Understanding the Fed

William Poole

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People often ask me questions about the Fed, sometimes out of simple curiosity and sometimes out of a real need to know for business reasons. Portfolio managers, for example, have a real need to know. My remarks reflect my effort to provide rather systematically some answers to common questions. And I will also answer questions that ought to be put to me, but usually are not. There is no reason why the Federal Reserve should be a mysterious organization—we ought to be responsive to your concerns.

Obviously, I want to emphasize that the views I express here are mine and do not necessarily reflect official positions of the Federal Reserve System. I suspect that each of us involved in Federal Reserve policy would answer the questions somewhat differently and emphasize different things. In any event, I’ll offer my answers. I thank my colleagues at the Federal Reserve Bank of St. Louis for their comments, especially Robert H. Rasche, senior vice president and director of research, who provided special assistance.

THE ROLE OF ECONOMIC SCIENCE IN MONETARY POLICY

A very general question concerns the basis on which policy decisions are made. It is important to recognize that economists have developed a formal theory of monetary policy over the past 60 years or so and that this theory really does guide our thinking. The theory has two logical parts. The first is a clear set of objectives. The second is a specification of how policy, in pursuit of these objectives, affects the economy.

The model of how the economy works is complicated, and I could not possibly begin to present it here. But I will say that our understanding of how the economy works is based on economic theory and an enormous body of empirical research that tests the theory. Our understanding is often qualitative, and we know that we must attach standard errors to our numerical predictions. An active research program within the Federal Reserve and by academic and business economists continuously refines the theory and our empirical understanding.

Let me use an analogy: Hurricane forecasting has come a long way, but, as anyone who watches the weather news knows, the forecasts are not perfectly reliable. Ship captains have to make policy decisions on what courses to set, taking into account the forecasts and what is known about forecast accuracy. Economic policymakers have to make the same sorts of decisions based on incomplete knowledge.
So, given policy objectives, and given a view about how policy decisions affect the economy, the central bank can in principle specify a policy rule, or response function, that guides policy. To achieve a good result, the general public and market participants need to understand the objectives and the response function so that the private economy can determine its activities with full knowledge of how the central bank will act. Of course, uncertainty is an inherent characteristic of the economic world. What should be predictable are the central bank’s responses to the never-ending sequence of surprises that characterize the economic environment.

**Monetary Policy Objectives**

Congress sets the mission of the Federal Reserve in the conduct of monetary policy. Originally, the Fed’s mission was specified in the Federal Reserve Act signed into law by President Woodrow Wilson in December 1913. The Fed’s current mandate, set formally in an amendment to the Federal Reserve Act in 1977 and reaffirmed in 2000, requires the Federal Reserve to pursue three objectives through its conduct of monetary policy. They are “maximum employment, stable prices and moderate long-term interest rates” (Bernanke, 2006a). Economists recognize that long-term interest rates incorporate a premium for expected inflation. Thus, the objectives of price stability and low long-term interest rates are essentially the same objective.

This “dual mandate,” so-called because of its emphasis on both employment and price stability objectives, differs from that of other central banks, especially the “inflation targeting” central banks. Inflation targeters, including the Bank of Canada, the Bank of England, and the Reserve Bank of New Zealand, among others, operate under an agreement with their respective governments that defines price stability as the single objective and specifies a quantitative definition of the inflation objective. In a similar fashion, the European Central Bank (ECB) is given a price stability mandate under the Maastricht Treaty, though the treaty does not give a numeric value or range to the ECB. The ECB has interpreted its mandate as preventing the inflation rate from exceeding 2 percent per annum over a “medium term” horizon.

Today, there is general agreement among professional economists and central bankers around the world that, in the long run, monetary policy cannot achieve a tradeoff between inflation and employment. Successive Fed chairmen have emphasized that price stability is not only a mandated objective of monetary policy but also the means by which monetary policy contributes to achieving the other two objectives. The view goes back at least to Chairman William McChesney Martin: “My interest in a monetary policy directed toward a dollar of stable value is not based on the feeling that price stability is a more important national objective than either maximum sustainable growth or a high level of employment, but rather on the reasoned conclusion that the objective of price stability is an essential prerequisite for their achievement” (McChesney Martin, 1959, p. 5). In his 1979 confirmation hearing, Chairman Paul Volcker (U.S. Congress, 1979) made this statement: “I believe that ultimately the only sound foundation for continuing growth and prosperity of the American economy is much greater price stability.” Early in his tenure, Chairman Alan Greenspan (1988) concurred in this view: “The Committee continued to focus on maintaining the economic expansion and on progress toward price stability, which was seen as a necessary condition for long-term sustained economic growth.” In July 2006, Chairman Ben S. Bernanke (2006b) acknowledged the following: “The achievement of price stability is one of the objectives that make up the Congress’s mandate to the Federal Reserve. Moreover, in the long run, price stability is critical to achieving maximum employment and moderate long-term interest rates, the other parts of the congressional mandate.”

I believe that we can go a step beyond these statements. In my view, the goal of price stability must be the primary goal for three reasons. First, in the long run, employment and economic growth are maximized in an environment of price stability. Second, only in an environment of price stability and market confidence that the central bank will continue to maintain price stability will the central bank be in a position to act deliberately to offset
many types of disturbances that would otherwise create fluctuations in employment and output. The Federal Reserve does not have the power to completely offset all such disturbances, but it can cushion their effects and thereby improve economic stability. Finally, price stability is a goal in its own right simply because price instability creates arbitrary and unfair redistributions of income and wealth.

I have often noted that my own personal preference is to define “price stability” as a condition in which the rate of inflation, properly measured, is on average zero. I insert the qualifier “properly measured” to point out that actual price indices may have statistical problems such that zero measured inflation on a particular price index might not in fact reflect a true state of zero inflation. Although my own preference is for zero inflation properly measured, I believe that a central bank consensus on some other numerical goal of reasonably low inflation is more important than the exact number chosen. Thus, I find that recent discussion of a “comfort zone” of 1 to 2 percent inflation measured by the price index for personal consumption expenditures (PCE), excluding the volatile food and energy components, is perfectly consistent with my own thinking.

Note that the congressional mandate to the Federal Reserve does not include any of numerous objectives that from time to time have been advocated by supporters of various interests: for example, stable exchange rates, stable asset prices, or housing investment. Clarity of objectives is an important attribute of monetary policy today and contributes greatly to its success.

**Systematic Policy**

The dual nature of the Fed mandate is well summarized in the “Taylor rule.” In 1993, Stanford economist John Taylor proposed a simple formula relating the federal funds rate to (i) a long-run inflation target and (ii) short-run deviations of inflation from that target and short-run deviations of real gross domestic product (GDP) (Taylor, 1993) from a measure of “potential real GDP.” Taylor suggested that his simple relationship characterized in broad outline the actual behavior of the federal funds rate in the early years of the Greenspan FOMC. The essence of this relationship is that, in the long-run, the FOMC seeks to keep the federal funds rate roughly consistent with a level that is believed to produce a target level of inflation. Taylor assumed a target rate of inflation of 2 percent per year measured by the total consumer price index (CPI). In the short run, the relationship implies that the FOMC adjusts the target federal funds rate up as either the observed inflation rate exceeds the target level of inflation or real GDP exceeds potential real GDP. Conversely, under the Taylor rule, the FOMC reduces the target federal funds rate when inflation falls below its target and/or real GDP falls short of potential real GDP. Thus the relationship incorporates the primacy of a long-run inflation objective while incorporating short-run stabilization efforts.

Figure 1 shows the actual value of the federal funds rate target on FOMC meeting dates starting in 1987 as well as a computed value based on Taylor’s original formula and the information available to the FOMC at the time of each meeting.2 The inflation rate in the figure is the total CPI. Through 2000, the gap between real GDP and potential real GDP is the value measured by the staff of the Board of Governors at the time of each FOMC meeting.

After 2000, the staff assumptions about the GDP gap are not yet publicly available, so the dotted line in the graph for this period is computed with the GDP gap as constructed by the Congressional Budget Office. Also beginning in 2000, the FOMC changed its inflation objective in two ways. First, the Committee emphasized the inflation rate as measured by changes in the PCE inflation rate rather than the CPI inflation rate. Second, the Committee emphasized the core PCE index, which excludes the volatile food and energy components. Hence, it is likely that after

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1 Taylor compared the values of his formula against the observed history of the funds rate from 1987 through 1992.
2 In the figure, the Taylor formula is evaluated on the basis of “real time” information that could have been used in reaching a policy decision. Since May 17, 1989, all changes in the intended funds rate have been 25 basis points or multiples thereof. Since April 18, 1994, all changes in the intended funds rate have been voted on by the FOMC either at a regularly scheduled meeting or on an intermeeting conference call.
2000 the Taylor formula does not accurately reflect the information used by the FOMC as input to its deliberations.

Note that the target funds rate predicted by the Taylor formula generally tracks the actual funds rate through 2000, though there are sizable and persistent deviations of the funds rate from the values predicted by the formula. Nevertheless several of these episodes are consistent with a systematic monetary policy. First, in 1989, the FOMC increased the target funds rate more quickly than predicted by the formula, suggesting that the Committee responded more vigorously to rising inflation than incorporated in the Taylor specification. Second, during 1990-91, the FOMC reduced the funds rate more quickly than predicted by the formula, suggesting a stronger response to the recession than incorporated in the Taylor specification. Third, between late September 1992 and February 1994, the target funds rate was held at a lower level (3 percent) than predicted by the Taylor specification. It was during this period that the FOMC expressed concern about “financial headwinds” that were restraining the recovery from the 1990-91 recession. Finally, in the fall of 1998, the FOMC lowered the funds rate when the Taylor specification predicted that the rate would be held constant. At this time, concern about financial stability figured strongly in policy deliberations in the wake of the Asian financial crisis, the Russian Default, and the collapse of Long-Term Capital Management (LTCM).

The FOMC, and certainly John Taylor himself, view the Taylor rule as a general guideline. Departures from the rule make good sense when information beyond that incorporated in the rule is available. For example, policy is forward looking, which means that from time to time the economic outlook changes sufficiently that it makes sense for the FOMC to set a funds rate target either above or below the level called for in the Taylor rule, which relies on observed recent data rather than on economic forecasts of future data. Other circumstances—an obvious example is September 11, 2001—call for a policy response. These responses can be and generally are understood by the market. Thus, such responses can be every bit as systematic as the responses specified in the Taylor rule.
Credibility of the Inflation Objective

A critical ingredient in the Taylor specification as a description of monetary policy is the long-run target rate of inflation. In practice, financial market participants and the public in general cannot adequately understand the Fed’s monetary policy—that is, the strategic thinking that guides the sequence of individual policy actions—without a good understanding of what the FOMC considers to be an acceptable long-run average rate of inflation. When monetary policymakers articulate their goal for long-run inflation and pursue credible policies to achieve that goal, they provide the basis for “anchoring” the inflation expectations that guide consumption behavior of households and investment decisions of firms. Inflation expectations also determine the inflation premiums in nominal interest rates that are required to equilibrate financial markets.

Evidence suggests, particularly in the U.S. economy, that the actual inflation experience is driven by inflation expectations, resource utilization—usually measured by a gap term as in the Taylor rule—and “supply shocks” such as changes in the world market prices of energy and other commodities. Of these, the most significant factor historically has been the influence of inflation expectations. Hence, when the anchor for inflation expectations begins to drag, actual inflation becomes volatile, and the resulting distortions to economic activity and conditions in financial markets produce significant disruptions in the economy. The most recent severe example from our economic history of inflation expectations getting out of control occurred in 1977-79.

It is a terrible thing if monetary policymakers lose their credibility that they will maintain low and stable long-run inflation. Once credibility is impaired, it can only be re-established the “old fashioned way”—policymakers have to earn it! Restoring credibility takes time in the face of substantial persistence in the actual inflation process. It took well over a decade to completely restore low inflation in the United States after the Great Inflation of the 1970s, and in the process the economy experienced the worst recession, in 1981-82, since the Great Depression.

INTERPRETING NEW INFORMATION

Financial market participants form expectations with respect to the prospective state of the economy from evidence of the current state of the economy as indicated in regular data releases, and other activities, such as political events and policy actions that influence economic activity and market prices. The evidence for such forward-looking expectations is widespread. Futures contracts in commodities, interest rates, and foreign exchange are actively traded in large volume on organized exchanges. Surveys of forecasts of forthcoming data releases appear regularly (e.g., The Ticker, which appears every Monday in the Wall Street Journal, and the Calendar of Releases, which appears each Friday on the cover page of U.S. Financial Data published by the Federal Reserve Bank of St. Louis). Prices in financial markets respond to differences between the observed information on the economic situation and the expectations about such information—that is, markets respond to “news.”

There are many claims but no convincing documented evidence of lagged responses to “news.” Economic theory suggests that market prices of assets should behave like random walks—that the accumulated information at a point in time should have no predictive power for future changes in prices. Put another way, new information is quickly reflected in market prices, leaving no remaining predictable change in market prices that would permit an investor to expect an above-normal return from buying or selling the asset.

A huge body of empirical research is broadly consistent with this hypothesis. Thus, market commentary that today’s market adjustments are caused by, or due to, continuing concerns over implications of old information are of doubtful validity. Traders, financial journalists, and economic pundit seem to believe that they have to attribute market adjustments to something, even when there is no evidence to support the asserted reasons.

3 The latter data are from a survey conducted by Thomson Financial.
An analyst who is presumed to be an expert ought often to say that price changes appear inexplicable or random. But few experts in fact say such a thing. Therefore, I recommend that the wary observer be skeptical about purported explanations for price changes and should always check an explanation against behavior in other markets. In my experience, explanations for stock market fluctuations are especially suspect. In recent years, I have often read claims that the stock market went down because of interest rate fears, only to find that interest rates in the bond market were unchanged or went down instead of up. Given that so many institutions deal in both the equity and bond markets, it makes absolutely no sense that interest rate fears could drive down stock prices and have no effect on interest rates.

Clearly, Federal Reserve policy adjustments and market expectations about future policy adjustments do explain some stock market fluctuations. I accept that fact. Indeed, the transmission mechanism linking monetary policy decisions to changes in the inflation rate and employment require such effects. But, I really don’t want to be held responsible for stock market fluctuations that occurred for other reasons or are simply inexplicable! So, next time you read that the stock market went down because of “interest rate fears,” please do take a quick look at the bond tables to see if interest rates actually changed that day.  

New information drives both market adjustments and policy changes. Policy decisions ordi-

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4 Those who report on the stock market do not confine their misleading causal statements to the Fed. In mid-August 2006, the Dow Jones average closed down over 90 points, attributed by at least one report to “oil price fears.” Looking at trading in the oil markets, September oil futures on the NYMEX exchange closed up only 4 cents, but October futures closed down 19 cents.
narily cannot be set long in advance because the FOMC must be open to changing its policy stance in response to new information, which is inherently unpredictable. To gain a sense of the impact of new information on interest rates, I’ll analyze data from the eurodollar futures market. Eurodollar deposits are not federal funds, though changes in the two yields are highly correlated. To study market expectations about the federal funds rate over horizons of four or more months, it is best to use eurodollar futures because these contracts are actively traded over far future horizons, whereas trading of federal funds futures is relatively thin on horizons of more than a few months.

Prices in the eurodollar futures market provide direct information on market expectations of future FOMC policy actions setting the target federal funds rate. Consider the forecasting record on three-month and six-month horizons. Figure 2 focuses on the difference between the yield on a three-month eurodollar futures contract with three months to maturity and the actual eurodollar deposit yield. This difference is plotted on the horizontal axis against the actual change in the yield on eurodollar deposits over the corresponding three months to the maturity date on the vertical axis. Thus, the three-month actual change in the eurodollar deposit rate is plotted against the forecasted change in the eurodollar deposit yield over the same time period. The observations are taken every three months starting in December 1994.\(^5\) The same exercise is repeated at a six-month horizon in Figure 3.

In each of the two graphs, the diagonal line from the lower left to the upper right represents a line of perfect forecasts—if all the points lay along

\(^5\) Hence, the observations are nonoverlapping.

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**Figure 3**

**Actual and Predicted Changes in Eurodollar Yields, 6-Month Horizon**
this line, the eurodollar futures market would never have made any errors in forecasting the change in the eurodollar yield over the succeeding three (six) months. It is evident from the figures that the futures markets fall short of such perfection. In fact, over the entire period, the correlation between the forecast changes and the actual changes on a three-month horizon is only 0.65; on the six-month horizon the correlation falls to 0.54.

As an aside, note that economists and statisticians usually measure forecasting accuracy by the square of the correlation coefficient, or $R^2$. Thus, a correlation of 0.65 is an $R^2$ of 0.42, which means that the forecasts embedded in the eurodollar futures market explain 42 percent of the variance of fluctuations in the actual eurodollar yield. Thus, unpredictable events even over a three-month horizon are responsible for more than half of the variance of the eurodollar yield. Over a six-month horizon, the $R^2$ is 0.29, which means that unpredictable events are responsible for more than 70 percent of the variance over a six-month horizon.

The overall correlations mask some interesting details. The points plotted in black in each figure represent observations since the middle of 2003, when the FOMC started providing “forward guidance” regarding future policy actions. Note that these points scatter fairly tightly around the line of perfect forecasts—markets were not particularly surprised by the evolution of policy actions over this period. In contrast, consider the forecasts for the first half of 1995. The three-month and six-month futures market forecasts in December 1994 were for large positive changes in the eurodollar deposit rate over the succeeding three and six months. In the event, the eurodollar deposit rate fell a bit over these horizons. The December 1994 futures prices were observed shortly after the FOMC increased the funds rate target by 75 basis points in November 1994, and the market had expected further substantial increases. In fact, the FOMC increased the funds rate target by only 50 basis points in the first half of 1995 (at the January FOMC meeting).

Another large miss occurred in December 2000. At that time, the futures market forecasts were for a decline in the eurodollar yield of 35 basis points over the following three months and a total of 67 basis points over the six-month period. Instead, the FOMC acted aggressively to lower the funds rate target starting in January and continuing through May 2001 by a total of 250 basis points. The FOMC acted aggressively as incoming information pointed to growing weakness in economic activity. Both the FOMC and the markets were surprised by incoming information indicating that the economy was weakening quickly and significantly.

It is rare that a single data report is decisive for the FOMC. The economic outlook is determined by numerous pieces of information. Important data such as the inflation and the employment reports are cross-checked against other information. The FOMC is aware of the possibility of data revisions and short-run anomalies.

My key point is that market commentary indicating that the FOMC is unpredictable is off base. Typically, the FOMC cannot be predictable because new information driving policy adjustments is not predictable. All of us would like to be able to predict the future. We in the Fed do the best we can, but the markets should not complain that the FOMC lacks clairvoyance! What the FOMC strives to do is to respond systematically to the new information. There is considerable evidence that the market does successfully predict FOMC responses to the available information at the time of regularly scheduled meetings.6

### FOMC PROCESSES

The Board of Governors and the Reserve Banks are fortunate to have highly professional, nonpolitical staffs of economists. The role of the staff is to provide analysis of current economic conditions, forecasts of the evolution of the economy over a horizon of a couple of years, and assessments of the risks to those forecasts. Such information is a valuable and valued input into policy discussions. I myself do not finally make up my mind on a policy position until I’ve heard both staff presentations and the views of other FOMC participants. More accurately, I go into each FOMC

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6 See, for example, Poole (2005).
meeting with a view on the appropriate policy action given my assessment of the economic outlook, but I try to be as open as I can to having my view altered by discussion at the FOMC meeting. There are certainly instances when I have changed the view I took into the meeting as a consequence of the discussion.

**Distinction Between Members and Participants**

Except when there are vacancies in offices, there are 19 principals, or participants, at each FOMC meeting—the 7 members of the Board of Governors and the 12 Reserve Bank presidents. All of these participants are fully engaged in presenting their views. They bring information from their business and academic contacts, comment on staff presentations, discuss analytical issues relevant to understanding the economy and policy issues, and present their views as to the most appropriate policy action. However, at any particular meeting there are only 12 voting members of the Committee. Each of the 7 members of the Board of Governors is a permanent member of the FOMC. The president of the Federal Reserve Bank of New York is also a permanent member. The remaining Federal Reserve Bank presidents rotate as members of the FOMC. As president of the Federal Reserve Bank of St. Louis, I am in a rotation group with the presidents of the Federal Reserve Banks of Atlanta and Dallas. This structure of the FOMC dates from 1942. In the early years of the FOMC, not all the principals were allowed to participate, or even attend, meetings at which they were not voting members of the Committee.

The purpose of FOMC meetings is to reach a consensus among the participants and, particularly, among the members about the appropriate policy action (setting of the funds rate target) given policy goals and the outlook for the economy. Unanimous decisions, while desirable, are not required, and members are free to dissent from the consensus view if they feel strongly that an alternative policy action is preferable. Indeed, I believe that it is my obligation under the Federal Reserve Act to dissent when I believe strongly that an alternative policy course would be better. Historically, dissents were not unusual; though, in the recent years, they have been relatively rare.

**Communication**

Once policy action has been set, it is absolutely necessary that communication to the public about the policy action not be garbled. Hence, the Chairman is the only participant who speaks officially for the Committee. He presents official Federal Reserve positions through testimony before congressional committees and in public speeches. The minutes of FOMC meetings, currently released three weeks after each meeting, also represent the official position of the Committee.

Participants other than the Chairman express their own views in speeches. These speeches often may seem to reflect a “party line” but are rarely centrally coordinated in any way. In my experience, the only time there has been a real effort to coordinate public comments by the participants was in the late summer of 1998. At that time, financial markets were skittish as a result of the Russian default and financial troubles of LTCM. I recall an informal gathering in the late summer of 1998 with Chairman Greenspan and a couple of other FOMC members when the Chairman made a request that we say very little given the rather tense state of the markets as the LTCM situation unfolded.

Seem ing coordination at other times is a consequence of the fact that FOMC participants ordinarily see things quite similarly. But most participants are not shy about expressing their differences. Differences are registered in a formal way through discount rate decisions of the Reserve Banks and informally through positions stated in speeches. Anyone can obtain an excellent feel for what goes on at a FOMC meeting by reading transcripts that are released with a lag of five years and are made available on the website of the Board of Governors.

**Dealing with the Press**

Different FOMC participants have different attitudes and comfort levels in dealing with the press. I myself give many speeches and almost
always talk with the press after my speeches. I try to be as clear as I can, but from time to time I realize after the fact that I have not expressed myself as clearly as I would have liked. When reading press accounts, be aware that FOMC members misspeak from time to time and press interpretations are not always as intended. We all try to be as careful as possible but are not infallible. Be wary of headlines. Reporters will tell you that they are sometimes frustrated with the headlines that appear over their stories. Be aware also that wire service reports are sometimes designed to move markets. Considerations behind policy adjustments are often complex—be cautious about simple interpretations.

I believe that one of my responsibilities is to communicate to a wider audience through the press, doing the best I can to be accurate and to convey both policy fundamentals and policy nuances. A well-informed public is essential to an effective monetary policy. In my experience, press reports are generally, but not always, accurate. The financial journalists with whom I interact are genuinely interested in getting the story right. They do ask probing questions, as they should, but do not try to impose their own personal slant to the reports they publish. Inaccuracies are generally a consequence of the complexity of the subject and the need, on my part and the journalists’ part, to make reports simple enough for a wide audience to understand.

When talking with the press, one of the points I try to convey is that I do not come to a firm conclusion about my policy position until just before the FOMC meeting; as I have said, even then, I do my best to maintain an open mind, which can be changed by the staff presentation and general discussion at the meeting itself. I have already documented the most important reason for this policy of mine. Inherently unpredictable information can arrive right up to the day of the meeting. It would not be sound practice for policymakers to lock themselves into decisions impervious to new information.

Another reason why I ordinarily do not have a settled policy position weeks before an FOMC meeting is this: I follow economic reports continuously between FOMC meetings, but do not ordinarily dig deeply into them until the period of intense preparation the week before an FOMC meeting. Thus, my views on incoming information are often tentative and incomplete; I know that I’ll be reviewing all available information in the intense preparation period. I believe that it would not be helpful to the markets for me to convey views that I know are tentative and incomplete; thus, I try not to speculate about the significance of new information for the policy decision to be debated at the next FOMC meeting. My responsibility is to convey accurate information and, equally, not to be a source of misleading or inaccurate interpretations of incoming information.

**Bottom Line**

The Federal Reserve has the responsibility to provide leadership. The ideal situation is when the market can reasonably predict what the Fed is going to do because the Fed has provided the leadership to make clear its objectives and how it pursues those objectives. The Fed is not and ought not to be viewed as an adversary of the markets. Policy actions and statements do have market effects. Those are unavoidable, but the Fed strives to make policy as clear as it can so that what is really surprising the markets is not Fed actions but the arrival of new information that surprises the Fed and markets together.

I’ve tried to answer questions that are commonly put to me and to provide a general framework for better understanding of the Federal Reserve. And I hope that I have provoked some additional questions.

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