Ben S Bernanke: Panel discussion: what have we learned since October 1979?

Remarks by Mr Ben S Bernanke, Member of the Board of Governors of the US Federal Reserve System, to the Conference on Reflections on Monetary Policy 25 Years after October 1979, Federal Reserve Bank of St Louis, St Louis, Missouri, 8 October 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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The question asked of this panel is, "What have we learned since October 1979?" The evidence suggests that we have learned quite a bit. Most notably, monetary policy-makers, political leaders, and the public have been persuaded by two decades of experience that low and stable inflation has very substantial economic benefits.

This consensus marks a considerable change from the views held by many economists at the time that Paul Volcker became Fed Chairman. In 1979, most economists would have agreed that, in principle, low inflation promotes economic growth and efficiency in the long run. However, many also believed that, in the range of inflation rates typically experienced by industrial countries, the benefits of low inflation are probably small - particularly when set against the short-run costs of a major disinflation, as the United States faced at that time. Indeed, some economists would have held that low-inflation policies would likely prove counterproductive even in the long run, if an increased focus on inflation inhibited monetary policy-makers from responding adequately to fluctuations in economic activity and employment.

As it turned out, the low-inflation era of the past two decades has seen not only significant improvements in economic growth and productivity but also a marked *reduction* in economic volatility, both in the United States and abroad, a phenomenon that has been dubbed "the Great Moderation." Recessions have become less frequent and milder, and quarter-to-quarter volatility in output and employment has declined significantly as well. The sources of the Great Moderation remain somewhat controversial, but as I have argued elsewhere, there is evidence for the view that improved control of inflation has contributed in important measure to this welcome change in the economy (Bernanke, 2004). Paul Volcker and his colleagues on the Federal Open Market Committee deserve enormous credit both for recognizing the crucial importance of achieving low and stable inflation and for the courage and perseverance with which they tackled America's critical inflation problem.

I could say much more about Volcker's achievement and its lasting benefits, but I am sure that many other speakers will cover that ground. Instead, in my remaining time, I will focus on some lessons that economists have drawn from the Volcker regime regarding the importance of credibility in central banking and how that credibility can be obtained. As usual, the views I will express are my own and are not necessarily shared by my colleagues in the Federal Reserve System.

Volcker could not have accomplished what he did, of course, had he not been appointed to the chairmanship by President Jimmy Carter. In retrospect, however, Carter's appointment decision seems at least a bit incongruous. Why would the President appoint as head of the central bank an individual whose economic views and policy goals (not to mention personal style) seemed, at least on the surface, quite different from his own? However, not long into Volcker's term, a staff economist at the Board of Governors produced a paper that explained why Carter's decision may in fact have been quite sensible from the President's, and indeed the society's, point of view. Although the question seems a narrow one, the insights of the paper had far broader application; indeed, this research has substantially advanced our understanding of the links among central bank credibility, central bank structure, and the effectiveness of monetary policy.

Insiders will have already guessed that the Board economist to whom I refer is Kenneth Rogoff, currently a professor of economics at Harvard, and that the paper in question is Ken's 1985 article, "The Optimal Degree of Commitment to an Intermediate Monetary Target" (Rogoff, 1985).[1] The insights of the Rogoff paper are well worth recalling today. Rather than considering the paper in isolation, however, I will place it in the context of two other classic papers on credibility and central bank design, an earlier work by Finn Kydland and Edward Prescott and a later piece by Carl Walsh.

[1] Rogoff's paper was widely circulated in 1982, a sad commentary on publication lags in economics.

As I proceed, I will note what I see to be the important lessons and the practical implications of this line of research.[2]

Central bankers have long recognized at some level that the credibility of their pronouncements matters. I think it is fair to say, however, that in the late 1960s and 1970s, as the U.S. inflation crisis was building, economists and policymakers did not fully understand or appreciate the determinants of credibility and its link to policy outcomes. In 1977, however, Finn Kydland and Edward Prescott published a classic paper, entitled "Rules Rather than Discretion: The Inconsistency of Optimal Plans" (Kydland and Prescott, 1977), that provided the first modern analysis of these issues.[3] Specifically, Kydland and Prescott demonstrated why, in many situations, economic outcomes will be better if policymakers are able to make credible commitments, or promises, about certain aspects of the policies they will follow in the future. "Credible" in this context means that the public believes that the policymakers will keep their promises, even if they face incentives to renege.

In particular, as one of Kydland and Prescott's examples illustrates, monetary policy-makers will generally find it advantageous to commit publicly to following policies that will produce low inflation. If the policymakers' statements are believed (that is, if they are credible), then the public will expect inflation to be low, and demands for wage and price increases should accordingly be moderate. In a virtuous circle, this cooperative behavior by the public makes the central bank's commitment to low inflation easier to fulfill. In contrast, if the public is skeptical of the central bank's commitment to low inflation (for example, if it believes that the central bank may give in to the temptation to overstimulate the economy for the sake of short-term employment gains), then the public's inflation expectations will be higher than they otherwise would be. Expectations of high inflation lead to more-aggressive wage and price demands, which make achieving and maintaining low inflation more difficult and costly (in terms of lost output and employment) for the central bank.

Providing a clear explanation of why credibility is important for effective policymaking, as Kydland and Prescott did, was an important step. However, these authors largely left open the critical issue of how a central bank is supposed to obtain credibility in the first place. Here is where Rogoff's seminal article took up the thread.[4] Motivated by the example of Carter and Volcker, Rogoff's paper showed analytically why even a president who is not particularly averse to inflation, or at least no more so than the average member of the general public, might find it in his interest to appoint a well-known "inflation hawk" to head the central bank. The benefit of appointing a hawkish central banker is the increased inflation-fighting credibility that such an appointment brings. The public is certainly more likely to believe an inflation hawk when he promises to contain inflation because they understand that, as someone who is intrinsically averse to inflation, he is unlikely to renege on his commitment. As increased credibility allows the central bank to achieve low inflation at a smaller cost than a non-credible central bank can, the president may well find, somewhat paradoxically, that he prefers the economic outcomes achieved under the hawkish central banker to those that could have been obtained under a central banker with views closer to his own and those of the public.

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2 In focusing on three landmark papers I necessarily ignore what has become an enormous literature on credibility and monetary policy. Walsh (2003, chap. 8) provides an excellent overview. Rogoff (1987) was an important early survey of the "first generation" of models of credibility in the context of central banking.

3 In another noteworthy paper, Calvo (1978) made a number of points similar to those developed by Kydland and Prescott. The extension of the Kydland-Prescott "inflation bias" by Barro and Gordon (1983a) has proved highly influential.

4 Rogoff was my graduate school classmate at M.I.T., and I recently asked him for his recollections about the origins of the conservative central banker. Here (from a personal e-mail) is part of his response:

> [T]he paper was mainly written at the Board in 1982 . . . It came out as an IMF working paper in February 1983 (I was visiting there), and then the same version came out as an International Finance Discussion paper [at the Board of Governors] in September 1983 . . . The original version of the paper . . . featured inflation targeting. Much like the published paper, I suggested that having an independent central bank can be a solution to the time consistency [that is, credibility] problem if we give the bank an intermediate target and some (unspecified) incentive to hit the target . . . I had the conservative central banker idea in there as well, as one practical way to ensure the central bank placed a high weight on inflation. Larry Summers, my editor at the [*Quarterly Journal of Economics*], urged me to move that idea up to the front section and place inflation targeting second. This, of course, is how the paper ended up.
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> [Regarding the Fed], Dale Henderson and Matt Canzoneri liked the paper very much . . . many other researchers gave me feedback on my paper (including Peter Tinsley, Ed Offenbacher, Bob Flood, Jo Anna Gray, and many others) . . . Last but perhaps most important, there is absolutely no doubt that the paper was inspired by my experience watching the Volcker Fed at close range. I never would have written it had I not . . . ended up as an economist at the Board.

Appointing an inflation hawk to head the central bank may not be enough to ensure credibility for monetary policy, however. As Rogoff noted in his article, for this strategy to confer significant credibility benefits, the central bank must be perceived by the public as being sufficiently independent from the rest of the government to be immune to short-term political pressures. Thus Rogoff's proposed strategy was really two-pronged: The appointment of inflation-averse central bankers must be combined with measures to ensure central bank independence. These ideas, supported by a great deal of empirical work, have proven highly influential.[5] Indeed, the credibility benefits of central bank autonomy have been widely recognized in the past twenty years, not only in the academic literature but, far more consequentially, in the real-world design of central banking institutions. For example, in the United Kingdom, the euro area, Japan, and numerous other places, recent legislation or other government action has palpably strengthened the independence of the central banks.[6]

Rogoff's proposed solution to the credibility problems of central banks does have some limitations, however, as Ken recognized both in his paper and in subsequent work. First, although an inflation-averse central banker enhances credibility and delivers lower inflation on average, he may not respond to shocks to the economy in the socially desirable way. For example, faced with an aggregate supply shock (such as a sharp rise in oil prices), an inflation-averse central banker will tend to react too aggressively (from society's point of view) to contain the inflationary impact of the shock, with insufficient attention to the consequences of his policy for output and employment.[7] Second, contrary to an assumption of Rogoff's paper, in practice the policy preferences of a newly appointed central banker will not be precisely known by the public but must be inferred from policy actions. (Certainly the public's perceptions of Chairman Volcker's views and objectives evolved over time.) Knowing that the public must make such inferences might tempt a central banker to misrepresent the state of the economy (Canzoneri, 1985) or even to take suboptimal policy decisions; for example, the central banker may feel compelled to tighten policy more aggressively than is warranted in order to convince the public of his determination to fight inflation. The public's need to infer the central banker's policy preferences may even generate increased economic instability, as has been shown in a lively recent literature on the macroeconomic consequences of learning.[8]

The third pathbreaking paper I will mention today, a 1995 article by Carl Walsh entitled "Optimal Contracts for Central Bankers," was an attempt to address both of these issues.[9] To do so, Walsh conducted a thought experiment. He asked his readers to imagine that the government or society could offer the head of the central bank a performance contract, one that includes explicit monetary rewards or penalties that depend on the economic outcomes that occur under his watch. Remarkably, Walsh showed that, in principle, a relatively simple contract between the government and the central bank would lead to the implementation of monetary policies that would be both credible and fully optimal. Under this contract, the government provides the central banker with a base level of compensation but then applies a penalty that depends on the realized rate of inflation - the higher the observed inflation rate, the greater the penalty.

If the public understands the nature of the contract, and if the penalty assessed for permitting inflation is large enough to affect central bank behavior, the existence of the contract would give credence to

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5 Walsh (2003, section 8.5) reviews empirical research on the correlations of central bank independence and economic outcomes. A consistent finding is that more-independent central banks produce lower inflation without any increase in output volatility.

6 The benefits of central bank independence should not lead us to ignore its downside, which is that the very distance from the political process that increases the central bank's policy credibility by necessity also risks isolating the central bank and making it less democratically accountable. For this reason, central bankers should make communication with the public and their elected representatives a high priority. Moreover, central bank independence does not imply that central banks should never coordinate with other parts of the government, under the appropriate circumstances.

7 Lohmann (1992) shows that this problem can be ameliorated if the government limits the central bank's independence, stepping in to override the central bank's decisions when the supply shock becomes too large. However, to preserve the central bank's independence in normal situations, this approach would involve stating clearly in advance the conditions under which the government would intercede, which may not be practicable.

8 Evans and Honkopohja (2001) is the standard reference on learning in macroeconomics. Recent papers that apply models of learning to the analysis of U.S. monetary policy include Erceg and Levin (2001) and Orphanides and Williams (forthcoming).

9 Persson and Tabellini (1993) provided an influential analysis of the contracting approach that extended and developed many of the points made by Walsh (1995).

central bank promises to keep the inflation rate low (that is, the contract would provide credibility).[10] Walsh's contract has in common with Rogoff's approach the idea that, in a world of imperfect credibility, giving the central banker an objective function that differs from the true objectives of society may be useful. However, Walsh also shows that the contracting approach ameliorates the two problems associated with Rogoff's approach. First, under the Walsh contract, the central banker has incentives not only to achieve the target rate of inflation but also to respond in the socially optimal manner to supply shocks.[11] Second, as the inflation objective and the central banker's incentive scheme are made explicit by the contract, the public's problem of inferring the central banker's policy preferences is significantly reduced.

There have been a few attempts in the real world to implement an incentive contract for central bankers - most famously a plan proposed to the New Zealand legislature, though never adopted, which provided for firing the governor of the central bank if the inflation rate deviated too far from the government's inflation objective.[12] But Walsh's contracts are best treated as a metaphor rather than as a literal proposal for central bank reform. Although the pay of central bankers is unlikely ever to depend directly on the realized rate of inflation, central bankers, like most people, care about many other aspects of their jobs, including their professional reputations, the prestige of the institutions in which they serve, and the probability that they will be reappointed.

Walsh's analysis and many subsequent refinements by other authors suggest that central bank performance might be improved if the government set explicit performance standards for the central bank (perhaps as part of the institution's charter or enabling legislation) and regularly compared objectives and outcomes. Alternatively, because central banks may possess the greater expertise in determining what economic outcomes are both feasible and most desirable, macroeconomic goals might be set through a joint exercise of the government and the central bank. Many countries have established targets for inflation, for example, and central bankers in those countries evidently make strong efforts to attain those targets. The Federal Reserve Act does not set quantitative goals for the U.S. central bank, but it does specify the objectives of price stability and maximum sustainable employment and requires the central bank to present semi-annual reports to the Congress on monetary policy and the state of the economy. Accountability to the public as well as to the legislature is also important; for this reason, the central bank should explain regularly what it is trying to achieve and why. In sum, Walsh's paper can be read as providing theoretical support for an explicit, well-designed, and transparent framework for monetary policy, one which sets forth the objectives of policy and holds central bankers accountable for reaching those objectives (or, at least, for providing a detailed and plausible explanation of why the objectives were missed).

In the simple model that Walsh analyzes, the optimal contract provides all the incentives needed to induce the best possible monetary policy, so that appointing a hawkish central banker is no longer beneficial. However, in practice - because Walsh's optimal contracts can be roughly approximated at best, because both the incentives and the policy decisions faced by central bankers are far more complex than can be captured by simple models, and because the appointment of an inflation-averse central banker may provide additional assurance to the public that the government and the central bank will keep their promises - the Walsh approach and the Rogoff approach are almost certainly complementary.[13] That is, a clear, well-articulated monetary policy framework; inflation-averse central bankers; and autonomy for central banks in the execution of policy are all likely to contribute to increased central bank credibility and hence better policy outcomes. Of course, other factors that I

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[10] An objection to this conclusion is that, although the central bank's incentives are made clear by the contract, the public might worry that the government might renege on its commitment to low inflation by changing the contract. Those who discount this concern argue that changing the contract in midstream would be costly for the government, because laws once enacted are difficult to modify and because changing an established framework for policy in an opportunistic way would be politically embarrassing.

[11] A key assumption underlying this result is that the central banker cares about the state of the economy as well as about the income provided by his incentive contract.

[12] In personal communication, Walsh reports to me that he was visiting a research institute in New Zealand at the time of these discussions. Walshs reflection on the New Zealand proposals helped to inspire his paper.

[13] Several authors have shown this point in models in which the inflation bias arising from non-credible policies differs across states of nature; see, for example, Herrendorf and Lockwood (1997) and Svensson (1997).

could not cover in this short review, such as the central bank's reputation for veracity as established over time, may also strengthen its credibility (Barro and Gordon, 1983b; Backus and Driffill, 1985).[14]

Let me end where I began, with reference to Paul Volcker and his contributions. I have discussed today how Volcker's personality and performance inspired one seminal piece of research about the determinants of central bank credibility. In focusing on a few pieces of academic research, however, I have greatly understated the impact of the Volcker era on views about central banking. The Volcker disinflation (and analogous episodes in the United Kingdom, Canada, and elsewhere) was undoubtedly a major catalyst for an explosion of fresh thinking by economists and policymakers about central bank credibility, how it is obtained, and its benefits for monetary policy-making. Over the past two decades, this new thinking has contributed to a wave of changes in central banking, particularly with respect to the institutional design of central banks and the establishment of new frameworks for the making of monetary policy.

Ironically, the applicability of the ideas stimulated by the Volcker chairmanship to the experience of the U.S. economy under his stewardship remains unclear. Though the appointment of Volcker undoubtedly increased the credibility of the Federal Reserve, the Volcker disinflation was far from a costless affair, being associated with a minor recession in 1980 and a deep recession in 1981-82.[15] Evidently, Volcker's personal credibility notwithstanding, Americans' memories of the inflationary 1970s were too fresh for their inflation expectations to change quickly. It is difficult to know whether alternative tactics would have helped; for example, the announcement of explicit inflation objectives (which would certainly have been a radical idea at the time) might have helped guide inflation expectations downward more quickly, but they might also have created a political backlash that would have doomed the entire effort. Perhaps no policy approach or set of institutional arrangements could have eliminated the 1970s inflation at a lower cost than was actually incurred. If so, then the significance of Paul Volcker's appointment was not its immediate effect on expectations or credibility but rather the fact that he was one of the rare individuals tough enough and with sufficient foresight to do what had to be done. By doing what was necessary to achieve price stability, the Volcker Fed laid the groundwork for two decades, so far, of strong economic performance.

[14] But see Rogoff (1987) for a critique of models of central bank reputation.

[15] Evidence on the behavior of inflation expectations after 1979 supports the view that the public came to appreciate only very gradually that Volcker's policies represented a break from the immediate past (Erceg and Levin, 2001).