

Inflation, Inflation Expectations, and Monetary Policy

Introduction

As a Federal Reserve policymaker, I constantly review the latest national and international economic statistics. Economists throughout the Federal Reserve System pore over the data, conduct research, and create models to project economic activity. But I also rely on conversations I have with business leaders to get a better sense of how you see economic conditions and the prospects for business going forward.

For example, last month, right before the Federal Open Market Committee meeting, one of the CEOs of a very large manufacturing firm in my District called to tell me about a manufacturing trade association meeting he had just attended. He said that rising copper prices dominated the discussions at that meeting. He told me that from the perspective of those in attendance, the rise in copper prices was not totally demand driven - other factors were driving up copper prices.

Understanding why the prices of commodities, like copper, increase or decrease is one of the many pieces of the puzzle that we as policymakers try to fit together to help us figure out how the economy and inflation will perform in the future.

As I am sure you are well aware, the Federal Open Market Committee, or FOMC, decided to keep the federal funds rate target unchanged at our last meeting on August 8. Although I cannot speak for any of my colleagues on the Committee, let me explain what was behind my decision to support a pause at that meeting.

Although the elevated inflation numbers concerned me, and indeed they still do, the overall pace of economic activity - especially housing activity - had begun to moderate, and the full effect of the FOMC's previous rate increases had not yet been felt. I viewed the pause as appropriate to give me the chance to accumulate more information before judging whether additional policy firming would be needed.

Another important element in my thinking was the stability of inflation expectations. I will quote directly from the minutes of the August 8 meeting here: "Following 17 consecutive policy firming actions, members generally saw limited risk in deferring further policy tightening that might prove necessary, as long as inflation expectations remained contained."

I put special emphasis on inflation expectations because that is the topic I would like to discuss with you this morning. In particular, I

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want to explain why it is vitally important that the central bank - the Federal Reserve - anchor inflation expectations in order to best promote sustainable economic growth.

I will begin by explaining how inflation - which Congress has mandated the Federal Reserve to control - is conceptually different from relative price increases. Then I will talk about why keeping inflation expectations anchored is so important to our nation's prosperity. Finally, I will describe some of the measures I use to gauge inflation expectations and why it is important to continue to learn more about inflation expectations.

I. What Is Inflation and How Is It Different from a Relative Price Increase?

Let me begin by making a crucial distinction - between inflation and a relative price increase.¹ People often see price increases in some of the items they buy and assume that a period of inflation has begun. However, inflation is a condition that affects all prices, not just the price of particular goods or services.

Consider copper prices. As of yesterday, copper prices were roughly seven times higher than they were in 1965. Now, I might conclude that the resource costs of obtaining copper are now seven times higher than they were forty-some years ago. But we all know that's not true.

The truth is that, despite large swings up and down, the relative price of copper - that is, its price relative to the average of all prices - tended to fall for much of the period from the mid-1970s through 2001.² Over the past several years, the relative price of copper has shot up, of course, but even with this sharp increase, the relative price is nowhere near seven times its 1965 level.

Copper prices have not risen that much more than all prices, on average. The fact is that all prices, on average, have risen five-fold in the past forty years. This five-fold increase in all prices is inflation.

Changes in relative prices--that is, the prices of individual items relative to the average of all prices--are quite different from inflation. Changes in relative prices reflect changes in the supply and demand conditions in specific markets. Sometimes we experience such a large and persistent relative price change that it temporarily ripples through the inflation data. The obvious example is energy prices.

Today, energy prices are greatly increasing the costs faced by virtually every business and household in our country. Purchasing the same amount of gasoline or heating oil as we did a couple of years ago requires us either to earn more, save less, or purchase fewer non-energy items. Adjusting to higher energy prices requires us to make real sacrifices. The Federal Reserve cannot offset these costs because we do not create oil.³

Nevertheless, the Federal Reserve can still control inflation over the medium to longer term. How can we control the average price level over time? To paraphrase a famous economist, Irving Fisher, the average price level doesn't rise because of the goods; it rises because of the money.⁴ Simply put, if growth in money exceeds its demand, its purchasing power will depreciate. This is inflation. It affects all prices and wages, and ultimately it has only one origin, the central bank. This is because the central bank is solely responsible for

managing the nation's money supply.

I think most people recognize the importance of allowing individual prices to move up and down relative to one another. At the same time, I think that most people would agree that allowing the value of our money to depreciate over time is bad for economic prosperity. But just what is it about inflation that is so costly? How is it that inflation uses up precious resources?⁶ Well, it turns out that the lasting harm to our economy comes when a sustained period of inflation changes inflation expectations. This, in turn, affects the decisions that households and businesses make. Let me turn to that topic in more detail.

II. Why Anchoring Inflation Expectations Is Important to Prosperity

Back in 1968, Milton Friedman warned economists and policymakers not to try to stimulate economic growth at the cost of "just a little more" inflation.⁷ He predicted that people would come to anticipate that little bit of extra inflation, and then would change their behavior in various ways. The end result would be slower economic growth and ever-higher inflation. In effect, Friedman was warning policymakers not to treat inflation as a static concept, but to appreciate the interdependence between inflation and inflation expectations.

Unfortunately, the economic events of the 1970s bear out Friedman's warning. Households and businesses did adjust their behavior to minimize the costs they faced from rising inflation. And once inflation expectations became unglued, we watched with dismay as the costs arising from inflation expectations took a huge toll on our resources. The economy spiraled into "stagflation" - an environment of worsening economic performance and higher inflation.

Let's consider some of the ways that rising inflation expectations can hinder economic performance. For example, we know that people who fear higher inflation often choose to put their wealth into real assets, such as land, or gold, or silver, or copper.⁸ They do this not so much as a traditional business investment, but as a hedge against a rising price level. So as the expectation of inflation grows, these asset prices will likely reflect two things: the value of the asset in production and its value as an inflation hedge. This alters the flow of our scarce resources from their best use.

Of course, this is just one example of the damage that an inflationary psychology inflicts on our economy. When people begin to anticipate a decline in the purchasing power of their dollars, they will take many actions to protect themselves. They will use their time and wealth to try to minimize the amount of money they hold because that money is slowly losing its purchasing power. Inflation also raises the effective tax rate that people pay on income they earn from investing and saving. This, in turn, induces people to forgo investments and discourages them from saving.

Inflation also makes it difficult for borrowers and lenders, who now must evaluate the future purchasing power of money, not just the real terms of a contract. The costs associated with making these predictions rise with inflation because higher levels of inflation are generally more volatile and more difficult to predict. As inflation becomes more unpredictable, lenders demand insurance against this risk in the form of higher interest rates. This makes long-term contracts, particularly financial contracts, more costly than they

would be if inflation weren't a concern.

People can also make costly mistakes as they try to distinguish between changes in relative prices and inflation. If inflation is highly unpredictable, entrepreneurs may assume that all price changes are the result of the inflationary policies of the central bank, and ignore some important relative price signals telling them to adjust their business plans.

All of the actions that people take to guard against inflation consume precious resources that would be used more productively in a world where people didn't have to worry about inflation. These are the costs that a central bank must keep in check if our economy is to achieve its full potential.

III. The Measurement and Theory of Inflation Expectations

Well, it's one thing to understand that you want to keep inflation expectations in check, but it is an entirely different matter knowing when, in fact, they are in check. Let me explain some of the ways we attempt to measure inflation expectations.

We can look for changes in inflationary sentiment in a variety of indicators. Asset markets give us some indirect measures. For example, we can track the price movements of any number of investment goods, such as metals and other commodities, or real estate, or any tangible asset that investors might see as a "safe haven" from inflation.

We can also monitor the behavior of long-term interest rates relative to short-term rates, otherwise known as "the yield curve." A steepening of the yield curve - that is, a rise in long-term rates relative to short-term rates - might signal that bond buyers are demanding some protection against inflation.⁹

A relatively new and very promising measurement comes from Treasury Inflation Indexed Securities, commonly known as TIPS. These securities give the investor a fixed real return because their principal and interest payments are tied to the Consumer Price Index. Because regular Treasury securities are not tied to the CPI, we can compare the rate of return between TIPS and regular Treasury securities to infer how much inflation investors might expect to see over different time horizons - for example, over the next 5 to 10 years.

The problem with financial market indicators is that asset prices respond to any number of risks, not just inflation.¹⁰ In a world that is always confronting and evaluating risks, disentangling the inflation risk from all the other risks is a very imperfect science. Nevertheless, financial market indicators are proving to be a useful yardstick for monitoring inflation expectations.¹¹

You might think that a better way to gauge inflation expectations would be to simply ask people their views on inflation. In fact, there is a survey that does just that. Once a month, the University of Michigan interviews about 500 households around the nation, asking people how much they think prices will rise in the next 12 months and over the next 5 to 10 years. Here, too, there are some problems with interpreting the raw data. For one thing, households' beliefs about future inflation are typically much higher than the actual inflation rate.

Also, investigations into the survey data have revealed some fascinating patterns. For example, people are likely to report their inflation predictions in terms of whole numbers, and particular whole numbers at that. It turns out that people are far more likely to report that they expect 0, 3, or 5 percent inflation than 1, 2, or 4 percent.¹²

Research at the Federal Reserve Bank of Cleveland also reveals sharply different perspectives on future inflation across demographic groups. Women, on average, tend to have higher inflation expectations than men, the poor higher than the rich, and the young and elderly higher than the middle-aged.¹³

These patterns in the survey responses may be more than just an intellectual curiosity. When you get right down to it, we really know very little about how people form their inflation expectations. To what extent are expectations based on past inflation experience versus looking into the future? Do people scour all of the available data to predict inflation, or do they just consider the information most readily available to them? And, perhaps most important, how do people act on the inflation expectations that we measure through the household surveys?

There is much at stake in the answers to these questions. We might discover important differences between household survey information and financial market data. We may also find an answer to one of the great questions - and obstacles - in the monetary policy process. Namely, are inflation expectations responsible for the long time it takes for monetary policy actions to show up in the inflation data?

Understanding what lies behind our measures of inflation expectations could greatly enhance the design and conduct of monetary policy. For example, it could help us understand what types of institutional arrangements and communication policies help the central bank retain credibility for meeting its price stability objective, even when large and persistent relative price changes ripple through the inflation data.

To that end, unlocking some of the mysteries about inflation expectations may help central banks decide whether, and how, to incorporate a numerical inflation objective into the monetary policy process.¹⁴ Some central banks have used these numerical objectives as a tool to help anchor inflation expectations. Economists refer to a numerical inflation objective as a "commitment device," that is, a means for holding a central bank's feet to the fire. That may be so. But whether or not there is an explicit numerical objective, anchoring inflation expectations requires a central bank to keep inflation low and stable, to reinforce its commitment to price stability, and to clearly communicate its policies in pursuit of that commitment.

I welcome research that helps us learn about the strengths and weaknesses of various communication tools and strategies designed to keep inflation expectations firmly anchored. This is a research agenda and a discussion that is now under way in the Federal Reserve, and I am excited to be engaged in it.

Conclusion

I hope that I have given you a better understanding of why it is so important for the Federal Reserve to anchor inflation expectations. Inflation is what the Federal Reserve can control - not the price of oil or copper or any other commodity. By anchoring the inflation expectations of households and businesses, we will help sustain the

prosperity that generations of Americans have come to enjoy. And as we learn more about how inflation expectations are formed, we can do our job as monetary policymakers even better.

[1] A discussion of these issues can be found in Bryan, Michael F., "Is It More Expensive, Or Does It Just Cost More Money?" Economic Commentary, Federal Reserve Bank of Cleveland, May 15, 2002.

[2] Based on the CPI.

[3] There may be indirect costs that the central bank can help ease. For example, if oil prices rise and, as a result, labor productivity falls, there will be downward pressure on wages. If wages are downwardly "sticky," unemployment may result and the creation of a rising price level might allow "real" wages to adjust and alleviate the unemployment. These are not the direct costs of higher oil prices, however.

[4] "[By inflation w]e mean the .movement which would have been brought about if the 'changes on the side of money', . changes which tend to affect all prices equally, had been the only changes operating and there had been no forces present 'on the side of the things' tending to change their prices relatively to one another." Irving Fisher, 1922.

[5] Appreciating this distinction helps one better understand ideas like "core" inflation, which are useful metrics for the central bank, and perhaps only the central bank, to monitor. These core inflation measures, most commonly constructed as an aggregate price statistic less food and energy prices, attempt to strip away the most volatile of the relative price movements that may temporarily cause the aggregate price measure to fluctuate in a way that is not symptomatic of a persistent change in the purchasing power of money.

[6] A recent summary of these costs can be found in Anderson, Richard G., "Inflation's Economic Cost: How Large? How Certain?" The Regional Economist, Federal Reserve Bank of St. Louis, July 2006.

[7] Friedman, Milton, "The Role of Monetary Policy," American Economic Review, vol. 58, no. 1, March 1968, pp. 1-17.

[8] It may also be that the process by which inflation is transmitted to all prices begins with basic commodities like copper. Indeed, there is some evidence that commodity prices tend to lead inflation at the retail level, although the statistical strength of this relationship is not especially strong. For example, see Furlong, Fred, and Robert Ingenito, "Commodity Prices and Inflation," Economic Review, Federal Reserve Bank of San Francisco, 1996 (no. 2).

[9] Federal Reserve Chairman Ben Bernanke discusses the link between monetary policy and the yield curve in "Reflections on the Yield Curve and Monetary Policy," speech before the Economic Club of New York, March 20, 2006.

[10] For a discussion of monetary policy and the behavior of asset prices, including the pitfalls of policy based on the behavior of asset prices, I recommend Kohn, Donald L., "Monetary Policy and Asset Prices," Speech delivered at a European Central Bank Colloquium in honor of Otmar Issing, March 16, 2006.

[11] Research at the Federal Reserve Bank of Cleveland suggests that the risk premium in the TIPS market is likely to fluctuate and complicate an accurate interpretation of the inflationary sentiment coming from financial markets. See Carlstrom, Charles T., and Timothy S. Fuerst, "Expected Inflation and TIPS," Economic Commentary, Federal Reserve Bank of Cleveland, November 2004.

[12] See Bryan, Michael F. and Stefan Palmqvist, "Testing Near-Rationality Using Detailed Survey Data," Working Paper, Federal Reserve Bank of Cleveland, 05-02.

[13] See Bryan, Michael F. and Guhan Venkatu, "The Demographics of Inflation Opinion Surveys," Economic Commentary, Federal Reserve Bank of Cleveland, October 15, 2001, and "The Curiously Different Inflation Perspectives of Men and Woman," Economic Commentary, Federal Reserve Bank of Cleveland, November 2001.

[14] A large number of recent papers have described various ways the formation of inflation expectations may affect the conduct of the central bank. Two examples are: Ball, Laurence, N. Gregory Mankiw, and Ricardo Reis, "Monetary Policy for Inattentive Economies," Journal of Monetary Economics 52, May 2005, and Orphanides, Athanasios, and John C. Williams, "Inflation Targeting under Imperfect Knowledge," Working Paper, Federal Reserve Bank of San Francisco, April 2006.

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