

## Ben S Bernanke: Fedspeak

Speech by Mr Ben S Bernanke, Member of the Board of Governors of the US Federal Reserve System, at the meetings of the American Economic Association, San Diego, 3 January 2004.

*The references for the speech can be found on the Board of Governors of the Federal Reserve System's website.*

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There was a time when central bankers did not talk to the public. Montagu Norman, the Governor of the Bank of England for a quarter of a century after the First World War and a highly influential figure in his time in central banking circles, was notorious for his reclusiveness, both personal and professional. According to his biographer, Norman lived by the maxim, "Never explain, never excuse" (Boyle, 1967, p. 217). Norman was hardly unique. Central bankers long believed that a certain "mystique" attached to their activities; that making monetary policy was an arcane and esoteric art that should be left solely to the initiates; and that letting the public into the discussion would only usurp the prerogatives of insiders and degrade the effectiveness of policy.

In contrast to this tradition of secrecy, central banks around the world have become noticeably more open and transparent over the past fifteen years or so. Policymaking committees have adopted various mechanisms to enhance their communication with the public, including more informative policy announcements, post-meeting press conferences, expanded testimony before the legislature, the release of the minutes of policy meetings, and the regular publication of reports on monetary policy and the economy.

This increased openness is a welcome development, for many reasons. Perhaps most important, as public servants whose policy actions affect the lives of every citizen, central bankers have a basic responsibility to give the public full and compelling explanations of the rationales for those actions. Besides satisfying the principle of democratic accountability, a more open policymaking process is also likely to lead to better policy decisions, because engagement with an informed public provides central bankers with useful feedback in the form of outside views and analyses. Yet another benefit of full and timely release of information about policy decisions and their rationales is a reduced risk that market-sensitive information will dribble out through inappropriate channels, giving unfair advantage to some financial market participants.

Admittedly, for many central banks, including the Federal Reserve, progress toward greater transparency has come in halting steps and not without trepidation. For example, the decision to announce changes in the target for the federal funds rate immediately after meetings of the Federal Open Market Committee (FOMC) was implemented only in phases and after considerable soul-searching by FOMC members. In retrospect, however, I think that most central bankers, both in the United States and abroad, would agree that greater openness has been beneficial to central banks as institutions and for the advancement of their policy objectives.

Although the presumption today is that - absent compelling reasons to the contrary - central banks should strive for transparency, some basic questions about *what*, *how*, and *to what end* central banks should communicate with the public remain decidedly open. In my talk today I will put aside broader considerations such as democratic accountability and consider these questions as they bear on the ability of central banks to make monetary policy more effective and to improve macroeconomic performance. Before proceeding, I should emphasize that the views I will express today are not necessarily those of my colleagues on the Board of Governors or the Federal Open Market Committee.

### **Why central bank communication matters for policy effectiveness**

Can central bank talk - Fedspeak, in the vernacular of the U.S. media and financial markets - make monetary policy more effective and improve economic outcomes? To see why communication may be an integral part of good monetary policymaking, recall that the Federal Reserve directly controls only a single short-term interest rate, the overnight federal funds rate. Relative to the enormous size of global financial markets, the market for federal funds - the market in which commercial banks borrow and lend reserves on a short-term basis - is insignificant. Control of the federal funds rate is therefore useful *only* to the extent that it can be used as a lever to influence more important asset prices and

yields - stock prices, government and corporate bond yields, mortgage rates - which in turn allow the Fed to affect the overall course of the economy.

Of course, basic financial theory implies that a link does exist between short-term interest rates, such as the federal funds rate, and longer-term rates, such as Treasury bond yields and mortgage rates. In particular, longer-term yields should depend in part on market expectations about the future course of short-term rates. For example, with the current setting of the funds rate held constant, any arriving news that leads bond market participants to expect higher future values of the funds rate will tend to raise bond yields and lower bond prices. The link between long-term bond yields and market expectations of future monetary policy actions is familiar to all financial-market participants and has been well supported by recent empirical research. For example, Antulio Bomfim has demonstrated that the shape of the term structure of Treasury yields can be effectively described by a two-factor model, in which the first factor corresponds to the current setting of the funds rate and the second factor closely approximates medium-term monetary policy expectations (Bomfim, 2003).

The fact that market expectations of future settings of the federal funds rate are at least as important as the current value of the funds rate in determining key interest rates such as bond and mortgage rates suggests a potentially important role for central bank communication: If effective communication can help financial markets develop more accurate expectations of the likely future course of the funds rate, policy will be more effective (in a precise sense that I will explain further soon), and risk in financial markets should be reduced as well.

It is worth emphasizing that the predictability of monetary policy actions has both short-run and long-run aspects. A central bank may, through various means, improve the market's ability to anticipate its next policy move. Improving short-term predictability is not unimportant, because it may reduce risk premiums in asset markets and influence shorter-term yields. But signaling the likely action at the next meeting is not sufficient for effective policymaking. Because the values of long-term assets are affected by the whole trajectory of expected short-term rates, it is even more vital that information relevant to estimating that trajectory be communicated. As I will argue later, this can usually be done only by providing information about the central bank's objectives, assessment of the economy, and policy strategy.

### **Communication, asymmetric information and learning**

Ideally, what should central bank communication try to achieve? In an important analysis of the issue of central bank transparency, my FOMC colleague William Poole laid out a benchmark case in which the potential benefits of communication would be fully realized (Poole, 2003). In this benchmark case, the central bank has well-defined objectives and pursues regular and systematic policies consistent with those objectives. More important for our purposes, in this idealized world, financial markets are highly efficient and well informed. In particular, financial-market participants have access to all the information that the central bank uses in making policy decisions. Let us call the premise that the central bank has no significant information advantage over the private sector the assumption of *symmetric information*.

If the conditions of systematic policymaking, financial-market efficiency, and symmetric information all held, then one might hope that the economy would converge to a rational expectations equilibrium, in which participants in financial markets would need only to analyze incoming, publicly available economic data to make efficient forecasts of future Federal Reserve actions.<sup>1</sup> In this benchmark case, there would be no marginal benefit to central bank communication, beyond whatever was necessary to support this equilibrium in the first place.

Of course, to describe this idealized benchmark case is to recognize that it is at best an approximate description of the economy in which we live. In practice, financial-market participants generally do *not* have as much information as monetary policymakers do about a number of key inputs to policymaking, including the policymakers' own objectives, their (possibly implicit) model of the economy and the monetary transmission mechanism, their assessment of the economic situation (including both forecasts and the risks to the forecast), and their policy strategy. To the extent that this *asymmetry of*

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<sup>1</sup> As my discussion later will make clear, convergence to a full rational expectations equilibrium may also require that the economy's underlying structure be "learnable" by both the central bank and the public.

*information* between the central bank and the financial markets is quantitatively important - and I will present some evidence on this point shortly - financial markets will not price bonds and other assets efficiently (relative to the information possessed by the central bank), and scope may exist for central bank communication to improve the effectiveness of monetary policy and the overall performance of the economy.

A skeptic might argue that noise and other sources of pricing inefficiency pervade the financial markets, so that improving the predictability of monetary policy is of limited importance in practice, except perhaps to a few brokers and traders. To the contrary, there is good reason to believe that information asymmetries between the central bank and financial markets may matter a great deal for economic welfare. A theoretical basis for this view is provided by the lively recent literature on adaptive learning and monetary policy. This work has shown that, when the public does not know but instead must estimate the central bank's reaction function and other economic relationships using observed data, we have no guarantee that the economy will converge - even in infinite time - to the optimal rational expectations equilibrium.<sup>2</sup> In general, the problem is that the public's learning process *itself* affects the behavior of the economy - for example, as when expectational errors by bond traders affect interest rates and thus a wide range of economic decisions. The feedback effect of learning on the economy, this literature has shown, can in principle lead to unstable or indeterminate outcomes. More generally, the dynamic behavior of an economy with asymmetric information and learning may be radically different from the behavior of the same economy in the optimal rational expectations equilibrium.

A particularly interesting analysis of the implications of learning for monetary policy and central bank communication has been provided in a series of papers by Athanasios Orphanides and John C. Williams (2003a, 2003b). Orphanides and Williams study model economies in which the public is assumed to know the general nature of the economy's underlying structure but not the precise quantitative magnitudes describing that structure. Specifically, these authors consider a model in which the public is assumed to know the form of the equation describing the dynamic behavior of inflation but not the parameters of that equation, which depend on the (unobserved by the public) objectives and preferences of the central bank. Orphanides and Williams assume that, to learn the parameters of the process that generates inflation, people must apply standard statistical methods to observed data on inflation and other macroeconomic variables.

Obviously, in assuming that people know the true economic structure with certainty, and that they infer the underlying parameters of that structure using formal statistical methods, Orphanides and Williams and others in this literature are attributing much greater knowledge and sophistication to the public than exist in the real world. Nevertheless, the behavior of their model economies with learning can be quite different from that of the rational expectations analogue, in which the public is assumed to have full and symmetric information. For example, these authors show that the economy with learning is prone to episodes of stagflation, or combinations of high inflation and low output. The logic is as follows: When people are learning about the inflation process, an increase in inflation that would be only temporary and would leave expectations unaffected in a rational expectations world, may instead lead the public to infer that the long-run average rate of inflation is higher than previously thought. The rise in the public's inflation expectations affects wage- and price-setting and other economic decisions and thus raises actual inflation. In a vicious cycle, the higher rate of realized inflation further increases inflation expectations, forcing the central bank to tighten policy. The result is inflation that is unnecessarily high and output that is unnecessarily low.

Several insights come from this and other contributions to the literature on adaptive learning in macroeconomics. First, the fact that the public must learn about underlying economic relationships changes the nature of the optimal monetary policy. In general, with learning, the central bank's optimal policy involves exerting a tighter control on inflation than it might otherwise exert, to avoid the possibility that inflation expectations will drift randomly higher (or lower). Thus, this approach formalizes the idea that a central bank should work actively to "anchor" inflation expectations within a narrow range. Second, efficient policy in this world requires that policymakers pay attention to information (for example, from surveys) about the public's expectations of inflation and other variables; if these appear not to be converging toward the desired levels, then a policy response may be

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<sup>2</sup> See Evans and Honkapohja (2003a) for a survey of relevant results. Evans and Honkapohja (2001) provide an extensive analysis of macroeconomic models with learning. Kaushik and Mitra (2002) argue that central banks should restrict themselves to policies that are "learnable" by the public.

warranted.<sup>3</sup> Finally, and most important for my purpose today, communication by the central bank may play a key role in helping improve economic performance. For example, in the models analyzed by Orphanides and Williams, the provision of information by the central bank about its long-run inflation objective or its economic forecasts generally leads to more favorable policy tradeoffs and better economic outcomes.

The work on adaptive learning by Orphanides and Williams and others is largely theoretical, but in my view it is highly relevant to understanding modern U.S. monetary history. A leading example is the stagflationary period of the 1970s, in which astute observers recognized that high and unstable public expectations of inflation, themselves generated by poor macroeconomic policies that allowed inflation to get out of control, greatly increased the complexity and cost of restoring stability.<sup>4</sup> More recently, Marvin Goodfriend (1993) has identified several instances of what he calls “inflation scares,” apparently autonomous increases in inflation expectations that raised long-term bond yields and forced a tightening of monetary policy that could have been avoided if expectations had been better anchored. The view that adaptive learning and asymmetric information are crucial to understanding recent monetary history is apparently shared by the developers of the Federal Reserve’s primary econometric model, the FRBUS model, which relies heavily on these assumptions (Brayton et al., 1997). Simulations of that model suggest both that adaptive learning is needed to explain the observed responses of the financial market and the economy to monetary policy actions, and that asymmetric information and adaptive learning lead systematically to inferior macroeconomic outcomes, as implied by the work of Orphanides and Williams and others.

Of course, the situation in the United States is much better today than in the 1970s; both inflation and inflation expectations are much more stable, and better economic outcomes have been the result. But is there still scope for improvement? I will present some evidence to suggest that there is and then conclude by discussing how communications policies could help anchor and stabilize the system more firmly.

### **Evidence on the effectiveness of Fed communication**

In the past decade, the Federal Reserve has taken a number of significant steps toward increased transparency, including announcing decisions about the federal funds rate promptly after FOMC meetings, indicating first a policy “bias” and then a “balance of risks” assessment in post-meeting statements, and making the minutes of policy meetings publicly available (with a lag of about eight weeks). Members of the FOMC have also made greater use of vehicles such as testimony and speeches to convey their assessments of the economy and their policy inclinations to the public. How effective have these efforts been?

I earlier distinguished between short-run and long-run predictability of policy. Fairly strong evidence supports the conclusion that the short-run predictability of policy has increased in recent years. For example, Joe Lange, Brian Sack, and William Whitesell (2003) have shown that, since the late 1980s and early 1990s, monetary policy actions over short horizons have been predicted increasingly well by financial instruments such as three- and six-month Treasury bills and federal funds futures contracts. These authors attribute at least part of this improvement to greater transparency on the part of the Federal Reserve. Poole, Rasche, and Thornton (2002) reach a similar conclusion.<sup>5</sup>

However, the more important question is whether the Federal Reserve has improved the ability of the public to forecast its policies at long horizons. Long-horizon forecastability of policy has a number of dimensions, of course. One that has received particular attention in the literature, and which is closely

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<sup>3</sup> Evans and Honkapohja emphasize this point in a series of papers; see, for example, Evans and Honkapohja (2003b). Sack (2003) provides evidence that U.S. monetary policy does respond to inflation expectations, as measured by the yields on nominal and inflation-indexed Treasury securities.

<sup>4</sup> Erceg and Levin (2003) model the disinflation process of the early 1980s using the assumption that the public learns optimally about inflation. They show that learning and the consequently slow adjustment of inflation expectations help to explain the severe economic contraction of the period.

<sup>5</sup> Kohn and Sack (2003) studied the effect of the release of post-meeting FOMC statements on the term structure and found that the release of statements generated a response in short-term interest rates (up to two years' maturity), independent of the effects of any accompanying policy actions. They interpret this finding as supporting the view that statements contain information (over and above that inherent in the policy action) for near-term monetary policy. Of course, a fortiori, their findings are also evidence against the view that information relevant to monetary policy is approximately symmetric.

related to theoretical models that assume adaptive learning, is the question of whether the public is able to infer the Federal Reserve's implicit long-run inflation objective.<sup>6</sup> Uncertainty about this objective bears directly on the market's ability to price long-term assets, as well as on the capacity of wage- and price-setters to strike efficient long-term agreements and of firms and households to make long-term economic plans.

Various types of evidence bear on this question. For example, some recent research has considered expectations of inflation and other variables as measured by surveys. One clear finding is that, as inflation has come under control and has stabilized in the United States in recent years, long-term inflation expectations have stabilized as well, suggesting reduced uncertainty about the Fed's ultimate inflation objective. For example, a cross-country study of inflation expectations by staff of the European Central Bank found that, since 1990, both the average level of expected inflation and the volatility of reported expectations of inflation in the United States have declined, the latter quite significantly (especially since 1999).<sup>7</sup> However, as an aside, it is interesting that both surveys and the inflation compensation priced into the yields on indexed bonds suggest that today long-term inflation expectations in the United States remain in the vicinity of 2-1/2 to 3 percent, above the range of inflation that many observers believe to represent the FOMC's implicit target. Possibly, this observation indicates an ongoing process of adaptive learning.

A subtler issue is the degree to which inflation expectations in the United States are anchored. Specifically, to what extent would inflation expectations rise if actual inflation increased for some reason? To address this question, Andrew Levin, Fabio Natalucci, and Jeremy Piger (2003) examined U.S. private-sector forecasts of inflation since 1994. They found that medium- and long-term forecasts of inflation in the United States are strongly correlated with three-year moving average of lagged inflation, a finding that suggests that inflation expectations are not entirely anchored but are instead subject to adaptive learning. As a supporting piece of evidence, Levin, Natalucci, and Piger show that, compared to other industrial countries, shocks to inflation tend to be relatively persistent in the United States, an implication of models with adaptive learning.<sup>8</sup>

Bond markets provide fertile ground in which to search for evidence on the importance of adaptive learning and the degree to which expectations are well anchored. For example, Refet Gurkaynak, Brian Sack, and Eric Swanson (2003) show that distant forward rates (e.g., the implied one-year forward rate ten years in the future) move significantly in response to the unexpected components of both monetary policy decisions and a number of macroeconomic data releases. Because they do not find the same result for inflation-indexed securities (that is, real forward rates do not respond to policy or data surprises), they conclude that long-term expectations of inflation must not be tightly anchored in the United States. Kevin Kliesen and Frank Schmid (2003) support these findings by showing directly that ten-year inflation expectations, as derived from inflation-indexed bonds, respond significantly to policy surprises as well as to the unexpected components of macroeconomic data releases.<sup>9</sup>

Interesting work by Sharon Kozicki and Peter Tinsley (2001a, 2001b) bears directly on the importance of asymmetric information and learning in financial markets. Kozicki and Tinsley incorporate alternative specifications of the evolution of inflation expectations in a standard model of the term structure (see Campbell, Lo and MacKinlay, 1997). Kozicki and Tinsley show that by far the best fit is obtained when inflation expectations are modeled as evolving by adaptive learning, in which inflation expectations adjust slowly to actual inflation. When inflation expectations are modeled this way, and only when they are modeled this way, the expectations theory of the term structure performs well and estimated term premiums are relatively small. In related research, Glenn Rudebusch and Tao Wu (2003) show empirically that a two-factor model of the term structure can be closely linked to monetary policy

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<sup>6</sup> The working assumption here is that U.S. monetary policy is conducted "as if" there were a numerical inflation objective, even though there is no explicit agreement on the FOMC as to what that objective should be.

<sup>7</sup> Castelnuovo, Efram, Sergio Nicoletti-Altimari and Diego Rodriguez Palenzuela (2003). Kohn (2003) notes that the volatility of long-term inflation expectations in the United States has declined and is similar to that of industrial countries, including those that formally target inflation.

<sup>8</sup> For example, the model of Erceg and Levin (2003) has that implication.

<sup>9</sup> Some care must be taken when using inflation-indexed bonds to measure inflation expectations, however. These bonds were introduced in the United States relatively recently, and the secondary market remains less liquid than those for other Treasury securities. Changes in measured inflation compensation drawn from this market may thus sometimes reflect changes in liquidity or risk premiums as well as changes in market expectations of inflation.

fundamentals, but only on the assumption that the medium-term inflation expectations held by market participants are time-varying. All the cited findings apply to recent data, as well to earlier observations. The evidence for asymmetric information and adaptive learning, at least in regard to the Fed's inflation objective, thus seems quite strong.

### Implications for central bank communication

So far I have discussed why central bank communication is important for financial market efficiency and good macroeconomic performance, and I have presented a few pieces of evidence that suggest that asymmetry of information between the Federal Reserve and the public may be an important phenomenon. What implications does all this have for the communication policies of the Fed?

In an ideal world, the Federal Reserve would release to the public a complete specification of its policy rule, relating the FOMC's target for the federal funds rate to current and expected economic conditions, as well as its economic models, data, and forecasts. Using this information, financial-market participants would be able to forecast future values of the policy rate and efficiently price long-term bonds and other assets. Unfortunately, as stressed by Poole (2003) as well as by Chairman Greenspan (2003) in his talk at the most recent Jackson Hole conference, specifying a complete and explicit policy rule, from which the central bank would never deviate under any circumstances, is impractical. The problem is that the number of contingencies to which policy might respond is effectively infinite (and, indeed, many are unforeseeable).

While specifying a complete policy rule is infeasible, however, there is much that a central bank can do - both by its actions and its words - to improve the ability of financial markets to predict monetary policy actions. With respect to actions, the central bank should behave in as systematic and as understandable a way as possible, given the macroeconomic and financial environment. That is, although monetary policy cannot be made by a mechanical rule, policy can and should have "rule-like" features. Obviously, the more systematic and the more consistent with a few basic principles the conduct of monetary policy becomes, the easier it will be for the public to understand and predict the Fed's behavior.<sup>10</sup> However, because the world is complex and ever changing, policy actions alone, without explanation, will never be enough to provide the public with the information it needs to predict policy actions. Words are also necessary.

What then should the Fed talk about? In general, the research I have discussed today suggests that the central bank should do what it can to make information *symmetric*, providing the public to the extent possible with the same information that the FOMC uses in making its decisions.<sup>11</sup> More specifically, the strongest implication of the adaptive learning literature is that the Fed should be as explicit as possible about its policy objectives. Without clear information about policy objectives, the public's problem of predicting future monetary policy actions becomes extremely difficult. For example, without this information, it would be hard for the public to know whether an unexpected policy move signals a change in the policymakers' objectives, a change in their economic outlook, or both. As also suggested by the adaptive learning literature, a potential advantage of having an explicit objective for inflation in particular is that it may help to anchor the public's expectations.<sup>12</sup>

Besides its policy objectives, the central bank can make other useful information available to the public, including its economic forecasts, its assessment of the economic risks, and (if possible) the models or analytical frameworks that underlie its diagnosis of the economy. The Federal Reserve currently provides information on each of these elements. For example, the so-called "central tendency" forecasts of the FOMC are released twice a year, as part of the Chairman's semiannual testimony before Congress; the statements following FOMC meetings provide some assessment of the perceived risks to the forecast; and the active research programs conducted at the Board and the Reserve banks, including publications and conferences, provide observers insights into the underlying analytical frameworks that inform monetary policymaking.

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<sup>10</sup> "Rule-like" policies may also improve the central bank's credibility and ability to commit to future actions.

<sup>11</sup> Note that this suggestion brings us full circle back to Poole's (2003) benchmark case of rational expectations and symmetric information, discussed earlier.

<sup>12</sup> See Bernanke (2003a, 2003b) for discussions of the case for an explicit long-run objective for inflation.

We should continue to seek improvement in each of these areas. For example, FOMC forecasts might be released more frequently and for a longer horizon. Additional variables could be forecasted, notably core inflation, a key factor in FOMC policy decisions. More controversially, the FOMC might consider forecasting future values of the short-term interest rate, as is currently done by the Reserve Bank of New Zealand. The difficulty would be to make clear that an interest-rate forecast is not the same as a policy commitment. The use of “fan charts” to indicate the range of uncertainty would be helpful in this regard; and indeed, providing more information about the range of uncertainty for all FOMC forecasts would be a useful innovation.

In my talk today I have often adopted the common convention of speaking of the central bank as if it were a single actor. In reality, policymaking at most central banks is done by a committee. In the United States, nineteen people (twelve of whom get to vote at any given meeting) have seats at the FOMC table. The diversity of views and opinions likely to exist among the members of a large committee create further challenges for effective communication. However, vehicles do exist to help convey the breadth of opinion on the Committee. For example, the minutes of FOMC meetings describe the range of viewpoints and many of the key considerations underlying policy decisions. In my view, releasing these minutes more promptly than is now done would provide useful and more timely information for the public. Although at times it feels cacophonous, the willingness of FOMC members to present their individual perspectives in speeches and other public forums provides the public with useful information about the diversity of views and the balance of opinion on the Committee.

Other possibilities for improved transparency may exist. Importantly, as we think about these, we should not simply take the view that more information is always better. Indeed, irrelevant or badly communicated information may create more noise than signal; and some types of information provision - an extreme example would be televising FOMC meetings - risk compromising the integrity and quality of the policymaking process itself. Rather, the key question should be whether the additional information will improve the public's understanding of the Fed's objectives, economic assessments, and analytical framework, thus allowing them to make better inferences about how monetary policy is likely to respond to future developments in the economy. Communication that meets this criterion will lead to better monetary policy and better economic performance.