

Interest Rate Policy After Greenspan

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Early next year, we will experience an event that happens rarely in the Federal Reserve – the retirement of the Chairman of the Board of Governors. Alan Greenspan is just the fifth Fed Chairman in the modern era that began with the Treasury-Fed Accord in 1951, and his retirement provides us with an excellent opportunity both to look back at a period of extraordinary success in monetary policy-making and to look forward to the principles that might allow future policy to continue this success. I plan to do some of both today, but I may spend as much time looking back as looking forward, not because I'm particularly nostalgic for the 1990s, but because I think it's important for us to understand the nature of our policy successes in order to draw the right lessons to guide our future thinking about policy. As always, the views expressed are my own, and do not necessarily represent the views of my colleagues in the Federal Reserve System.

First and foremost, the success of monetary policy in the Greenspan era is evident in the behavior of inflation, the stability of which is our primary responsibility as a central bank. While under Greenspan's predecessor, Chairman Paul Volcker, the Fed brought inflation down from double digit levels, the period since 1987 has seen inflation fall from an average of over four and a half percent per year in the late 1980s to about 2.5 percent in recent years. Perhaps just as importantly, inflation and inflation expectations have become more stable since then as well.

Declining inflation does not appear to have come at the cost of slower growth or high unemployment. The economy experienced two relatively mild recessions during that period, and they came on either end of the longest expansion in our nation's history. Moreover, this has been a period during which there have been a number of real and financial shocks that might have been expected to derail economic growth. In fact, real economic growth appears to have been substantially less variable since the early 1980s, a development that several writers, including former Fed Governor Ben Bernanke have termed "The Great Moderation."¹

Of course, not all of this bountiful good fortune is attributable to good monetary policy. For example, the 1990s saw a renewal of strong productivity growth, largely due to the emergence of significant new information processing and communications technologies, and fiscal policy was moved in a favorable direction that decade as well. But monetary policy has certainly played an important role, and Chairman Greenspan's leadership of the Fed during this period has been widely praised for contributing to superior economic performance.

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Together with the praise, a fair amount of recent commentary has focused on the reasons for this success. At the end of a policymaker's term in office, it is natural to look back to appraise the conduct of policy during their tenure, and this task is considerably more pleasant when the results have been favorable.

One distinguishing characteristic of Fed policy under Chairman Greenspan that has been identified by some observers is "flexibility," which they describe as a practical approach to policy that is not excessively tied to any one doctrine or any narrowly prescriptive approach to the conduct of policy.² In this view, the hallmark of monetary policy in the Greenspan years has been the careful analysis of the state of the economy, taking account of whatever is special about the current situation and then choosing an action appropriate for that situation. These observers see the flexibility of the Greenspan Fed as contrasting with adherence to a monetary policy "rule," or with adoption of a numerical inflation target for performance.

This observation calls to mind the economics literature on "rules vs. discretion" in policy-making, a line of research recognized by the award of last year's Nobel Prize in economics to Professors Finn Kydland and Edward Prescott.³ In the late 1970s they demonstrated that a central bank that sets policy on a discretionary basis each meeting, focusing solely on current and prospective economic conditions, generally will not deliver the best possible policy. In particular, they showed that a central bank taking such a discretionary approach will be tempted at times to ease policy to boost employment and output, despite the risk of higher inflation. The anticipation that policymakers will behave this way in the future will drive up current inflation. The general problem is that the behavior of market participants *today* depends crucially on how they *expect* the central bank to set policy in the *future*. This feature makes monetary policy conceptually different from, say, driving a car, since the current behavior of the car doesn't depend on what it expects the driver to do in the future.

Kydland and Prescott showed that as a result of this feature of the economy the policymakers would do better if they could "commit" to a pattern of behavior that avoids the temptation to ease policy at the expense of inflation. That is, by choosing now how they will conduct policy in the future, and convincing market participants that they will do so, policymakers can improve on the results of choosing policy on a period-by-period basis. To put it more concretely, a central bank can achieve better outcomes today by convincing markets that they will avoid inflationary temptations in the future. This is why central banks have come to focus so heavily on inflation expectations, and to react strongly when those expectations seem in danger of becoming unstable.

To achieve superior outcomes, however, the central bank's promise has to be believable, that is to say "credible." One way to do so is for the central bank to explicitly commit to a formula that determines the target level of the federal funds rate as a simple arithmetic function of a few macroeconomic variables, such as inflation and unemployment. The now famous (at least in central banking circles) "Taylor Rule" – which makes the policy

interest rate a linear function of an output gap and the deviation of inflation from a target – is one such arithmetic formula. But the benefits of policy credibility can be achieved without a mechanical formula, as long as the central bank adheres to a consistent, predictable pattern of behavior that the public understands. The term “rules,” in the sense used by Kydland and Prescott, is best understood in this broader sense as a consistent and widely understood pattern of policymaking. Arithmetic rules are one way to achieve that, but not the only way. What is essential is a consistent pattern of behavior that the public understands and believes actually will describe the central bank’s future behavior.

Clearly, if the central bank wants the public to continue to believe that it will stick to a pattern of behavior in the future, it must actually follow through with that behavior as events unfold. And this idea of following through is key to the *true* distinction between a discretionary policymaker and a rule-like policymaker. Having worked to guide the public’s expectations about future policy, a rule-like policymaker sees actions that would disappoint those expectations as undesirable and to be avoided. That is, a rule-like policy maker seeks to preserve its reputation, as reflected in the public’s expectations. In contrast, a discretionary policymaker focuses solely on current and future economic conditions, and ignores the previous expectations of market participants concerning the policymaker’s current behavior.

To identify discretionary policy setting in the Kydland and Prescott sense as the hallmark of the Federal Reserve under Chairman Greenspan is to seriously misconstrue the historical record, in my opinion. It is true that Greenspan has voiced doubts about the desirability of conducting policy according to “the prescriptions of a formal policy rule.”⁴ But he was clearly referring to the arithmetic rules of the type I described earlier, which represent only one of many representations of commitment. The Federal Reserve has worked hard over the years to shape the public’s expectations regarding the conduct of monetary policy. Central to those efforts has been the pursuit of what many call *credibility* – that is, a reputation for pursuing low and stable inflation. To my mind, building monetary policy credibility has been the true hallmark of the Federal Reserve under Chairman Greenspan’s leadership.

The Fed’s credibility has been built through a number of channels during the Chairman’s tenure. First, of course, has been the actual behavior of inflation – having brought inflation down to a low and steady rate over the last two and a half decades, people expect us to keep it there. Equally important, the Fed has responded forcefully whenever signs emerge that the public’s faith in our commitment may be slipping. In the famous episode of 1994, for example, interest rates on long-term bonds indicated that inflation expectations were rising.⁵ The Fed responded preemptively by raising the federal funds rate target in seven steps from 3 percent to 6 percent, even though inflation itself had not yet begun to rise. A discretionary policymaker would have been less likely to raise rates preemptively.

Communication is another important tool in building and maintaining credibility. In the early 1990s, the Fed’s Monetary Policy Reports to Congress and public statements by Chairman Greenspan and other Fed officials repeatedly emphasized the importance of

reducing inflation and keeping it low. More broadly, during Greenspan's tenure the Fed has become far more transparent about its policy actions, first by announcing federal funds rate decisions immediately, beginning in 1994, and then by gradually expanding the substantive content of the statement accompanying those announcements. Recent statements have provided information regarding likely actions at future meetings. Together with public statements by FOMC participants, these moves toward greater transparency serve to enhance the public's understanding of how the Fed is likely to respond to economic conditions as they unfold over time – in other words, to help the public form expectations consistent with our future behavior.

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Now, for a speech with the words “after Greenspan” in the title, I've done a lot of talking about “during Greenspan.” So let me turn now to talk about the future. At the outset, I noted the Fed's success at bringing inflation down during Chairman Greenspan's tenure, to the point where we can be said to have achieved “price stability” – a situation in which core inflation and inflation expectations are low and stable. I want to spend the rest of my time discussing some of the consequences of price stability for monetary policy. To facilitate that discussion here today, I would like to ask you to suppose that the Fed continues its recent success in maintaining stable inflation expectations on the part of the public. I believe we will be successful, and I have, in a speech earlier this year, expressed my belief that adopting an explicit numerical inflation target would be helpful in this regard.⁶ But for the purposes of our discussion here today I want to take as a premise that inflation and expected inflation remain low and steady and ask, how should we conduct interest rate policy in such a world?

First, let me remind you that any interest rate, whether it's the overnight interbank rate (the so-called federal funds rate) that the FOMC sets, or the yield on a long-term Treasury bond, has three parts. One is simply compensation for expected changes in the purchasing power of money – expected inflation, in other words. A second part is a premium to compensate lenders for inflation risk. The remainder is the “real interest rate,” essentially the inflation-adjusted rate of return stated in terms of real resources over time.

If the public is convinced that the central bank will not allow inflation to move persistently outside of some low target range, then expected inflation will not move around a lot and the inflation compensation that financial markets build into longer-term interest rates will not fluctuate much either.⁷ Moreover, inflation risk premiums will not vary much either. In the past, the Fed has often had to raise the funds rate in response to rising inflation. At times, the Fed has raised rates preemptively when rising long-term interest rates indicated rising inflation expectations – as in 1994 – even though inflation itself was stable. But neither of these triggers would occur in a world where inflation and expected inflation remained low and stable. Does this mean that the Fed would never have to change interest rates if inflation was fully stabilized? The answer is an emphatic, “No.”

The reason stems from the fact that with stable expected inflation, nominal interest rates move one-for-one with real interest rates, and from the principle that real interest rates need to fluctuate in a healthy, well-functioning economy. A real interest rate, as I stated earlier, is a rate of return expressed in units of *real resources*. It represents the real amount of goods and services one must sacrifice in the future (in addition to the repayment of principal) to obtain real goods and services today. A real rate thus represents a *relative price* – the price of current resources *relative* to future resources.

In a market economy, relative prices will generally fluctuate in response to shifts in demand and supply. For example, when the demand for crude oil grows relative to the supply, the price of oil needs to increase relative to the prices of other goods and services in order to reflect the increased relative scarcity of oil. Similarly, the relative price of current and future resources should fluctuate in response to shocks that affect the demand and supply of current resources, relative to future resources.

Let me illustrate with an example lifted from today's headlines. Two successive hurricanes have caused devastation and heartbreaking losses to the central Gulf Coast region in the last two months. In economic terms, a natural disaster that destroys or damages residential and business capital represents a temporary disruption to productive capacity. Fewer goods and services are available for current consumption and investment. Setting aside the energy price increases, which I will discuss in a moment, history shows that our economy rebounds pretty strongly from this sort of event. After several quarters of rebuilding, our productive capacity should be back to about where it would have been otherwise.

A disaster like this thus makes current resources scarcer relative to future resources. In addition, the heightened demand for reconstruction resources places further strain on current capacity. For both reasons, one would expect real interest rates on this account to be, if anything, higher than otherwise in the short run, in order to reflect the scarcity of current resources relative to future resources and help adjust demand to the disaster-induced reduction in the current capacity.

The only caveat to this prediction is the possibility of an offsetting reduction in demand. But what would cause such a demand effect? A catastrophic event can certainly affect the public's mood, as captured, for instance, by consumer confidence surveys. But consumers and producers also can be expected to understand, from the history of such events, that the disturbance to economic activity is likely to be relatively short-lived. With that understanding, and the prospects for rising output and income in the not-too-distant future, there's little reason to expect a significant reduction in the current demand for resources by households and firms.

To take another example from today's headlines, and one to which I've already referred, oil price increases can be expected to have implications for real interest rates. Many economists are fond of noting that an oil price increase acts like a tax on the production and consumption of oil-related products. Since energy is an important input to most production, oil price increases can also be thought of as adverse productivity shocks; as

energy prices rise, and producers cut back on their use of energy resources, the productivity of other inputs – labor and capital – will decline. If the increase is expected to be temporary, its effects are analogous to a disaster-induced reduction in productive capacity, making current production more costly relative to future production. An increase in real interest rates is needed in this case, again to reflect the relative scarcity of current and future resources.

Energy prices figured prominently in the economic events of the 1970s, when sharp oil price increases were associated with rising inflation and subsequent recessions. But care is needed to avoid drawing the wrong lessons. Inflation was high and variable in the 1970s, inflation expectations were untethered, and the credibility of monetary policy was quite low. Oil price increases engendered expectations of increased inflation across a broad range of goods. The Fed accommodated the pickup in inflation by failing to increase nominal interest rates by as much as the increase in inflation. The result was falling real interest rates and further monetary stimulus. The Fed ultimately tightened policy in an effort to combat accelerating inflation, thereby inducing economic contraction. The proper lesson from the 1970s is not that energy price shocks induce major recessions; it is that monetary policy that reacts to energy price shocks by accommodating the rise in inflation and then subsequently has to fight inflation can induce major recessions. Thus, sharp energy price increases are not, by themselves, reasons to ease policy. The proper central bank response to energy price shocks is to remain focused on maintaining price stability.

Productivity trends seldom make the headlines, but sustained changes in productivity growth rates *have* figured prominently in recent macroeconomic history and can have important consequences for interest rate policy. The U.S. economy experienced a productivity slow-down from the mid 1970s through the early 1990s. Growth in output per hour went from about 2.5 percent per year before 1974 down to about 1.5 percent. In the mid-1990s, productivity growth accelerated back to about 2.5 percent. Most observers link the increase in productivity growth in the late 1990s to advances in information and communications technology. When a sustained increase in productivity comes to be widely recognized by households and firms, the effect is to increase the demand for current resources relative to supply. Because gains in labor productivity ultimately show through to real income, households experience a productivity surge as a pickup in real income growth and will tend to extrapolate brighter real income prospects into the future. Higher corporate profits raise equity values as well, further boosting consumers' real wealth. Households will attempt to spend some of those anticipated income gains in the present. On the business side, the pickup in productivity growth usually implies stronger returns to installing productive capacity, providing a boost to business investment spending. If real interest rates do not change, a step-up in productivity growth would raise current demand by more than current supply. Thus, real interest rates have to rise. Forces like these put upward pressure on interest rates in the late 1990s.

All three of my examples thus far have required real interest rates to rise. For an example in which real interest rates must fall, one can run the productivity pickup in reverse: a sustained fall in productivity growth should lead to lower real interest rates, everything

else equal. Another example of conditions that could indicate declining real interest rates is an independent fall in investment spending. This is different from my other examples because a change in investment spending reduces the demand for current resources rather than the supply. For example, the investment boom of the late 1990s came to an abrupt stop around 2000, especially in the telecommunications industry, where it became clear that growth in the installed capital stock was outstripping growth in demand for the industry's services. The slow-down in capital spending in some sectors amounted to a reduction in demand for current resources relative to supply – which warranted a reduction in real interest rates. The FOMC facilitated this decline by cutting the federal funds rate sharply in 2001 from 6.5 percent to 2 percent.

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By considering a world of perfectly complete credibility, I hope I have convinced you that there is more to monetary policy than responding to inflation scares or “emerging inflation pressures.” Real shocks that alter the relative balance of current and future resource utilization will require appropriate adjustments to real interest rates over time. In a world of stable inflation expectations, the responsibility for making such adjustments falls to the central bank.

It's not too hard to find examples in the past when the Fed's response to shocks has been different from what I've described here as appropriate. But it's important to remember that no past experience perfectly matches the hypothetical world I'm describing in which inflation expectations have been perfectly stabilized. So if you think the Fed is likely to build on its recent success and maintain low inflation and inflation expectations – and I do – then past history, drawn from times when credibility was lacking, will be a poor guide to future economic performance.

So, what will interest rate policy look like in an after-Greenspan world in which the Fed continues to build on its recent success at convincing the public of its commitment to price stability? Policy will less often be reacting to fluctuations in actual or expected inflation, and will more often be realigning real interest rates in response to changing economic fundamentals. The Fed will have to constantly monitor the state of the economy, understand the shocks that are affecting the economy's growth, and form an assessment of the appropriate implications for real interest rates. In other words, not *that* different from recent Fed policy.

It's important to remember that, even as understanding of economics and the economy continues to improve, models will never be perfect. Assessments of economic conditions and the associated forecasts will always be subject to substantial uncertainty. This may be one reason why rule-like policymaking may never take the form of the simple arithmetic formulas that are so handy for research purposes. Rather, both our understanding of the economy and our assessment of appropriate policy actions are likely to continue to evolve and be influenced by emerging data and trends.

I should be clear, however, that moving toward such robust credibility will take continual vigilance. Credibility regarding our general intentions is often less in question than how we will respond to various contingencies. Markets may have a firm idea that the Fed favors low inflation, but may not be sure how we will react in every conceivable circumstance. Somewhat unique contingencies may arise in which market participants harbor some uncertainty about whether the Fed would be willing to tolerate a sustained increase in inflation; financial market responses following Hurricane Katrina are a case in point. This means that the Fed's credibility, while quite strong now, might never be entirely unassailable. To preserve and build on the credibility we already enjoy, we will need to continue to respond to changing economic conditions in a way that confirms our commitment to low inflation. Key to this will be helping the public understand that we intend to respond to future conditions in a way that keeps inflation low and stable.

I have argued that the conduct of monetary policy under Chairman Alan Greenspan is best characterized as "rule-like." One possible pitfall of rule-like behavior that relies on the central bank's desire to preserve its reputation is that reputations can be associated with individual leadership, as opposed to the institution itself. Is the Federal Reserve in danger of losing its hard-won reputation with the upcoming change in leadership? As you might expect, I don't think so. I anticipate a stable transition with no sharp departure in the actual conduct of policy, and this stability should quickly become apparent to the public.

This observation in no way diminishes my assessment of the accomplishments of Chairman Greenspan. My confidence in the institutional continuity in the conduct of monetary policy rests in large part on what we have learned from Chairman Greenspan over the last 18 years about the theory and practice of monetary policy. The lessons of the Greenspan era – lessons having to do with expectations and the importance of consistent behavior – are now widely understood in the central banking and academic worlds. Academics may debate whether Greenspan-era policy is an example of discretion or rules, but no one in that debate really argues that the Fed's recent success proves the virtue of pure, unconstrained discretion. That discretion must be tempered by constraints linked to expectations, reputation and commitments is a lesson that I think has been widely learned, and that's what gives me great confidence in the continuity of monetary policy.

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¹ Bernanke (2004).

² Blinder and Reis (2005).

³ See Nobel prize website.

⁴ Greenspan (2003).

⁵ Goodfriend (2002).

⁶ Lacker (2005).

⁷ If the central bank targets core inflation rather than overall inflation, then expectations regarding overall inflation can fluctuate even if the central bank is successful in stabilizing core inflation. This adds a complication that is beyond my scope here, but does not alter any of the conclusions.