

How Inflation Hawks Escape Expectations Traps

BY SYLVAIN LEDUC

Why did inflation increase so dramatically from the 1960s to the 1970s? That's a question economists are still debating. One possible theory, however, is that once people started *believing* inflation would rise, the Fed was forced to validate those expectations by increasing the money supply. Sylvain Leduc discusses this "expectations-trap" hypothesis and uses a direct measure of expectations to see if the theory is consistent with the data.

In the early 1960s, inflation in the U.S. was below 2 percent, but by the late 1970s, it was in double digits. Why the inflation rate increased so much over such a relatively short period is still highly debated. Among the different views, one is particularly controversial. The expectations-trap hypothesis suggests that inflation rose dramatically over that period because the Fed, by projecting a dovish image, painted itself into a corner: For whatever reasons, once the public started *believing* inflation would rise, the Fed was forced to validate those expectations by increasing the money supply in the economy. According to this view, doing otherwise

would have been too costly. This article discusses the expectations-trap hypothesis, then uses survey data on inflation expectations to see if a sudden rise in that variable could have led to a burst of inflation.

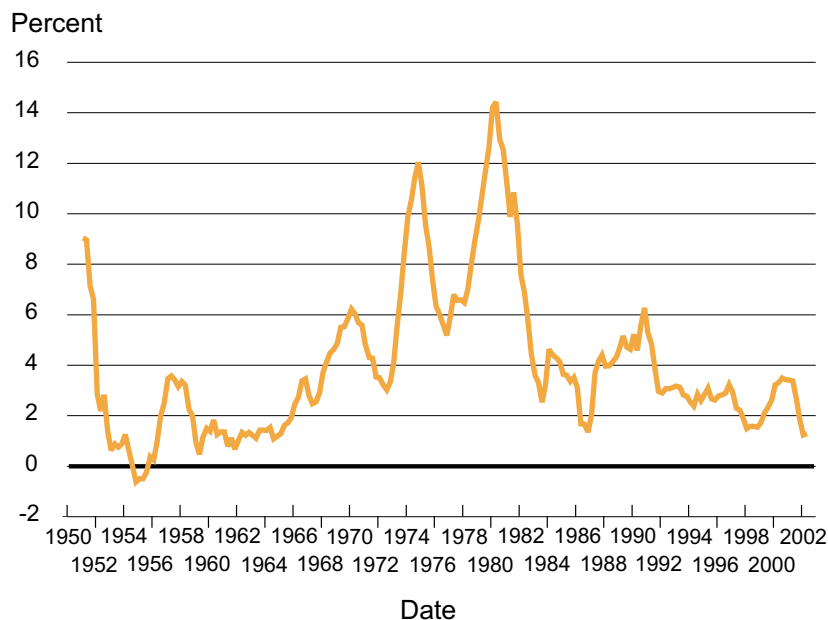
The expectations-trap hypothesis is controversial because it implies that the same set of economic fundamentals, such as industrial production and the unemployment rate, can lead to a drastically different inflation rate, depending on how the public interprets the data and their effects on future inflation. One practical implication of the expectations-trap hypothesis is that it becomes very difficult for theorists and forecasters to predict inflation rates because any inflation rate can be rationalized from a given set of economic fundamentals. The theory could be right or wrong, but in general, it's hard to tell from the data, since we don't know how people will interpret any given piece of economic news.

In this article, I will present an analysis that tries to get around this problem using a data set, maintained by the Federal Reserve Bank of Philadelphia, specifically designed to gather information on expected inflation. By using this direct measure of expectations, we can verify whether the theory is consistent with the data. The empirical analysis will show that the predictions of the expectations-trap hypothesis match the U. S. experience surprisingly well.

Obviously, the economy has changed substantially since the 1970s. The inflation rate has come down dramatically since the end of that decade; it averaged only 2.5 percent a year in the 1990s (Figure 1). Therefore, it may seem that understanding the causes of the inflation run-up of the 1970s would be mainly of academic interest. Yet, this is hardly the case. What triggered inflation to take off has important consequences for policymakers and the conduct of monetary policy today. Has a change in Fed policymaking kept inflation under control since the 1970s? Or has the structure of the economy changed to one favoring low inflation? The 1970s, after all, were much more turbulent than the 1990s. In the 1970s, there were two oil embargoes, and the Vietnam war was still going on. In the 1990s, there was an amazing increase in labor productivity growth. It is certainly easier to control inflation when you are in an environment of fast productivity growth that keeps production costs under control. But if policymaking hasn't changed, and we've just been lucky since the end of the 1970s, the corollary



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FIGURE 1**CPI Inflation**

Note: CPI inflation rate is the percent change year-to-year using quarterly data.

is that inflation can take off again when our luck runs out and economic conditions change. Thus, knowing the causes of the inflation run-up of the 1970s is relevant today.

The empirical work in this article demonstrates that changes in the economic environment are not the only reason for inflation's performance over the past two decades: The conduct of monetary policy must share some of the praise. Indeed, our results show that monetary policymakers have become much more "hawkish" since the early 1980s: They have been more ready to forcefully raise interest rates to fight off sudden increases in expected inflation, a policy they weren't ready to follow in the 1970s.¹

¹ Just as the term hawkish describes a central banker who places more weight on achieving low inflation rates, a "dovish" central banker is one who is less prone to fight inflation, especially if fighting inflation entails lower output growth in the short run.

THE WORLD ACCORDING TO A. W. PHILLIPS

To understand what may have gone wrong in the 1970s, we first have to take a small detour to the world of British economist A. W. Phillips, who, in the late 1950s, published an article that would come to heavily influence policymaking and theoretical economics. His research documented a simple inverse relationship between the rate of growth in nominal wages and the unemployment rate in the U.K. Subsequently, a similar relationship was found between the rate of growth of the prices of goods and the unemployment rate in many different countries. This empirical relationship became known as the Phillips curve, and it led many academics and policymakers to believe that a lower rate of unemployment could be achieved by tolerating a higher inflation rate. That is, by exploiting the Phillips curve, academics and

policymakers thought they could reduce unemployment in the face of adverse events by increasing the money supply and, in so doing, generate inflation.

In a nutshell, the belief was that the unemployment rate could be as low as policymakers desired as long as they were ready to live with a higher rate of inflation. More important, a policymaker, basing his analysis on the Phillips curve, might believe that he could *permanently* lower the unemployment rate by simply creating more inflation.² That is, there would be a permanent tradeoff between inflation and unemployment. Since, in general, the costs of higher inflation are less apparent than those of higher unemployment, policymakers thought they had found an easy cure for the regular slumps associated with the business cycle. And if we look at U.S. economic performance in the 1960s, there were reasons to be optimistic: In 1969, the U.S. economy was in its eighth year of expansion, the longest such episode up to that time. However, the following decade would discredit this view, as the tradeoff between inflation and unemployment suddenly disappeared.

THE NATURAL RATE

As one example of the great power of good theorizing, Milton Friedman in the late 1960s argued that a long-run tradeoff between the inflation rate and the unemployment rate was pure fiction. He predicted that, in the long run, people would come to anticipate changes in monetary policy, adjust their expectations of future inflation rates, and thus neutralize monetary policy's effect on the real economy. In his view, only unanticipated changes in the money supply could affect output.

² For a broader discussion of these issues, see the *Business Review* article by Satyajit Chatterjee.

Suppose the central bank wants to lower interest rates to boost the economy. To achieve that goal, the Federal Reserve would reduce the federal funds rate, which is the rate banks charge one another for overnight loans. Although most people are not directly affected by the federal funds rate, the goal is to change very short-term interest rates, such as the fed funds rate, which then affect long-term real interest rates, which, in turn, do influence people's decisions to buy a car or a house or to save.³ The real interest rate affects people's decisions to spend or save because it dictates the tradeoff between consuming goods today or consuming them in the future. An increase in the real interest rate motivates people to increase their savings, which translates into a lower level of consumption today but a higher one in the future.

To lower the federal funds rate, the central bank would typically need to increase the money supply, which tends to generate inflation. Since the nominal interest rate is the sum of the real interest rate and the rate of expected inflation, a fall in the nominal interest rate would bring about a corresponding fall in the real interest rate only if the public does not expect a change in inflation in the future. But, with time, the public would come to realize that, to keep interest rates low, the central bank needs to increase the money supply, an action that tends to be inflationary. The obvious consequence is that the public would then adjust upward its expectations about the rate of inflation. People would then demand to earn a higher nominal rate of interest on their savings to compensate them for the

³ The real interest rate is the difference between the nominal interest rate — that is, the posted interest rate at which consumers borrow or save — and the rate of expected inflation.

higher expected inflation, which erodes the value of their savings in the future. Similarly, because of higher expected inflation, borrowers would be willing to pay a higher nominal interest rate. This process ultimately leaves the real interest rate unchanged, since rising nominal interest rates offset the increase in

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expected inflation. As a result, monetary policy will lose its ability to affect components of the real economy, such as output, once the public comes to anticipate the change in monetary policy.

Obviously, this is more likely to happen as time passes. In the short run, there may be a tradeoff between inflation and unemployment, but given time, people can gather more evidence that the Fed has instigated a change in policy and can adapt their expectations accordingly.⁴ Therefore, in the long run, a strategy of pursuing an expansionary monetary policy that creates inflation to lower the unemployment rate will not work. An expansionary policy will indeed increase the rate of inflation, but because it fails to lower real interest rates, it will leave the unemployment rate unchanged at its so-called natural rate.⁵

⁴ More specifically, all *nominal* variables, such as the price level and inflation, would be affected by a change in monetary policy in the long run, while all *real* variables, like unemployment, would be unchanged.

⁵ The natural rate of unemployment is determined by fundamental economic factors that tend to change slowly over time, such as demographics, technology, laws and regulations, and social mores.

Friedman's prediction that the tradeoff between unemployment and inflation would vanish as soon as policymakers tried to exploit it received a stunning confirmation just a few years after it was originally stated in his 1967 presidential address to the American Economic Association. By 1975, a new

term, stagflation, had indeed appeared in the economic jargon to characterize the state of the U.S. economy. Stagflation describes an economy with high and rising inflation and high unemployment.

CREDIBILITY AND THE EXPECTATIONS TRAP

What Friedman really pointed out is the importance of inflation expectations for the way changes in monetary policy are transmitted through the economy. His argument implies that monetary policy will lose its ability to stir the economy if the public comes to anticipate changes in policy and alters its inflation forecasts and that policymakers need to keep surprising the public for monetary policy to have some bite.

How changes in monetary policy affect expected inflation is particularly important when central banks have no way of committing to a particular policy, as pointed out in the work of Robert Barro and David Gordon. These authors argued that the rate of inflation would be higher than desired because a central bank, such as the Federal Reserve in the U.S., could not credibly commit to achieving a specific low inflation rate. Central banks often have multi-purpose mandates,

such as maintaining full employment and price stability, which may conflict in the short run.

To see this, consider an economy characterized by a short-run tradeoff between high inflation and low unemployment. That is, to lower the unemployment rate, the central bank needs to engineer a higher inflation rate. The central bank, having a mandate to maintain full employment and price

Proponents of the expectations-trap hypothesis argue that credibility is exactly what the Federal Reserve was missing in the 1970s.⁶ But, more important, because it was perceived as dovish, the Federal Reserve, according to this theory, could be caught in an expectations trap.

The story of the expectations trap usually goes as follows. Suppose there is a sudden rise in expected

the U.S. experience over that decade consistent with the predictions of this theory?

AN EMPIRICAL STUDY OF EXPECTED INFLATION IN THE 1970S

Economics is a science that likes discipline, and there is no better disciplinarian than data. Typically, models' predictions are compared with the (broad) features of the data to investigate whether a particular theory is consistent with the way the real world works. This is what Keith Sill, Tom Stark, and I did to study the expectations-trap hypothesis. However, applying the data to this particular theory is potentially controversial, since it implies knowing how people's inflation expectations change in response to news about the economy. We got around this problem by using the Livingston Survey, which started compiling data on expected inflation in 1946. Joseph A. Livingston, a journalist at the *Philadelphia Record* (and later at the *Philadelphia Inquirer*), started the survey; he polled business economists on their forecasts of some important economic variables, including the inflation rate. Since Livingston's death in 1989, the Philadelphia Fed has been conducting the survey, which polls forecasters from different sectors of the economy (nonfinancial corporations, academic institutions, and Wall Street investment banks) every six months in June and December.⁷

We introduced this measure of expected inflation into an empirical model — a simple vector autoregression (VAR) — to study the implications of a sudden rise in expected inflation for the economy. A VAR is a system of linear equations that link different variables

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stability, would like to achieve low inflation and low unemployment rates. But if the central bank announces a policy of price stability (zero inflation) in the future, no one will believe it. If the public does believe the central bank and expects prices to stay constant in the future, the central bank would have an incentive to generate a little bit of inflation to lower the rate of unemployment. Obviously, no one would be fooled by such a policy for very long, and the public would start taking into account this possibility when forming their expectations.

The main problem facing this hypothetical central bank is that its policy of price stability lacks credibility. The public can see through the central bank's rhetoric and understands the incentives the central bank is facing. Since a central bank lacking credibility would have a tendency to deliver too much inflation, Barro and Gordon went on to argue that credibility is thus a necessary ingredient for achieving low inflation rates. And to gain credibility a central bank must have a clear anti-inflation mandate and be shielded from political influences that will often be too willing to raise inflation in the hope of lowering the unemployment rate.

inflation. The central bank could adopt a more restrictive monetary policy and raise the federal funds rate to fight the increase in expected inflation, but this action has a cost. If there is indeed a short-run tradeoff between inflation and unemployment (that is, a Phillips curve), a rise in the federal funds rate will also lead not only to a lower inflation rate but also to a higher rate of unemployment. A dovish central bank, which assigns too much weight to output growth and not enough to inflation, may not be willing to pay that price. Instead, it would simply accommodate (and validate) the rise in expected inflation by leaving nominal interest rates unchanged. The expectations-trap hypothesis dictates that a sudden increase in expected inflation can therefore lead to a long-run rise in the inflation rate because the dovish central bank ends up validating the initial rise in expected inflation. Proponents of this view argue that the Fed was probably caught in such a trap in the 1970s. But is

⁶ See the article by V.V. Chari, Lawrence Christiano, and Martin Eichenbaum and the one by Lawrence Christiano and Christopher Gust for details on the expectations-trap hypothesis.

⁷ For a more detailed description of the Livingston Survey, see the *Business Review* article by Dean Croushore.

together. For instance, a VAR with two variables, let's say the inflation rate and the expected inflation rate, would also have two equations. One equation would try to explain the movements in inflation. The other would try to explain the movements in expected inflation using previous values of the rates of actual and expected inflation. Our VAR included the rates of inflation, expected inflation, and unemployment, as well as data on oil prices and the federal funds rate. The federal funds rate was included as an indicator of monetary policy. A rise in the real federal funds rate was associated with a tightening of policy, while a fall was interpreted as an expansionary policy. To investigate whether the inflation takeoff of the 1970s is consistent with the predictions of the expectations-trap hypothesis, we first looked at data from 1952 to 1979.

Using our model, we estimated what effect a sudden increase in the expected rate of inflation would have on the rest of the economy. We did that by determining the impact that the change in expected inflation would have on the other variables in our statistical model. We were particularly interested in the way inflation and nominal and real interest rates reacted to this change, since the behavior of these variables is at the core of the expectations-trap hypothesis. This theory states that the sudden increase in expected inflation would be followed by an expansionary monetary policy, since the dovish Fed, fearing the impact on economic activity, would not want to fight the rise in expected inflation with higher real interest rates. As a result, the temporary rise in expected inflation would lead to a fall in the real interest rate and a long-lasting increase in the actual inflation rate.

The first column of Figure 2 shows the responses of some of the variables in our model in the 1952-79 period to a one-time, unanticipated

increase in expected inflation. The solid line in the charts represents the estimated response of the variable to the sudden change in expected inflation; the dotted lines tell us how much confidence we can place on this estimate. In particular, when the dotted lines are both above zero or both below zero, we can say with a 90 percent level of confidence that the estimated response of, say, inflation to the unanticipated jump in expected inflation is significantly different from zero — that

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is, the unanticipated jump has an impact on the variable. For instance, following the jump in expected inflation, actual inflation increases about 1 percent and climbs to 1.5 percent one year after. Then the rate of actual inflation starts falling and stabilizes at approximately 1 percent higher than it would have been without the sudden increase in expected inflation. Also, if you look at the dotted lines in the figure for actual inflation, you can see that both of these lines remain above zero until 10 years after the initial jump in expected inflation. Our model, therefore, predicts that an increase in expected inflation would have a positive impact on the actual inflation rate for 10 years.

Moreover, the figure shows that this effect is the result of more expansionary monetary policy. Although the figure shows that the nominal interest rate rises following the shock, it does not rise as much as the rate of expected inflation, which translates initially into a *lower* real interest rate, as the expectations-trap hypothesis predicts. For instance, immediately

following the increase in expected inflation, the real interest rate falls a half of a percent. And except for the second year (seen in the bottom chart), the real interest rate is about 0.25 percent lower than it would have been without the sudden rise in expected inflation.⁸

Our VAR model, therefore, offers some evidence to support the argument that inflation rose dramatically in the 1970s because the Fed was perceived as too dovish and was susceptible to an expectations trap.

Nevertheless, over the following two decades, inflation in the U.S. has declined steadily. Have we been enjoying a streak of lucky breaks, or has something more fundamental changed?

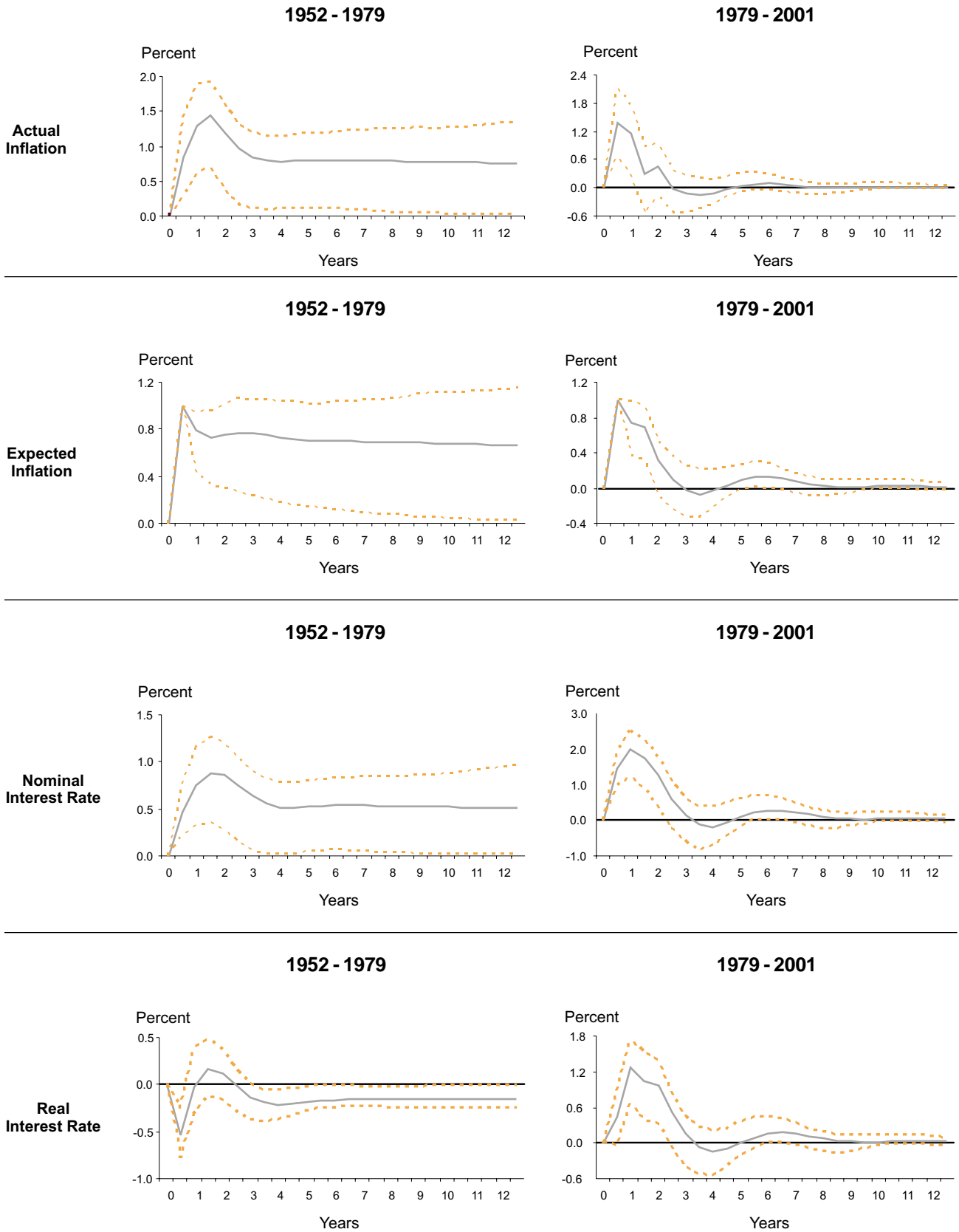
LUCK OR POLICY? AN EMPIRICAL STUDY OF THE POST-1979 ERA

As mentioned in the introduction, the inflation rate has come down dramatically since the end of the 1970s; it averaged only 2.5 percent a year in the 1990s (Figure 1). Although it is certainly true that the economy has experienced some changes that may have contributed to our luck, there is still a good reason to think that it was a

⁸ In the case of the real interest rate, both dotted lines are below zero most of the time, implying that the rise in expected inflation has a negative impact on the real interest rate. However, only in the second year does the real interest rate rise above zero, but in this case, the rise is not significantly different from zero, since the dotted lines are on both sides of the zero line.

FIGURE 2

Responses to a Shock to Expected Inflation



change in policymaking that mainly contributed to bringing inflation to its knees.

In 1979, soon after OPEC agreed to boost oil prices for the second time in the decade, President Carter appointed Paul Volcker as Chairman of the Federal Reserve. In many ways, this appointment is now regarded as one of the most important policy changes enacted since WW II, a change that is often viewed as the Waterloo for rampant inflation. For one thing, Volcker never believed that a little inflation could cure the vagaries of the business cycle. He further believed that tighter monetary policy was, by then, a necessity and that the Fed needed to be immune from political imperatives. His chairmanship (and the following one of Alan Greenspan) would transform the dovish Fed of the 1960s and 1970s into a more hawkish one. For the economy to prosper, the Fed had to provide the business community with an environment in which prices were stable, thus facilitating business decisions.

The Volcker and Greenspan anti-inflation policy should have resulted in making movements in expected inflation less likely to become self-fulfilling. Since they believed that the best way to achieve maximum sustainable economic growth was to keep inflation under control, any indication that the public anticipated a surge in inflation should have been actively fought.

To verify this conjecture, we also conducted our previous experiments using data for the period after Volcker's appointment as Chairman of the Fed. We again looked at the effects on the economy of an unanticipated rise in expected inflation (second column of Figure 2). The figure shows that, since

1979, the Fed has not tolerated sudden increases in expected inflation and has been ready to forcefully raise the nominal interest rate to fight it off — so much so that the real interest rate rises. The figure shows that the Fed's policy response, since 1979, implies that a sudden increase in expected inflation does not generate a permanent rise in actual inflation: The inflation response quickly comes back down toward zero. In this sense, the Fed has been ready to implement a more restrictive monetary policy, by raising real interest rates, whenever it sees the public doubting the Fed's resolve to keep inflation low. With Volcker's appointment as Chairman of the Fed, the central bank stopped validating sudden increases in expected inflation through a more expansionary monetary policy. Therefore, contrary to the pre-1979 era, the post-1979 data show that surges in expected inflation have not had a long-lasting impact on actual inflation.

For many, the change in policy instigated by Volcker largely contributed to the Fed's success in taming inflation, and the results from our analysis agree with that view.⁹ Chance and particular circumstances may have helped, but they alone cannot explain the behavior of inflation since the mid-1960s. Volcker used tight monetary policy to squeeze inflationary expectations out of the U.S. economy, even if that policy turned out to have major consequences for economic activity in the short run. As the Fed kept tight control over the money supply, nominal interest rates ballooned, and real GDP, in 1981-82, suffered its most dramatic drop since the

⁹ For instance, see the article by Richard Clarida, Jordi Gali, and Mark Gertler.

Great Depression of the 1930s. According to the books by William Neikirk and Bernard S. Katz, the newly elected Reagan administration, which emphasized tax cuts to spur economic growth, was concerned that tight monetary policy could hinder the success of its policies. Yet, even though the Federal Reserve often clashed with the administration over the proper type of policies the central bank should adopt, Volcker forcefully defended the independence of the Fed from political influences.¹⁰ In this process, he helped build the credibility that the Federal Reserve enjoys in financial markets today.

CONCLUSION

Your word is often all you have. In some respects, this is also true for central bankers. Without credibility, the central bank has a much more difficult task in keeping inflation under control, in part because it is prone to falling into an expectations trap. And to get an economy out of a trap is not a trivial task: Drastic measures often need to be taken. The appointment of a hawkish Chairman to head the Federal Reserve in 1979 was a necessary decision in the fight against double-digit inflation. The recession of 1981-82 was certainly a high price to pay for bringing inflation under control, but the shift in policy in the early 1980s helped pave the way for 20 years of great economic performance. 📈

¹⁰ The arguments mostly involved Volcker and Donald Regan, who was then Treasury Secretary and who favored a more expansionary monetary policy. President Reagan and White House officials mostly supported the Fed in its fight against inflation. In fact, President Reagan reappointed Volcker as Chairman of the Federal Reserve for a second term in 1983 (see the books by William Neikirk and Bernard S. Katz).

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