Progress Toward Price Stability: A 1998 Inflation Report

By C. Alan Garner

Many economists believe that price stability is the primary goal of monetary policy because it is thought to foster maximum sustainable economic growth. Price stability is often said to exist when changes in the general price level cease to be a factor in the decision processes of businesses and individuals. By this definition, price stability was not literally achieved in 1998, as many measures of the price level continued to rise, and inflation expectations were well above zero. Yet in 1998, consumer prices rose at the lowest rate in over a decade, and any upward pressures on inflation were surprisingly subdued.

Although many economists still worry about potential upward pressures on the inflation rate, last year's low inflation and foreign economic crises have produced a new set of concerns. In particular, some economic observers and financial market participants are concerned that *disinflation*, the process of lowering the inflation rate, may go so far as to produce *deflation*, a persistent decline in the general price level. These observers point to large decreases in petroleum prices and other primary commodity prices, rapidly falling computer prices, and moderate declines in U.S. nonoil import prices as possible signs of deflation.

This article argues that last year's favorable inflation performance, while suggestive of further modest progress toward price stability, does not foreshadow an emerging deflationary period. The first section reviews price developments over the last year, showing that many broad measures of inflation declined in 1998, but most remained positive. The second section argues that the factors that produced disinflation in 1998 are not likely to produce deflation this year. The third section examines the slight decline in long-term inflation expectations last year and its implications for future monetary policy.

I. INFLATION IN 1998

Many broad measures of the U.S. inflation rate declined last year. However, excluding food and energy prices, the inflation performance was more mixed. A sharp decline in energy prices was an important factor in last year's unexpectedly low inflation rates. International influences also played an important role in slowing U.S. inflation, with the strong dollar, intense import competition, and falling commodity

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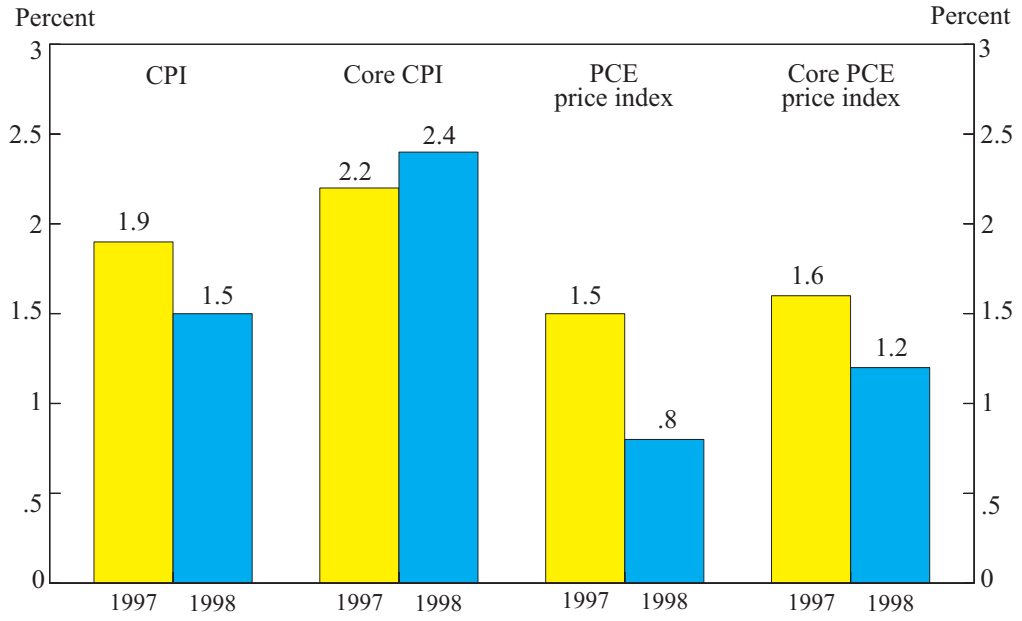
Chart 1
CONSUMER PRICE INFLATION



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

prices having a dramatic effect on the prices of internationally traded goods. But tight labor markets helped prevent an equally large decline in service-sector inflation.

Inflation statistics and forecasts

Consumer price inflation was lower than expected in 1998. Measured by the all-items consumer price index (CPI), the inflation rate declined to 1.5 percent last year from 1.9 percent in 1997 (Chart 1). At the end of 1997 and in early 1998, most forecasters had expected CPI inflation to be about 2.0 percent to 2.5 percent in 1998 (Table 1). An alternative measure of consumer price inflation from the national income and product accounts also declined last year. The chain-weighted personal consumption expenditure index (PCE price index) rose by only 0.8 percent in 1998, down from a 1.5 percent gain in the previous year.

Changes in *core* measures of consumer price inflation, which exclude food and energy prices, were mixed last year. Core CPI inflation was 2.4 percent in 1998, up slightly from a 2.2 percent rate in 1997. In contrast, the core PCE price index grew at a somewhat slower pace last year, rising 1.2 percent after a 1.6 percent gain in 1997.

Other broad measures of inflation were also mixed in 1998 (Chart 2). The chain-weighted price 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

Table 1

YEAR-AHEAD INFLATION FORECASTS FOR 1998

(Percent)

Forecast	Date published	CPI	GDP price index
FOMC*	February 1998	1.75-2.25	NA
CEA	February 1998	2.2	2.0
CBO	January 1998	2.4	2.1
Survey of Professional Forecasters	4th Quarter 1997	2.6	2.3
Blue Chip consensus	January 1998	2.3	2.1
Livingston Survey	December 1997	2.5	NA
University of Michigan Consumer Survey	January 1998	2.3	NA
Addenda:			
Actual inflation in 1998		1.5	.9

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

Notes: 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.

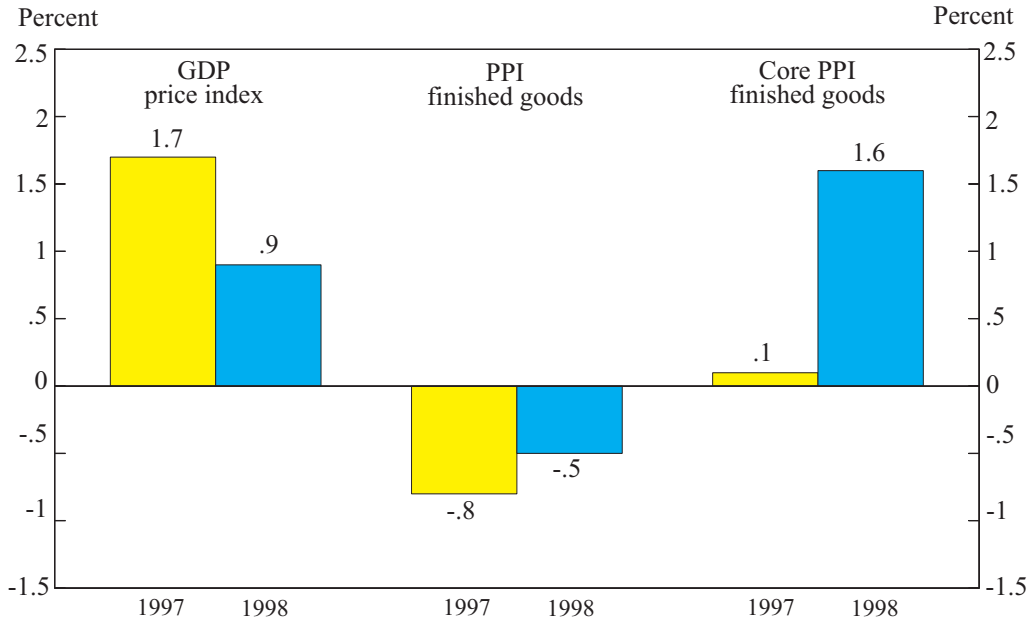
United States. The GDP price index increased 0.9 percent in 1998, down from a 1.7 percent gain in 1997. This low inflation rate was well below forecasts for an increase of 2.0 percent or slightly higher last year (Table 1). The producer price index (PPI) for finished goods actually decreased by 0.5 percent in 1998 after falling 0.8 percent in 1997. However, lower oil prices explained much of the decline in the PPI. Excluding food and energy prices, inflation in the core PPI for finished goods rose from 0.1 percent in 1997 to 1.6 percent in 1998.

The effects of food and energy prices on inflation

A major downward influence on the inflation rate in 1998 was the sharp decline in world oil prices. Petroleum prices declined in response to reduced foreign demand for oil, particularly due to the financial crises and sharp economic slowdowns in Southeast Asia and some non-Asian developing economies. Warmer than normal weather in the United States also helped reduce domestic oil demand, leading to a buildup in petroleum inventories. Oil-producing nations made some attempt to cut their output, but the cuts proved insufficient to stem the downward pressures on world oil prices.

Although hard to quantify, lower energy prices probably also restrained the core inflation measures in 1998. A decline in energy prices reduces transportation and other production costs in a wide variety of industries, not just the energy sector. In addition, crude oil is an important input into various products, such as plastics. Changes in energy prices often do not have as large an

Chart 2
OTHER MEASURES OF INFLATION



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

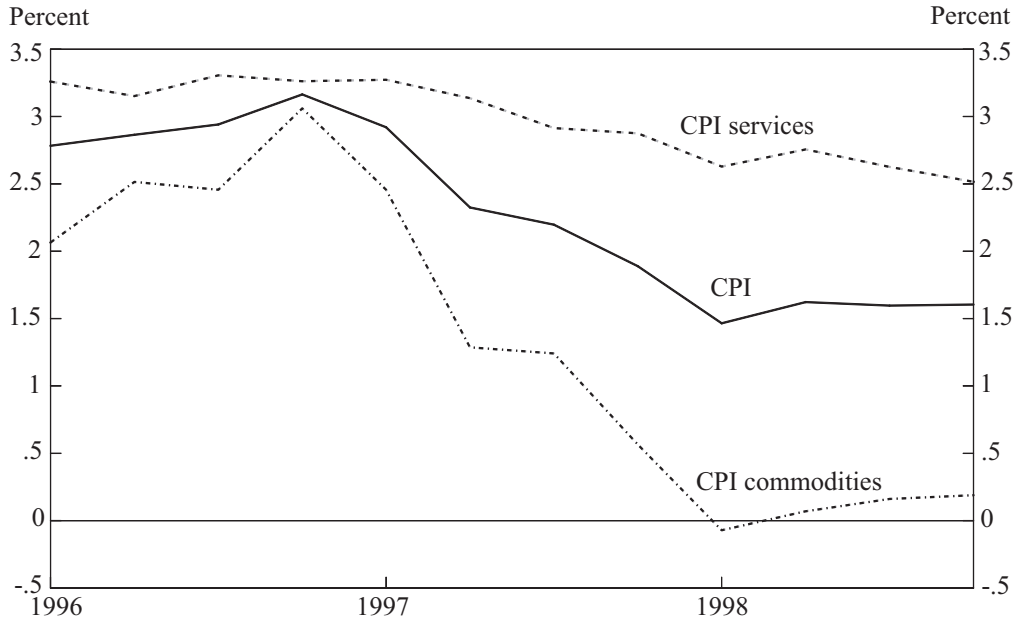
effect on core inflation as on the total index because energy price changes are passed through to other prices only with a lag, and because large changes in energy prices sometimes are reversed rather quickly. But the decline in energy prices last year was large and followed another substantial decline in 1997, which suggests that lower energy prices probably did reduce production costs for many goods and services included in the core inflation measures.

Food prices had less effect on the overall inflation rate last year than in 1997. Consumer food price inflation was slightly higher last year despite reduced foreign demand for U.S. agricultural products. For example, the food and beverage component of the CPI rose 2.3 percent in 1998, up slightly from a 1.7 percent increase in 1997. Although weak foreign demand and large harvests reduced the prices received by many U.S. farmers, such costs account for only a small percentage of food and beverage prices and thus did not lead to a further deceleration in the food component of the CPI.

Other factors affecting inflation

Several other factors had important effects on inflation in 1998. Some of these factors, such as import competition and low industrial capacity utilization, primarily lowered the inflation rate for goods rather than services. But other factors, such as rapid productivity growth, presumably affected the inflation rates for both goods and services.

Chart 3
DIFFERING GOODS AND SERVICES INFLATION



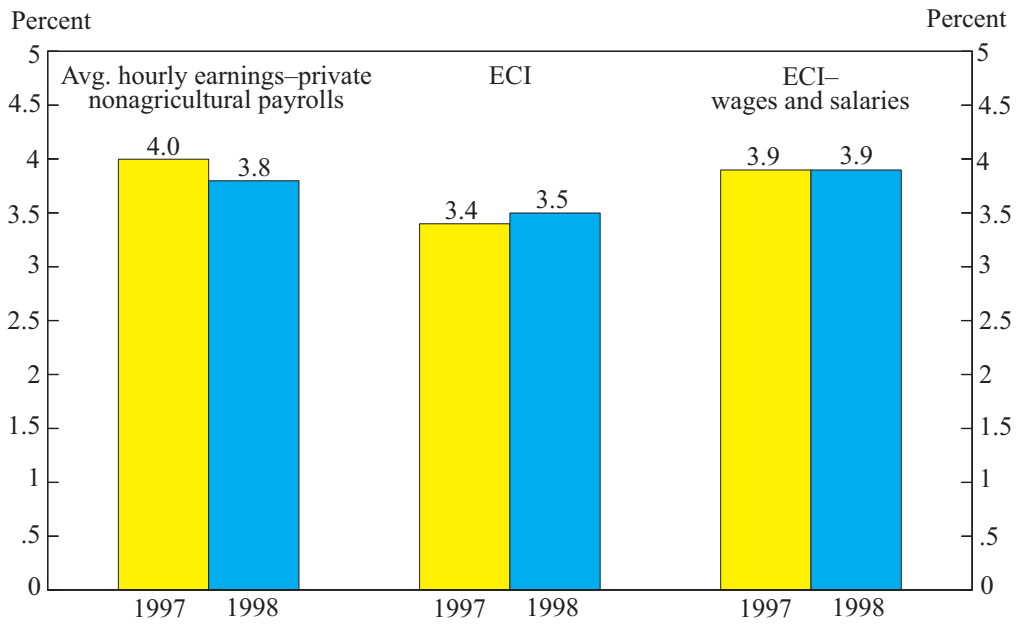
Note: Data are percent changes from four quarters earlier.
Source: Bureau of Labor Statistics.

The decline in inflation over the last couple of years has been much more pronounced for goods than for services. The inflation rate for consumer goods (CPI commodities) has slowed sharply, with consumer goods prices actually decreasing at times last year (Chart 3). At the same time, the inflation rate for consumer services (CPI services) has drifted downward only modestly. The sharp decline in world oil prices was an important cause of this differing behavior, but other factors were also at work.

Intense import competition has lowered the inflation rate for a wide range of internationally traded goods. The foreign exchange value of the dollar increased substantially in 1997 and the first part of 1998, tending to reduce the dollar price of foreign-produced goods. In addition, the financial crisis in the developing world and the resultant downturn in demand from these economies made foreign industrial capacity even more readily available for exports to the United States. Nonoil import prices declined over much of 1998, lowering costs for consumers and reducing the pricing power of domestic producers.

Lower domestic capacity utilization also held down the inflation rate for consumer goods. The capacity utilization rate for the manufacturing sector of the U.S. economy averaged 80.9 percent last year, slightly below the average utilization rate of 81.1 percent over the preceding 30 years. Although the lower capacity utilization rate was partly due to the strong influx of imported goods, lower capacity utilization also reflected rapid growth in domestic capacity caused by strong

Chart 4
GROWTH IN COMPENSATION



Note: Data are Q4/Q4 percent changes.
Source: Bureau of Labor Statistics. ECI data are for nonfarm private industry workers.

business spending on new plant and equipment. Manufacturing capacity in the United States grew 5.6 percent in 1998, well above its average growth rate over the previous 30 years.

Tight labor markets have helped keep the slowing of service-sector inflation more modest than the slowing of goods-sector inflation. Labor markets were tight throughout the year, with the civilian unemployment rate averaging 4.5 percent. Perhaps somewhat surprisingly, though, the tightness in labor markets did not have a big effect on wage inflation. Looking at the two leading measures of wage inflation, the average hourly earnings index rose at a slightly lower rate in 1998, while the employment cost index for wages and salaries (ECI wages and salaries) increased at the same pace as in 1997 (Chart 4). However, faster growth in benefit costs did cause the employment cost index for total compensation (ECI) to accelerate slightly last year.

Tightness in labor markets and continuing increases in labor compensation may help to explain why the inflation rate for consumer services remained well above the inflation rate for consumer goods. While measures of labor compensation have not been highly reliable indicators of future changes in the general inflation rate, some evidence suggests that labor costs may be related to the inflation rate for consumer services (Brauer).[1] In part, this relationship may reflect labor's higher share of production costs

in many service industries. Consistent with the evidence on labor compensation, the inflation rate for consumer services barely slowed last year.

Although the differing performance of goods and services inflation was an important story in 1998, other factors also had a notable effect on the general inflation rate. Solid growth of labor productivity probably helped contain upward pressures on both goods and services inflation last year. Labor productivity in the nonfarm business sector has grown at nearly a 2 percent rate over the last three years, well above the average productivity growth rate in the 1980s and 1990s. Faster productivity gains may reflect higher levels of business investment, new computer and telecommunications technologies, a more experienced work force, and aggressive restructuring over the last decade by many companies. Recent improvement in labor productivity growth may have moderated cost pressures from the tight labor market, although economists do not agree about whether this faster productivity growth will persist in the future.

In addition, much of the acceleration in core CPI inflation last year could be attributed to higher tobacco prices. Tobacco prices rose faster than most other goods prices last year because tobacco producers anticipated higher costs stemming from legal settlements. Much of the increase occurred in December of last year, shortly after tobacco companies announced a 45-cent-per-pack increase in wholesale cigarette prices. Economic theory suggests that such a factor would raise the price of tobacco products relative to other goods and services but should not permanently raise the general price level. However, to the extent that offsetting declines in the prices of other goods and services take a long time to occur, the upward pressure on tobacco prices might temporarily raise broad inflation measures.

Finally, methodological changes introduced by the Bureau of Labor Statistics in 1998 lowered the reported CPI inflation rate by roughly 0.2 percentage point last year (Haver).[2] This suggests that, had the CPI been measured on the same basis in both 1997 and 1998, the overall CPI would have decelerated by less than in the reported statistics, and the core CPI might have shown somewhat greater acceleration. Part of last year's decline in CPI inflation, therefore, may be statistical in nature rather than a true lessening of consumer price inflation. Despite such caveats, the broad array of inflation indicators in Charts 1 and 2 still suggests a lower than expected general inflation rate in 1998.

II. SHOULD DEFLATION BE A CONCERN?

With the prices of consumer goods sometimes declining last year, and with sharp decreases in crude oil and other raw materials prices, concerns have been growing about possible deflationary pressures in the U.S. economy. Financial market volatility and the prolonged decline in real estate and stock prices in Japan, the world's second-largest economy, have heightened these concerns. Some analysts have focused on the near-term chances for deflation, while others have debated the prospects for a more prolonged deflationary era (Greider, Krugman, Laing, Shilling). After a definition and some general discussion of deflation, this section considers whether the U.S. economy is likely to experience deflation in 1999.

What is deflation?

Economists define deflation as a persistent decline in the general price level of goods and services. Deflation thus means a sustained decline in broad measures of the price level, such as the CPI or the GDP price index. Economic commentators sometimes use the term loosely to refer to a widespread decline in asset prices, such as corporate stock prices or real estate prices, which are not in the CPI or the GDP price index. A

better term to describe this situation might be *asset price deflation*. Because asset prices are more volatile than the prices of consumer goods and services, large asset price declines can easily occur without a general decline in the price level of goods and services. For example, U.S. stock prices dropped sharply in 1987 with little effect on the general inflation rate.

Most economists believe that sustained changes in the general price level, whether upward or downward, are ultimately a monetary phenomenon. Monetary institutions and policies are generally believed to dominate longer run changes in nominal demand, demand measured in current-dollar terms. If monetary conditions are overly accommodative, the rapid growth of nominal demand will exceed the growth in supply, bidding up the price level of scarce goods and services. Likewise, overly tight monetary conditions result in nominal demand growth that is slower than the growth of supply, causing a persistent glut of goods and services and sustained downward pressures on the price level. This latter case is, obviously, the case of deflation.

Although deflation is always linked to monetary developments, all deflationary episodes are not alike. For example, a severe decline in overall demand might produce a high level of economic slack, putting downward pressure on the price level and creating economic hardship. The depression in the 1930s is an example of such a harsh deflationary episode. But other deflationary episodes, such as the U.S. economy in the late 19th century, were associated with solid real output growth and improved living standards. Thus, the supply of goods and services can grow faster than overall demand, putting downward pressure on the general price level without creating severe hardship.[3]

The benefits of price stability

Even though deflation is not necessarily associated with hardship, many economists and policymakers believe price stability maximizes long-run growth and is therefore greatly preferable to deflation. Even in a period of strong productivity growth with a rapidly expanding supply of goods and services, price stability would produce greater efficiency and economic welfare than would deflation. According to Federal Reserve Chairman Greenspan, "Deflation, like inflation, would distort resource allocation and interfere with the economy's ability to reach its full potential." Changes in the price level, whether up or down, make it more difficult to enter into long-term nominal contracts and create greater uncertainty about long-term investment decisions.

Price stability would certainly be preferable to a period of rapid and variable deflation. In the current environment, such deflation would be unexpected because most economic agents appear to project moderate inflation, rather than deflation, for 1999. Unexpected deflation would arbitrarily redistribute wealth from debtors to creditors, and income from payers to payees, whenever contracts are denominated in nominal terms. Labor markets also might have difficulty adjusting to sharp deflationary pressures because, as product prices fell, employers might have to cut workers' nominal wages to keep production costs under control. In principle, workers should be willing to accept a percentage cut in their nominal wages that just matched the percentage reduction in the general price level because their true purchasing power would be unchanged. But to the extent that workers did not make this purchasing power adjustment and resisted nominal wage cuts, the unemployment rate might rise to a higher level and remain there longer, with accompanying losses in the real output of goods and services.

Price stability would probably also be preferable to a period of moderate deflation, such as occurred in the late 19th century. Although real output can grow solidly during a gradual deflation, many economists feel that growth could be

even better under conditions of price stability.[4] Even a moderate deflation—like a moderate inflation—can compound over time into a large change in the general price level. This uncertainty about the long-term value of nominal debt and contracts could make long-term planning more difficult and thereby discourage long-term investments and production relationships that might raise economic efficiency.

Relative price changes

The dramatic declines in some prices last year reflected special factors affecting the markets for goods rather than a general decline in the price level. As the first section showed, most broad measures of the U.S. price level are not falling, although the general inflation rate is low by recent historical standards. The price indexes that are falling, such as the PPI, are those that most closely reflect the sharp decline in crude oil prices and the other downward pressures on prices of internationally traded goods. In addition, computer prices have continued to fall because of an exceptionally high rate of technological advance. The declines in prices for goods represent changes in relative prices, the prices of particular goods or groups of goods relative to other goods and services, rather than a declining general price level.

Economists believe that relative price changes are natural and desirable in a free market economy. Relative price adjustments allocate scarce resources toward the industries and products that are most highly valued by society. When demand decreases for a particular item, such as oil, the declining relative price of oil causes producers to lower their output.[5] At the same time, the lower relative price gradually encourages greater use of oil by businesses and consumers. The decline in the amount of oil produced and the rise in the quantity of oil demanded gradually bring the oil market back into balance.

Relative price declines are, however, more likely to result in outright price declines for particular goods and services in a period of low inflation or price stability. In a period of high inflation, relative price declines can occur when particular products, say, consumer electronics, have a lower inflation rate than other goods and services. However, the price of these goods in dollar terms would still be rising. But if the general inflation rate declines much closer to price stability, the required changes in relative prices may occur only through outright cuts in the dollar prices of the consumer goods. With the general price level currently rising at low rates, outright declines in dollar prices have become more common.

Short-term chances of deflation

Besides the fact that broad measures of the price level are not currently declining, short-term forecasts for the U.S. economy do not envision deflation in 1999 (Table 2). For example, three surveys of economists project moderate increases in the inflation rate this year. The Survey of Professional Forecasters projects a 2.3 percent gain in the CPI this year, and a 1.6 percent increase in the GDP price index. The Blue Chip consensus foresees a 2.1 percent increase in the CPI and a 1.7 percent rise in the GDP price index. The Livingston Survey of economists found an average forecast for CPI inflation of 2.2 percent over the 12 months ending in December 1999. Households responding to the University of Michigan's Survey of Consumers expected a somewhat higher inflation rate this year. These households expected the CPI to increase 2.7 percent in 1999.

Forecasters do not anticipate deflation this year because the fundamental factors underlying price developments do not seem consistent with a generalized glut of goods and services. As noted earlier, deflation occurs when the supply of goods and services outruns general demand. Such hardly appears to be the case for the U.S. economy at the moment. Demand has been

Table 2

INFLATION FORECASTS FOR 1999

(Percent)

Forecast	Date published	CPI	GDP price index
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	December 1998	2.7	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.

expanding at a strong pace over the last couple of years, and most economists anticipate continued, although more moderate, growth in 1999. For example, business economists responding to both the Survey of Professional Forecasters and the Blue Chip survey anticipated 2.1 percent real GDP growth this year.

As long as household spending remains vigorous, it is hard to imagine a deflationary glut of goods and services developing in the U.S. economy. Many forecasters do anticipate some slowing in the growth of consumption after a brisk expansion in 1998. But solid growth of consumer spending is still widely anticipated for this year. Consumer confidence remains high, job growth has been strong, and lenders remain willing to extend credit to the consumer sector overall. Households have also been buying both new and existing homes at a rapid rate, which may spur additional spending on furniture, appliances, and building materials. With mortgage rates at low levels by recent standards, most housing analysts anticipate a healthy housing market this year, although some anticipate slowing in the market from last year's strong pace.

If sustained price level movements are ultimately a monetary phenomenon, it should also be reassuring that monetary and financial conditions appear supportive of further spending growth this year. The money supply and consumer credit are growing at ample rates, and interest rates on corporate securities are relatively low. The stress in financial markets has eased compared with the late summer and early fall of last year, although corporate yield spreads have not retreated to the low levels seen in the first half of 1998. In addition, stock prices have risen substantially over the last few years, implying households have experienced large gains in wealth with which to support their spending.[6]

Moreover, some of the factors that reduced inflation over the last year or two may now be waning. In particular, the dollar declined substantially in the last part of 1998, and nonoil import prices have recently posted some gains after a lengthy string of decreases. Also, energy prices and other crude materials prices may begin to flatten out in 1999 or soon thereafter. With the severe contractions in many developing economies and substantial capacity additions in recent years, such commodity prices may not rebound sharply this year, but these prices also may be less likely to drag down the rate of change in broader price indexes.[7]

Although some fundamental forces may exert upward pressure on inflation this year, methodological improvements to the CPI will tend to reduce reported consumer price inflation. Announced methodological changes are likely to reduce reported CPI inflation by another 0.25 percentage point annually in 1999 and in subsequent years. Beginning with the January 1999 release, the CPI employs a geometric mean formula for index categories comprising 61 percent of consumer spending. The new procedure is expected to better represent how consumers change their spending patterns in response to changes in the relative prices of different items within index categories. This methodological change is expected to lower CPI inflation by about 0.2 percentage point annually. Also in 1999, the BLS will adopt a new sample rotation procedure that is expected to reduce CPI inflation by about 0.05 percentage point annually.[8] Although these methodological changes were all announced by the end of 1998, it is unclear to what extent the forecasters in Table 2 have incorporated these revisions into their inflation expectations.

In summary, the short-term chances for deflation appear negligible. Solid economic fundamentals and a waning of temporary disinflationary factors should prevent any decline in the general price level this year. Indeed, surveys of economists and households show an expected increase in the inflation rate this year, although methodological changes should tend to lower reported CPI inflation.

III. THE LONG-TERM INFLATION OUTLOOK

Beyond the short-term outlook, monetary policymakers must consider the long-term prospects for inflation or deflation. For price stability to be fully achieved, firms and households must have a high degree of certainty about the purchasing power of the dollar in long-term debt and other nominal contracts. Survey evidence on inflation expectations shows that private forecasters do not anticipate deflation. Long-term inflation expectations may be consistent, however, with some modest movement toward price stability last year. But despite last year's low inflation rate, inflation remains a factor in business and household decisions, implying price stability has not yet been achieved.

Long-term inflation expectations

Long-term inflation expectations declined slightly in 1998 according to the latest survey evidence (Table 3). In the Survey of Professional Forecasters, the average annual inflation rate over the next ten years is projected to be 2.5 percent, down slightly from a forecast of 2.7 percent made in the fourth quarter of 1997. Professional economists contacted by the Livingston Survey also predicted a 2.5 percent inflation rate over the next ten years, down from a forecast of 2.8 percent made at the end of 1997. Consumers responding to the Michigan survey expected a somewhat higher annual inflation rate of 2.9 percent over the next five to ten years, down 0.2 percentage point from the expectation in December 1997.

Not all of the decline in long-term inflation expectations should necessarily be viewed as true progress toward price stability. Part of the downward adjustment in inflation expectations

Table 3

LONG-TERM INFLATION EXPECTATIONS

(Percent per year)

			CPI inflation
Expectation source	Date published	Expectation horizon	Expectation
Survey of Professional Forecasters	4th Quarter 1997	10 years	2.7
	4th Quarter 1998	10 years	2.5
Livingston Survey	December 1997	10 years	2.8
	December 1998	10 years	2.5
University of Michigan Consumer Survey	December 1997	5-10 years	3.1
	December 1998	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.

could be due to the announcement of CPI methodological changes, as discussed in the previous section. For example, the adoption of a geometric mean formula for the CPI, which is expected to reduce inflation by 0.2 percentage point annually, was announced in April 1998. This announcement would be expected to reduce long-term inflation expectations, but such methodological revisions are really changes in the measurement yardstick rather than true progress toward price stability. Moreover, it is unclear how rapidly consumers and economists incorporate methodological changes into their expectations, and survey respondents may still have been incorporating methodological changes that were announced before 1998. As a result, it is impossible to know with certainty what part, if any, of the downward revision to long-term inflation expectations represents progress toward price stability; but any true reduction in long-term expectations was probably modest.

Implications for monetary policy

Just as deflation appears unlikely for the current year, the long-term inflation expectations in Table 3 suggest it is highly unlikely the U.S. economy is entering a prolonged deflationary period. Of course, forecasts by households and economists are not infallible. But the long-term expectations do show that, if deflation were to develop, the decline in the general price level would be unexpected and therefore would reduce economic welfare. In this event, some policy response would likely be necessary to prevent a decline in the price level.

Fortunately, U.S. policymakers appear to have adequate policy tools available in the unlikely event that prolonged deflationary pressures were to develop. Because deflation is ultimately a monetary phenomenon, monetary policy alone should be able to counteract persistent downward pressure on the price level.[9] Monetary policy could be eased, resulting in faster growth of

money and credit and, thereby, stronger gains in overall spending that could eliminate any developing glut of goods and services. If necessary, fiscal policy also might be eased to stimulate overall demand through tax cuts or increases in government spending.

Long-term inflation expectations also show, however, that the United States has not yet achieved price stability. With CPI inflation expected to be around 2 ½ percent to 2 ¾ percent annually over the next ten years, inflation still appears to be an important factor in business and household decisions. Because the CPI contains measurement errors causing it to overstate the inflation rate, true price stability would probably be associated with a small measured increase in consumer prices. Although conclusions have varied widely, previous studies put the upward bias in CPI inflation at around 1 percent annually (Shapiro and Wilcox). However, recent revisions to the CPI methodology have probably reduced this upward bias by half, suggesting the current upward bias in CPI inflation is roughly ½ percentage point annually.[10]

The long-term inflation expectation of around 2 ½ percent to 2 ¾ percent annually over the next ten years is well above the estimated bias in CPI inflation. This gap suggests that both forecasters and households expect inflation to remain a factor in economic decisions for the foreseeable future, and shows that they expect CPI inflation to rise from last year's surprisingly low rate. It is unclear, however, whether all respondents to these surveys were aware of recent and impending changes in BLS methodologies. To the extent that bias-lowering methodological changes have not been incorporated into expectations, the U.S. economy might be somewhat closer to price stability than the forecasts in Table 3 imply. But the long-term inflation expectations still suggest that price stability has not been achieved because the forecasts are well above the one percentage point bias estimated before the introduction of revised methodologies.

IV. CONCLUSION

Recent low inflation in the United States and other developed economies has made deflation a greater concern than at any other time in the last 30 years. A variety of factors, including weak foreign demand and sharp declines in crude oil prices, have put downward pressure on goods inflation, while services inflation has remained moderate. But a decline in the general price level still appears unlikely this year because of strong domestic demand and the probable disappearance of some of the temporary factors that are lowering goods inflation. Over the longer term, deflation also appears unlikely because monetary and fiscal policy can keep nominal demand growing at about the same rate as the supply of goods and services, preventing a deflationary glut. Survey evidence shows that neither professional forecasters nor consumers expect deflation in 1999 or over the next ten years.

Survey evidence also suggests, though, that inflation remains a factor in many economic calculations. Although there may have been some recent progress toward price stability, long-term inflation expectations remain above estimates of the upward bias in the CPI. As the world economy eventually recovers from recent financial and economic turmoil, policymakers will need to exercise continued vigilance to maintain, and possibly extend, the gains in efficiency and welfare stemming from a lower inflation rate.

APPENDIX

ALTERNATIVE INFLATION MEASURES

Several measures of inflation in final goods and services prices are available. The consumer price index (CPI) tracks the average change in the prices of a fixed set of goods and services purchased by the typical consumer. The CPI is known as a *fixed-weight* index because the basket of goods and services is fixed from year to year. The all-items CPI, known simply as *the* CPI, measures the average price change of all goods and services purchased by consumers. The more specialized *core* CPI measures the prices of nonfood and nonenergy goods and services. The exclusion of food and energy prices, which tend to be highly volatile, can help make underlying inflation trends more apparent.

The chain-weighted price index for personal consumption expenditures (PCE price index) provides an alternative measure of consumer prices. Like the CPI, the PCE price index measures the average change in the prices of goods and services purchased by consumers. Moreover, most of the prices for specific goods and services included in the PCE price index come from the CPI. However, the PCE price index differs from the CPI in some important ways. First, the PCE price index allows for broad year-to-year changes in the basket of goods and services purchased by consumers. Particularly, the index allows for shifts across general categories of goods, such as from ground beef to frozen food. Inflation in the PCE price index is the average of two fixed-weighted measures of overall price change. In measuring inflation from the past year to the current year, one fixed-weighted index uses the past year's composition of consumption purchases to weight individual price changes, while the other index uses the current year's composition of purchases to weight individual price changes. Second, for some items, the PCE price index and the CPI use different price information. For example, the PCE price index is constructed using producer, rather than consumer, price indexes for computers. Third, the weights assigned to specific items differ between the PCE price index and the CPI. Medical care, for instance, receives a larger weight in the PCE price index than in the CPI.

The chain-weighted price index for GDP (GDP price index) measures the average price change for all goods and services produced in the United States. Unlike the CPI and the PCE price index, the GDP price index excludes the prices of imports. Like inflation in the PCE price index, inflation in the GDP price index is the average of two different fixed-weight measures of overall price change. One of the fixed-weight indexes uses the past year's composition of purchases to weight individual price changes, while the other index uses the current year's composition of purchases to weight individual price changes. Roughly three-fourths of the specific item prices used to construct the GDP price index come from the CPI and PPI.

Finally, the producer price index for finished goods (PPI) tracks the average change in prices received by domestic producers of a fixed set of goods. While the PPI includes some services, the index largely reflects just goods prices. A core PPI for finished goods, which excludes food and energy prices, is also available.

ENDNOTES

[1] Garner surveyed previous research on the relationship between labor cost growth and the general inflation rate, concluding the relationship is not highly reliable at the aggregate level.

[2] Two major revisions were made to the CPI in 1998. The CPI "market basket" was updated by introducing 1993-95 expenditure weights, along with updated population weights for the geographic sample. This revision is estimated to have reduced CPI inflation by about 0.15 percentage point. In addition, a new method of quality adjustment, called hedonic regression, was applied to personal computers, resulting in an estimated reduction of 0.06 percentage point in the inflation rate. The estimated impacts on the inflation rate are from *The Economic Report of the President*, February 1998, p. 80.

[3] Some analysts attribute the prosperous deflation of the late 19th century to rapid productivity growth. Although productivity growth appears to have been solid in this period, McClellan and Kolivakis argue that strong productivity growth was not primarily responsible for the deflation. Growth of output per hour was stronger in the 1960s without deflationary pressures developing. A more likely explanation, they argue, for the deflation in the late 19th century was an inadequate supply of gold, which was needed to back monetary issues under the gold standard. Because of the limited money supply, nominal demand could not grow fast enough to keep up with the expanding output of goods and services, thereby exerting downward pressure on the price level.

[4] Some economists argue, however, that central banks should attempt to produce a low, stable rate of inflation rather than price stability. Akerlof, Dickens, and Perry claim that downward inflexibility of nominal wages is a pervasive and important economic phenomenon. As result, they argue that moderate inflation facilitates the downward adjustment of wages in purchasing power terms. In contrast, maintenance of a zero inflation rate would impede adjustment in the labor market, resulting in higher unemployment and lower real output.

[5] The example in the text emphasizes a decline in the demand for oil, reflecting the view that a collapse in Asian demand was a major factor in the recent sharp decline in oil prices and other commodity prices. However, supply factors have probably also played a role. Technological advances have reduced the costs of finding new oil fields, and many primary commodity industries have experienced major expansions of supply in recent years. Also, supply-side factors clearly have driven the decline in prices for some goods, such as personal computers. Despite robust demand for computers, technological advances have continually been lowering the costs of computation.

[6] Many financial market observers, however, view the high level of stock prices as a possible downside risk to the economy. A downward correction in stock prices might erase a large amount of household wealth and change consumer psychology, with adverse effects on overall demand growth.

[7] For example, some analysts project a bottoming of oil prices in 1999, with a slow recovery beginning in late 1999 or 2000 as foreign economic growth strengthens (King, Standard & Poor's DRI).

[8] The estimate of a 0.2 percent reduction in CPI bias from the geometric mean formula comes from the BLS. The estimated effect for the new sample rotation procedure is from the *Economic Report of the President*, February 1998, p. 80. Some further methodological changes will also be introduced to the CPI in 1999, but the effects on inflation of the remaining changes either are unpredictable or are expected to be small.

[9] This discussion assumes that monetary policy is not constrained by either a liquidity trap or a zero lower bound on nominal interest rates. Keynes posited that, under certain circumstances, a positive lower bound on nominal interest rates could make it impossible for an easier monetary policy to stimulate overall demand. Some economists have also argued that price stability would hamper the ability of central banks to combat recessions (Summers). If nominal interest rates cannot fall below zero, a central bank might find it impossible in a world of price stability to lower interest rates enough to combat recessions. However, Thornton has argued that short-term nominal interest rates can be less than zero. In addition, Wolman has shown that, in certain economic models, real interest rates may not be constrained even if nominal rates are zero.

[10] The CPI is not the only broad price index that could be used to assess progress toward price stability. The choice of an appropriate index may depend on one's views about the costs and benefits of inflation. The CPI or the PCE chain price index may be especially appropriate if one believes that monetary policy should stabilize the purchasing power of the dollar for households. If one believes, instead, that central banks should try to reduce a broader range of distortions to the relative price mechanism caused by inflation, then a very broad index, such as the GDP chain price index, might be more appropriate. The PCE chain price index and the GDP price index are also subject to measurement errors causing them to overstate the true inflation rate, on average. However, the upward biases in these indexes have not been studied as carefully as the CPI, suggesting the CPI remains a valuable yardstick with which to assess progress toward price stability.

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