
An Inflation Report for 1999

By C. Alan Garner

The U.S. economy turned in an exceptional performance in 1999, combining strong real output growth with moderate inflation. Real GDP, a broad measure of the nation's output of goods and services, grew 4.6 percent from the fourth quarter of 1998 to the fourth quarter of 1999. Employment also rose solidly, and the civilian unemployment rate declined to the lowest level in about 30 years. Although rising world oil prices caused consumer prices to increase faster than in 1998, core inflation measures, which exclude food and energy prices, were about the same or slightly lower. Moreover, survey measures of long-term inflation expectations were stable despite the robust pace of the economic expansion.

What accounts for this exceptional combination of rapid growth and moderate inflation? Several factors helped hold down the inflation rate, including strong import competition and ample industrial capacity at home and abroad. But many recent discussions have emphasized the pronounced increase in productivity growth, reflecting both the high level of business investment and accelerated technological change. In particular, new information technologies, such as computers and the Internet, may be increasing

economic efficiency through better coordination of business activities and reduced inventories. The evidence is unclear, however, about how much of the productivity acceleration is due to new technologies, and whether faster productivity growth can be sustained in the years ahead.

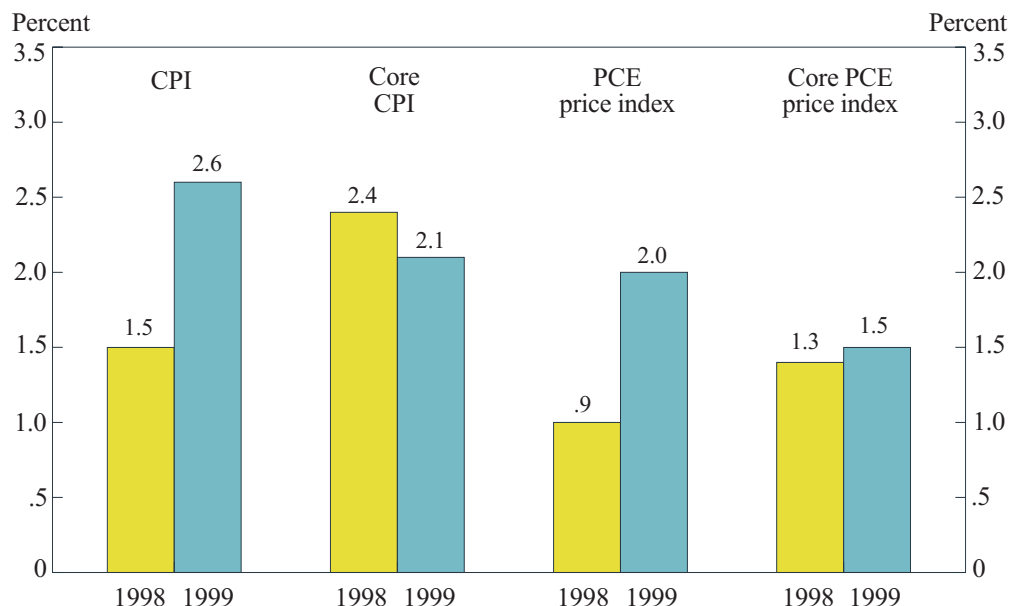
Such questions are crucial in judging whether rapid growth can continue without undermining the Federal Reserve's long-run objectives of price stability and sustainable economic growth. This article examines recent inflation developments and the policy implications of faster productivity growth. The first section reviews last year's price statistics and discusses various factors that affected overall and core inflation. The second section considers whether the recent faster pace of productivity growth can be expected to persist in the years ahead. Finally, the third section considers the inflation outlook for 2000 and beyond, concluding that monetary policymakers must remain vigilant even if faster productivity growth continues.

I. INFLATION IN 1999

Early in 1999, some commentators expressed concern that the economy was heading toward deflation, a persistent decline in the general price level. In the following months, however, crude oil prices rose sharply and other commodity

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Chart 1
CONSUMER PRICE INFLATION



Note: Data are Q4/Q4 percent changes.

Sources: Bureau of Labor Statistics and Bureau of Economic Analysis.

prices increased in response to signs of faster world growth. Depreciation of the dollar in the second half of the year helped halt the decline in nonoil import prices. In addition, the domestic economy expanded rapidly last year, and labor markets tightened. As a result, deflation faded as a topic of concern, replaced by worries about possible future increases in the inflation rate. The actual inflation statistics, though, were mixed. Measures of inflation that directly reflect energy prices, such as the CPI and the PPI, rose at a somewhat faster rate last year, but core inflation measures were about the same or slightly lower.

Inflation statistics and forecasts

Measures of consumer price inflation that include food and energy prices increased some-

what in 1999. The inflation rate of the all-items CPI rose to 2.6 percent last year from 1.5 percent in 1998 (Chart 1). The CPI inflation rate was slightly above most forecasts made in late 1998 or early 1999 (Table 1). An alternative measure of consumer prices from the national income and product accounts also rose at a faster rate last year. The chain-weighted personal consumption expenditure index (PCE price index) rose 2.0 percent after a modest 0.9 percent gain in 1998.¹

In contrast, measures of core consumer prices did not accelerate markedly last year. Core CPI inflation actually decreased to 2.1 percent from 2.4 percent in 1998. However, core PCE inflation increased slightly to 1.5 percent from 1.3 percent in 1998. It is doubtful whether a 0.1 per-

Table 1
YEAR-AHEAD INFLATION FORECASTS FOR 1999
Percent

<u>Forecast</u>	<u>Date published</u>	<u>CPI</u>	<u>GDP price index</u>
FOMC*	February 1999	2.0-2.5	NA
CEA	February 1999	2.3	1.9
CBO	January 1999	2.5	1.7
Survey of Professional Forecasters	4th Quarter 1998	2.3	1.6
Blue Chip consensus	January 1999	2.1	1.7
Livingston Survey	December 1998	2.2	NA
University of Michigan Consumer Survey	January 1999	2.7	NA
Addenda: Actual inflation in 1999		2.6	1.6

* Central tendency of projections made by Federal Reserve Governors and Reserve Bank Presidents.

Note: Data are Q4/Q4 percent changes, except for the Livingston Survey and Michigan survey figures, which are December/December percent changes. Figures from the Survey of Professional Forecasters and from the University of Michigan Consumer Survey are the medians of individual forecasts and expectations, respectively. Data from the Blue Chip Consensus and Livingston Survey are the averages of individual forecasts. GDP price index forecasts are not available for the FOMC, Livingston Survey, and Michigan survey. The Survey of Professional Forecasters and the Livingston Survey are compiled by the Federal Reserve Bank of Philadelphia.

centage point increase in core PCE inflation is meaningful, but even if that change is viewed as meaningful, the acceleration was much smaller than that of the overall PCE price index.

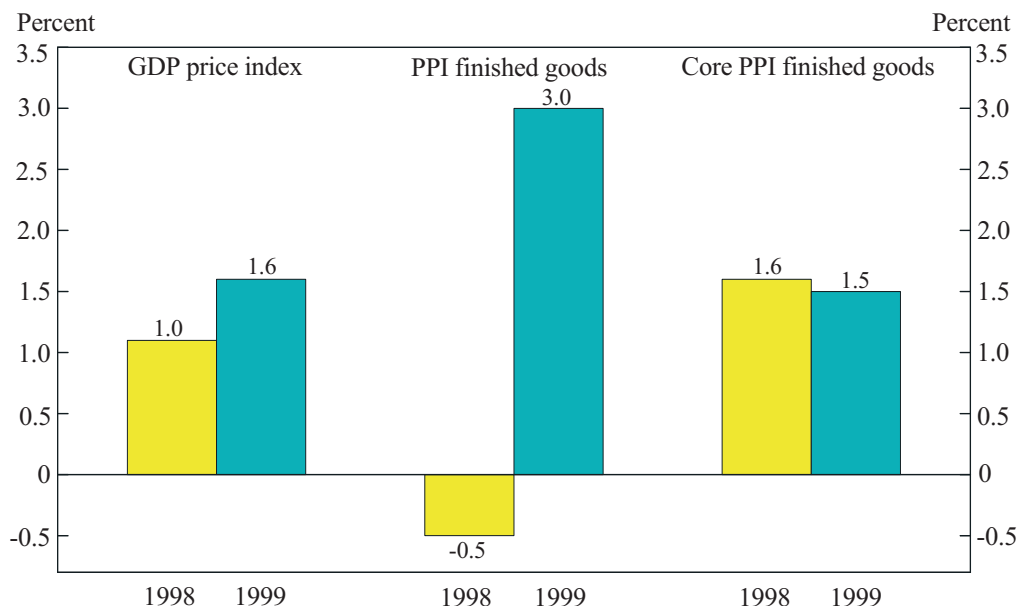
Other broad measures of the inflation rate were mixed in 1999 (Chart 2). The chain-weighted index for gross domestic product (GDP price index) is the broadest inflation rate considered here, measuring the average price change for all final goods and services produced in the United States. The GDP price index increased 1.6 percent last year, up from a 1.0 percent gain in 1998. This increase was near, but slightly below, what many forecasters predicted in late 1998 or early 1999 (Table 1). The PPI for finished goods accelerated sharply in 1999, rising 3.0 percent after a

decline of 0.5 percent the year before. But the sharp increase in oil prices appears to explain this large change in producer price inflation. Excluding food and energy prices, the core PPI rose by a modest 1.5 percent, down from 1.6 percent in 1998.

Effects of energy and food prices

Large movements in petroleum prices clearly had an important effect on inflation over the last two years. Oil prices decreased substantially in 1998, lowering the inflation rate for the CPI and other broad indexes that include energy prices. The decline in oil prices was partly due to a drop in world oil demand, caused by the financial crises in many developing economies. The

Chart 2
OTHER MEASURES OF INFLATION



Note: Data are Q4/Q4 percent changes.

Sources: Bureau of Labor Statistics and Bureau of Economic Analysis.

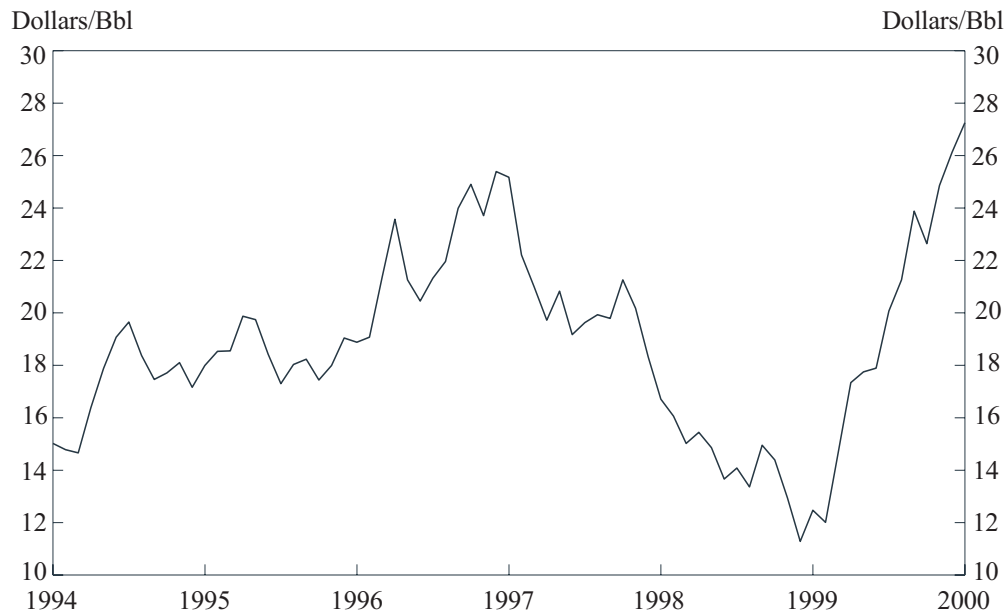
spot price of West Texas crude oil declined to \$11.28 per barrel in December 1998 (Chart 3). However, efforts by oil-producing countries to reduce their output raised petroleum prices substantially in 1999. In addition, world oil demand began to recover as economic growth strengthened in Europe and as many developing economies recovered faster than expected from their financial crises. Oil prices more than doubled in 1999, closing the year around \$26 per barrel.

Reflecting these large fluctuations in crude oil prices, the energy components of the major price indexes accelerated sharply between 1998 and 1999. For example, energy prices in the CPI rose 11.2 percent in 1999 after falling 9.2 percent in 1998. Similarly, energy prices in the finished-goods PPI jumped 15.1 percent after dropping 11.1 percent in 1998.

But any effects of the oil price fluctuations on core inflation were harder to discern. Historically, changes in oil prices have had less of an effect on core inflation because energy prices affect other prices with a lag, and because large increases or decreases in energy prices are sometimes reversed rather quickly. In addition, the economy is less dependent on oil than in the 1970s (Kendell; Liesman and Schlesinger). However, oil is still an important raw material in many production processes, and the price of oil affects transportation costs for many industries. Thus, if oil prices remain at recent high levels, last year's sharp gain in energy prices might have a more noticeable effect on core inflation in 2000.²

In contrast to the energy sector, food prices rose modestly in 1999. Reduced foreign demand

Chart 3
CRUDE OIL PRICES – WEST TEXAS SPOT



Source: *Wall Street Journal* (Daily Quote).

for U.S. agricultural products and abundant domestic supplies put downward pressure on crop prices. However, the prices of finished food products also reflect manufacturing, transportation, and marketing costs, which generally rose last year. The net effect was that the food price component of the CPI increased 1.9 percent in 1999, down slightly from a 2.3 percent gain in 1998.

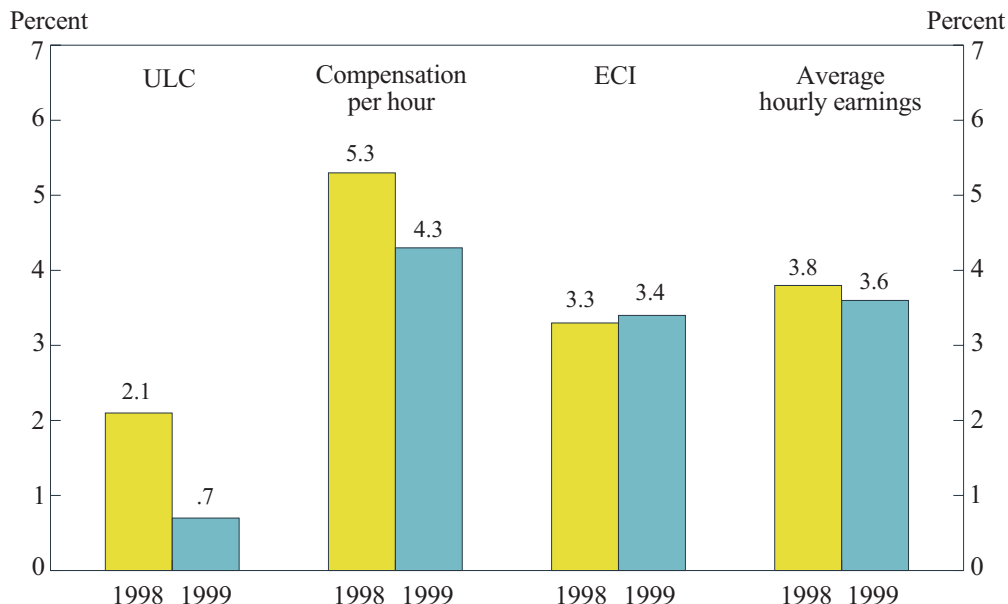
Other factors affecting inflation

Various other factors affected the inflation rate in 1999. For example, several of the special factors that lowered inflation in 1998 either stabilized or reversed somewhat in 1999, putting upward pressure on the inflation rate. Although the large increase in crude oil prices was the most dramatic example of a reversal, other pri-

mary commodity prices also strengthened in 1999 as foreign economic growth stabilized and then started to recover. In addition, the foreign exchange value of the dollar weakened somewhat in the second half of the year, and foreign excess capacity began to diminish. As a result, nonoil import prices, which decreased during much of 1998 and early 1999, began to rise in the second half of last year.

Surging tobacco prices were also a factor in consumer price inflation last year. Tobacco companies boosted their prices sharply at the end of 1998 and in 1999 to cover the costs of legal settlements against those companies. The sharp rise in tobacco prices was clearly caused by supply factors that were unrelated to aggregate demand or the stance of monetary policy. However, as in the case of higher oil prices, an

Chart 4
LABOR COST GROWTH



Note: Data are Q4/Q4 percent changes.
Source: Bureau of Labor Statistics.

increase in the price of one commodity relative to others may temporarily raise the measured inflation rate.³

A factor that may have contributed to low core inflation last year was a deceleration in unit labor costs (ULC). Unit labor costs in the nonfarm business sector grew by only 0.7 percent in 1999, more than a percentage point slower than in the previous year (Chart 4). The restrained behavior of unit labor costs reflects two main factors. First, the growth rate of compensation per hour in the nonfarm business sector slowed to 4.3 percent from 5.3 percent in 1998. In addition, productivity continued to grow rapidly, with nonfarm business productivity up 3.3 percent last year. With labor being the largest component of business costs, the slowing in ULC may have

helped businesses limit their price increases.

Other major measures of labor compensation confirmed that compensation growth did not accelerate markedly last year despite the tight labor market. Growth of the employment cost index (ECI) increased slightly to 3.4 percent from 3.3 percent in 1998, reflecting faster growth of employee benefit costs partially offset by slower growth of wages and salaries (Chart 4). Average hourly earnings of private nonagricultural employees rose 3.6 percent last year, down from a 3.8 percent gain in 1998.⁴

Other factors may also have helped to counteract the upward pressures on the inflation rate. Many business executives and economic commentators pointed to a lack of pricing power in

U.S. product markets as an important factor restraining core measures of inflation. Despite the modest rise in nonoil import prices, import competition remained intense, and the trade balance worsened substantially over the course of last year. Domestic manufacturing capacity was ample, with the average utilization rate for 1999 below the average for the last 30 years. In addition, some commentators cited the role of the Internet, which may allow consumers to shop more effectively for the best bargains. Reflecting such factors, some producers may have been reluctant to raise prices for fear of losing their customers to other companies.

Finally, methodological changes by the Bureau of Labor Statistics (BLS) lowered reported CPI inflation last year (Haver). At the beginning of 1999, the BLS started using a geometric mean formula to calculate price indexes for about 61 percent of total consumer spending in the CPI. This methodological change was expected to reduce reported CPI inflation by about 0.2 percentage point annually. Other methodological changes by the BLS had small but indeterminate effects on reported CPI inflation.

II. HAS TREND PRODUCTIVITY GROWTH INCREASED?

Underlying a number of the factors discussed in the previous section is the recent increase in productivity growth. As higher productivity growth has continued over the last few years, more observers have concluded that trend productivity growth—the average growth rate of productivity abstracting from cyclical influences—has shifted upward. Some proponents of this view have even written about a “new economy” in which the laws of supply and demand, although not repealed, have been significantly amended (Mandel; McTeer). This section examines whether the recent surge in productivity represents a fundamental improvement in the trend—a development that would have important implications for monetary policy.

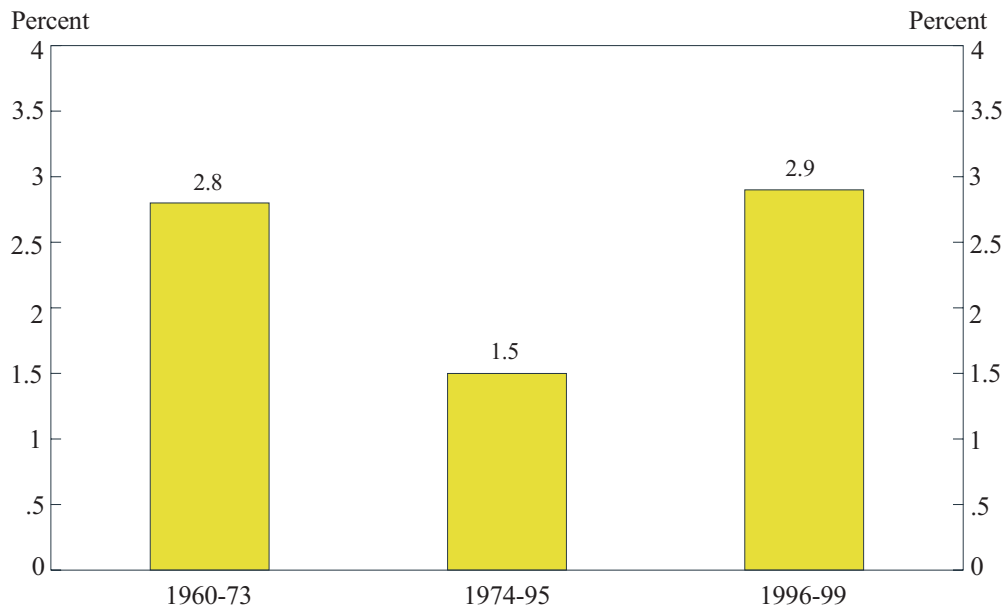
Recent productivity gains

Recent statistics on labor productivity show a substantial increase in productivity growth over the last three years (Chart 5). Labor productivity is the average output of goods and services per hour worked. The average growth rate of nonfarm business productivity for 1996-99 was 2.9 percent, well above the average growth rate of 1.5 percent over 1974-95. Moreover, recent productivity growth slightly exceeded the average productivity growth rate of 2.8 percent annually for 1960-73, another period of rapid economic growth.⁵

Several factors may have contributed to the higher productivity growth in 1996-99. Changes in labor productivity reflect anything that alters real output except a change in the number of hours worked. For example, an increase in the amount of capital goods, such as computers and machinery, used by workers should increase labor productivity. Improvements in the quality of labor inputs, such as a more educated work force, could also raise measured labor productivity because an educated worker may produce goods or services with higher value in a given period of time. In addition, technological advances might raise average output per hour worked by improving the efficiency of the production process so that a given amount of labor and capital can produce greater output. Because several aspects of the production process are involved, labor productivity is not a “pure” measure of how recent technological advances, such as computerization and the Internet, are changing the economy.⁶

Faster productivity growth is desirable because, over the long run, productivity growth raises the living standards of American households. Higher productivity allows firms to pay increased real wages to their workers without lowering business profits. Or viewed differently, increased productivity allows the same number of workers to produce a larger total out-

Chart 5
PRODUCTIVITY GROWTH



Note: Data are averages of Q4/Q4 percent changes.
Source: Bureau of Labor Statistics.

put of goods and services, which can be consumed directly by U.S. households or traded for goods and services produced abroad. Moreover, as the baby-boom generation retires in the years ahead, higher productivity could help the Social Security System support the larger number of retirees without undue pressure on the living standards of working-age families.

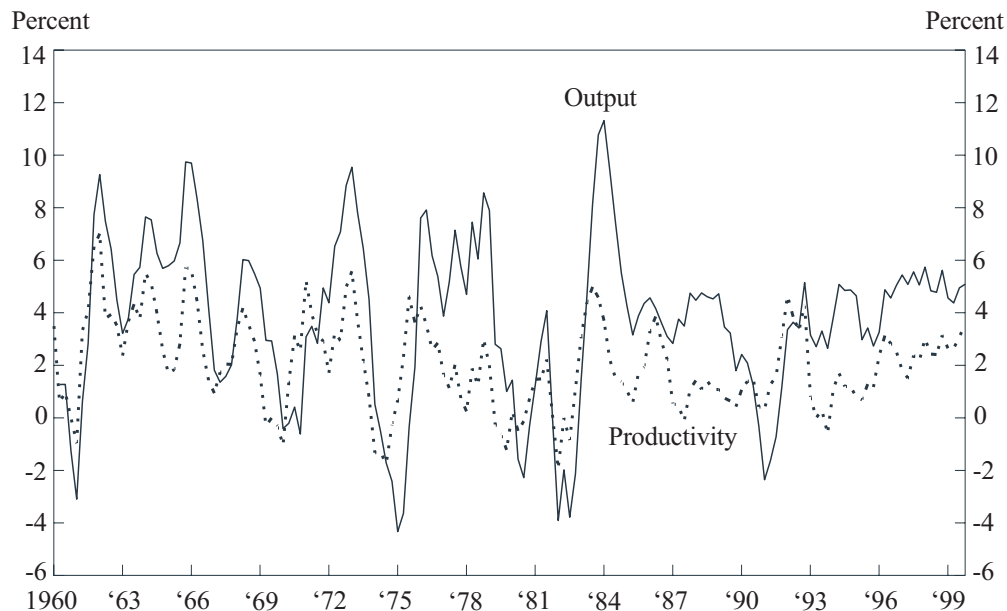
From a monetary policy standpoint, faster productivity growth raises the potential growth rate of the economy, the rate at which output of goods and services can grow without putting upward pressure on inflation. Economists view output and inflation as being determined by the interaction of overall supply and demand for goods and services. A faster rate of productivity growth implies the supply of goods and services would expand at a higher average rate. As a result, the

overall demand for goods and services could also grow faster over the long run without creating shortages that would cause rising inflation. Because monetary policy affects the demand for goods and services, productivity growth requires careful monitoring by policymakers.

Trend versus cyclical explanations

For monetary policymakers, a key issue is whether the recent surge in productivity growth is due primarily to higher trend productivity growth or unsustainable cyclical factors. To the extent that trend factors provide the explanation, there is a stronger case that policymakers should assume higher potential output growth in the future and should permit faster long-run average growth in demand than would otherwise be acceptable. However, the trend and cyclical

Chart 6
PRODUCTIVITY AND OUTPUT GROWTH



Note: Data are percent changes from four quarters earlier.
Sources: Bureau of Labor Statistics and Bureau of Economic Analysis.

explanations are not mutually exclusive, and sorting out their relative importance is difficult.

Many economists are hesitant to conclude that the stronger productivity growth of the last three years represents an increase in trend productivity growth. The recent surge in productivity might be largely a business cycle phenomenon. Growth of nonfarm business productivity has a moderately strong positive association with growth of nonfarm business output (Chart 6).⁷ As business output turns down in a recession, firms may be slow to lay off their workers, particularly skilled workers, who might be hard to replace when the economy turns up again in the future. As a result, output tends to fall faster than hours worked, producing a decline in measured labor productivity. During the following economic recovery, firms can initially raise their output by working

their existing employees and equipment more intensively, causing a sharp increase in measured productivity.

But the unusual timing of the recent surge in productivity growth adds some credibility to the view that trend productivity growth has risen. Sharp increases in productivity growth have been common when the economy was recovering from a recession. The rapid productivity growth shortly after the recessions in 1981-82 and 1990-91 was fairly typical. Although the recent surge in productivity growth looks a lot like these two previous episodes, it is atypical in that the faster productivity growth is occurring in the "mature" stages of the longest expansion in U.S. economic history.

Besides this unusual timing, dramatic and

highly visible improvements in computer and communications technology make it more plausible that a fundamental shift in trend productivity has occurred. Computer processing speeds have grown at a rapid pace, causing the effective price of computer power to decline relative to other goods and services. In addition, important advances have occurred in exchanging information. The best known of these advances is the Internet and related web technology, but cellular telephones and other advances in wireless communications are other highly visible examples.

Many observers believe recent advances in information technology are producing fundamental changes in how businesses operate. The new technology may permit more flexible production processes, allowing firms to produce with shorter lead times and reduced bottlenecks. Such technology may allow better planning and scheduling by firms, reducing inventory-sales ratios as well as the need for redundant stocks of workers and capital (Greenspan 2000a). New information technologies also may have facilitated the rapid growth in international trade, which has put competitive pressures on U.S. companies to innovate and to raise their efficiency.⁸ And new information technologies may have promoted the development of new financial markets and instruments, which may permit more efficient sharing of risks and reduce the costs of financing new business enterprises.

One important explanation for faster productivity growth, however, does not necessarily suggest an increase in trend productivity growth. The high level of business investment in recent years has resulted in “capital deepening,” an increase in the amount of capital used by the typical worker. Capital deepening may partly reflect the new investment opportunities created by rapid technological change and thus may be consistent with an increase in trend productivity growth. But the high level of business investment may also be due, in large part, to unusually strong growth of consumer spending and favor-

able corporate profits, which may not be sustainable over the long run. Because these explanations are not mutually exclusive, the high level of productivity-enhancing business investment may reflect a combination of temporary and longer-lasting factors.⁹

Will faster productivity growth continue?

As the previous section suggests, economic analysts disagree about the outlook for productivity growth partly because of differing views about the relative importance of the trend and cyclical explanations. Some researchers have found little evidence of a broad technology-based acceleration in productivity. Robert Gordon, for example, found that faster productivity growth could be explained by a combination of measurement changes, cyclical productivity effects, and rapid productivity gains in one relatively small economic sector—production of computers and related equipment. Other observers, however, believe that the recent productivity acceleration is due to more widespread effects from new information technologies, and that the U.S. economy is still in the early stages of a “new industrial revolution.”

Because economists disagree about the importance of different factors contributing to recent productivity growth, it is tempting to rely on purely statistical models that do not require a deeper understanding of the sources of productivity growth. However, because faster productivity growth is a recent development, such statistical models do not have enough observations to conclude with a high degree of certainty that trend productivity growth has increased (Filardo). Additional years of faster productivity growth are needed before such models can determine whether there has been a shift in the productivity trend.

Although it is hard to tell whether faster productivity growth represents an upward shift in the trend or an unsustainable cyclical develop-

ment, many reputable economists are gradually raising their estimates of potential output growth. For example, Gordon, who found little evidence of a widespread new-economy effect from information technology, has still raised his estimate of potential output growth. The Congressional Budget Office and the Council of Economic Advisers have also increased their projections for potential output growth to reflect capital deepening and a faster pace of technological change. Moreover, many private-sector forecasters have raised their estimates of potential economic growth.¹⁰

Economists have not, however, had a good track record at predicting productivity growth in the past. For example, the slowdown of productivity growth in the early 1970s was not widely anticipated by forecasters, and economists still do not have a good understanding of why productivity growth slowed at that time. Policymakers must, therefore, view such forecasts as being subject to considerable uncertainty.

III. THE INFLATION OUTLOOK

Although productivity growth may be the most intriguing factor in the inflation outlook, policymakers must weigh other important issues, such as the uncertain effects of higher oil prices and tight labor markets on future inflation. This section first examines survey and market-based evidence on inflation expectations. Then, it argues that, despite seemingly benign inflation expectations, monetary policymakers must remain vigilant against potential inflationary imbalances.

Evidence on inflation expectations

Recent survey evidence shows that most forecasters expect inflation to remain near last year's moderate level. Looking first at short-term expectations, respondents to the Survey of Professional Forecasters at the end of 1999 predicted a 2.5 percent CPI inflation rate in 2000,

about the same as the 2.6 percent rate actually experienced last year (Table 2). The GDP price index was expected to rise 1.7 percent this year, slightly above the 1.6 percent rate in 1999. Participants in the Blue Chip and Livingston surveys made similar forecasts for CPI and GDP price index inflation in 2000.¹¹ However, consumers participating in the University of Michigan's survey anticipated a 3.0 percent increase in consumer prices in 2000, 0.5 percentage point above last year's rate.¹²

Long-term inflation expectations also were stable, remaining near last year's moderate inflation rate (Table 3). According to the Survey of Professional Forecasters, the average CPI inflation rate over the next ten years is predicted to be 2.5 percent, exactly the same as the forecast made at the end of 1998.¹³ The Livingston Survey reported an identical inflation expectation for the next ten years. However, the University of Michigan's Consumer Survey found a somewhat higher expectation of 2.9 percent CPI inflation over the next five to ten years. But this forecast also matched the response given at the end of 1998, suggesting no upward movement in the long-term inflation expectations of consumers.

Market-based indicators provide greater evidence that inflation expectations may have risen last year. The yield on 10-year Treasury Inflation Protection Securities (TIPS) gives a market-based estimate of the real interest rate. The 10-year TIPS yield rose a little less than 0.5 percentage point from the fourth quarter of 1998 to the fourth quarter of 1999, while the yield on a conventional 10-year Treasury note increased almost 1.5 percentage points. The rising differential between these rates could be due partly to higher 10-year inflation expectations by investors. Yields on TIPS are difficult to interpret, however, because of the limited liquidity in these markets (Shen) and the greater desire of investors for liquidity after recent world financial crises. But ignoring these cave-

Table 2

INFLATION FORECASTS FOR 2000

Percent

<u>Forecast</u>	<u>Date published</u>	<u>CPI</u>	<u>GDP price index</u>
Survey of Professional Forecasters	4th Quarter 1999	2.5	1.7
Blue Chip consensus	December 1999	2.4	1.7
Livingston Survey	December 1999	2.5	NA
University of Michigan Consumer Survey	December 1999	3.0	NA

Notes: Data from the Survey of Professional Forecasters and Blue Chip consensus are the medians and averages, respectively, of individual forecasts of Q4/Q4 percent changes. The Livingston Survey figure is the average of individual forecasts of December/December percent changes. The figure for the University of Michigan Consumer Survey is the median of individual expectations for inflation in the next 12 months. GDP price index forecasts are not available from the Livingston Survey or the Michigan Survey. The Federal Reserve Bank of Philadelphia compiles the Survey of Professional Forecasters and the Livingston Survey.

ats, 10-year inflation expectations were around 2 percent annually based on Treasury rates in the fourth quarter of last year. Thus, though the increase in market-based expectations is worrisome, implied 10-year inflation expectations remained moderate.

Implications for monetary policy

Although seemingly benign, such inflation expectations do not imply that monetary policymakers can relax their vigilant stance against inflation. Surveys of expectations do not fully convey the reasons behind a consensus forecast of moderate inflation. Some of the business forecasters and households responding to such surveys may be optimistic about productivity growth, believing an upward shift in trend productivity growth will mitigate future inflationary pressures. But other respondents may simply be assuming the Federal Reserve will take whatever policy actions are necessary to

keep the inflation rate near recent levels. Some of the survey responses made at the end of 1999 may, therefore, have assumed a tightening of monetary policy.

Even if trend productivity growth has increased, monetary policy may need to be adjusted at times to keep overall supply and demand in balance. Federal Reserve Governor Meyer noted that higher trend productivity growth “has profound effects on demand as well as supply.” Technological advances, such as computerization and the Internet, create new profit opportunities, spurring higher business investment spending. In addition, these same profit opportunities may encourage higher stock prices, which can raise household wealth and thereby encourage stronger growth of consumer spending.¹⁴ Finally, to the extent that faster productivity growth is expected to persist, households will anticipate higher future incomes, also causing higher consumer spend-

Table 3

LONG-TERM INFLATION EXPECTATIONS

Percent per year

<u>Expectation source</u>	<u>Date published</u>	<u>Expectation horizon</u>	<u>Expectation</u>
Survey of Professional Forecasters	4th Quarter 1998	10 years	2.5
	4th Quarter 1999	10 years	2.5
Livingston Survey	December 1998	10 years	2.5
	December 1999	10 years	2.5
University of Michigan Consumer Survey	December 1998	5-10 years	2.9
	December 1999	5-10 years	2.9

Notes: Data from the Survey of Professional Forecasters and University of Michigan Consumer Survey are the medians of the individual forecasts. Figures from the Livingston Survey are the averages of the individual forecasts. The Federal Reserve Bank of Philadelphia compiles the Survey of Professional Forecasters and the Livingston Survey.

ing. As Governor Meyer stated, “we cannot assume the higher trend productivity eliminates concern about overheating.”

Moreover, economic growth has outstripped most of the recent upwardly revised estimates of potential output growth. Real GDP grew at well over a 5 percent annual pace in the second half of 1999, far above most recent estimates of potential growth. Even if trend productivity growth has increased, the economy might already be operating at—or beyond—its productive potential, setting in motion pressures that could raise inflation over the years ahead. Such concerns are reinforced by the tightness of domestic labor markets and the growing trade deficit, both factors that suggest demand may have been exceeding the sustainable supply of domestic output.¹⁵

Federal Reserve policymakers have recognized a continued need for vigilance in light of the current strength in domestic spending. In its statement announcing an increase in the federal funds rate target on February 2 of this year, the

Federal Open Market Committee stated that it “remains concerned that over time increases in demand will continue to exceed the growth of potential supply, even after taking account of the pronounced rise in productivity growth.” Policymakers must remain vigilant because faster productivity growth, by itself, cannot guarantee price stability and sustainable economic growth.

IV. CONCLUSION

Rapid real GDP growth and moderate inflation combined to make 1999 an exceptional year. The increase in consumer price inflation was chiefly due to higher oil prices, while there was little or no acceleration in core price measures. Faster productivity growth helped maintain last year’s moderate core consumer price inflation. And as the evidence continues to accumulate, more and more economists are boosting their estimates of trend productivity growth. Although the reasons for faster productivity growth are not entirely clear, technologi-

cal advances such as computers and the Internet are likely making a contribution. But growth of domestic spending has recently exceeded even the upwardly revised estimates of potential output growth, a situation that could eventually lead to rising core inflation. As a result, policymakers

must remain vigilant against inflationary imbalances because that is the best way that monetary policy can promote long-run economic growth.

ENDNOTES

¹ The CPI and the PCE price index are both widely used to measure consumer price inflation.

² Empirical evidence is mixed concerning the effect of higher oil prices on core CPI inflation. For example, Lown and Rich present a model in which higher oil prices can raise core CPI inflation. However, Hooker finds that oil price changes have had little or no effect on core inflation since 1980, although oil price shocks contributed substantially to core inflation before 1980.

³ Economic theory suggests that such factors should raise the price of tobacco relative to other goods and services with no long-run effect on the general price level. However, to the extent that offsetting price adjustments for other goods and services take a long time to occur, the sharp rise in tobacco prices might temporarily raise CPI inflation and other broad inflation measures.

⁴ The ECI differs from compensation per hour in several ways. For example, compensation per hour includes some forms of compensation that are not in the ECI, such as proprietors' income. In addition, the ECI employs fixed industry-occupation weights, but compensation per hour does not (Garner). Both compensation per hour and the ECI are broader measures of labor compensation than average hourly earnings, which covers nonsupervisory and production workers.

⁵ Several analysts have compared recent faster productivity growth with the "golden era" of the mid-1960s. However, McClellan noted some important differences between these periods. The expansion of the capital stock was more widespread across industrial sectors in the 1960s. In addition, the recent surge in productivity growth has been concentrated in the computer sector, and unlike the 1960s, productivity growth in the nondurable goods sector has deteriorated.

⁶ A better measure of technological change is multifactor productivity, which measures the average output produced by a fixed bundle of capital and labor (Bauer). Data on multifactor productivity are available with a relatively long time lag. However, over 1990-97, multifactor productivity

grew only 0.4 percentage point annually, up from an average annual gain of zero in 1979-90. Such productivity growth was far short of average experience in the 1950s and 1960s. However, multifactor productivity growth increased more sharply in 1990-97 for the manufacturing sector.

⁷ The correlation between growth in nonfarm business output and growth in nonfarm business productivity over 1960 to 1999 is 0.6.

⁸ International trade has grown faster than gross national product (GNP) over most of the period since World War II. But international trade has especially increased in the 1990s, with the ratio of trade (defined as exports plus imports) to GNP rising to over 25 percent recently (Council of Economic Advisers). Throughout the postwar era, technological advances have helped lower the costs of air-freight and transcontinental telephone calls. More recently, the Internet and e-mail have probably lowered the costs of trading over long distances. New information technologies may have been particularly important in promoting international trade in services. Changes in government policies concerning international trade and capital flows may also have encouraged the trend toward globalization.

⁹ Another explanation for faster productivity growth may be improvements in the quality of the U.S. labor force. Some analysts argue that the work force is becoming better educated, and that the mix of skills is shifting toward greater specialization in technical and scientific fields that "breed" technological innovation (PaineWebber). In addition, the aging of the baby-boom generation might be enhancing labor productivity through reduced job turnover and increased acquisition of skill on the job.

¹⁰ The median estimate of potential output growth from the Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters has risen 0.6 percentage point in the last year. In the first quarter of 1999, survey respondents reported a potential growth rate for the next ten years of 2.5 percent annually, but this estimate had risen to nearly 2.9 percent annually in the third quarter. In response to the revi-

sions of the national income and product accounts, professional forecasters raised their median estimate another 0.2 percentage point, to 3.1 percent annually. This increase matches the 0.2-percentage-point increase in average annual growth for 1959-98 in the revised accounts.

¹¹ The outlook for core consumer price inflation might be less benign than these projections of overall inflation suggest. Many forecasters probably anticipated reduced inflationary pressures from energy prices but also may have expected higher core inflation in 2000. The surveys are not clear on this issue, however, because they do not ask for core inflation forecasts.

¹² In the Federal Reserve's semiannual Monetary Policy Report to Congress, Federal Reserve governors and Reserve Bank presidents presented their projections for PCE price index inflation in 2000. The central tendency of these projections was 1 $\frac{3}{4}$ percent to 2 percent, compared with the actual PCE inflation rate of 2.0 percent in 1999. Prior to the latest report, Federal Reserve governors and Reserve Bank presidents submitted projections for CPI inflation. The expected decline in PCE price index inflation was due, at least partly, to likely moderation in energy prices compared with last year's large increases. Elsewhere in the economy, prices could be pushed upward by such factors as firmer nonoil

import prices, the pass-through effects of last year's rise in oil prices, and pressures from tight labor markets.

¹³ Ten-year inflation expectations in the Survey of Professional Forecasters actually decreased slightly from 2.5 percent in the fourth quarter of 1998 to 2.3 percent in the first quarter of 1999. However, the long-term expectation went back to 2.5 percent in the second quarter of 1999, and stayed at that level for the remainder of the year.

¹⁴ Empirical estimates suggest that consumer spending rises by 3 to 4 cents for every additional dollar of stock market wealth. Capital gains in excess of income increases are estimated to have raised gross domestic purchases by about one percentage point annually over the past five years (Greenspan 2000b).

¹⁵ In contrast, industrial capacity utilization does not suggest such strong pressures on productive resources. The capacity utilization rate in manufacturing was 80.2 percent in December 1999, slightly below the average utilization rate over the last 30 years. One factor that has held down capacity utilization is large gains in manufacturing capacity caused by strong business investment. Another factor has been rapid import growth, which has helped meet domestic demand without utilizing U.S. plant and equipment.

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