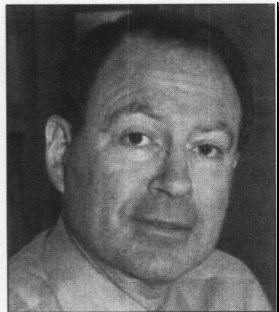


# Understanding Inflation: Lessons From My Central Banking Career

THE MAIN LESSON IS THAT INFLATION IS STILL A MYSTERY

By Harvey Rosenblum



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Committee, which formulates the nation's monetary policy. A widely recognized expert on both the national and Texas economies, he is the author of many articles. He is also a visiting professor at Southern Methodist University and has taught at other universities. He received a BA in economics from the University of Connecticut and an MA and Ph.D. in economics from the University of California, Santa Barbara.

Economic theory—much less modeling based on historical data—has a difficult time keeping up with structural change in the contemporary economy. Anecdotal evidence and a feel for the economy based on experience are likely to be as important as theory-based modeling in making real-time policy decisions on the con-

trol of inflation and the stability of the economy. Many of the phenomena to be understood are microeconomic in nature. While much has been learned about effective stabilization policy over the past forty years, economists still have a long way to go before inflation can be understood and managed.

The theme of NABE's 2002 annual meeting was "Understanding Cycles and Shocks." In light of what's happened to the economy, to NABE, and to its membership since our 2001 annual meeting at the World Trade Center in New York ended prematurely last September 11, I can think of no better theme for the annual meeting.

Economic policymakers responded quickly to the September 11 terrorist attacks. The Federal Reserve remained open for business and provided massive liquidity to the financial system to keep it running. Monetary stimulus was boosted through four additional reductions in the Federal funds rate target, bringing it to 1.75 percent on December 11, 2001, the lowest rate in four decades. As spending on the military and homeland security were added to other federal government spending, deficits ballooned and fiscal policy turned quite expansionary as

This paper is based on the Presidential Address to the National Association for Business Economics at its Annual Meeting on October 1, 2002.

well. Both monetary and fiscal policy rolled into high gear simultaneously, for the first time since the 1970s. We know how badly the 1970s policy mix worked out for the economy. As I speak, many of my colleagues in the economics profession are forecasting rising inflation. Others believe, however, that easy monetary and fiscal policies are barely offsetting the shortfall in demand.

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## ***Economists don't fully understand inflation and have tried to oversimplify it.***

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What will happen to inflation? NABE surveys conducted throughout 2001 and 2002 suggest inflation will remain quiescent during 2003. Beyond that time frame, the outcome is a matter of open debate. In spite of the fact that inflation is such an important macroeconomic variable, I have come to the conclusion that economists don't fully understand the subject and have tried to oversimplify what turns out to be an extremely complex phenomenon.

My career as an economist began in August 1970 when I joined the Chicago Fed. Let me summarize what I've learned since 1970 about inflation and the processes that generate it.

- The Phillips Curve is not a reliable relationship. As soon as you (re)gain faith in it, the curve will shift and break your heart.
- Strict monetarist ideology no longer works in the modern-day financial system. Money is difficult to define, its growth even harder to control, and its relationship to economic activity often uncertain.
- Inflation is an evolving and very complex phenomenon that embodies a combination of macro and microeconomic forces. The economics profession has not fully appreciated the microeconomic factors.
- When the anecdotes and economic data do not corroborate one another, one of them is wrong. More often than not, it's the data. When the anecdotes and the data are in concordance, but the economic models suggest a different outcome, it's time for a new model. When the Fed's Beige Book respondents say they have no pricing power and the inflation statistics are drifting lower, we should seek to find the missing variables in models that forecast rising inflation.
- Macroeconomic models do not deal well with a changing economic structure, let alone paradigm shifts. Policymakers must make decisions in real time and cannot wait for the parameters in their economic mod-

els to catch up and stabilize. When in doubt, policymakers should pay greater attention to the anecdotes, especially large volumes of systematically gathered anecdotes like the ones the Fed analyzes regularly from the Beige Book.

- Last, the inflation experience of the 1970s is an aberration. It was a combination of bad policy and bad shocks played out against a backdrop of bad institutions—monopoly pricing power for business and labor, increasing regulations, and complacency.

### **Confessions of a Monetarist**

I was hired by the Chicago Fed in 1970 to work on micro-banking issues. I was happy to take the job because I thought I would be able to put my other expertise, monetary economics, to good use at the Fed. Armed with the monetarist teachings of Professor Robert E. Weintraub, I sought to educate my colleagues on a few simple principles. Namely, the Fed could expand or contract its balance sheet as needed to control the monetary base and in the process, exercise effective control over the money stock. By smoothing and slowing down the growth of money, the Fed would be able to reduce the rate of inflation, which had been trending up the prior few years. My ideas were not appreciated and were ignored. The St. Louis Fed had advocated a similar plan for several years, but the Federal Reserve System stuck to its operating plan, which sought to smooth fluctuations in short-term interest rates at the expense of influencing the rate of monetary growth. Inflation drifted up throughout the 1970s.

Ironically, the ideas I espoused were not new and had a long and distinguished pedigree. Indeed, these ideas had been enunciated very clearly just a few years earlier in Milton Friedman's Presidential Address to the American Economic Association. Friedman (1968) was succinct: "Inflation is always and everywhere a monetary phenomenon."

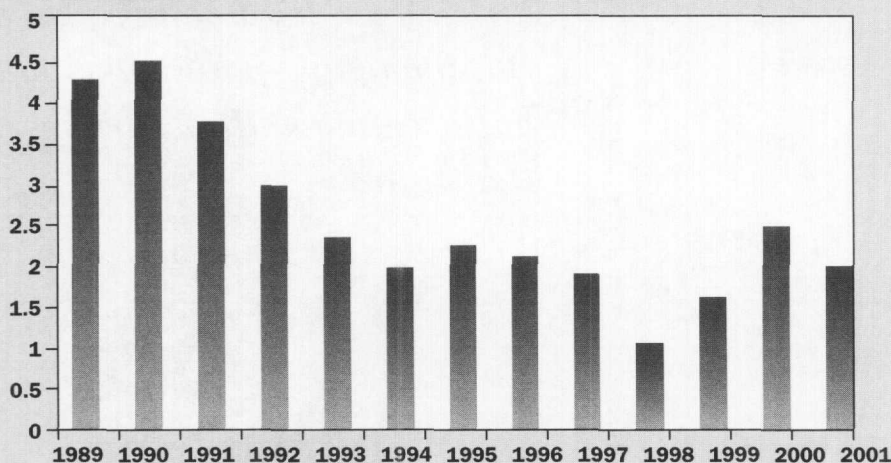
It was adherence to this belief that induced then Federal Reserve Chairman Paul A. Volcker and the Federal Open Market Committee (FOMC) on October 6, 1979, to abandon conducting monetary policy by setting the federal funds rate and to instead focus more directly on controlling the growth rate of money. In part because extreme volatility of interest rates accompanied monetary targeting, and in part because inflation had become muted, the FOMC's experiment with rigid monetary control ended three years after it began.

Although the inflation rate dropped from double-digit levels in the late 1970s and early 1980s, it rarely fell below the three percent to four percent range. The Fed

FIGURE 1

1990S CORE INFLATION DRIFTS DOWNWARD

Percent change (year-over-year)



finally abandoned monetary targeting altogether in mid-1993. The FOMC announced its downgrading of M2 and M1 as intermediate targets because it recognized, in the words of Fed Chairman Alan Greenspan, "that the relationship between spending and money holdings was departing markedly from historical norms.... The FOMC would continue to monitor the behavior of money-supply measures, but it would base its policy actions on a wide variety of economic indicators." In other words, the Fed was abandoning the monetary aggregates because their behavior, at least in the short run, had abandoned us.

In spite of these problems, inflation was well-contained. The inflation experience of the 1990s can be seen in Figure 1. The latest research findings suggest not that money growth doesn't matter, but that it matters over much longer horizons. Work by the Cleveland Fed concludes that "a relatively close relationship between money growth and inflation may exist over eight-year time horizons, at least for the broader monetary aggregates." In other words, money growth is not a particularly useful guide for short-term monetary policy decisions, but long-run inflation trends are significantly influenced by the long-run growth rate of the money supply. However, recent

studies convince me that the definition of "the long run" keeps getting longer, and longer.

**The Phillips Curve and Related Concepts**

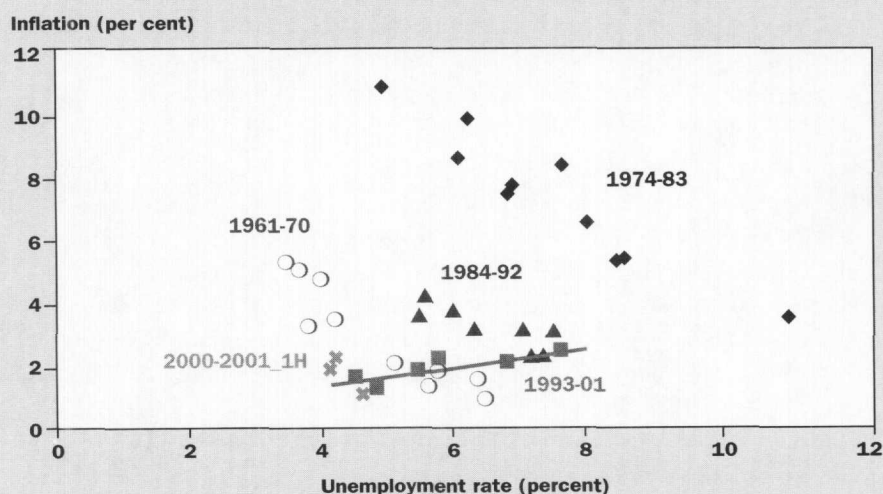
Economists are well known for airing and discussing their differences in public. This has given the economics profession a reputation for never agreeing on much of anything. Nothing could be further from the truth. Economists agree on a great deal and their points of agreement fill the best-selling textbooks in principles of economics, most of which have expanded by a couple of hundred pages over the last decade or so. Can we infer that economists agree on more than they used to? Probably not!

It is a rare text that doesn't spend a dozen or more pages on the Phillips Curve and its cousins, the NAIRU (the non-accelerating inflation rate of unemployment) and the natural rate of unemployment (for short, the natural rate). Until about 1995, the Phillips Curve, which depicted a negative association or tradeoff between inflation and unemployment, generally looked as it was supposed to, though it did tend to shift roughly once a decade. This can

be seen in Figure 2. The Phillips Curve, which depicted a negative association or tradeoff between inflation and unemployment, generally looked as it was supposed to, though it did tend to shift roughly once a decade. This can

FIGURE 2

THE PHILLIPS CURVE SLOPES UP IN THE '90S



be seen in Figure 2. A line fitting the points labeled “1961-70” is the Phillips Curve that prevailed when I studied undergraduate and graduate economics in the 1960s. Following President Nixon’s experiment with price and wage controls in 1971-73, the Phillips Curve relationship shifted in 1974; and over the next decade, U.S. policymakers were confronted with a Phillips Curve array that offered choices that by today’s standards would be labeled “bad” and “worse.”

Once the Paul Volcker Fed succeeded in reducing the inflation expectations of labor and business management, the Phillips Curve shifted once again around 1984. This relationship remained in place through 1992. The relationship began to change in 1994, but this was not apparent until 1995 or 1996. My point is simply that at any given time, it is difficult to know whether the economy is on what is thought to be the then-prevailing Phillips Curve or whether the curve was in the process of shifting to a new location. You just can’t be sure.

By 1996 it was becoming apparent that the rate of inflation associated with any given state of macroeconomic performance had shifted, and by the end of 1997, it was beginning to appear as though the tradeoff, if it ever really existed, was becoming quite favorable. Indeed, some economists began to wonder whether the U.S. economy had entered a world where less inflation could be accompanied by *lower* unemployment!

Shifts in the Phillips Curve had happened previously, but a positively sloped Phillips Curve was unprecedented. (As I discuss later, this very different Phillips Curve gave rise to discussion of a “new” economy.) Many economists still believe the Phillips Curve relationship is immutable and that one-time forces occasionally disrupt the relationship in the short run. Examples abound.

Several studies have been published in the last few years that augment the Phillips Curve relationship by including a number of special factors that have suppressed inflation in the 1990s. To name a few: energy prices, import prices, fringe benefit costs, markup of prices over unit labor costs, maturing of the workforce, and the growth of international trade.

I offer two critical comments. First, the fact that many different combinations of supply shocks can be used to set the Phillips Curve relationship back together is somewhat disturbing. Second, how many years must elapse before it becomes apparent that the Phillips Curve must be augmented by some combination of supply-side forces if it is to have any validity? This underscores my earlier point that the Phillips Curve relationship has ceased to be useful for making monetary policy choices *in real time*.

The dominance of disinflationary forces on changing

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***Volcker’s extreme methods of confronting inflation certainly did differ from his two predecessors. But monetary policy was not the only regime shift occurring at that time.***

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the nature of the Phillips Curve during the period 1993-1999 can be seen in the *upward-sloping* Phillips Curve shown in Figure 2. Let me add, however, that it is not clear whether the period for the upward-sloping Phillips Curve extends beyond 1999. Observations for 2000, 2001, and the first half of 2002 could be interpreted as still another shift and rotation in the Phillips Curve.

### **Other Inflation Indicators**

What about other inflation indicators? A recent Chicago Fed study by Fisher, Liu and Zhou (2002) finds that Phillips Curve models sometimes improve upon naive inflation forecasts in that they help forecast the direction of inflation changes, but not the magnitude, particularly when there has been no change in the monetary policy regime. The authors characterize the period 1977-84 as a shifting monetary regime. During this period the Fed had three different chairmen: Arthur F. Burns, G. William Miller, and Paul A. Volcker. Volcker’s extreme methods of confronting inflation certainly did differ from his two predecessors. But monetary policy was not the only regime shift occurring at that time. Deregulation of several industries—including airlines and natural gas (1978), trucking (1980), railroads (late 1970s), telephones (1982), and banking (1980, 1982)—began in the late 1970s. President Ronald Reagan provided overt support to the Fed’s inflation-fighting efforts during the presidential election campaign in 1980 and when he took office in 1981. And President Reagan’s willingness to fire the air traffic controllers, thereby breaking the union, and imposing downward wage flexibility was another regime shift. The bankruptcy of Chrysler and the wage and work rules concessions made by the auto workers in order to keep the company and their jobs alive, was another regime shift. The need for companies and unions to react to a changing competitive landscape by reducing their pricing power may have been just as important to inflation developments in the 1980s as was the Fed’s effort to match its monetary policy to its stated goal of price stability.

That increased product market competition has impacted labor markets and inflation trends is shown in a couple of papers by my Dallas Fed colleague John Duca (1998, 2000). He presents evidence that increased competition has been associated with a declining rate of unionization, a falling incidence of CPI indexation clauses in union contracts, and increased use of profit sharing arrangements. These three trends are most evident in sectors that have experienced either deregulation or increased foreign competition since the 1970s. Duca's more recent work demonstrates that the increased flexibility in U.S. labor markets stemming from greater competition has restrained U.S. inflation and reduced the NAIRU in the 1990s. Or to put it another way, the increased competitive pressures faced by many U.S. businesses has, during the 1990s, lowered the amount of inflation associated with any given set of macroeconomic conditions.

Is the reduced inflation associated with past deregulation and a tougher competitive environment sustainable? Have the inflation benefits run their course? I can only hazard a guess. Most economists argue that if deregulation affects inflation, it is a one-off phenomenon that results in a one-time change in the price level, not a sustained impact on the rate of inflation. That position may be correct, but it misses the underlying industry dynamics. Next year will mark the twenty-fifth anniversary of airline deregulation. The airline industry is still adjusting. So too are its competitors, customers, and suppliers. Moreover, its railroad and trucking competitors are still adjusting to their own deregulation.

The impact of telephone and telecommunications deregulation will not be complete for years to come. The greater prevalence of market forces in several key sectors of the economy allows the forces of creative destruction to work more quickly and completely throughout the economy. The era of lower inflation for any given monetary/fiscal policy regime and set of macroeconomic conditions could last for many more years. Further efforts to deregulate and privatize would help; but increased regulation and government ownership of productive resources could undermine, and even reverse, the disinflationary process. The trend toward increased regulation, government intervention, and the socialization of airport security in the aftermath of September 11 may already be adversely impacting pricing decisions.

### A Confession Digression

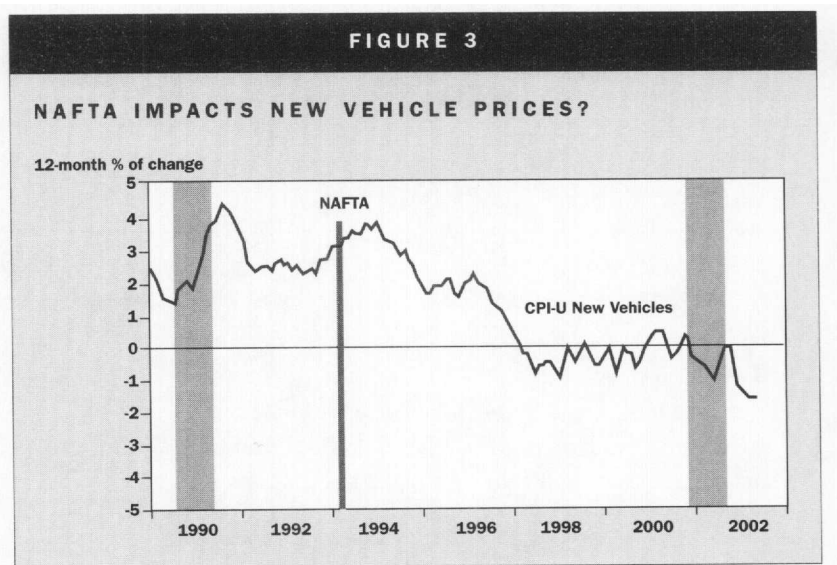
It is time for a confession. I am not a macroeconomist. My doctoral dissertation and the

bulk of my research over my career has been in industrial organization, with special emphasis on banking and financial markets. My focus is microeconomics. Within the Fed, I'm a micro guy in a macro world! I don't fit in, nor do I belong. I have been trained to believe that:

- Pricing decisions are made by private sector businesses and that competition, innovation, and flexibility are paramount factors affecting these pricing decisions.
- The price level is determined by the intersection of aggregate supply and aggregate demand.
- The rate of inflation depends upon how fast aggregate demand grows relative to aggregate supply.
- The disinflation of the 1990s is a result of millions of businesses being forced to compete and innovate and having access to a wider source of labor resources and other inputs than was true in the two prior decades.
- In the 1990s, most of the millions of businesses, whose individual supply of goods and services add up to U.S. aggregate supply, became more elastic in their supply function than previously, implying that any increase in aggregate demand could be accompanied by a smaller increase in the price level.

In this world, increased growth of the economy can be consistent with falling inflation, and even deflation. It's not that businesses seek this outcome, it's just that more contestable markets give them *no other choice*.

An expanded market for sourcing inputs of labor, financial capital, and materials will shift out the aggregate supply curve, at least for awhile. The passage of the North American Free Trade Agreement (NAFTA) in 1993 allowed and encouraged the North American automobile industry to reorganize itself so it could optimize the production of autos and light trucks utilizing labor and mate-



rials from Canada, Mexico, and the United States. This increased the effective labor supply that was available and contributed to a reduction in cost. It may be a coincidence, but the fact that the CPI for automobiles has been falling over the last several years likely has something to do with NAFTA (Figure 3).

TABLE 1

LOCUS OF MANUFACTURING SHIFTS TO THE SOUTHWEST

1985 Rank	State	1999 Rank	State	2002 Rank	State
1	California	1	California	1	California
2	New York	2	Maquiladoras	2	Maquiladoras
3	Ohio	3	Texas	3	Texas
4	Pennsylvania	4	Ohio	4	Ohio
5	Texas	5	Illinois	5	Michigan
10	Maquiladoras				

Source: Bureau of Labor Statistics, Instituto Nacional de Estadística, Geographica e Informatica

The benefits of freer trade in general, and NAFTA in particular, have not been limited to the automobile industry. One of the best-kept secrets in Washington, D.C., is that NAFTA is a success. Mexico has become our second-largest trading partner, with exports to Mexico currently exceeding \$100 billion annually. Because U.S. companies are sharing production among their U.S., Canadian and Mexican plants, the epicenter of U.S. manufacturing has shifted from the Northeast and Midwestern states to the Southwest, as shown in Table 1. If maquiladora manufacturing is thought of as a physical extension of Texas and California production, the locus of manufacturing employment has clearly shifted during the past fifteen years. Moving production to its lowest cost location allows U.S. firms to compete more effectively with foreign companies. This has permitted output to grow while both unemployment and inflation fall.

The economy has been undergoing a number of structural changes in recent years, most, but not all of which have fostered lower inflation. One recent structural shift, the transition from a peace-time to a war-time economy that has occurred following the terrorist attacks on September 11, is working in the opposite direction. War is notorious as a period when demand outstrips supply, when governments run large deficits often financed by printing money and taxing through increased inflation, and where borders tend to be more closed, thereby restricting the input of foreign goods and labor.

## Demographics and Immigration

Let's turn now to the subject of demographics, with special emphasis on immigration. Demographers are fond of the saying: "Demographics is destiny." The United States is a nation of immigrants; as such, the United States redefines its demographic destiny whenever it changes its immigration laws, their enforcement, or lack thereof. Over the last two decades, there has been a sharp increase in legal (i.e., measured) immigration, not to mention a sizeable increase in unmeasured immigration because of benign neglect in enforcement. Consequently, I have often said that the term "immigration statistics" is an oxymoron.

Over the 1990s decade, and to a lesser extent during the 1980s as well, structural demographic forces acted to lower the NAIRU and the inflationary pressures that otherwise might have prevailed. The entry of the baby boom generation into the labor force during the 1970s raised the NAIRU by about 0.75 percentage points, but the subsequent aging and increased experience of the boomers over the 1980s and 1990s lowered the NAIRU by a roughly equivalent amount. Future reductions in the NAIRU from a changing composition of the labor force are expected to be moderate.

A substantial rise in incarceration rates has occurred over the last decade. The removal of this high unemployment group from the labor force has reduced the NAIRU by about 0.2 percentage points. The combined effect of age composition shifts together with better law enforcement and prosecution, has contributed to a decline in the NAIRU of about one full percentage point, thereby reducing the inflationary pressures that might otherwise have been expected as the unemployment rate fell by more than three percentage points during the 1990s expansion. The equilibrium unemployment rate has also been lowered by improvements in job matching efficiency, for example, the rise of private-sector-employment intermediaries, temporary-help firms that deliver just-in-time labor, and such private-sector Internet sites as Monster.com. The improved technology that matches employers with job-seekers has lowered the equilibrium unemployment rate by as much as 0.4 percentage points.

*Immigration.* Immigration increases the supply of labor and reduces shortages of workers in a wide range of skill groups. The 1990s was a period of surging immigration unmatched since the first decade of the twentieth century. During the 1990s, forty-three percent of U.S. population growth came from immigration; during the

1980s, thirty-two percent of population growth was from immigration. Legal immigrants appear to have supplied roughly forty percent of the growth of the U.S. labor force in the mid-1990s.

How has immigration affected inflation? To the extent that immigration has restrained wage growth while allowing output to increase to keep up with demand, inflation is probably lower than it would have been with the slow-growth labor force we would have had without immigration. Immigrants filled about five million new jobs in the 1990s. Without immigration, the unemployment rate would have been well below four percent, possibly reaching three percent or lower. The eased pressure on wages certainly was a factor in restraining inflation—and still is.

When businesses have been unable to bring workers to the job location, they have sometimes managed to take the job to the workers. Such “virtual immigration” is made possible by the Internet and other low-cost communications technologies that have allowed information-processing jobs—such as writing software or processing credit card and hospital bills—to be shipped to other countries, including Ireland, India, and Mexico. This has increased the pool of available labor beyond the conventional measures of the domestic labor force.

Will demographic forces in combination with immigration continue to maintain downward pressure on inflationary forces in the future? In the environment post September 11, 2001, the answer is not encouraging. The barriers to immigration are on the rise, thereby reducing labor force growth.

### **The Role of Economic Policy**

I turn next to the role of economic policy on reducing inflation. Monetary policy became more focused on reducing inflation, at least since Paul Volcker became Fed Chairman in 1979 followed by Alan Greenspan in 1987.

The Fed has been a catalyst in fostering an environment where the concept of price stability became an underlying reality, and where private sector behavior changed to fit that emerging reality. This is no small accomplishment. This position is supported by the academic literature on this subject.

John Taylor (1998) argues that the change in the Fed's post-1979 reaction function to rising inflation “has been the key to keeping the real economy stable.” In particular, he finds that the Fed roughly doubled its sensitivity to rising inflation between the 1965-1979 period and the period from 1980-1998. Since October 1979, the Fed generally raises the federal funds rate by 150 basis points for every percentage point increase in inflation, thereby raising the short-term real interest rate. Taylor dismisses or relegates to

minor importance a range of other factors that are believed by others to have contributed to the increased stability of the U.S. economy over the last two decades. These include discretionary fiscal policy, a more service-oriented economy, improved inventory control, and fewer and/or smaller shocks. Taylor believes that, “Focusing on keeping the inflation rate low and stable and responding aggressively with interest rates is the most important thing the Fed can do to keep the economy stable.”

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More recent work by Christina and David Romer underscores and reinforces Taylor's findings. A key empirical finding of Romer and Romer (2002) is “that had Paul Volcker or Alan Greenspan been confronted with the inflation of the 1960s and 1970s, they would have set the real federal funds rate nearly three percentage points higher than did Arthur Burns and G. William Miller.”

The Volcker FOMC believed that aggregate demand policy not only could, but must, be used to combat inflation. They subsequently raised the real federal funds rate by nearly seven percentage points from 1979:Q3 to 1981:Q3, and it remained high through the 1980s. Equally important was the support the Fed received from fiscal policymakers. This point is made eloquently by Robert Samuelson (2002): “If the great boom of the 1990s had godfathers, they were Paul Volcker. . . and Ronald Reagan: Volcker for controlling inflation and Reagan for supporting him.” Romer and Romer credit the Greenspan Fed for not raising rates despite very low rates of unemployment in the late 1990s. Because monetary policy in the 1990s maintained the same strong aversion to inflation that characterized the 1980s, the Greenspan Fed deserves at least some of the credit for the 1990s disinflation experience of falling inflation accompanied by strong economic growth, together with very low unemployment rates.

### **A New Economy?**

To a Shumpeterian economist like myself, who believes in the renewal powers of creative destruction, the idea of a “new economy” seems like a truism. As noted by Robert Samuelson (2002), “the economy is constantly

recreating itself. It is always 'new,' if 'new' means different from the past." Yet, around 1997 I was talking publicly about the economy being "new and different," not just different.

Let me add some context. As I've mentioned, I have spent a long career with the Fed and the central theme of my career has been understanding inflation, taming inflation, and helping to bring in and maintain an era of price stability before I retire. Something happened during the 1990s to inflation that was not just different from the prior twenty-five years; it was markedly different. A confluence of inflation-depressing forces, each with a half life of five-to-seven years, and perhaps longer, converged on the U.S. economy in the 1990s. Inflation subsided when our economic models said it should have risen. To a central banker whose focus had been on inflation the prior twenty-five years, this was a sufficiently different and potentially long-lived experience to be labeled "new." This had the potential to accelerate my retirement, not because my investments were doing well, but because my inflation goals were being met ahead of schedule and my leadership legacy could be in place faster than anticipated.

When I studied economics in school, I read about cost-push inflation. In my speeches now, I routinely use the term "cost-compression disinflation." I studied about a wage-price spiral and prices and wages moving in only one direction, up, never down. We have two-way price and wage flexibility today: in my lifetime this is "new."

Earlier, I mentioned that I'm a micro guy in a macro world. Consequently, my views on the new economy focus on the environment in which microeconomic decisions are made. To me, the essence of the "new economy" is that when businesses are confronted with rising costs, their impulse is to boost productivity, not prices. Unlike the 1960s and 1970s, there is an economic imperative to boost productivity: raising prices is a last resort. This is fundamentally different. The competitive climate makes raising prices considerably more difficult today than it was three decades ago. These conditions won't last forever, and I have already alluded to ways in which the economic climate is changing since September 11, 2001.

I am not alone in my beliefs about a new economy and the prospect that it will be with us for several years. Former CEA Chairman Martin Baily (2002), who has addressed NABE several times in recent years, defines the driving force behind the new, or different, economy of the 1990s much as I have

done. His findings suggest that the main driver of productivity acceleration was increased competitive pressures that forced improvements in business operations. He adds that the 1990s economy "experienced heightened competition in an increasingly deregulated economy with strong international competition." Firms across a wide range of industries sought out new technologies, not because they wanted to, but to repeat a term I used earlier, because they had no other choice. Baily projects that these competitive driving forces will be around for several years.

While Martin Baily and I put a changed competitive environment at the center of the "new economy," DeLong and Summers (2001) ascribe the essence of the new economy to the "four-billion-fold increase in the world's raw automated computational power in forty years, an average annual growth rate of fifty-six percent per year." Given that Moore's Law is expected to hold up for at least a decade, DeLong and Summers view the "new economy" as having a sustainable life. They conclude "that the principal effects of the 'new economy' are more likely to be 'microeconomic' than 'macroeconomic'."

### Policy Implications

Had it not been for the events of September 11, 2001, which ended NABE's 2001 annual meeting and altered the course of U.S. economic history, I would have forecast that the U.S. economy would have entered a period of sustainable price stability somewhere in the 2004-2007 time frame. As shown in Table 2, the disinflationary forces that characterized the 1990s—in particular, an aggressive and generally tight monetary policy operating against a backdrop of microeconomic forces that suppressed the econo-

TABLE 2

TODAY'S INFLATION TUG OF WAR	
1990s Disinflation Forces	Post September 11 Inflation Forces
• Monetary policy	• Homeland security
• Microeconomic forces	• Federal deficits
• Globalization	• War on two fronts
• NAFTA	• Nationalization (e.g. airport security)
• Deregulation	• Reregulation (Patriot Act)
• Immigration	• Protectionism (e.g. steel, lumber, agriculture)
• Technology	• Immigration barriers
• Competition	
• Productivity	



my's old inflationary tendencies of the 1970s and '80s—were reinforcing one another and bringing the rate of inflation toward the low one percent range, a level that many economists would agree was the operational equivalent of price stability.

While it is possible that the disinflation momentum could have overshoot the price stability region and produced an era of deflation, it is the job of monetary policy to make sure this does not happen. Throughout the 1980s and 1990s, the Fed's job has been to cap the rate of inflation from above. Put differently, the Fed attempted to and succeeded in putting an ever-lower ceiling on the inflation rate. As the economy approaches price stability, the Fed's job has shifted to one of maintaining a floor under the rate of inflation, probably at some very low, but positive inflation rate, on average. Staving off, or fighting deflation, requires a very different monetary policy from the inflation fighting policies of the 1979-2002 era. The Fed's leadership understands this, but, in reality, has no experience with deflation—something not experienced in the United States, in any serious way, since the 1930s. (See Bernanke, 2002)

As alluded to throughout this paper and as shown in Table 2, several inflationary forces have impinged upon the U.S. economy, especially since September 11, 2001. These inflationary forces will likely postpone the start of an era of price stability and render moot the discussion of deflation in the years immediately ahead.

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## *Is money these days a stock or a flow, and how do you define and measure it, let alone control it?*

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### **Summing Up**

In my discussion of inflation, and what I have learned about it in more than forty years of studying the topic, I have said nothing that is "new" to this audience. I have merely elaborated upon the footnotes and qualifying assumptions that appear in most standard economic textbooks. The concept of a natural rate of unemployment assumes that economic and political institutions remain constant. From quarter-to-quarter and year-to-year, this is a reasonably valid assumption. Over a time frame that spans decades, it is not. Monetarist ideas were clearly appropriate when the media of exchange were monopolized by currency issued by central banks and deposits issued by a highly regulated commercial banking system.

In 2002, my children can sit in an outdoor café in Paris and rearrange their portfolio of bank deposits, stocks and bonds on their Palm Pilot or Blackberry. Dick Tracy's wrist radio, once the subject of science fiction, has been superseded by telecommunications equipment available to the masses. Is money these days a stock or a flow, and how do you define it and measure it, let alone control it?

The one constant over the last forty years is that most prices in our economy are determined by market forces that rule over the interactions between businesses, households and governments. Buyers have alternative sources: competition, entrepreneurship, and innovation have not gone away. If anything, they are at least as important as in the past, maybe more important.

I have argued that changes in inflation over time are affected by a wide range of forces, only a few of which have made their way into macroeconomic models. The purpose of models is to simplify the world, not to add complexity. Macro models are further constrained by the availability of a limited number of time series and by the fact that data are collected in discrete units of time such as weeks, months, quarters, and years. Supposedly one-off events like NAFTA or deregulation of airlines can be represented by dummy variables, but not very well, especially when many of these events come in rapid-fire sequence and have mutually-reinforcing impacts on the inflation process, all of which is distributed and propagated over a decade or more.

My conclusion is very simple. Economists have a pretty good understanding about the role of money growth in causing inflation. Over my career, central banks have not only gained this understanding, but they now practice it everyday. Better monetary policy has contributed to overall economic stability.

While the economics profession and central bankers understand that part of inflation that comes from the production of too much money, we don't fully appreciate that part of inflation that derives from the dozens—indeed hundreds—of one-off things like Monster.com or China's accession to the WTO that occur with varying frequencies and that impact with long, mostly unknown, overlapping and variable lags.

To paraphrase Brad DeLong (2000), if economists are to be of any use, they need to come up with a better—and more sophisticated—approach to understanding why inflation rises and falls. Much work remains to be done. ■

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