

# *U.S. Economic Performance: Good Fortune, Bubble, or New Era?*

**T**he performance of the U.S. economy in the late 1990s was very good by most measures. Overall growth was robust; and both the unemployment rate and inflation were at the lowest levels in over 30 years. But for many economists, delight in the economy's strong performance was tempered by puzzlement, even consternation. Since the 1960s, unemployment rates below 6 percent or so had been associated with rising rates of inflation. Yet in the late 1990s, with unemployment rates around 4 percent, inflation declined.

Explanations for the breakdown in the historic link between inflation and unemployment tend to fall into two categories:<sup>1</sup>

The U.S. economy has been the beneficiary of a number of temporary factors that have held down the inflation rate; and

The U.S. economy has entered a new era of intense competition and high productivity growth in which inflation is much less of a threat.

In addition, some observers have suggested that the U.S. economy is experiencing an asset price bubble somewhat similar to that in Japan in the late 1980s.<sup>2</sup> While a stock market bubble cannot explain recent low inflation rates, it may help to explain why growth has surpassed most forecasters' expectations. Additionally, one can conceive of circumstances under which a decline in inflation would boost equity prices and possibly create conditions conducive to a bubble. Clearly, these three explanations for our recent good fortune have very different implications for the conduct of monetary policy and for other policies as well. However, as the following will show, determining the true state of affairs is no simple task. The article begins with a very brief overview of the link between unemployment and inflation and then proceeds to discuss some of the arguments surrounding each of the three views of the economy.

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## Inflation and Unemployment

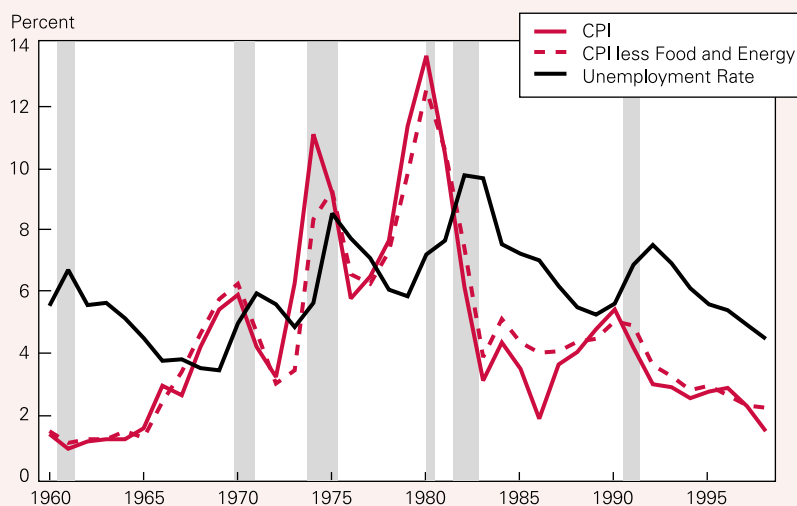
Historically, low rates of unemployment in the United States have been associated with rising inflation, while high rates of unemployment have been associated with declining inflation. Figure 1 shows the pattern since 1960. Particularly noteworthy is the episode in the 1960s, when the very low unemployment rates of that decade gave rise to a sharp escalation in inflation. It was that episode that focused attention on, and seemingly validated, what came to be known as the Phillips curve, named after A. W. Phillips, who published an article in 1958 showing a statistical link between unemployment rates and wage growth in the United Kingdom over a hundred-year span.

The combination of high inflation and high (by historic standards) unemployment rates in the 1970s for a time confounded believers in the Phillips curve. However, once account was taken of the oil price shocks and expectations of future inflation, typically measured by past experience, the link between inflation and the unemployment rate was reestablished. Phillips himself had pointed out that price shocks from imports or agricultural commodities could alter the normal relationship between wage changes and unemployment.

The experience of the 1980s seemed consistent with the Phillips curve. The sharp escalation in unemployment in the early 1980s was associated with a marked slowing in the rate of inflation, and the relatively low unemployment rates of late 1980s were associated with a pickup in inflation. Not all economists interpreted the changes in inflation in this light, however. Some attributed the pronounced decline in inflation early in the 1980s to the Federal Reserve's decision to focus on controlling the money supply rather than interest rates. Others emphasized the effect of more aggressive Fed leadership in combating inflation on expectations of future inflation. It was not the rise in unemployment per se that caused inflation to come down, but the increase in the Fed's credibility as an inflation-fighter that altered expectations. How-

Figure 1

### Inflation<sup>a</sup> versus Unemployment Rate



<sup>a</sup>Year-over-year percent change in CPI.  
Source: U.S. Bureau of Labor Statistics.

ever, credibility is impossible to measure and the financial innovations of the 1980s caused the historic relationship between money growth and the economy to fall apart. Thus, partly by default, as well as through its apparent success in explaining inflation, the Phillips curve began to regain acceptance as offering useful guidance for monetary policy.

Attention increasingly focused on the unemployment rate that would be consistent with no change in inflation. This unemployment rate, known as the NAIRU (Non-Accelerating Inflation Rate of Unemployment) could be backed out of Phillips curve equations in which the coefficients on past inflation were constrained to sum to one. Such a representation of past inflation captures the idea that, notwithstanding the short-run relationship between inflation and unemployment, expectations adjust to eliminate any long-run trade-off.<sup>3</sup> Estimates of the NAIRU centered around 6 percent or a little less.<sup>4</sup>

<sup>1</sup> See, in particular, Gordon and the subsequent discussion by Stock and others in the *Brookings Papers on Economic Activity* (1998, no. 2). Gordon also notes that some economists question whether a stable link between inflation and unemployment ever existed.

<sup>2</sup> See, for example, *The Economist*, April 18, 1998.

<sup>3</sup> Unconstrained estimates were sufficiently close to one that this hypothesis could not be rejected.

<sup>4</sup> Changes in the demographic composition of the labor force affect estimates of the NAIRU. In particular, teenagers and young adults tend to have much higher unemployment rates than older

The Phillips curve–NAIRU framework seemed to work very well in the late 1980s and early 1990s. When the unemployment rate fell to 5½ percent in 1988 and 1989, inflation accelerated; but as soon as the unemployment rate rose above 6 percent, inflation started to moderate.<sup>5</sup> And with the unemployment rate remaining above 6 percent through most of 1994, inflation continued to fall. However, in 1995 and 1996 the Phillips curve started to miss. The unemployment rate fell to 5½ percent. Inflation inched up, but not as much as most Phillips curve relationships would have predicted, particularly in the light of rising oil prices. Then, in 1997 and 1998 the miss became a mile, as the unemployment rate fell below 5 percent and the inflation rate declined.

### Temporary Factors

One explanation for the surprisingly good performance of the U.S. economy in the second half of the 1990s is the beneficial effect of temporary factors. According to this view, temporary factors have held down inflation in the face of low unemployment rates.<sup>6</sup> The low rate of inflation has, in turn, allowed the Federal Reserve to maintain and even reduce interest rates. Relatively accommodative financial conditions, in combination with strong real income growth, the latter partially a product of the low inflation, have supported the continued vigorous expansion of the economy. Even those who believe that more fundamental changes are at work acknowledge that temporary factors have tended to reduce the rate of inflation. At issue is the relative importance of these forces and whether the temporary factors are, indeed, temporary. The most commonly cited temporary factors pertain to the benefits portion of compensation and to the global environment.

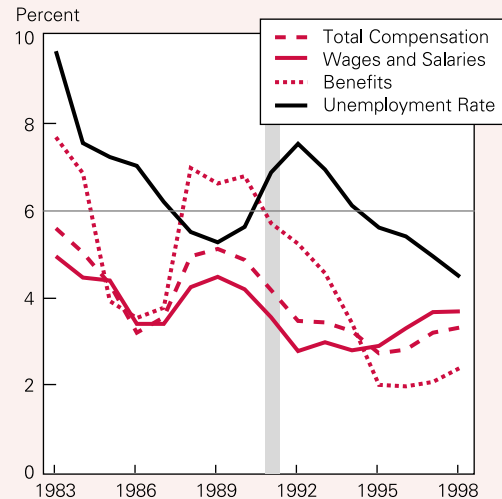
people. Brinner (1999) estimates that increases in the fraction of young adults in the labor force caused the NAIRU to increase about 0.5 percent in the 1960s and 1970s, while a dwindling fraction of young adults in the 1980s led to a similar decline.

<sup>5</sup> Brinner (1999), while asserting that the Phillips curve continued to perform well through mid 1998, attributes the changes in inflation in the late 1980s and early 1990s primarily to changes in oil prices.

<sup>6</sup> An alternative characterization is that the NAIRU has been temporarily reduced. For example, Gordon (1998) allows the declining cost of medical care and several other “supply” shocks to moderate inflation through a decline in the NAIRU. However, as Gordon himself points out, carried to an extreme, such an approach eliminates much of the conceptual appeal of the NAIRU, relegating it to the role of a residual.

Figure 2

### Employment Cost Index<sup>a</sup> versus Unemployment Rate



<sup>a</sup>Year-over-year percent change in ECI.  
Source: U.S. Bureau of Labor Statistics.

### Health Care and Other Benefits

When questions were first raised about whether the traditional relationship between unemployment and inflation still held, the puzzle seemed less the behavior of prices than labor compensation. The employment cost index (ECI) is considered by many economists to be the best measure of labor compensation costs.<sup>7</sup> During 1995 and 1996, with the unemployment rate at 5½ percent, the ECI declined (Figure 2). The wage and salary component of the ECI edged up slightly, but this was offset by slower growth in benefits costs. Particularly notable was the slowing in the growth of medical benefits.

This slowing in medical benefits was caused by restructuring in the health care industry, spurred, in large part, by employers’ reactions to soaring costs of

<sup>7</sup> The employment cost index (ECI) holds job categories constant, while both business compensation and average hourly earnings are affected by changes in the allocation of employment among different jobs. The ECI includes benefits and thus provides a more comprehensive indication than average hourly earnings of the cost pressures facing businesses. However, some economists believe that the wages and salaries portion of the ECI provides a better gauge of labor market tightness.

## *Impact on the Phillips Curve of Alternative Measures of Inflation and Resource Utilization*

One frustration for economists attempting to reconcile the current low inflation and low unemployment rates with the Phillips curve–NAIRU framework of analysis is choosing among alternative measures of inflation and resource utilization. Different measures give somewhat different pictures of the extent of the breakdown.

Because food and energy costs are volatile, many regressions of price and wage inflation use the CPI excluding food and energy (often called core inflation). The coefficients on unemployment and other explanatory variables derived from these regressions are generally similar to those generated by regressions that use the total CPI or other inflation measures that include food and energy. The fits may differ, but not so decisively that one can say with absolute confidence that one measure of inflation is a better representation of the truth. Nor is the logic in favor of one measure versus another overwhelming. And in most circumstances, it does not matter. But that is not so true at present. Sharp decreases in energy prices in 1998 caused the aggregate CPI and the price index for personal consumption in the GDP accounts to grow more slowly than core inflation. Thus, projections of future inflation or wage growth that incorporate the CPI will tend to be lower than those that employ core CPI.

Similarly, Phillips curve-type regressions can be estimated using industrial capacity utilization as the measure of resource utilization rather than the unemployment rate. Most economists who have worked with the Phillips curve prefer the unemployment rate. It was, after all, the measure used by Phillips. Moreover, it covers the whole economy, while capacity utilization is calculated only for manufacturing, mining, and utilities. On the other hand, to the degree that one is trying to represent not only pressures from the labor market, but also the effect of limitations on production from shortages and bottlenecks, as well as the effect from overseas competition in tradable goods, capacity utilization may have something to offer.

In any event, capacity utilization and unemployment rates are closely correlated; so regressions run with either variable will generally show a

plausible and statistically significant link to inflation. However, in the past few years, the unemployment rate and capacity utilization have diverged, with the unemployment rate showing a higher degree of resource utilization and greater inflationary potential than capacity utilization. Given that inflation has been low, does it follow that capacity utilization is the better measure? Perhaps, but not necessarily. The problem for the economist is to determine whether capacity utilization really belongs in the model or whether its explanatory power in the past derived largely from its correlation with unemployment, and its recent divergence from unemployment—in a direction more consistent with inflation—is simply attributable to chance. If the latter, introducing capacity utilization into the model is not very different from adding a dummy variable to represent the past several years. It improves the fit but not the ability to forecast.

The introduction of other variables, the recent behavior of which seems consistent with recent inflation, raises similar concerns. Help-wanted advertising is a case in point. Help-wanted advertising moves inversely with the unemployment rate; but in recent years help-wanted advertising has remained relatively low, while the unemployment rate has fallen. Many people attribute this to a shift from newspaper ads to the Internet. However, including help-wanted advertising in a Phillips curve equation would reduce the measure of resource utilization and improve the fit.

On the other hand, relationships can change. A variable that seemed in the past to have no independent explanatory power, may become important. For example, prior to the oil price shock of the mid 1970s, attempts to assess the effect of energy prices on the demand for electricity or motor vehicles or other things did not find much impact. Energy prices did not move very much, so they seemed to have little influence on demand. However, the oil shocks ushered in an era of much more volatile prices, and it quickly became apparent that oil prices do matter.

Sometimes even the most scrupulous analysis of historical data cannot distinguish among competing hypotheses.

medical insurance in the late 1980s and possibly by the prospect of federal legislation. Through much of the 1980s, benefits costs and health care benefits in particular had risen faster than wages and salaries. Initially reluctant to upset their workers by altering health insurance plans or reducing benefits, employers eventually responded aggressively. They increased workers' shares of premiums, encouraged employees to enroll in health maintenance organizations, and shifted among health insurance plans in search of the best price. These actions introduced a new competitive spirit into the health care field, one based more on costs.

Thus, the 1990s brought growing use of HMOs, faster hospital discharges and more use of outpatient facilities, and widespread mergers and consolidations in the high-cost hospital component of the medical system. The result was a substantial slowing in the

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rate of inflation for medical care and the rate of increase in health care benefits, as measured in the ECI. Employers' expenditures on health insurance slowed even more, reflecting not only the moderate rate of inflation in benefits costs but also cutbacks in the benefits packages provided.<sup>8</sup>

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<sup>8</sup> Engel (1999) presents data showing that employers' expenditures on health insurance actually declined in 1995, 1996 and 1997. Data for 1998 were not available. In 1990 and 1991, in contrast, expenditures rose more than 10 percent per year.

completion. Indeed, that point may have been reached. While the rate of inflation in medical care fell from more than 9 percent in 1990 to less than 3 percent in 1997, it has since edged up slightly.

Other temporary factors also contributed to the moderation in benefits growth. A number of state governments enacted changes in workers' compensation in the late 1980s and early 1990s, which resulted in one-time reductions in this component of benefits.<sup>9</sup> In addition, the strong stock market increased the assets of defined benefit pension plans, thereby reducing employers' obligations to make current contributions.<sup>10</sup>

Brinner (1999) has argued that, once account is taken of the temporary factors reducing the growth in benefits, the behavior of the ECI through the middle of 1998 was consistent with traditional Phillips curve analysis. If a break with the past occurred, it was not in the relationship between unemployment and compensation, but in the link between compensation and prices. Even the decrease in compensation growth toward the end of 1998 and into 1999 can be interpreted in a Phillips curve framework. Workers care about their income relative to the prices of goods and services purchased, and employers care about labor costs relative to the prices of products sold. Thus, the decrease in price inflation in 1997 and 1998 may have reduced both workers' and firms' expectations of future inflation and slowed compensation growth.

Not everyone, however, accepts that temporary factors account for the moderate increase in compensation growth. The argument is not over whether temporary factors affected benefits. They did. Rather, some would argue that reductions in benefits should have been offset by increases in wages, leaving the link between total compensation and unemployment unchanged. That workers did not respond to reductions in benefits by demanding higher wages is seen as an indication of a more docile work force.

Among the arguments advanced for why workers may have become more docile are the decline in unionization—from 20 percent of all workers in 1983 to 16 percent some 10 years later<sup>11</sup>—and increasing global competition and the associated threat that jobs might be lost to other countries. Additionally, although the 1990–91 recession was quite mild, it

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<sup>9</sup> Employers' contributions for workers' compensation and unemployment insurance are treated as employee benefits in the ECI.

<sup>10</sup> Since the ECI looks at compensation as a cost to the employer, it is the employers' contributions rather than the retirees' income that constitute pension benefits as measured by the ECI.

<sup>11</sup> *Statistical Abstract of the United States 1998*, Table No. 712.

did produce cutbacks in industries such as banking, and occupations such as management, that historically had been relatively immune to recessions. Companies' rising use of temporary workers rather than permanent hires may also have created an aura of uncertainty.<sup>12</sup>

The counterargument has two parts. First, workers may not value a dollar of benefits as much as a dollar of wages; and second, even if compensation, rather than wages and salaries, is what really matters to workers, some of the reductions in benefits costs were probably not discernible to workers. The reduction in employers' contributions to pension plans attributable to the strong stock market would most likely not be regarded as a "take-away" from workers. Nor should workers care that their employers' costs for medical care are rising more slowly—provided the benefits to the worker are unchanged. A shift to a less generous health care package might reasonably be expected to lead to demands for higher wages; but the full extent of the benefits reduction might not be recognized right away, possibly not until a medical problem was incurred.

As for the reasons why workers might be cowed, both declining unionization and increasing globalization are long-term trends; and yet as recently as the late 1980s, inflation in compensation and prices threatened to flare up when unemployment fell to low levels. Moreover, even if workers were cowed by the somewhat atypical impact of the 1990–91 recession, they presumably would regain their assertiveness as the unemployment rate declined and remained low.

### *Global Financial Crisis*

The other "temporary" factor most often cited as holding down prices is weakness in world demand. Although the U.S. economy has been growing strongly, other parts of the world have fared less well. Total world output increased only 2 percent in 1998, compared to 4 percent in 1997.<sup>13</sup> The greatest economic weakness is in Asia. In the spring of 1997 evidence of serious problems began to emerge in Thailand, South Korea, and other emerging Asian countries that had previously enjoyed very rapid growth. Currency devaluations and financial crises

<sup>12</sup> A more positive characterization of temporary help firms is that they have improved the efficiency of the labor market. In the terminology of the Phillips curve, they may have reduced the NAIRU.

<sup>13</sup> *OECD Economic Outlook*, December 1998, p. 1.

soon followed. Most of these countries fell into deep recessions. In Korea, for example, real GDP fell 5 percent in 1998 after growth averaging over 7 percent in the preceding seven years. In Indonesia, real GDP fell roughly 14 percent, after growth of 8 percent per year earlier in the 1990s.

Japan, the world's second largest economy with output almost 45 percent of that in the United States, was seeing a pickup in growth after an extended period of stagnation when its neighbors and trading partners began to encounter difficulties. The combination of the spillover from these difficulties and tight domestic fiscal policies thwarted the nascent recovery. Real GDP fell almost 3 percent in 1998.

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All of these Asian countries are active in world markets and the falloff in their demand exerted downward pressure on the prices of many goods that are traded globally. Commodity prices, which tend to be sensitive to even small changes in demand, were particularly affected. Oil prices plummeted, falling 35 percent from the summer of 1997 to the end of 1998. Prices also fell sharply for many agricultural products and metals. In the United States, a variety of crude materials experienced price declines in excess of 20 percent, including soybeans, hogs, and scrap metals.

Decreases in commodity prices feed into the prices of consumer goods. This is most apparent at the gas pump, where changes in crude oil prices translate very rapidly into changes in gasoline prices. The effect of changes in energy prices also shows up quite clearly in domestic heating and electricity bills and in transportation services. The impact of reductions in the prices of metals, raw cotton, hides, and logs is not so easily identified; but given competition, it stands to reason that they should be reflected in the prices of final goods.

It is not reasonable, however, to expect such reductions to continue. Even if the Asian economies remain mired in recession, commodity prices should stabilize as suppliers adjust to plummeting prices. Again, oil provides the clearest illustration. Members of OPEC responded to the decline in prices by announcing production cutbacks; and by March 1999 oil prices had risen to \$17 a barrel from \$11 at the end of 1998. Supply can also adjust without concerted action; if prices are below the variable costs of production, individual suppliers will start shutting down operations. Indeed, economic textbooks used to include the hog cycle as the classic example of how prices can fluctuate: If low demand causes prices to plummet one year, farmers respond by breeding fewer hogs the next, leading to a sharp increase in prices.

Beyond the sharp decline in commodity prices, the weakness in Asia has intensified competitive pressures on U.S. producers. Growth in U.S. exports has slowed quite sharply and the U.S. trade deficit has widened appreciably since the Asian crisis. Industrial capacity utilization and manufacturing employment have both fallen. Thus, even though the unemployment rate suggests an economy that is straining its capacity, in the manufacturing sector there is considerable slack.

People have been talking about the competitive pressures from globalization for some time. Indeed, it is an important part of the argument that the United States has entered a new era in which inflation is much less likely to be a worry than it was in the past. However, even if the United States is in a new era of increased global competition, the intensity of that competition was increased by the Asian crisis. And as the Asian countries stabilize, that intensity should diminish.

## *A New Era*

Even before the U.S. unemployment rate fell to levels traditionally associated with higher rates of inflation, the Federal Reserve's decision to increase interest rates early in 1994 prompted an outburst from critics arguing that the economy had entered a new era, in which inflation was less of a threat than in the past. The arguments at that time emphasized the cowed labor force and the pressures on firms from global competition. Today's story is much more optimistic. Global competition is still very much an issue; but these competitive pressures are providing an incentive for investments in new technologies and the

adoption of new business practices that are yielding productivity gains. Increases in productivity growth are, in turn, allowing the economy to grow rapidly without a pickup in inflation.

## *Globalization*

Advocates of a new era do not see an intensification of global competition as simply a temporary factor brought on by the Asian crisis. Rather, they see a profound change in the conduct of business that has a long course to run before its depressing effects on prices are exhausted. Declining trade barriers; the entry of China and parts of the former Soviet bloc into world markets; and the increasing technical prowess of countries like Korea, Singapore, and India have greatly expanded the number of potential competitors

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and suppliers to U.S. firms. At the same time, U.S. firms have increased their exports and their investments in overseas affiliates. The result, it is argued, is strong downward pressure on the prices of products traded in world markets.<sup>14</sup> A hint of pickup in domestic prices will be cut short by a shift, or at least the threat of a shift, of production to a lower-cost location. Thus, as sellers, U.S. firms feel surrounded on all sides by low-cost, aggressive competitors, while as buyers, they use their access to a global network of suppliers to help them respond to this competition.

The effects of this expansion in the array of competitors and suppliers have been reinforced by changes in the conduct of business. Large companies press suppliers to hold down or reduce prices, threatening to cut off all business if they fail but holding out the promise of more exclusive relationships if they succeed. Wal-Mart is commonly mentioned as a leader

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<sup>14</sup> This argument applies primarily to goods, but trade in services has been increasing and anecdotes about use of foreign facilities for such activities as software development and records processing are numerous.

Table 1  
*Growth in Productivity, Output, and Labor and Capital Inputs in the U.S. Business Sector, 1960–1998*

Percent, Annual Rate of Change

	Output per Hour	Output per Unit of Capital	Multifactor Productivity	Output	Labor Input	Capital Input	Capital/ Labor
1960–70	3.3	.0	2.0	4.3	1.2	4.3	3.3
1970–80	1.8	–.9	1.0	3.5	1.7	4.4	2.7
1980–90	1.4	–.5	.4	3.1	2.2	3.6	1.9
1990–97	1.3	.1	.5	2.9	2.1	2.8	1.2
1990–92	2.0	–1.0	.2	.7	–.1	1.8	3.1
1992–95	.3	.6	.2	3.2	3.2	2.6	–.3
1996	2.7	.4	1.7	4.3	2.0	3.9	2.2
1997	1.4	.3	.7	4.7	3.8	4.4	1.2
1998	2.4						

Source: *Monthly Labor Review*, February 1999, Tables 40 and 41.

in this regard. U.S. automakers, seeking to learn from their Japanese competitors, are also reported to have adopted this approach some years back. Now, however, others are following suit, with large suppliers to such companies doing to their own suppliers what was done to them.

A puzzle is why profit-maximizing enterprises would not have adopted such tactics earlier, if indeed they result in lower costs and, therefore, higher profits. A possible answer is that, a priori, it is not obvious that exerting market power over a select group of suppliers would achieve lower costs than taking the lowest bids from a larger group. However, the successes of Wal-Mart and the automakers have inspired emulators and the effects are percolating through the economy.

### *Productivity Gains*

While global competition and changes in business practices may create a strong incentive to hold the line on prices, doing so in the face of rising compensation costs will entail a squeeze on profits—unless productivity also increases. Declining profits do not represent a sustainable outcome; eventually, firms will raise prices or curtail their expansion. Thus, critical to the argument that we have entered a new era, in which rapid growth and low unemployment rates are compatible with low and stable inflation, is that productivity growth has increased and, in the most optimistic views of the new era, is accelerating.

Productivity growth, or the growth in output per

hour, has picked up. As can be seen in Table 1, in the three years 1996 through 1998, the growth in output per hour in the business sector averaged 2.2 percent, well above productivity growth earlier in the 1990s and through most of the 1980s.<sup>15</sup> Prominent among the explanations that have been advanced for this increase are improved management practices, often based on continuous improvement and other approaches inspired by the Japanese, and the heavy investment in information technology equipment that has occurred in the 1990s.

Although investment in computers and other information technology equipment rose rapidly in the 1970s and 1980s with no discernible effect on productivity, computers are much more pervasive today and, it is argued, are changing the conduct of business in fundamental and productivity-enhancing ways. Federal Reserve Chairman Greenspan, in particular, has drawn attention to Paul David's description of the gestation period of the electric dynamo at the start of the twentieth century.<sup>16</sup> Initially, the impact of the dynamo was quite modest; but as more and more applications were developed and as more and more businesses changed their plant layouts and industrial processes to take advantage of electricity, the benefits multiplied.

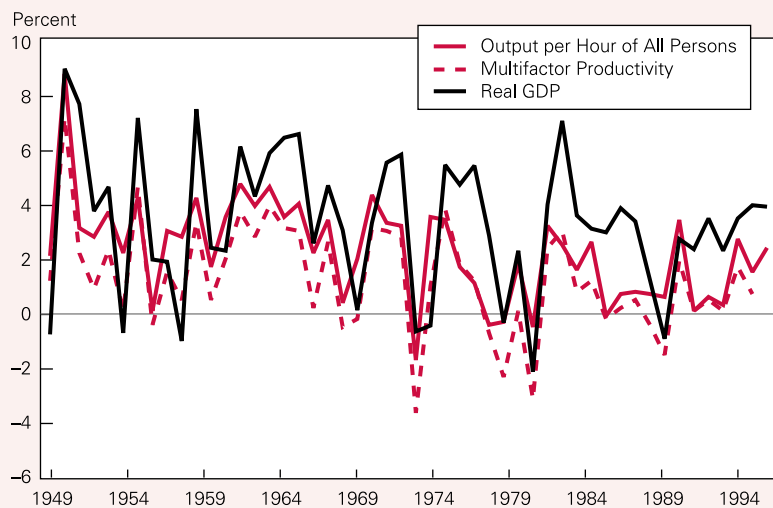
<sup>15</sup> The business sector excludes government, nonprofit institutions, household employees, and the rental value of owner-occupied buildings. It accounts for roughly three-quarters of GDP.

<sup>16</sup> For example, remarks by Fed Chairman Alan Greenspan, "The implications of technological changes," at the Charlotte Chamber of Commerce, Charlotte, North Carolina, July 10, 1998.



Figure 3

*Growth in Business Sector Productivity and in Real GDP*  
Year-over-Year Percent Change



Source: U.S. Bureau of Labor Statistics.

So it may be with computers. The productivity gains may not derive so much from computers per se. Indeed, some would argue that the tremendous increases in computer processing speed and memory have not been matched by comparable improvements in other attributes and in software and, thus, overstate the gains in functionality. Moreover, since depreciation rates are very rapid, much investment simply replaces the existing computer stock. However, computers make possible a host of new products and they may permit organizational changes that allow labor and capital to be used more efficiently. That this is happening now rather than yesterday or tomorrow is simply luck.

Skeptics question the significance of these developments, pointing out that recent productivity growth is impressive only against the abysmal performance of the late 1980s and early 1990s. Moreover, productivity growth is highly cyclical, as can be seen in Figure 3; and, thus, the recent strength of the economy could account for some of the pickup in productivity growth. If growth were to slow, productivity growth would likely slow as well.<sup>17</sup>

More important, even if productivity growth has increased on a long-term basis, it does not eliminate the threat of inflation. If the economy grows faster than the sum of the growth in productivity and the

growth in the labor force, the unemployment rate will fall; and if it falls low enough, inflation is likely to pick up. Thus, during the 1960s, productivity growth exceeded 3 percent per year; but with the economy growing 4 percent per year, unemployment rates fell from 5.5 percent at the start of the decade to 3.5 percent at the end. Inflation accelerated, from less than 2 percent in the first half of the decade to over 5 percent at the end.

An increase in the growth in output per hour *does* mean that compensation can grow more rapidly without generating inflationary pressures. Thus, productivity growth of 2 percent per year, rather than 1 percent, means that compensation growth of 4 percent, rather than 3 percent,

is compatible with labor costs per unit of output rising 2 percent. However, if low unemployment rates pushed compensation growth to 5 percent per year, the growth in unit labor costs would rise, and inflation most likely would increase.

Higher productivity growth could also be reflected in a lower rate of inflation for a given rate of compensation growth. This is not the customary story; but workers are also consumers, and standard theory says only that higher productivity growth will result in higher growth in real compensation, not whether nominal compensation will increase or whether productivity gains will be passed through to consumers (and workers) in the form of lower price inflation. Nor is the historical record much help. In the past 50 years, there has only been one clear change in trend productivity growth—a deterioration following the oil shock of the mid 1970s. In that case, the resultant slowing in real compensation growth came about initially

<sup>17</sup> Even if the economy's productive capabilities have increased in some fundamental way, realizing these benefits on a broad scale depends upon continued growth in the economy. Japan, which had enviable rates of productivity growth in the 1980s and was the source of many of the management practices commonly cited in connection with recent productivity gains in the United States, experienced very meager productivity growth as its economy stagnated in the 1990s.

## *Productivity, Compensation, and Earnings*

When most people speak of productivity, they mean output per hour of labor input. This is also the concept of productivity that the U.S. Bureau of Labor Statistics publishes each quarter in the release "Productivity and Costs." However, capital, in the form of equipment, structures, inventories, and land, also contributes to output. Indeed, one reason why output per hour may increase is because workers have more and better capital at their disposal. Output may also increase because of technological change that allows the inputs of labor and capital to be used more effectively. To capture productivity growth of the latter type, the Bureau of Labor Statistics estimates the growth in output relative to the combination of labor and capital inputs. This measure is called multifactor productivity. Labor and capital and the various categories of capital inputs are combined using weights based on the shares of labor compensation and capital earnings in total output.

As can be seen in Table 1 (p. 10), the rapid growth in output per hour in the 1960s was the result of rapid growth in the ratio of capital to labor and rapid growth in multifactor productivity. In the 1970s, the growth in capital continued to exceed the growth in labor by a substantial although lesser margin; but the growth in multifactor productivity slowed. During the 1980s, both the growth in capital relative to labor and the growth in multifactor productivity slowed yet again.

In the 1990s, multifactor productivity growth remained quite low, although a pickup seems to have occurred toward the end of the period. Interestingly, despite all the investment in computers and information technology equipment, the capital-labor ratio grew relatively slowly. Rapid employment (labor input) growth outstripped the expansion in the stock of capital. The investment emphasis in the 1990s on shorter-lived equipment helps to explain the moderate rate of expansion in capital.

In the United States, labor's share of total income

has been relatively constant at roughly 70 percent for a long time. If one assumes competitive markets and that labor and capital are paid their marginal products, the stability of labor's share of income suggests that the U.S. economy can be reasonably characterized using a particular mathematical representation known as the Cobb-Douglas production function. Among the implications of the Cobb-Douglas production function is that the real wage is proportional to output per worker, with the proportion reflecting labor's share of income. Thus, output per worker and real wages will grow at similar rates.<sup>a</sup>

In this characterization, the impact of higher productivity growth on real wages does not depend upon whether the increase in output per worker comes from technological change or from more capital per worker. In contrast, an increase in output per worker attributable to technological change also increases the real return to capital, while an increase arising from more capital per worker reduces the return to capital—although capital's share of output remains unchanged.<sup>b</sup> Thus, over the long run, technological progress or multifactor productivity growth is the key to rising real wages, since increases in the capital-labor ratio, without technological progress, will eventually drive down the return to capital below investors' discount rate. Given sufficiently rapid technological progress, however, increases in the capital-labor ratio need not impair the return to capital.<sup>c</sup> Indeed, that has been the experience of the United States for most of this century.

<sup>a</sup> With both output per worker and real wages growing at similar rates, labor's share of output remains at roughly 70 percent, with the balance going to capital.

<sup>b</sup> See Mankiw (1994) chapters 3 and 4 for a very clear discussion of the Cobb-Douglas production function and productivity growth in the United States.

<sup>c</sup> Multifactor productivity must grow sufficiently rapidly that output grows as fast as capital.

through an acceleration in price inflation rather than a moderation in compensation growth.

To the degree that an improvement in productivity growth is manifested in a decline in inflation, it could mask the upward pressure from tight labor markets. This is only a temporary phenomenon, how-

ever. Once real compensation growth is consistent with the improvement in productivity growth, the effect of low unemployment rates on price inflation should be apparent.

Thus, to argue that higher productivity has broken the link between unemployment rates and infla-

tion, it is not sufficient that productivity growth has risen from 1 to 2—or even 3—percent. Rather, one must make the claim that productivity gains are, in effect, there for the asking—that firms, faced with cost pressures from tight labor markets or other sources, can come up with the productivity increases or efficiencies that allow them to absorb these without raising prices or squeezing margins. Again, the question arises, Why do firms not take advantage of these opportunities under normal circumstances and increase their profits? Why do they wait to be pushed by higher costs?

For believers in a new era, the buoyant stock market is a confirmation of their optimism. Increases in productivity growth will allow the economy to grow rapidly without inflationary pressures, generating strong growth in earnings, as well as boosting real wages. Thus, the price-earnings ratios that seem so high by historic standards will be validated by future earnings. The Internet, in particular, is seen as transforming the conduct of business and allowing companies that pioneer new uses of the Internet to vanquish traditional rivals. Skeptics counter that even if the Internet does transform how business is done, it does not follow that Internet companies will enjoy extraordinary earnings. Much of the benefit of the Internet is accruing to consumers in the form of greater convenience and greater recreational and educational opportunities. Buyers and sellers are brought together who might not have found one another otherwise. All this may entail important benefits to society, but it may not show up as higher corporate earnings or even higher output as it is customarily measured.

### **Bubble Economy**

Some observers of the U.S. economy believe that the stock market is not just a reflection of the good economic conditions of the 1990s and a promise of more good to come, but an important cause of our unexpectedly strong growth. Since 1990, common stock prices, as measured by the Standard & Poor's composite index, have quadrupled in value. Prices have increased particularly rapidly, more than 20 percent per year, since 1995. This increase in stock prices has increased household wealth; and in the opinion of many economists, this increase in wealth has fueled the very strong growth in consumption that has characterized the past several years.

With capital gains adding to their wealth, households have felt comfortable spending most of their

incomes and taking on additional liabilities, primarily mortgage debt. The personal saving rate fell from 3½ percent of disposable income in 1995 to less than 1 in 1998 (and negative 0.5 percent at the beginning of 1999). Even so, households' financial net worth, particularly the values of their equity holdings, mutual fund shares, and pension reserves, soared (Figure 4).

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*Since 1990 stock prices have quadrupled in value, and this increase in household wealth may have fueled the very strong growth in consumption that has characterized the past several years.*

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Some question whether the stock market can really be an important impetus to consumption, since stock market wealth is quite concentrated.<sup>18</sup> However, participation in the market has broadened substantially; and while the value of the typical household's equity or mutual funds holdings is relatively small, the gains of recent years have boosted these nest eggs considerably. Moreover, the buoyancy of the market may well have induced a sense of optimism about the future that has encouraged even those who are not participants in the market to spend freely.<sup>19</sup>

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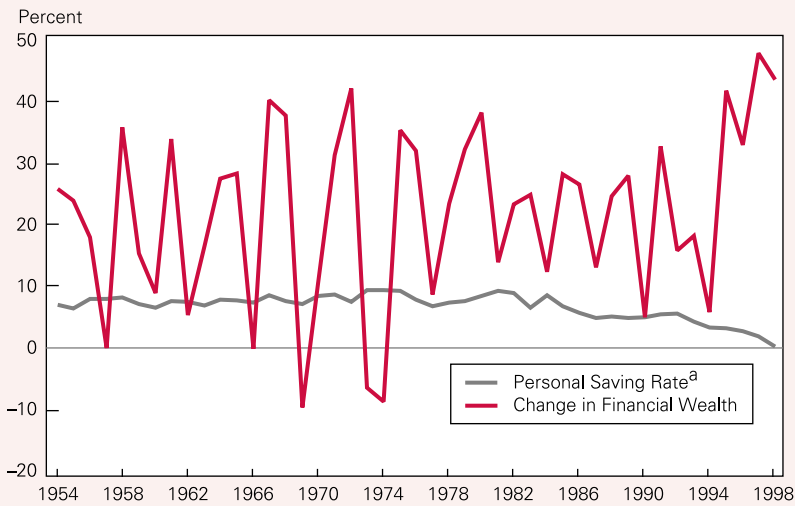
<sup>18</sup> In 1995, 41 percent of all families had direct or indirect stock holdings, including holdings in retirement accounts. The median value of these holdings was \$14,500. However, the 6 percent of families with incomes of \$100,000 were twice as likely to hold stocks and the median value of their holdings was close to \$100,000 (Kennickell, Starr-McCluer, and Sunden, 1997). *The State of Working America 1998–1999* (Bernstein, Mishel, and Schmitt 1999) presents analysis by Edward N. Wolff showing 54 percent of all stock, including stock in defined contribution pension plans, being owned by the 6 percent of families with incomes over \$100,000 (see Table 5.11); the authors also estimate that over 80 percent of the stock market gains from 1989 to 1997 went to the wealthiest (highest net worth) 10 percent of families (see their Figure 5E).

<sup>19</sup> The market itself is also a source of employment and income gains. Although the securities and brokerage industry is quite small, salaries are very high and the industry has been growing rapidly. The share of total U.S. labor earnings accounted for by securities and commodities brokers, which include investment banks, and holding and investment offices, which include mutual funds, rose from 1.2 percent in 1990 to 2.3 percent in 1997. (Source: U.S. Bureau of Economic Analysis, State Personal Income CD-Rom.) Securities firms and mutual funds also purchase goods and services from a host of firms in such industries as printing, law, advertising, and real estate.

Figure 4

### Increase in Household Wealth

Personal Saving Rate and Change in Financial Wealth as a Percent of Disposable Income



<sup>a</sup>NIPA measure.

Source: Board of Governors of the Federal Reserve System.

The recent growth in stock prices has not been accompanied by comparable growth in earnings (Figure 5). In 1995, the price-earnings ratio (PE) for the S&P 500 was roughly 17. This was higher than PEs through most of the 1970s and 1980s, but comparable to PEs in the 1960s. By the end of 1998, however, the Standard & Poor's PE had doubled to over 30—a value not seen in the United States going back to at least 1949.

As noted above, believers in a new era regard these high PEs as anticipating strong earnings in the years ahead. Additionally, confidence in the future may have reduced the risk premium that investors historically have required on equities relative to bonds. However, to some, high and rising PEs suggest a bubble. Prices are so high that even historically fast earnings growth will prove disappointing. In this view, prices have risen based on the expectation of further price increases, with little attention to earnings potential. Stocks of companies built on commerce over the Internet are commonly cited in this regard; valuations are huge for companies that have minimal earnings or even losses.

To the degree that stock prices are not grounded in expectations of future earnings, but in expectations of further appreciation, the situation may be unstable.

Rising prices reinforce expectations of future gains, which feed back in a self-fulfilling prophecy. However, should the upward spiral be interrupted, by some unforeseen shock or simply because of a shift in sentiment on the part of a sufficiently large fraction of investors, prices may collapse. Without the prospect of capital gains and with current prices well in excess of the present value of the expected stream of earnings, prices must fall until their relationship with future earnings is more comparable to the returns available on alternative investments.<sup>20</sup> And just as the increase in stock market wealth buoyed the economy, a decline in wealth would have a negative effect.

### The Stock Market and Inflation

It is easy to see how rising stock prices could provide an impetus to growth; and since most forecasters did not predict the sharp run-up in stock prices, this could help to explain why growth has been stronger than expected in recent years. It is not so easy to see how rising stock prices relate to the unusually low inflation we have experienced. In particular, it is not clear why rising stock prices would help to hold down inflation. Although stock prices affect employers' pension contributions, the impact on inflation must be quite small, as retirement and savings benefits account for only 3 percent of total compensation.<sup>21</sup>

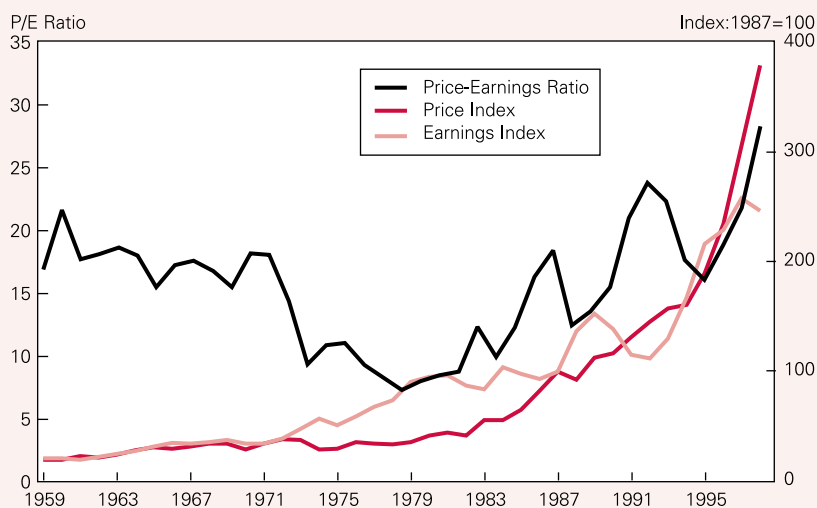
One possibility is that in a world in which stock valuations are based on expectations of very high earnings in the future, managers may think that raising prices in response to labor or other cost pressures is not as effective in supporting share values as other strategies. For example, keeping prices low in order to increase market share, even at the expense of current

<sup>20</sup> This assumes that shareholders' discount rate does not fall sufficiently to offset the shock; but with the prospect of capital gains in doubt, the discount rate seems more likely to rise than fall, aggravating the decline.

<sup>21</sup> *Statistical Abstract of the United States 1998*, Table No. 701.

Figure 5

*Price-Earnings Ratio and Price and Earnings Indexes for S & P 500*



Note: Earnings index is derived from P/E and stock price series.  
Source: Standard & Poor's.

earnings, might be seen as conferring a long-run competitive edge through economies of scale or greater brand recognition that would generate higher earnings in the future. High valuations may also make possible purchasing earnings—or the hope of earnings—through acquisitions.<sup>22</sup>

But perhaps the relevant question is not whether rising stock prices help explain low inflation rates—to which the answer is probably not. A more meaningful question is whether low inflation rates help explain rising stock prices. And to that, the answer may be yes. There are a number of reasons why a low inflation environment might favor corporate equities and, therefore, why a decrease in inflation, particularly in the context of strong growth, might boost share prices.<sup>23</sup>

Most obviously, earnings and share prices typically fall in recessions; and in the United States, most

<sup>22</sup> That shareholders would reward management that uses high market valuations to buy other companies with lower valuations, unless these offered important synergies or cost-cutting opportunities, may seem irrational. On the other hand, if managers have a better sense of their firms' growth prospects than investors, such activities move in the direction of greater efficiency.

<sup>23</sup> Ritter and Warr (1999) and Sharpe (1999) provide reviews of the academic literature on this subject.

of the recessions since World War II have been preceded by rising inflation and tighter monetary policy. In addition, high rates of inflation are typically variable, and uncertainty about the future course of inflation can lead to costly mistakes in planning or to resource-consuming defenses against such mistakes. Inflation may also interact with the tax code to reduce after-tax profits. Thus, low inflation may be seen as auguring well for future earnings.

Changes in inflation also affect the relative attractiveness of stocks and bonds. Stocks and bonds are competitive investments, with potential investors comparing the returns on stocks with those on bonds. The fixed coupon on bonds reflects a real rate of interest plus an inflation premium.

If the expected rate of inflation increases, the nominal interest rate that investors require on bonds will increase. In contrast, since corporate earnings and dividends tend to rise over time with inflation, the investor in stocks should not require an inflation premium; and thus, in principle, the ratio of dividends or earnings to stock price should not change with changes in expected inflation. In fact, however, the ratios of earnings and dividends to price do tend to rise and fall with bond yields and inflation (Kopcke 1997).

While this pattern could arise because higher inflation reduces the outlook for real earnings, some have suggested that stock prices suffer because investors confuse nominal and real variables. Most notably, Modigliani and Cohn (1981) hypothesized that investors use nominal interest rates to discount real earnings and, therefore, undervalue stocks when inflation increases nominal interest rates.<sup>24</sup> Additionally, since the inflation premium on debt is front-loaded, the new

<sup>24</sup> Sharpe (1999) suggests that investors do not discount real earnings with a nominal discount rate so much as fail to fully account for the effect of rising inflation on the nominal value of future earnings, possibly because they base their forecasts on historical data.

investor in bonds receives higher interest payments at the start, while the investor in equities is compensated for higher inflation much more gradually. If investors prefer the near-term certainty of high bond coupon payments to the prospect of dividends growing with inflation over the long run, share prices will be bid down until the dividend-price ratio is more competitive with the coupon on bonds. Conversely, a shift to a low-inflation environment may increase the attraction of stocks relative to bonds, as the inflation premium on bonds and thus the differential between nominal interest rates and the dividend-price ratio are much smaller.

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*Whatever the reason,  
the U.S. stock market in the  
postwar era has been strongest  
when inflation was low.*

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Inflation also interacts with leverage to affect current earnings. If investors focus on the near term or use current earnings to project forward, valuations of leveraged firms will tend to be reduced by higher inflation.<sup>25</sup> An increase in inflation reduces the current earnings of firms with variable-rate debt as interest rates jump up to incorporate the inflation premium, while a decrease in inflation boosts the current earnings of these same firms. (Firms with fixed-rate debt benefit from rising inflation, while a decrease in inflation means that interest payments will consume a larger share of future earnings than anticipated.<sup>26</sup> But in either case, the earnings impact is in the future.)

Various one-time “shocks” may both reduce inflation and, temporarily at least, increase earnings. As noted in discussing temporary factors, restructuring in the health care industry and changes to workers’

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<sup>25</sup> This implies irrationality, or at least confusion, on the part of investors. However, Ritter and Warr (1999) find that investors do make mistakes in valuing leveraged firms in high inflation periods. In particular, they find that highly leveraged firms are undervalued relative to their peers in high inflation periods. They suggest that this result arises from investors failing to take into account that higher inflation reduces the real value of nominal liabilities. Modigliani and Cohn (1981) made a similar argument.

<sup>26</sup> Firms with fixed rate debt may be able to refinance and avoid this outcome.

compensation helped to slow the growth in compensation in the early 1990s. To the degree that compensation growth slows more than price inflation, corporate earnings may benefit. Similarly, a cyclical increase in productivity or a decrease in the prices of commodities and other inputs purchased from abroad may boost earnings.<sup>27</sup> In principle, the impact on share prices should be muted to the degree that the favorable shock is seen as a one-time event or to the degree that competition will cause longer-term gains to be shared with labor or passed on to consumers in lower prices. However, distinguishing between one-time and permanent changes and between the short and the long term can be difficult.

Whatever the reason, the U.S. stock market in the postwar era has been strongest when inflation was low and, to a lesser degree, when real growth was high. As can be seen in Figure 6 and the accompanying regressions in Table 2, both the year-over-year percentage change in stock prices and the level of the PE ratio are negatively related to inflation, while the change in stock prices is positively related to the growth in real GDP.<sup>28</sup>

But can the interaction among low inflation, stock prices, and real growth create too much of a good thing? Can a series of favorable growth and inflation surprises, with favorable impacts on share prices, lead to expectations of future gains and set in motion an asset price bubble? Japan’s experience in the 1980s suggests that it may.

### *Japan’s Experience*

Through most of the 1970s, the value of Japan’s stock market paralleled that of nominal GDP although, consistent with the U.S. experience, values fell as inflation increased and real GDP slowed after the first oil shock. However, the situation changed in the early 1980s. Japan emerged from the world recession relatively unscathed; and as growth began to pick up, inflation remained subdued at just 2 to 3 percent. Stock prices soared. From the end of 1982 to the end of 1989, stock prices rose an average of 25 percent per year. This growth far outstripped the growth in nominal GDP and far outstripped earnings (Figure 7). PE ratios rose from 23 in 1982 to 67 in 1987; an increase in

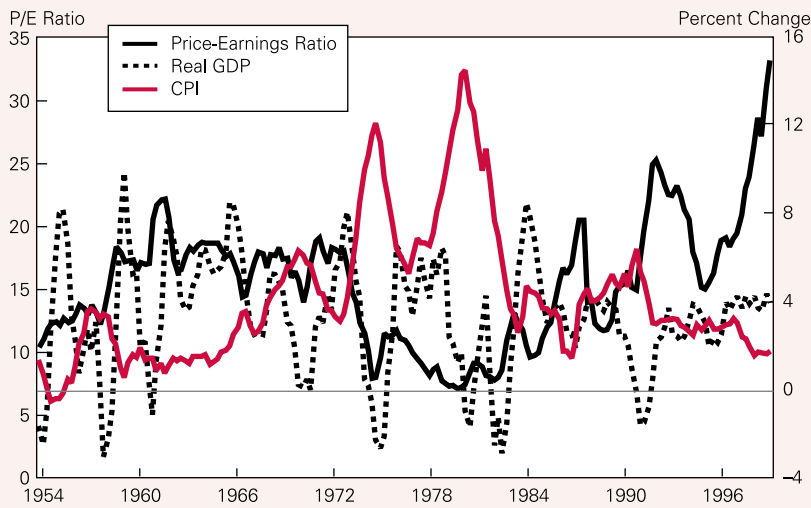
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<sup>27</sup> The inputs need not be purchased from abroad, but must be purchased from outside the corporate sector. Otherwise the higher profits for some firms are offset by lower profits for others.

<sup>28</sup> Since earnings fall in recessions, the PE ratio may actually increase when real GDP declines.

Figure 6

*Price-Earnings Ratio and Year-over-Year Percent Change in Real GDP and CPI*



Source: U.S. Bureau of Labor Statistics, Standard & Poor's.

inflation, and substantial gains in productivity and real income. Although many observers commented on the extremely high values of Japanese stocks and land prices, these were often interpreted as evidence of Japan's economic prowess. Japan had already achieved world preeminence in motor vehicles, consumer electronics, and other important industries; and it was common knowledge that Japan was attempting to establish a leadership position in more technologically sophisticated industries. Thus, many, both internally and externally, believed that Japan would be the dominant world economic power in the twenty-first century.

In 1989 labor market pressures began to emerge, as compensation growth accelerated and productivity growth slowed. Productivity growth was still high by historical and world standards; and inflation, up to 2.3 percent from 0.7 percent the year before, was still well below that in such countries as the United States and Germany. Nevertheless, the Bank of Japan increased short-term rates.

Growth remained rapid in 1990, however; and labor market stresses became more visible, even though productivity growth remained strong. Inflation was now up to 3.1 percent, although a spike in oil prices was a contributing factor. The stock market faltered as short-term interest rates were increased again and as earnings slipped. Over the next two years, stock values fell over 40 percent. Land prices also began to fall. The Japanese economy has still not recovered. The economy stagnated throughout the 1990s, as Japan dealt ineffectively with the fallout from the collapse in land and stock prices. An incipient recovery in 1996 was aborted by a move to more stringent fiscal policy and the crisis in East Asia.

Table 2

*Relationship between Stock Prices, Inflation, and Real Growth*

	Percent Change in Stock Prices <sup>a</sup> 1949:Q1–1999:Q1		P/E Ratio 1954:Q1–1999:Q1	
	Coefficient	t-statistic	Coefficient	t-statistic
Constant	9.96	4.87	19.97	29.24
CPI <sup>b</sup>	-1.16	-3.88	-1.00	-10.03
Real GDP <sup>b</sup>	1.34	3.97	-.14	-1.12
Adjusted R <sup>2</sup>	.15		.37	

<sup>a</sup>Year-over-year percent change in Standard & Poor's 500 index, quarterly data.

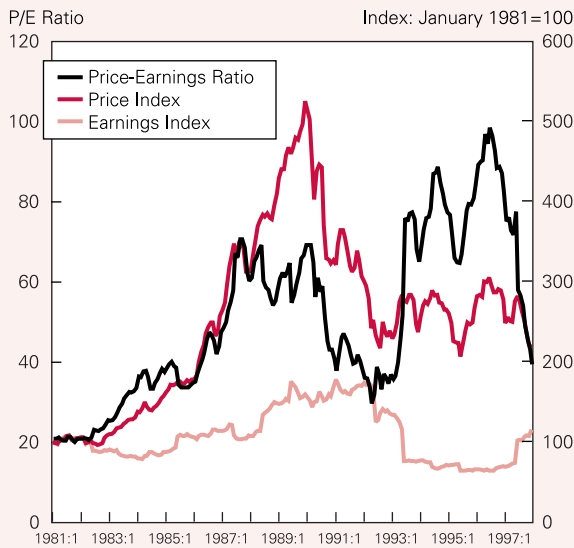
<sup>b</sup>Year-over-year percent change, quarterly data.

earnings then caused PEs to fall back to 55 in 1989. Starting in 1986 land prices in large cities also began to increase more than 20 percent per year, and by 1987 land prices were also increasing quite rapidly in smaller cities.

Throughout this period, real growth was strong and inflation was low by historical standards and relative to that in other countries. Investment spending grew rapidly and growth in output per hour was strong (Table 3). In other words, the performance of the Japanese economy was quite extraordinary—rapid growth, an improving unemployment rate, negligible

Figure 7

*Price-Earnings Ratio and Price and Earnings Indexes for Japan*  
Arithmetic Average of Stocks in  
First Section of Tokyo Stock Exchange



Note: Earnings index is derived from P/E and stock price series.  
Source: Nikkei Macroeconomic Statistics: *Wall Street Journal*.

With the benefit of hindsight, Japan is seen as having experienced an asset price bubble.<sup>29</sup> However, as Japan's experience illustrates, a bubble economy can appear to be performing very well; and at the time, this strong performance may seem justified by economic fundamentals. In particular, Japan's strong productivity growth and aggressive investment spending seemed to support the promise of high future earnings implied by high market valuations. Moreover, while share prices rose much more rapidly than earnings, other potential indicators that Japan might be experiencing a bubble were not helpful. Both capital's share of income and the rate of return on capital in the business sector were increasing in this period.<sup>30</sup> And with inflation low until the very end of the decade, the extraordinary performance must have seemed sustainable.

What held down inflation in Japan? After seeing inflation soar in the mid 1970s, Japan was relatively

<sup>29</sup> See Browne, Hellerstein, and Little (1998) for a fuller description of developments in Japan in this period.

<sup>30</sup> See *OECD Economic Outlook*, December 1998, pp. 214 and 215.

aggressive in resisting subsequent increases. Thus, Japan started the 1980s with a lower inflation rate than many other industrialized countries. Moreover, while Japan did not suffer as much in the recessions of the early 1980s as the United States, for example, unemployment rates did increase to levels that were relatively high by Japanese standards. And when growth picked up, productivity growth also increased, so unemployment rates remained high through 1987. Indeed, the Japanese central bank actually lowered short-term interest rates in both 1986 and 1987. With the benefit of hindsight, this policy was excessively stimulative; but until quite late in the decade, the Japanese economy was operating below its potential.<sup>31</sup>

Beginning in the mid 1980s, inflation was also held down by several "temporary" factors. In 1986, world oil prices fell almost 50 percent. Japan depends on imported oil and, thus, enjoyed the full benefit of the price decline without any adverse impact on domestic producers. Additionally, the value of the yen appreciated sharply from 1985 to 1988. This caused the yen price of Japanese imports to fall. It also forced Japanese companies producing for export to hold down their costs, as the rising yen meant that export goods were less competitive. Presumably, these cost containment efforts spilled over to production for domestic use. Thus, a combination of traditional forces and special factors created a low-inflation environment in which an asset bubble emerged.

The U.S. situation today bears some similarities to the Japanese situation in the 1980s—the favorable effect on inflation of "temporary" factors, a very buoyant stock market, strong productivity, and overall economic growth. However, there are also many important differences. Land prices rose very rapidly in Japan. This provided an additional spur to the economy at the time and, arguably, the subsequent collapse in real estate values has proved as problematic for the Japanese economy as the decline in the stock market. In the United States, real estate values have increased rapidly in some areas recently; but nationwide, housing prices are not increasing all that much and investment in office buildings and other long-lived commercial and industrial structures has been relatively modest in the 1990s.

In addition, Japan was in the process of a financial liberalization that encouraged banks to enter into new and riskier lines of business. This helped feed the bubble in land prices, and the impairment of the banks

<sup>31</sup> See *OECD Economic Outlook*, December 1998, p. 202.



Table 3  
*Economic Conditions in Japan, 1982 to 1997*  
 Percent Change, unless Noted

Date	Real GDP	Employment	Real Gross Pvt. Nonres. Fixed Cap. Formation	Output per Worker <sup>a</sup>	Compensation per Employee per Business Sector	Unit Labor Costs	Consumer Prices	Unemployment Rate <sup>b</sup>	Short-Term Interest Rate <sup>b</sup>	Real Short-Term Interest Rate <sup>c</sup>
Average, 1971–81	4.3		3.3		12.1	9.4				
1982	3.1	1.0	1.3	2.1	4.3	2.6	2.7	2.4	7.0	4.3
1983	2.3	1.7	1.7	.6	2.5	2.8	1.9	2.7	6.7	4.8
1984	3.9	.6	11.4	3.3	4.2	1.6	2.3	2.7	6.5	4.2
1985	4.4	.7	12.1	3.7	3.4	.3	2.0	2.6	6.6	4.6
1986	2.9	.8	4.5	2.1	2.4	1.4	.6	2.8	5.2	4.6
1987	4.2	1.0	5.9	3.2	2.5	−.6	.1	2.8	4.2	4.1
1988	6.2	1.7	14.7	4.4	3.0	−.5	.7	2.5	4.5	3.8
1989	4.8	2.0	14.5	2.7	3.8	2.2	2.3	2.3	5.4	3.1
1990	5.1	2.0	10.9	3.0	5.1	3.2	3.1	2.1	7.7	4.6
1991	3.8	1.9	6.3	1.9	4.3	3.8	3.3	2.1	7.4	4.1
1992	1.0	1.1	−5.6	−.1	.9	2.5	1.7	2.2	4.5	2.8
1993	.3	.2	−10.2	.1	.6	2.0	1.2	2.5	3.0	1.8
1994	.6	.0	−5.3	.6	2.0	1.8	.7	2.9	2.2	1.5
1995	1.5	.1	5.2	1.4	.8	.2	−.1	3.1	1.2	1.3
1996	3.9	.5	9.5	3.4	.5	−1.9	.1	3.4	.6	.5
1997	.8	1.1	4.3	−.3	1.8	2.1	1.7	3.4	.6	−1.1

<sup>a</sup>Calculated from the growth in real GDP and the growth in employment.

<sup>b</sup>Level.

<sup>c</sup>Calculated as the short-term rate less change in consumer prices.

Source: *OECD Economic Outlook*, December 1998, various Annex Tables.

in the subsequent collapse has slowed the recovery. The United States also underwent financial liberalization in the 1980s and also ran into problems with speculative excesses, most notably in the Southwest and New England. U.S. banks and their regulators were chastened by this experience and have focused much more intently on evaluating risk ever since. Some evidence of this more prudent attitude is found in U.S. banks' limited involvement in the troubled East Asian countries, relative to that of Japanese and European banks.

Finally, a number of institutional features of the Japanese economy that are not duplicated in the United States contributed to the speculative tendencies of the 1980s and exacerbated the difficulties of the 1990s. Prominent among these were Japanese banks' ownership of stocks in other companies, including extensive cross-holdings, which made Japanese banks' capital positions and capacity to lend very sensitive to stock market fluctuations, and the greater importance of bank lending relative to capital markets in financing the Japanese economy.

## Conclusions

So what accounts for the extraordinary performance of the U.S. economy? How is it that we have been able to enjoy such strong economic growth and the resulting low unemployment rates without an upturn in inflation? The optimistic story of a new era is internally consistent, but it requires a leap of faith to argue for a fundamental change from the past based on a relatively small number of observations. It also requires ignoring some plausible alternative explanations for low inflation. Plausibility is the strength of the temporary factors story—but it has an ad hoc quality. There are almost too many plausible explanations for the breakdown in the relationship between unemployment and inflation—and no clear ways of sorting out the true ones. Plausibility also wears thin when the supposedly temporary factors persist for so long.

The bubble story is incomplete; while a bubble could account for the economy's unexpected strength, it is not an obvious explanation for why the historic relationship between unemployment and inflation

should have broken down. It is easier to see how a breakdown in the relationship between unemployment and inflation might contribute to a bubble.

Unfortunately, based on Japan's experience in the late 1980s, distinguishing a bubble from a new era is only possible with the passage of time.

## References

- "America bubbles over." 1998. *The Economist*, April 18, pp. 67–69.
- "America's bubble economy." 1998. *The Economist*, April 18, pp. 15–16.
- Bernstein, Jared, Lawrence Mishel, and John Schmitt. 1999. *The State of Working America 1998–99*. Ithaca: Cornell University Press.
- Brinner, Roger E. 1999. "Is Inflation Dead?" Federal Reserve Bank of Boston, *New England Economic Review*, January/February, pp. 37–49.
- Browne, Lynn Elaine and Rebecca Hellerstein. 1997. "Are We Investing Too Little?" Federal Reserve Bank of Boston, *New England Economic Review*, November/December, pp. 29–50.
- Browne, Lynn Elaine, Rebecca Hellerstein, and Jane Sneddon Little. 1998. "Inflation, Asset Markets, and Economic Stabilization: Lesson from Asia." Federal Reserve Bank of Boston, *New England Economic Review*, September/October, pp. 3–32.
- Chase Securities Inc. 1999. "Productive Confusion." *U.S. Economic and Policy Research*, May 20, pp. 3–9.
- Dean, Edwin R. 1999. "The accuracy of the BLS productivity measures." *Monthly Labor Review*, vol. 122, no. 2 (February), pp. 24–34.
- Engel, Cynthia. 1999. "Health services industry: still a job machine?" *Monthly Labor Review*, vol. 122, no. 3 (March), pp. 3–14.
- Espinosa-Vega, Marco A. and Steven Russell. 1997. "History and Theory of the NAIRU: A Critical Review." Federal Reserve Bank of Atlanta, *Economic Review*, Second Quarter, pp. 4–25.
- Feldstein, Martin. 1980. "Inflation and the stock market." *The American Economic Review*, vol. 70, pp. 839–47.
- Fuhrer, Jeffrey C. 1995. "The Phillips Curve Is Alive and Well." Federal Reserve Bank of Boston, *New England Economic Review*, March/April, pp. 41–56.
- Gordon, Robert J. 1998. "Foundation of the Goldilocks Economy: Supply Shocks and the Time-Varying NAIRU." *Brookings Papers on Economic Activity*, no. 2, pp. 297–346.
- Gullickson, William and Michael J. Harper. 1999. "Possible measurement bias in aggregate productivity growth." *Monthly Labor Review*, vol. 122, no. 2 (February), pp. 47–67.
- Kennickell, Arthur, Martha Starr-McCluer, and Annika E. Sundén. 1997. "Family Finances in the U.S.: Recent Evidence from the Survey of Consumer Finances." *Federal Reserve Bulletin*, January, pp. 1–24.
- Kopcke, Richard W. 1988. "Inflation, Taxes, and Interest Rates." Federal Reserve Bank of Boston, *New England Economic Review*, July/August, pp. 3–14.
- . 1997. "Are Stocks Overvalued?" Federal Reserve Bank of Boston, *New England Economic Review*, September/October, pp. 21–40.
- Mankiw, N. Gregory. 1994. *Macroeconomics*, Second Edition. New York: Worth Publishers.
- Modigliani, Franco and Richard A. Cohn. 1981. "Inflation and the Stock Market." *Review of Economic Conditions in Italy*, October, pp. 415–31.
- Phillips, A. W. 1958. "The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861–1957." *Economica*, November, pp. 283–99.
- "Return of the Dread-It?" 1999. *The Economist*, May 22, pp. 29–30.
- Ritter, Jay R. and Richard S. Warr. 1999. "The Decline of Inflation and the Bull Market of 1982 to 1997." June. Draft. University of Florida. <http://bear.cba.ufl.edu/ritter/bull8297.htm>.
- Sharpe, Steven A. 1999. "Stock Prices, Expected Returns, and Inflation." Board of Governors of the Federal Reserve System, *Finance and Economics Discussion Series*, no. 99-2, April.
- Shigemi, Yosuke. 1995. "Asset Inflation in Selected Countries." *Bank of Japan Monetary and Economic Studies*, vol. 13, no. 2, pp. 89–130.
- Tootell, Geoffrey M. B. 1994. "Restructuring, the NAIRU, and the Phillips Curve." Federal Reserve Bank of Boston, *New England Economic Review*, September/October, pp. 31–44.
- . 1998. "Globalization and U.S. Inflation." Federal Reserve Bank of Boston, *New England Economic Review*, July/August, pp. 21–33.