Inflation and Monetary Restraint: Too Little, Too Late?

After five years of declining interest rates, the Federal Reserve began to increase the federal funds rate in early February 1994 with the goal of alleviating potential inflationary pressures. Somewhat surprisingly, the bond-market reaction was negative: long-term bond yields increased 50 basis points over the next four weeks. At that time, market analysts attributed much of the run-up in yields to worries that inflation would increase during the next year and erode the value of bonds.

The bond-market reaction to the Federal Reserve's move to tighten monetary policy was disappointing from a central banker's perspective. After all, the Federal Reserve tightened monetary policy with the explicit aim of moving early enough to ensure that the economy would not overheat and generate inflation. What prompted bond markets to react the way they did?

History may provide the answer. Chart 1 plots the federal funds rate and the inflation rate, as measured by the gross domestic product deflator, over the period 1960–93. From Chart 1, it appears that the federal funds rate and inflation move together. That is, when the federal funds rate increases, inflation rises as well. Perhaps even more perplexing is that the correlation between the federal funds rate and *subsequent* inflation is positive (*Table 1*). This correlation appears to suggest that when the Federal Reserve moves to tighten monetary policy by raising the federal funds rate, inflation rises!

Note also from Table 1 and Chart 1 that this positive correlation between inflation and the federal funds rate seems to have diminished, beginning in the early 1980s. The weakened correlation offers more evidence with which to evaluate the relationship between inflation and monetary restraint. It suggests that either the economy's reaction to monetary policy has changed, or the conduct of monetary policy itself has changed in aspects such as policy timing or magnitude.

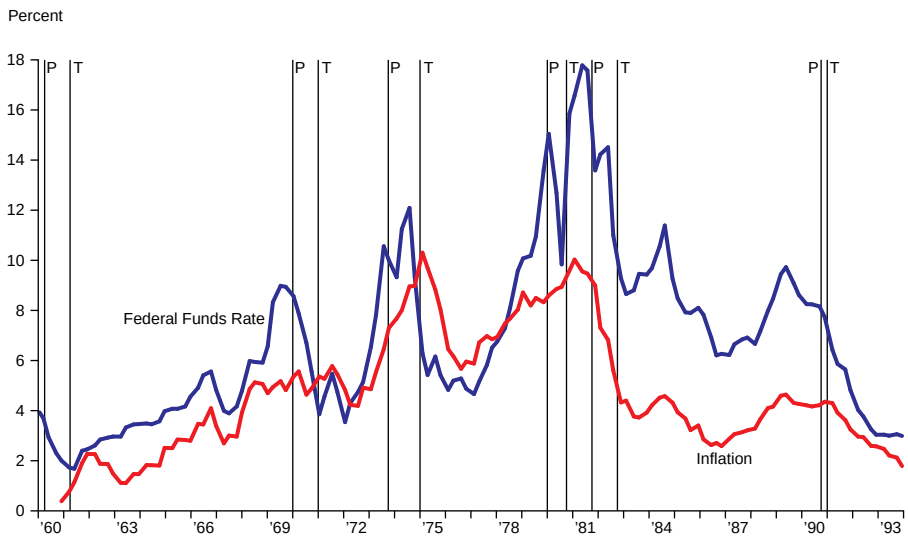
Table 1
Correlation Between Federal Funds Rate and Subsequent Inflation*

Sample:	
1960:1–93:4	.26
1960:1–79:3	.75
1982:4–93:4	.09

* This correlation is obtained from a regression of the funds rate on subsequent inflation. The correlation for the 1982:4–93:4 is not statistically different from zero. (See the Emery–Balke article in note 1 for further details.)

Subsequent inflation equals the average annualized rate of inflation over the subsequent eight quarters.

Chart 1
Federal Funds Rate and Inflation



NOTE: P and T are business-cycle peaks and troughs.
SOURCE: Board of Governors, Federal Reserve System.

The Price Puzzle

Why did inflation increase following tightenings of monetary policy in the 1960s and 1970s, and why did this pattern begin to diminish in the early 1980s?

The positive correlation between the federal funds rate and subsequent inflation, or *price puzzle*, poses a conundrum for traditional macroeconomic theory and monetary practice. According to conventional theory, a tightening of monetary policy, by slowing the growth rate of money and raising short-term interest rates, should result in a decline in the demand for goods and services in the economy and, hence, lead to a reduction in the inflation rate. Typically, a tightening of monetary policy is implemented through an increase in the federal funds rate.

There are two alternative explanations of the so-called price puzzle—one consistent with traditional beliefs about the effect of monetary contractions, the other inconsistent with traditional beliefs. We call the nontraditional theory a *cost–push* explanation. In short, the cost–push

explanation says that a rise in the federal funds rate boosts the interest-rate costs of some firms. These increases, in turn, are passed onto consumers in the form of higher prices. Thus, a hike in the federal funds rate causes inflation to rise. Although traditional theories about the effect of contractionary monetary policy might allow such cost–push effects, these are typically believed to be small, temporary and swamped by the negative aggregate demand consequences of a monetary contraction. Still, some observers see the positive correlation in Chart 1 as evidence that higher interest rates are a fundamental cause of higher inflation.

The second explanation, consistent with traditional economic theory, we term the *too-little, too-late Fed*. Here, a monetary tightening has the traditional effect: holding everything else constant, increases in the federal funds rate slow money growth and lessen the demand for goods and services. As a result, inflationary pressures subside. The price puzzle arises because the Federal Reserve has information about building inflationary pressures—such as excessive output growth, low unemployment rates and rising commodity prices—and increases the funds rate before inflation begins to increase. However, the federal funds rate is not raised sufficiently, or soon enough, to prevent actual inflation from increasing. The end result is that inflation increases even after the federal funds rate increases—not because the rate increased but because it did not increase enough! Of course, had the Federal Reserve not moved to tighten, inflation would have been even higher.

Distinguishing between these two explanations is important for both investors and policymakers. If higher interest rates were a cause of rising inflation, policymakers at the Federal Reserve would need to reevaluate their anti-inflation policies. Additionally, with a clearer understanding of the links between monetary restraint and inflation, both investors and policymakers would be able to make better informed decisions.

Solving the Puzzle

To determine which of these two alternative explanations is, in fact, correct, one must strip out the *systematic* response of the federal funds rate to other economic developments. For example, the Federal Reserve systematically tightens policy in response to higher inflation signals and systematically loosens policy during recessions. These systematic responses make it difficult to determine the independent, or *exogenous*, effects of federal funds rate increases. By examining the response of prices to independent changes in the federal funds rate, we can determine which of the two explanations is more plausible. For the too-little, too-late Fed explanation, after accounting for the Federal Reserve's systematic response to signals of future inflation, a federal funds rate increase should be followed by the traditional response of a decline in prices. On the other hand, for the cost–push explanation, even after accounting for the systematic response of the federal funds rate, an increase in the federal funds rate should result in an increase in prices.

Using data from 1960–79, Chart 2 shows the price level's positive response to an increase in the funds rate (controlling for the Federal Reserve's systematic reaction to past movements in output, inflation and the federal funds rate).[1] In Chart 2, we see evidence that prices still increase after a hike in the federal funds rate. This evidence seems to support the cost–push explanation.

Chart 2
Response of Prices
To Federal Funds Rate Shock

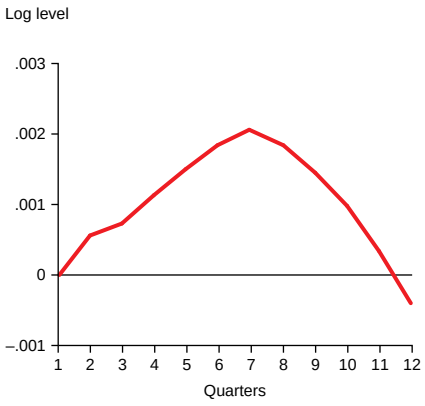
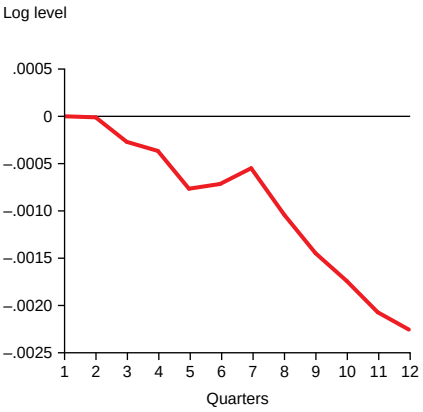


Chart 3
Response of Prices
To Federal Funds Rate Shock
(Commodity Prices and Spread Included)



However, the Federal Reserve may have additional information about building inflationary pressures—information not captured in just the past movements of output, inflation and the federal funds rate. If such were the case, the unsystematic or exogenous component of the funds rate would be mismeasured because it would not take into account that the Federal Reserve systematically responds to this other information. Indeed, variables such as commodity prices and interest-rate spreads have been shown to contain information about future inflation and are monitored by the Federal Reserve. Chart 3 shows that an increase in the federal funds rate results in a *decline* in prices after accounting for the systematic response of the federal funds rate to these additional indicators of future inflation. This evidence is consistent with the conventional view of monetary effects and inconsistent with the cost–push explanation.

Thus, the evidence suggests that during the 1960s and 1970s the Federal Reserve would tighten

policy in response to building inflationary pressures but not by enough, or early enough, to prevent inflation from actually increasing. Of course, if the Federal Reserve had not tightened policy, inflation would have increased even more. Evidence also suggests that, while federal funds rate increases may increase borrowing costs and cause upward pressure on some prices, the net effect of funds rate hikes on prices is negative, supporting the traditional view of monetary policy's effects.

Monetary Policy Since the Early 1980s

Returning to Chart 1, it also appears that the positive correlation between the funds rate and inflation weakened somewhat during the 1980s. Indeed, the regression results presented in Table 1 confirm that there is almost no relationship between the funds rate and subsequent inflation for the 1983–93 period. For some reason, then, monetary policy tightening has not been associated with subsequently higher inflation since the early 1980s.[2]

What accounts for this change? One possible explanation consistent with traditional theory is that the Federal Reserve has been more determined to control inflation in the 1980s and 1990s. Indeed, since the disinflation engineered by the Federal Reserve in the early 1980s, the Federal Reserve has more forcefully emphasized its commitment to achieving price stability.[3]

On a tactical level, policy has shifted toward increasing the federal funds rate earlier, before inflationary pressures build, and by a sufficient amount to keep actual inflation from rising.[4] Because the Federal Reserve has successfully tightened monetary policy, inflation does not increase. And the funds rate–inflation correlation disappears.

An alternative explanation for the lack of a price puzzle in the 1980s may be that Federal Reserve policymakers have not had to confront the same types of economic shocks they faced during the 1970s. During the 1970s, for example, the U.S. economy was hit with several large oil price shocks. Oil price shocks and, more generally, negative supply shocks present policymakers with a difficult choice because such shocks lead to lower output and higher inflation. How should monetary policymakers respond? Should policy be tightened to prevent inflation from rising or loosened to prevent output from falling? Evidence suggests that the Federal Reserve faced these difficult situations by raising the federal funds rate but not by enough to keep inflation from rising.

During the 1980s and early 1990s, it may simply be the case that there have been few negative supply shocks. Such an environment may have made it easier for the Federal Reserve to focus on its inflation-fighting objectives. In other words, the Federal Reserve's increased commitment to price stability may not have yet been tested, leaving open the question of how the Federal Reserve will respond when decisions get tough.

Conclusions

In the past, hikes in the federal funds rate have often been followed by increases in inflation. This positive correlation presents a paradox —a so-called price puzzle—because it is inconsistent with traditional macroeconomic theory, which predicts that inflation will fall in response to a monetary policy tightening. While the price puzzle is particularly evident for the 1960s and 1970s, in the 1980s and 1990s the response of inflation to the federal funds rate has been close to zero.

The evidence cited here suggests that there is a simple explanation for these phenomena. Historically, the Federal Reserve has increased the federal funds rate in anticipation of inflation. Unfortunately, it has sometimes failed to increase the funds rate by enough to prevent inflation from actually rising. Simply put, past monetary restraint has been too little, too late. Evidence that the price puzzle has diminished since the early 1980s suggests that the Federal Reserve is now more successful in anticipating and reacting to inflationary pressures.

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Notes

[1] The model is a simple vector autoregression. (For further details see Nathan S. Balke and Kenneth M. Emery, "Understanding the Price Puzzle," Federal Reserve Bank of Dallas *Economic Review*, Fourth Quarter 1994.) The results indicate that the Federal Reserve systematically increases the funds rate in response to unexpected jumps in output or the price level.

[2] On the other hand, inflation does not fall when the federal funds rate increases, as traditional theory would predict. Again, though, once we control for the systematic response of the federal funds rate to commodity price and interest-rate spread changes, prices decline in response to a hike in the federal funds rate.

[3] The Federal Reserve's rationale for this increased commitment is the view that high rates of inflation during the 1970s significantly damaged the U.S. economy.

[4] One valuable lesson of the 1970s was that monetary policy, if it is to be used successfully to prevent inflation from rising, must be tightened long before inflation pressures build. In other words, it must be successful at taking away the punch bowl before the party gets out of hand.