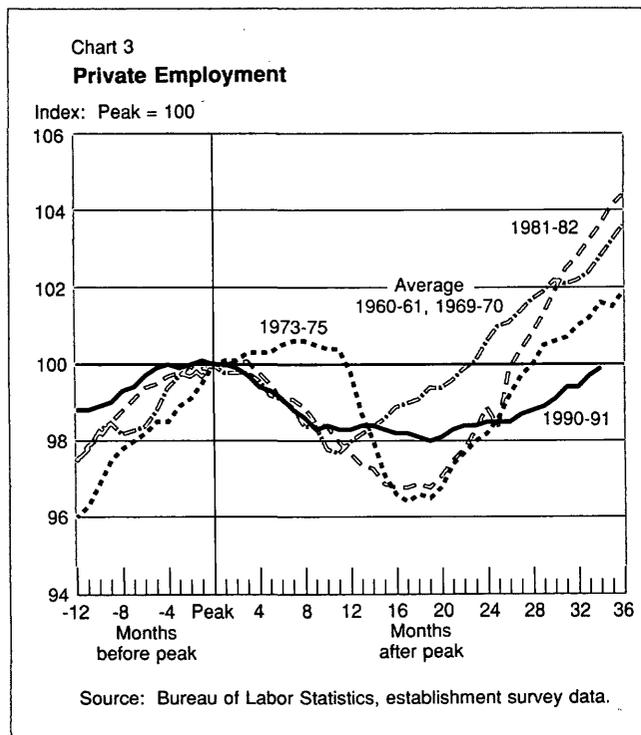
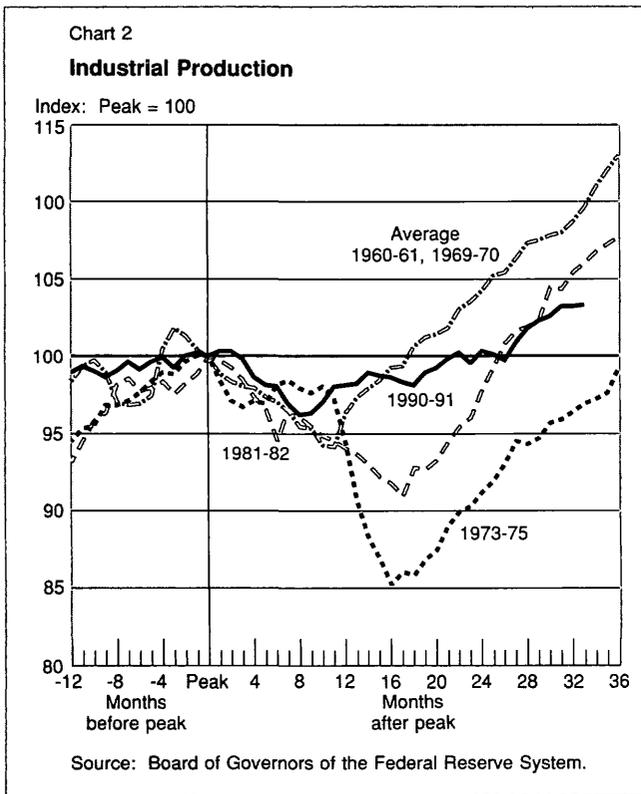


period as a whole. Even so, as Chart 2 shows, its performance through early 1993 was much weaker than at a similar stage following the 1960-61 and 1969-70 recessions, and slightly weaker than in the quarters following the 1981-82 recession. Furthermore, despite a significantly smaller than normal decline during the recession, it did not rise above its peak level until October 1992 (month 27). Nevertheless, it was stronger relative to its peak level than it was at the same stage following the 1973-75 recession.

Chart 3 shows the striking weakness of employment during the recent slow growth period as compared with earlier episodes.⁸ Private employment continued to decline through February 1992 (month 19) and was still below its peak level in June 1993, although solid growth did begin to appear in early 1993. This performance contrasts with the rapid growth observed in past episodes: even after the sharp 1973-75 and 1981-82 recessions, employment was 1½ to 3½ percent higher than its peak level at the same stage. Like output and industrial production, employment growth was also relatively weak before the most recent recession. Finally, Chart 4 shows that the weakness of employment growth in turn contributed to sub par income growth over the entire slow growth period, comparable only to income growth in the period surrounding the 1973-75 recession.

Several explanations have been proposed for the weakness of employment growth. These explanations are not necessarily mutually exclusive and may in some instances be complementary. One explanation centers on restructuring moves by a number of large corporations, such as IBM and General Motors, that have resulted in permanently lower staffing levels. Of the large corporations responding to a survey by the American Management Association, 46 percent reported downsizing between July 1991 and June 1992. These cuts resulted in an average workforce reduction of 9.3 percent. The effects of the downsizing phenomenon may, however, be exaggerated for some sectors. Within manufacturing, the restructuring process had clearly been under way for a considerable time before 1989. One indication is that aggregate employment by Fortune 500 firms declined in all years but one since 1979. Although employment at these firms fell at a reported 2.1 percent annual rate between 1989 and 1992, this rate of decline was only slightly faster than that recorded between 1982 and 1989. In the service sector, however, downsizing may have been more widespread than in the past. The American Management Association survey results indicate that service-producing firms

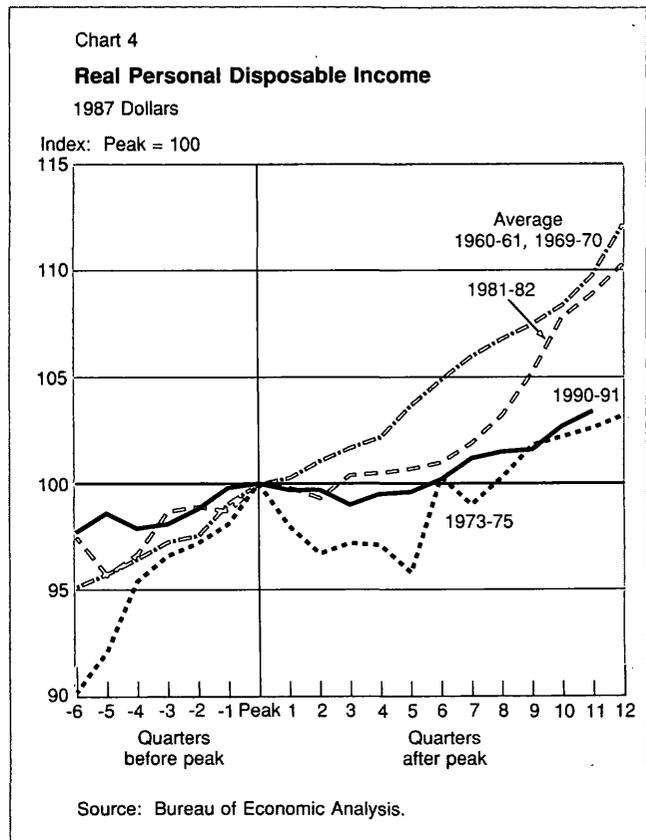
⁸Chart 3 and the discussion in this paragraph reflect the recent benchmark revisions, which indicated smaller employment declines during the recession, and somewhat stronger growth in late 1992 and early 1993, than had previously been reported



downsized in recent years at roughly the same rate as firms engaged primarily in manufacturing. Although we cannot compare this finding directly with job loss patterns in earlier episodes, anecdotal evidence and aggregate employment statistics by sector both suggest that downsizing probably did take place at service-producing firms during the last episode to a greater degree than in earlier episodes.

While employment at large corporations has been weak but possibly not exceptionally so, small businesses appear to be creating new jobs at a significantly slower pace than during the 1980s expansion. High debt levels of their own and bank balance sheet problems may have prevented some small businesses from borrowing in order to expand. Anemic consumer spending resulting from weak employment and income growth, together with a lack of confidence in the recovery's durability, may have inhibited the formation of new businesses and the expansion of existing small businesses.

Two other explanations for the poor job performance merit consideration. A recent study estimated that declining defense spending caused a 0.5 percent reduction in real GDP during the first five quarters of the



latest recovery, and that 855,000 defense-related jobs, including 440,000 in private defense industries, were lost between fiscal years 1987 and 1992.⁹ Such cuts are not unprecedented; defense spending and related employment also declined throughout most of the 1970s. Still, while it is difficult to assess the exact magnitude of the effect, these reductions are clearly at least partly responsible for the failure of manufacturing employment to recover following the recession. It has also been suggested that high nonwage labor costs, especially for health insurance, have led employers to expand output through productivity-enhancing investment and increased overtime rather than by hiring additional workers. Some support for this view is offered by the near-normal growth of productivity through the end of 1992 (Chart 5) despite the weakness of output growth.

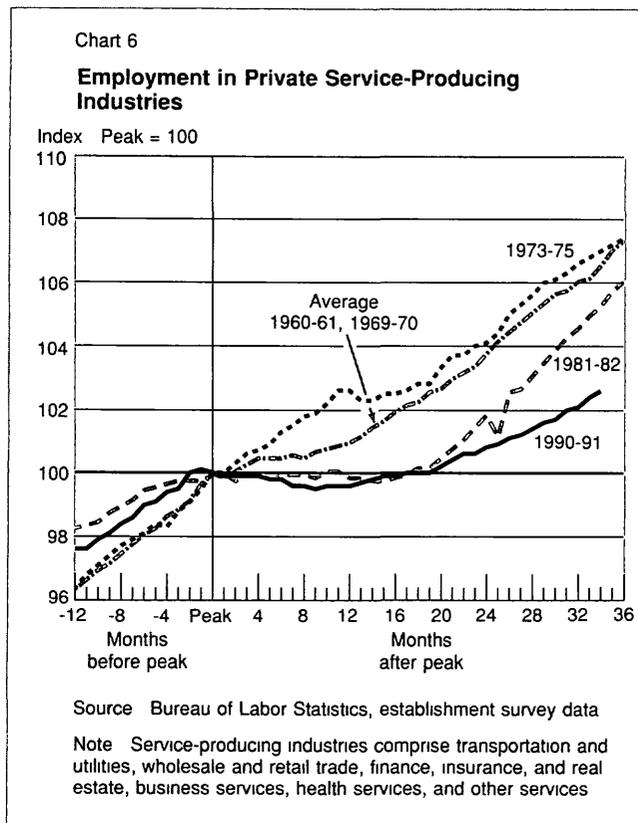
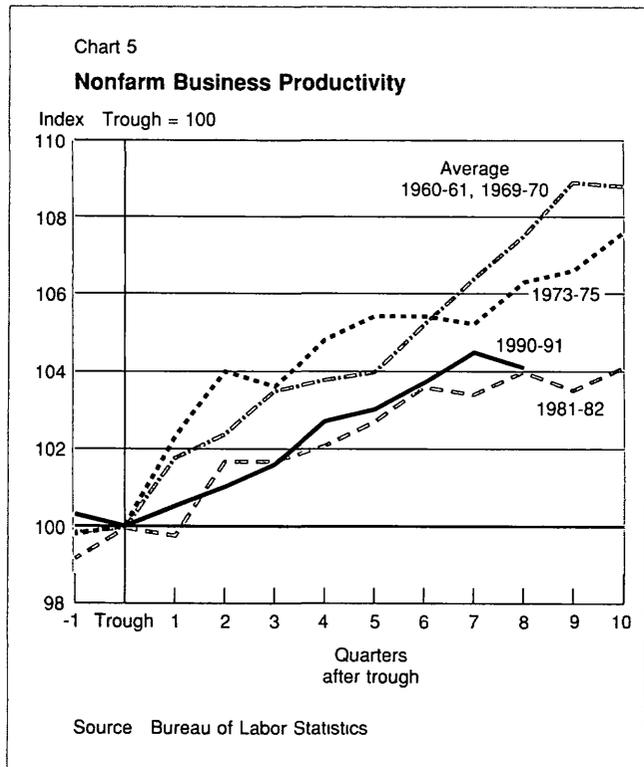
Because the private service-producing sector accounted for virtually all of the growth in aggregate employment throughout the 1980s, weak employment growth in that sector during the recent period deserves special attention. As Chart 6 shows, in past cycles the growth of service employment typically merely paused during recessions before resuming its rapid pace early

in the subsequent recovery. In the recent episode, by contrast, service employment declined modestly during the recession and did not rise above its pre-recession peak level until April 1992 (month 21).¹⁰ Since then, service employment has grown steadily, but at a slower pace than in past recoveries. In particular, employment in finance, insurance, and real estate stagnated between 1987 and 1990 after a period of rapid growth during the previous two decades, declined during the recession, and has not recovered. Weakness in this sector can be attributed to consolidation in the securities industry—an apparent consequence of the 1987 stock market crash—and in banking. Weakness is also evident in wholesale and retail trade, where employment fell to a greater than normal degree during the 1990-91 recession (though, in the case of wholesale trade, less than in 1981-82) and did not begin to recover until more than a year after the recession ended.

Another distinguishing feature of the latest episode

¹⁰Results from the Displaced Workers' Surveys conducted by the Census Bureau indicate that persons employed in trade and financial services were more likely to lose their jobs for economic reasons in 1990 or 1991 than in 1982 or 1983. See Henry S. Farber, "The Incidence and Costs of Job Loss 1982-91," *Brookings Papers on Economic Activity: Microeconomics* 1993, pp. 73-119.

⁹Ronnie Lowenstein and Richard Peach, "The Impact of the Current Defense Build-down," *Federal Reserve Bank of New York Quarterly Review*, Autumn 1992, pp. 59-68.



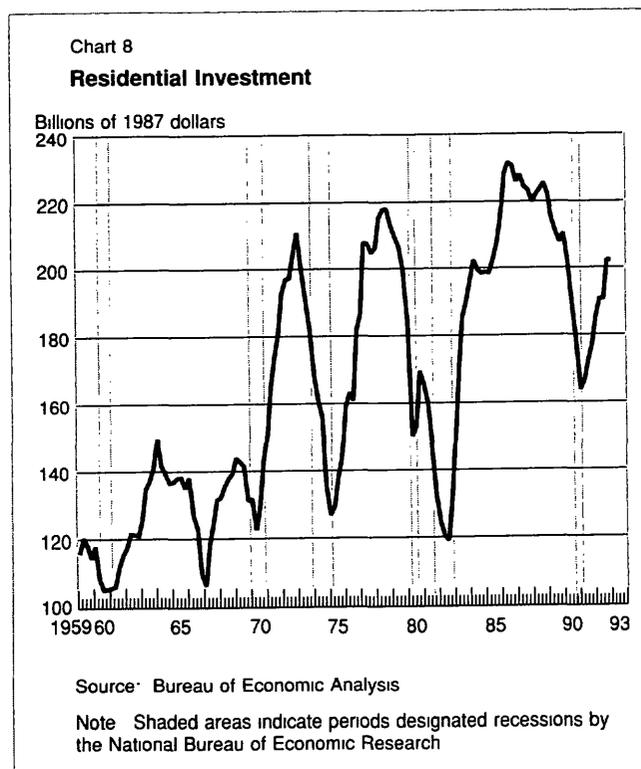
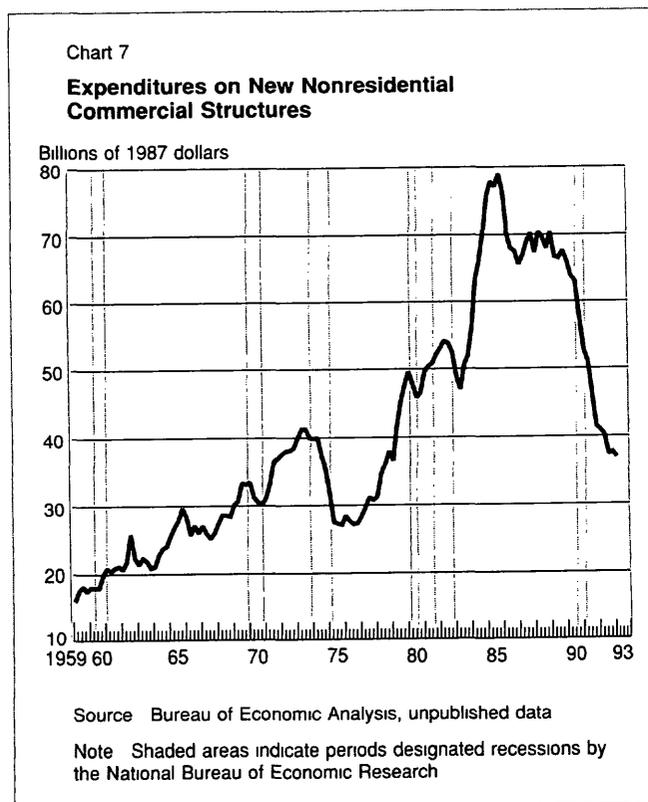
was the extreme weakness of construction spending, especially in commercial buildings. Over the full slow growth period, real expenditures on nonresidential structures declined nearly 18 percent, and housing expenditures also declined. As Charts 7 and 8 demonstrate, spending on both in fact peaked during the mid-1980s, and had been declining partly because of high vacancy rates (a consequence of earlier overbuilding) and the elimination of tax incentives supporting multifamily residential and commercial construction. Since the trough, residential investment has recovered to approximately its level at the start of the recession, though this performance has not been as strong as in earlier recoveries. Investment in single family structures had by the end of 1992 surpassed its level at the cyclical peak, but spending on multifamily structures remained depressed. Meanwhile, spending on commercial structures continued to decline, falling to its lowest level since 1978. Such a sustained drop is unprecedented during the postwar period.

Real expenditures on producers' durable equipment over the entire period were also somewhat weaker than normal, though the difference was less dramatic than for construction. However, the reported 9.8 percent increase shown on line 3 of Table 3 is somewhat mis-

leading because it reflects in part the impact of falling computer prices. Real business purchases of computers were reported to have more than doubled between the second quarter of 1989 and the first quarter of 1993, while nominal computer spending rose just 22 percent. Excluding computers, real investment in producers' durable equipment fell 3.7 percent over that period; the difference between the measures including computers and those excluding computers was especially pronounced during the recovery.

The regional pattern of employment developments over the extended slow growth period, shown in Table 5, was for the most part similar to that of the narrow recession period. Employment growth measured over the whole period was weaker than the average of past episodes in all regions, with the Northeast (New England and the Mid-Atlantic) showing declines and the South Atlantic and Pacific Coast (mainly California, where employment fell more rapidly after the national recession than during it) exhibiting unusually weak growth. For the first time in recent cyclical experience, however, employment growth in the East North Central region exceeded the national average, although it was still slightly below its own average of past episodes.¹¹

¹¹Employment in the East North Central region declined by 4.2 percent over the full period from 1979-I through 1984-III, which



Not surprisingly, estimates of personal income growth by state and region yield a picture generally similar to that for employment those regions that show unusually poor employment growth also exhibit weak income growth

Table 6 shows the pattern of unemployment during and after the last recession and three earlier recessions in ten large states Because state unemployment rates tend to show sharp fluctuations from month to month, the figures shown are based on three-month centered moving averages One striking fact is that the unemployment rate in each of these states during the latest recession and its aftermath never exceeded 10 percent, and only two states even saw peak-to-trough increases greater than 5 percentage points By contrast, in the 1981-82 recession, four industrial states experienced unemployment rates of 12.9 percent or greater¹²

Footnote 11 continued
encompassed two recessions Incorporating this figure in the average of past episodes yields an average 1.4 percent increase

¹²Although no state experienced a peak-to-trough increase in its unemployment rate of more than 6 percentage points during the

The effect on the output gap

Another way to gauge the economy's recent performance is to track the deviation of real GDP from its potential level Estimates of potential output at any point in time can vary widely and are particularly sensitive to assumptions about the nonaccelerating inflation rate of unemployment (NAIRU)—in other words, the unemployment rate at which no upward or downward pressure exists on the underlying rate of inflation In addition, the rate of change in potential output over time is related to assumptions about underlying trend growth in the labor force and productivity These issues are discussed in much greater detail in the accompanying box.

It seems clear that regardless of the assumptions chosen, GDP exceeded its potential level a year before the recession. Thus, the slowdown in growth immediately before the recession apparently represented a

Footnote 12 continued
narrowly defined 1981-82 recession, treating 1980 and 1981-82 as a single episode yields increases of at least 8 percentage points in Illinois, Ohio, and Michigan

Table 5

Percentage Change in Employment by Region: Four Quarters before Peak to Eight Quarters after Trough Seasonally Adjusted

	1989-II to 1993-I	1980-III to 1984-IV	1972-IV to 1977-I	1968-IV to 1972-IV	Average of Three Preceding Columns
National	1.6	6.5	8.0	8.7	7.7
New England	-9.4	9.8	5.3	4.3	6.5
Mid-Atlantic	-4.9	5.2	-1.0	2.8	2.3
South Atlantic	2.5	11.9	8.7	18.1	12.9
East North Central	2.2	0.4	5.7	4.5	3.5
West North Central	5.1	3.9	11.8	8.2	8.0
East South Central	6.1	4.2	11.0	14.3	9.8
West South Central	8.2	8.9	18.9	13.1	13.6
Mountain	10.3	12.2	19.1	25.2	18.8
Pacific	0.7	8.0	15.5	7.5	10.3
Standard deviation of regional changes	5.9	3.8	6.3	7.0	

Notes Table reports changes in total employment, including government employment Figures are based on the monthly establishment survey and are seasonally adjusted by the author Regions are defined as follows

New England—Connecticut, Maine, Massachusetts, New Hampshire, Vermont, Rhode Island

Mid-Atlantic—New Jersey, New York, Pennsylvania

South Atlantic—Delaware, Washington, D.C., Florida, Georgia, Maryland, N Carolina, S Carolina, Virginia, W Virginia

East North Central—Illinois, Indiana, Michigan, Ohio, Wisconsin

West North Central—Iowa, Kansas, Minnesota, Missouri, Nebraska, N Dakota, S Dakota

East South Central—Alabama, Kentucky, Mississippi, Tennessee

West South Central—Arkansas, Louisiana, Oklahoma, Texas

Mountain—Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming

Pacific—California, Oregon, Washington (Alaska and Hawaii omitted)

Table 6

Unemployment Rates in Ten Large States

	Highest Rate [†]				Change, Peak to Trough [‡]				Rate Two Years after NBER Trough			
	1990-91	1981-82	1973-75	1969-70	1990-91	1981-82	1973-75	1969-70	Mar. 1993	Nov 1984	Mar 1977	Nov 1972
National	7.6	10.7	8.9	6.0	2.3	3.3	4.1	1.8	7.0	7.2	7.4	5.4
Massachusetts	9.2	9.0	12.0	6.6	5.1	3.8	6.0	3.4	6.9	4.0	8.9	6.4
New Jersey	9.5	9.4	11.7	5.8	5.6	2.7	6.4	2.4	8.4	5.7	10.3	6.2
New York	9.0	9.4	10.5	6.8	4.1	2.2	5.3	3.3	7.4	7.1	9.7	6.2
Pennsylvania	7.8	13.4	8.7	5.4	3.4	6.0	4.4	1.9	6.8	8.3	7.9	5.0
Illinois	8.6	12.9	7.6	5.1	2.9	5.0	3.8	2.2	8.1	8.9	5.9	4.7
Michigan	9.8	16.6	13.4	8.3	2.8	5.1	8.1	3.2	6.6	10.9	8.1	5.9
Ohio	7.5	14.0	10.0	6.7	2.2	5.8	5.8	2.6	6.6	9.1	7.4	5.1
Florida	8.7	9.8	11.3	5.3	3.3	4.3	7.3	1.7	6.7	6.3	9.2	5.2
Texas	7.7	8.6	5.8	5.2	1.9	3.8	2.2	1.9	7.0	6.1	5.7	4.5
California	9.9	11.1	10.1	9.3	4.9	4.2	3.5	3.5	9.3	7.3	8.5	7.6
Coefficient of variation of state rates [§]	111	216	224	252	.487	362	408	375	.150	220	190	192

Note: Unemployment rates are based on a three-month centered moving average.

[†]During or after recession.

[‡]Values for 1990-91, 1981-82, and 1973-75 represent the difference between the highest state rate during or after the recession and the lowest state rate within one year of the NBER-designated peak. Values for 1969-70 give the change in the unemployment rate between the first quarter of 1970 and the highest rate during or after the recession.

[§]Standard deviation of state rates, weighted by adult civilian noninstitutional population, divided by national average.

reversion of output to its potential level. That both wage growth and price inflation accelerated beginning in 1988 lends credence to the view that GDP had been above its potential level. As a consequence of the recession, output fell below potential, but to a considerably lesser extent than in the 1973-75 and 1981-82 recessions. The recovery was so weak, however, that over its first two years the 2.1 percent annual rate of increase in real GDP actually failed to match the 2.2 percent growth in potential GDP under the baseline assumptions outlined in the box. Thus, in early 1993 the economy remained, under any reasonable set of assumptions, significantly below its potential level.

Conclusions

Although the 1990-91 recession, viewed narrowly, can be characterized as mild to moderate, the U.S. economy has since 1989 experienced an unusually long period of sub par economic performance. By every measure discussed, the economy's current performance relative to peak and year-before-peak levels is signifi-

cantly worse than the average for earlier episodes at the same stage of the cycle. Growth in the year leading up to the recession was unusually weak, but this can apparently be explained as a reversion of output to its potential level. More important, the recovery since early 1991 has been extremely weak compared with past recoveries. In particular, employment continued to decline for some time after the recession ended and remained below its peak level more than two years after the trough. The recovery of output can be attributed mostly to productivity growth, which has been roughly comparable to that of past recoveries, rather than employment growth. Both coasts suffered the brunt of the recession and slow growth period, while the industrial Midwest was affected less than in past recessions. Plausible assumptions concerning potential output suggest that real GDP did not fall as far below its potential level during the last recession as it had during previous recessions. However, by any reasonable measure, output remained significantly below its potential level in early 1993.

Box: Estimating Potential Output

One key issue raised by the recent slow growth period is the degree to which real GDP has deviated from its potential level at various stages of the cycle. Potential GDP can be thought of as the total value of goods and services that the economy is capable of producing without causing an acceleration in inflation. If real GDP falls short of potential, resources are probably being underutilized or wasted. At the same time, an output level exceeding potential, while possible for a short period, cannot be sustained without generating upward pressure on inflation.

Potential GDP is, however, unobservable, and its estimation poses great difficulties. Defining the *level* of potential GDP at any point in time is clearly related to one's assumptions about the NAIRU—the unemployment rate at which there is no upward or downward pressure on the underlying rate of inflation. In the long run, the *growth* of potential output is related to trend growth in the labor force and in productivity. Nevertheless, temporary supply shocks (for example, energy price increases) can cause the levels of both potential and actual output to deviate from their long-term paths.

A relatively simple method for estimating potential output relies on "Okun's law," which describes the relationship between real GDP growth and the unemployment rate. Estimating this relationship from the fourth quarter of 1973 through the second quarter of 1990, a period encompassing three recessions and three expansions (one abbreviated), yields the following result (standard errors in parentheses):

$$(1) \quad \Delta Y = 0.63 - 1.81\Delta U, \quad \bar{R}^2 = .59, \quad D.W. = 2.15, \\ (0.08) (0.19)$$

where ΔY is the quarterly (not annualized) percent GDP growth rate, and ΔU the change in the unemployment rate. The equation indicates that when unemployment does not change in a quarter, GDP growth will approximately equal its long-term average (as given by the constant term (0.63 percent, or an annual rate of about 2.5 percent)). The equation also suggests that an abrupt 1 percentage point *decline* in the unemployment rate taking place over a single quarter would be associated with growth 1.8 percent above its average (equivalent to a compound annual growth rate of 7.4 percent above the 2.5 percent average).

To recast the above result in terms of potential output, we can simply substitute the gap between actual unemployment and the NAIRU for the change in unemployment. Thus, if the current unemployment rate were 1 percentage point above the NAIRU, we would need a 1.8 percent higher output level in that quarter to attain full employment.[†] We would therefore infer that output was about 1.8 percent below its potential. Any such inference,

however, depends on the current value of the NAIRU, which must be estimated independently, or just assumed arbitrarily.

An alternative approach to estimating potential GDP centers on the computation of long-term trend values for output. In its simplest version, this approach involves picking an initial period in which actual output is assumed to be equal to potential output, then allowing potential output to grow at the long-term growth rate of actual output. Under this approach, we can use past estimates of the NAIRU to find periods when actual output was approximately equal to potential GDP.[‡] One major difficulty with this approach, however, is that it assumes that trends observed during previous cycles will continue into the current one. This assumption is especially problematic when the current level of potential GDP is estimated early in an expansion.

A more sophisticated version of this approach involves the decomposition of long-term growth into several components, each of which may follow distinct trends of its own. Specifically, potential output can be decomposed into labor productivity (output per worker hour), average hours worked per worker, and the labor force (number of workers). The latter can in turn be decomposed into labor force participation rates (workers per capita) and population. This procedure can be summarized as

$$(2) \quad Y = \frac{Y}{H} \times \frac{H}{L} \times \frac{L}{N} \times N,$$

where Y refers to output, H to total hours worked, L to the labor force, and N to the working-age population. Because both output per hour (Y/H) and average hours worked (H/L) are subject to cyclical influences as well as long-term trends, trend rather than actual values should be used. Trend values for labor force participation rates (L/N) by age-gender group, combined with actual population figures (N), yield estimates of the potential labor force. All of these components can be observed directly with a relatively short data collection lag.

[†]This figure captures the effects of other factors such as weekly hours, induced labor force growth, and capacity utilization, which tend to rise together with a decline in the unemployment rate. Martin F. J. Prachowny has estimated that when capacity utilization and the average work week are held constant, the *marginal* contribution to output of a 1 percentage point decline in the unemployment rate is only about two-thirds for the 1975-88 period ("Okun's Law: Theoretical Foundations and Revised Estimates," *Review of Economics and Statistics*, vol. 75, no. 2 [May 1993], pp. 331-36).

[‡]Using past values for the NAIRU is in some ways preferable to using current values, since one can observe the actual past behavior of price inflation.

Box: Estimating Potential Output (Continued)

Equation 2 can easily be expressed in terms of growth rates rather than levels. Thus, we can still use past values of the NAIRU to determine periods in which actual output is set equal to potential, then allow each component to follow its trend path (except population, which is exogenously determined). This approach, however, does not fully resolve our inability to observe recent breaks in the trend for the components of potential output. For example, since 1989 the adult female labor force participation rate has grown only about half as fast as during the previous decade. This slowdown probably contains both cyclical and permanent elements, but at this time it is impossible to distinguish between them.⁵

The accompanying table shows estimates of the gap

⁵An alternative, theoretically appealing approach involves the use of an economy-wide production function or a set of sectoral functions. Given the existing technology, this approach yields an estimate of the level of output when all resources (usually represented by labor, capital, and energy) are fully utilized. Using this approach to analyze the growth of potential output, one can incorporate and estimate the importance of such factors as technological progress and the skills of the work force. It is not as useful for estimating the current level of potential output, largely because adequate data on many of the factors involved only become available with a considerable lag, and consequently it is not employed in this article.

between actual and potential output at several key stages of the recent slow growth period under a variety of alternative assumptions. The figures in row 1 represent a baseline path for potential GDP under the approach focusing on trend growth in components. Potential GDP is set equal to its actual level in the fourth quarter of 1987, implying a NAIRU of about 5.8 percent. Taking into account the 1979-89 trend in GDP per hour worked by employees (including government employees), we assume annual productivity growth of 0.9 percent. Since average weekly hours for private nonsupervisory employees fell at a slower rate during and after the 1990-91 recession than in the preceding decade, we assume only a 0.12 percent annual decline in average hours worked per employee, rather than the 0.2 percent average rate of decline during the 1980s. To obtain estimates of the potential labor force, we calculate population figures and labor force participation rates separately for men and women aged twenty to sixty-four, and for teens.⁶ Since no trend is visible during the expansion of the 1980s, we

⁶Persons aged sixty-five and over were omitted from the analysis. This was done to avoid having to consider changes in participation rates resulting solely from changes in the age structure of the population. Since most persons over sixty-five are not employed, including them would not materially alter any results.

Alternative Estimates of the GDP Gap, 1989-93

Scenario	1989-II	1990-II	1991-I	1991-IV	1992-III	1993-I
(1) Baseline	1.4	0.6	-3.3	-4.0	-3.7	-3.5
(2) High NAIRU	2.7	1.9	-2.0	-2.7	-2.4	-2.2
(3) Low NAIRU	0.8	-0.1	-3.9	-4.6	-4.3	-4.1
(4) Faster productivity growth	1.4	0.3	-3.7	-4.6	-4.6	-4.5
(5) Slower labor force growth	1.4	0.8	-2.4	-2.9	-2.5	-2.2
(6) Okun's law, NAIRU=6	1.4	1.3	-1.0	-1.8	-2.8	-1.9
(7) Okun's law, NAIRU=6.5	2.3	2.2	-0.1	-0.8	-1.9	-1.0
(8) Okun's law, NAIRU=5.5	0.5	0.4	-1.9	-2.7	-3.7	-2.8

Notes: A negative number means actual GDP was below potential. The assumptions underlying the alternative scenarios are as follows:

- (1) Potential GDP equals actual GDP in 1987-IV. Productivity increases at 0.9 percent annual rate. Average hours per employee decline 0.12 percent annually. Labor force participation rate is constant at 88.6 percent for men aged 20-64, for women aged 20-64, it is 67.5 percent in 1987-IV, then rises 0.9 percentage points per year. Participation rate is constant at 55.0 percent for teens. Adult population growth is based on annual estimates of resident population from U.S. Department of Commerce, Bureau of the Census, Current Population Reports, P25-1095, *U.S. Population Estimates by Age, Sex, Race, and Hispanic Origin 1980 to 1991*, extrapolated to 1993-I. Teen population growth is based on monthly estimates of civilian noninstitutional population from U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, Table A-4.
- (2) Potential GDP equals actual GDP in 1987-II, otherwise assumptions are same as (1).
- (3) Potential GDP equals actual GDP in 1988-II, otherwise assumptions are same as (1).
- (4) Productivity grows at 1.2 percent annual rate beginning in 1989-IV, otherwise assumptions are same as (1).
- (5) Alternative labor force participation rate assumptions. Adult male rate is 88.6 percent through 1990-I, then falls to 88.2 percent by 1991-I and thereafter. Adult female rate rises 0.9 percentage points per year through 1989-III and 0.45 percentage points per year thereafter. Teen rate is 55.0 percent through 1990-II, then 53.0 percent thereafter. Otherwise assumptions are same as (1).
- (6)-(8) Based on equation 1 (see box).

Box: Estimating Potential Output (Continued)

assume constant participation rates for both working-age males and teens. Working-age female participation is allowed to grow at a rate corresponding to its trend growth rate during the 1980s. Given actual population growth, these assumptions together imply an average annual potential growth rate of about 2.2 percent since 1989. This rate is somewhat slower than the 1980s trend growth rate, in part because of slower growth in the working-age population.

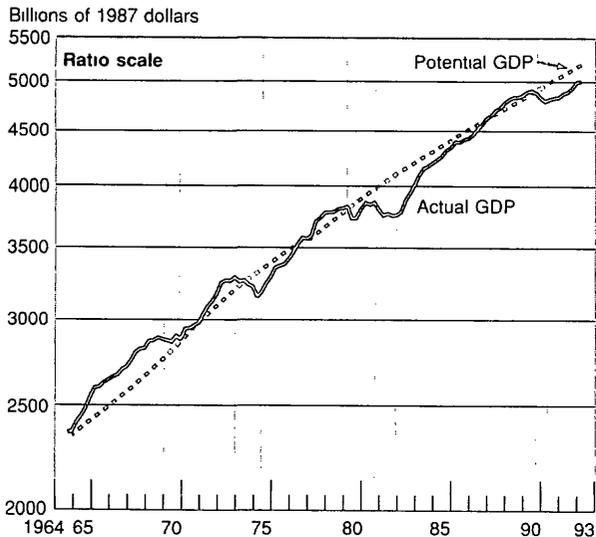
Rows 2-5 represent various alternative estimates of potential GDP, each based on a change in one of the baseline assumptions. Rows 2 and 3 correspond to NAIRUs of 6.3 and 5.5 percent, respectively, but with all components of potential output growing at the same rate as in the baseline case. Row 4 reflects the apparent productivity surge during the recovery, allowing trend productivity to rise at a 1.2 percent annual rate beginning in the fourth quarter of 1989. This change raises the potential growth rate to 2.5 percent. Row 5 recognizes the possibility that part of the sharp decline in labor force growth since 1989 reflects a permanent break in trend

participation rates. This adjustment reduces the average potential growth rate since 1989 to just 1.8 percent. Finally, for the sake of comparison, rows 6-8 are based on the Okun's law coefficient from equation 1, under alternative assumptions about the current NAIRU.

Several points are apparent from the table. The first is that plausible alternative assumptions can yield quite different estimates of potential GDP, and consequently of the output gap. If we compare only those estimates based on the trend growth in components approach (rows 1-5), the gap in the first quarter of 1993 could be as small as 2.2 percent or as large as 4.5 percent. Because unemployment only increased modestly during the recent episode, estimates using Okun's law show uniformly smaller gaps than the corresponding measures with baseline trend growth rates.

Nonetheless, although differing assumptions can and do substantially affect the magnitude of the gap, the direction of the gap at the key points shown does not appear to be in dispute. Output was clearly above its potential level at the start of the slow growth period, and

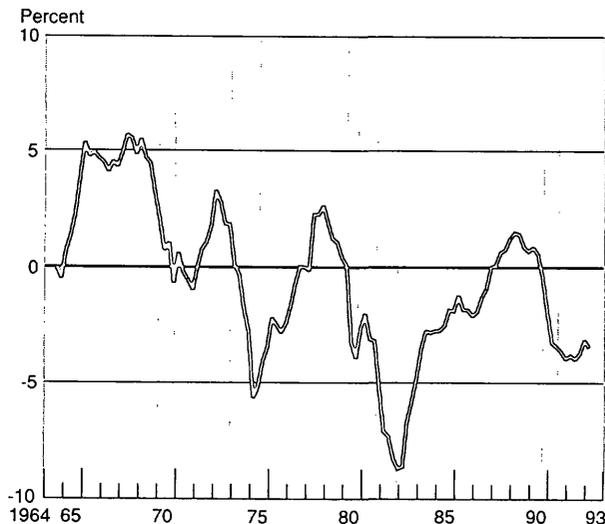
**Chart A1
Actual and Potential GDP**



Sources For actual GDP, Bureau of Economic Analysis, May 28 release, for potential GDP, author's estimates

Note Shaded areas indicate periods designated recessions by the National Bureau of Economic Research

**Chart A2
GDP Gap**



Notes Chart shows percentage difference between actual GDP and estimated potential GDP. Values are negative when actual GDP is below potential GDP. Shaded areas indicate periods designated recessions by the National Bureau of Economic Research

Box: Estimating Potential Output (Continued)

under all but one of the outlined scenarios it remained above potential at the start of the recession. At the same time, there is no doubt that output dropped well below potential during *and after* the recession, and that some degree of slack remains.^{††}

Chart A1 illustrates the historical path of actual real GDP relative to estimated potential output, with figures for the most recent five years corresponding to the base-line scenario. Estimates for earlier periods were obtained by setting actual output equal to potential in the third quarter of 1964 (when the unemployment rate was 5.0 percent). The major components of output were initially allowed to grow at rates consistent with contemporaneous long-term trends. However, the growth rates were adjusted in line with significant permanent breaks in the trend, the most notable of these being a sharp slowdown in productivity growth beginning in 1973. The model was recalibrated by setting actual output equal to potential in the fourth quarter of 1977 (with a 6.7 percent unemployment rate), and, as noted above, in the fourth quarter of 1987. Although hindsight makes us better able to observe breaks in trends in the more distant past than in more recent episodes, these estimates still depend on assumptions concerning the NAIRU, and are also sensitive to one's treatment of the timing of breaks in trends.

The estimates shown here, summarized in Chart A2, suggest that the gap during the most recent episode was

not particularly large by historical standards. In the first quarter of 1975, output by this measure was 5.6 percent below its potential level, at the end of the 1982 recession, we observe a gap of 8.7 percent. (Although other estimates vary widely, these figures are broadly consistent with them^{‡‡}.) In contrast to the recent episode, however, in both previous instances the output gap began to shrink as the recovery got under way, and substantial progress was made toward eliminating the gap during the first two years of expansion.

^{‡‡}The now-discontinued potential GNP series issued by the Bureau of Economic Analysis showed a 5.3 percent output gap in the first quarter of 1975 and a 6.1 percent shortfall in the fourth quarter of 1982. Steven N. Braun, using a modified Okun's law framework with independently estimated NAIRUs, found a shortfall of 4.0 percent in 1975 and a 7.2 percent gap in 1982 ("Estimation of Current-Quarter Gross National Product by Pooling Preliminary Labor-Market Data," *Journal of Business and Economic Statistics*, vol. 8, no. 2 [July 1990], pp. 293-304). At the high end, Jeffrey M. Perloff and Michael L. Wachter estimated a 7.9 percent shortfall in 1975 using a production function approach ("A Production Function—Nonaccelerating Inflation Approach to Potential Output: Is Measured Potential Output Too High?" in Karl Brunner and Allan H. Meltzer, eds., *Three Aspects of Policy and Policymaking: Knowledge, Data, and Institutions* [Amsterdam: North Holland, 1979]). Charles Adams and David T. Coe, following a procedure in which the NAIRU and potential output are jointly estimated using a combination of the production function and Okun's law approaches, found gaps of 9.2 percent in 1975 and 11.2 percent in 1982 ("A Systems Approach to Estimating the Natural Rate of Unemployment and Potential Output for the United States," *IMF Staff Papers*, vol. 37, no. 2 [June 1990], pp. 232-93).

^{††}Another estimate of current potential output, by DRI/McGraw-Hill, suggests an output gap of about 4.2 percent in the first quarter of 1993 (*Review of the U.S. Economy*, April 1993, p. 106).