FRBSF WEEKLY LETTER

The Recession, the Recovery, and the Productivity Slowdown

From 1988 to 1991, real output grew at the unusually slow rate of 1.3 percent per year. In contrast, from 1953 to 1987, real GNP grew at an average rate of 3.0 percent per year. If the current growth rate persists, the cumulative effect on real income will be very large. For example, at a 3.0 percent annual growth rate, per capita income doubles every 23 years, while at a 1.3 percent annual growth rate, it takes 53 years for income to double.

Economists generally attribute the slowdown to two factors: a short-run contraction beginning in 1990 and a long-run productivity slowdown that began in the early 1970s. If our problems were due mainly to the recession, the slowdown would be mostly transitory. Output growth would eventually return to normal as the economy recovered from recession. In this case, the main problem for policymakers would be to increase the pace of recovery without increasing inflation. On the other hand, if the primary problem is a long-term productivity slowdown, then slow growth may be the norm. In this case, short-term monetary or fiscal stimuli are not likely to be helpful.

This *Weekly Letter* seeks to quantify the relative importance of long-run and short-run factors, and it discusses some implications for policymakers. It concludes that the economy is operating near its long-run trend path and that its recent sluggish performance is due primarily to a slowdown in trend growth. This suggests that policies aimed at stabilizing the business cycle may be less effective than those designed to stimulate productivity growth.

Separating secular and cyclical fluctuations

Our first task is to separate long-run trends in per capita GNP from short-run cycles. To accomplish this, I use a variant of the model developed by Blanchard and Quah (1989). They identify business cycles by studying the joint dynamics of output growth and the unemployment rate. Roughly speaking, their model can be interpreted as a dynamic version of Okun's Law. The basic idea underlying Okun's Law is that unemployment tends to be higher than normal when

actual output falls below potential output. For example, the static version of Okun's Law states that for each percentage point of unemployment above the natural rate, output falls below potential by roughly 2.5 percent. Thus one can estimate the gap between actual and potential GNP from cyclical fluctuations in the unemployment rate. Blanchard and Quah translate this idea into a dynamic setting, which allows for lags in the relation between output and employment gaps. I modify their model by substituting per capita hours worked for the unemployment rate. The rationale for this substitution is that hours are a better indicator of the state of the labor market, since firms can vary employment by adjusting overtime as well as by hiring or firing. But the basic idea remains the same: Hours worked tend to be lower than normal when output is below potential.

To be specific, I assume that output and hours are subject to two kinds of independent random shocks; one kind generates permanent movements in per capita GNP, while the other has only transitory effects. I attribute permanent movements in per capita output to technological innovations. Since technological innovations permanently alter productivity, they affect potential GNP and therefore have a permanent effect on actual GNP. I attribute transitory movements in output to cyclical disturbances. This interpretation is consistent with business cycle theories in which cycles represent temporary deviations from the long-run growth path. Such theories include Keynesian, Monetarist, and some New Classical models. In these models, fluctuations in aggregate demand and temporary fluctuations in aggregate supply can drive the economy away from its long-run growth path, but the economy will eventually recover and return to its long-run path.

A model was estimated for output growth and employment, and the assumption that business cycles are transitory was used to separate trends and cycles. The results are illustrated in the following chart. The solid line shows real GNP per working age person over the period 1955 to 1991.

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Per Capita GNP
Total and Long-Run Component

Thousands of 1992 dollars
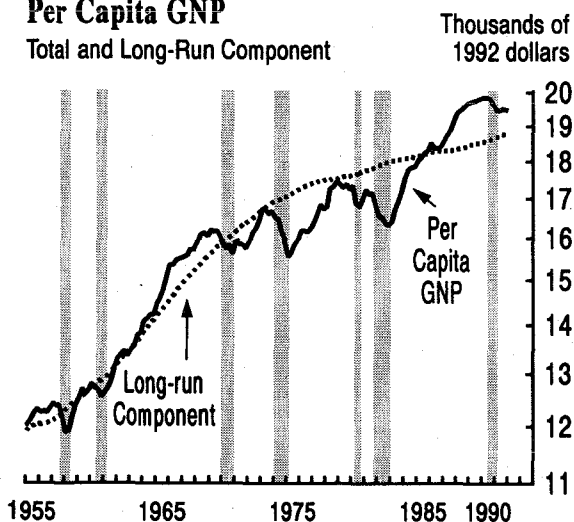
The dotted line shows the long-run component of GNP, which is defined as the path that output would have followed had there been no cyclical disturbances. The distance between the two lines is the cyclical component of GNP, and it can be interpreted as the path output would have followed had there been no technological progress. The shaded lines mark the dates of recessions, as determined by the National Bureau of Economic Research.

The productivity slowdown
The chart shows that long-run growth was substantially higher in the first half of the period than in the second. During the first half of the sample (1955.Q1–1973.Q2), the average rate of trend GNP growth was approximately 3.5 percent per year. During the second half (1973.Q3–1991.Q4), the average rate of trend growth fell to roughly 2.0 percent per year. The decline in long-run growth has had a large cumulative effect. For example, if the economy had sustained an average growth rate of 3.5 percent through 1992, per capita income would now be more than 20 percent higher. In current dollars, this amounts to almost $4,000 for each working age person. Thus, to a great extent, the economy's current malaise reflects the effects of an ongoing productivity slowdown.

The behavior of real wages provides some independent support for these estimates. In the long run, increases in real wages are tied to increases in labor productivity. Thus, a slowdown in pro-

ductivity growth should be accompanied by a slowdown in real wage growth, and this has occurred. From 1955.Q1 to 1973.Q2, real compensation per hour grew at an average rate of 2.7 percent per year, but since 1973.Q3 it has grown by only 1.0 percent per year. The decrease in real wage growth roughly matches the decrease in trend output growth. While real wage growth fell by 1.7 percentage points, trend output growth fell by 1.5 percentage points.

The causes of the productivity slowdown are not well understood. Economists have proposed various hypotheses, including theories based on changes in the composition of the labor force, an increase in government regulations, slow commercial adaptation of scientific discoveries, and mismeasurement of output, but no consensus has emerged.

How does the 1990 recession compare with past business cycles?
Various observers have remarked that the current recession and recovery seem to be different from previous business cycles. To put this into perspective, it is useful to compare the 1990 recession with earlier business cycles.

The chart shows that the economy has experienced two large contractions since 1954. The first occurred in 1974–1975 as a consequence of the first OPEC crisis, and the second occurred in 1980–1982 as a consequence of the second OPEC crisis and the Volcker disinflation. The economy also has experienced two large booms, the first at the time of the Vietnam War and the second in the 1980s. In fact, the 1980s boom was the longest and largest in the post-war period, with output peaking at 6.7 percent above trend at the end of 1989.

The most recent recession began in July 1990, and it ended in March 1991. Compared with past recessions, the initial decline in economic activity was relatively mild (see, for example, Trehan 1992). What has been disturbing is the weakness of the subsequent recovery (see Throop 1992). My model suggests a possible explanation, namely, that the recovery has been weak because the economy is operating near its long-run trend.

When the economy falls below its long-run path it has a subsequent tendency to catch up. That is, when output falls below trend, subsequent output growth tends to be unusually high. The 1974–1975 and 1981–1982 recessions provide dramatic examples. In the first quarter of 1975, real output bottomed out at 9.4 percent below trend. Over the next two years, output growth averaged 4.8 percent per year, which is 70 per-

cent higher than average. Similarly, after GNP had bottomed out at 9.7 percent below trend in the fourth quarter of 1982, output growth averaged 5.5 percent per year over the next two years, or more than twice the average growth rate.

But recessions do not necessarily push the economy below trend. Roughly speaking, a recession occurs when output declines for two (or more) consecutive quarters. If the economy is well above trend when output begins to fall, it may end up near trend when the recession ends. In this case, there will be no tendency to catch up. While this scenario is somewhat unusual, it does appear to fit the 1990 recession. According to my model, the 1990 recession began when the economy was near the peak of the 1980s boom. Since the fall in output was relatively mild, the economy seems to have absorbed the recession without falling below trend. Further, since output appeared to be close to trend when the recession ended, the economy did not experience the "catch up" phenomenon that followed earlier, deep recessions. Instead, the economy seems to be experiencing the slower trend growth that has become the norm over the last twenty years, perhaps damped a bit by a gradual convergence to trend.

While these estimates are subject to sampling error, it is possible to quantify the degree of uncertainty about the direction and size of the deviation from trend. Monte Carlo simulations indicate that there was an 86 percent chance the GNP was above trend at the end of 1991. Further, if GNP was below trend at that time, it was probably only slightly below. For example, the chance that the economy was more than 2.5 percent below trend was only 7.1 percent. Finally, the chance that the 1990 recession was as deep as the 1975 or 1982 contractions was only 2.4 percent.

Summary and implications
The recovery from the 1990 recession has been disappointing. My model suggests that this is due more to slow growth in trend real GNP than to cyclical factors. This recession marked the end of the large 1980s boom. The recovery has been slow because the usual "catch up" phase did not occur and because trend growth has become slower.

One implication of this diagnosis is that growth is likely to continue to be modest in the near term, barring unforeseen shocks. Since the economy seems to be near its trend path, businesspeople

and policymakers should not expect a recovery like those following the 1975 or 1982 recessions.

A second implication concerns the nature of unemployment. If the economy is operating near its trend path, then unemployment must be primarily structural rather than cyclical. As some sectors expand and others shrink, workers who lose jobs in shrinking sectors must find new ones in expanding sectors. The reallocation process takes time, since unemployed workers may have to acquire new skills or move to new locations. For example, many people who have lost jobs in banking, defense, or as a result of corporate downsizing expect to make career changes. There is also some evidence that regional imbalances have been important. Cromwell and Trenholme (1992) report that job losses in the recession were unusually concentrated in two regions (the Northeast and California) and that these regions have continued to lose jobs in the recovery. If this diagnosis is correct, the natural rate of unemployment has increased and will remain high until structural reallocations are complete.

A third implication concerns the focus of policymakers. If our current woes are due primarily to a long-term productivity slowdown, then short-term monetary or fiscal policies are not likely to be helpful. Such policies are useful mainly for stabilizing the business cycle, that is, for damping the amplitude of short-term deviations from trend. Most economists believe that they have little effect on long-term productivity growth. This suggests that understanding the productivity slowdown ought to be a priority for policymakers.

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