MAKING MONETARY POLICY

Robert L. Hetzel

This paper describes the procedures the Federal Open Market Committee (FOMC) of the Federal Reserve System follows in formulating monetary policy. It then examines Fed policy actions over the period 1986 through summer 1990. The rate smoothing and monetary deceleration that have preceded past recessions preceded the 1990 recession.

FOMC Procedures

Objectives

The FOMC employs judgmental procedures in formulating monetary policy. That is, the FOMC does not make use of an analytical framework for decisionmaking whereby it specifies explicit objectives and an explicit strategy for ensuring that each meeting's policy actions are consistent with achieving its objectives. This paper constructs an analytical model of the FOMC's judgmental procedures. Such a description must make inferences about the objectives that matter to the FOMC and about the model that expresses the FOMC's view of the links between those objectives and its policy actions.

Statements by the FOMC consistently mention qualitative objectives for inflation and real growth. The FOMC would like "sustainable" real growth and it would like to "make progress" in moving toward price stability. Such statements are usually uninformative about the relative emphasis the FOMC places on achieving each objective. For example, when the FOMC emphasizes reducing inflation, it is not explicit about the acceptable behavior of real growth.

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The author is Vice President and Economist at the Federal Reserve Bank of Richmond. The ideas in the paper are solely those of the author and are not to be associated with the Federal Reserve Bank of Richmond or the Federal Reserve System. Helpful comments by Thomas Mayer and Bennett McCallum are gratefully acknowledged.

Because the Fed does not formulate explicit objectives, an analytical model of monetary policy must infer them. Such a model must also infer what the FOMC believes about how the structure of the economy constrains its ability to achieve its objectives.

Finally, because the FOMC does not make its objectives explicit, the interpretation of changes in its policy instrument, the funds rate, is ambiguous. In its discussions, the FOMC does not distinguish between (a) changes in the funds rate undertaken to *eliminate a discrepancy* between actual real growth (or inflation) and its implicit objective for real growth (or inflation) and (b) changes in the funds rate undertaken to *alter its objective* for real growth (or inflation). An analytical description of monetary policy must distinguish between changes in the funds rate undertaken to achieve the FOMC's ongoing objectives and changes undertaken to alter these objectives.

FOMC Judgmental Procedures

The following provides an overview of the monetary policy process as seen through the FOMC's "Record of Policy Actions." In the first half of their deliberations, FOMC members present their views about the economy. This "go-around" on the economy produces a majority view on the current and near-term behavior of real growth and inflation. It also produces a majority view on objectives. FOMC members never mention explicit numbers for their real growth and inflation objectives. Instead, they express their preferences about the relative importance to attach to these objectives by emphasizing undesirable behavior in either real growth or inflation. Through this emphasis, they attempt to influence the majority view on the importance to assign to either promoting real growth or reducing inflation.

In the second half of the meeting, FOMC members formulate the directive, which instructs the manager of the System Open Market Account (the trading desk) either to maintain the existing funds rate or to move it moderately up or down from its prevailing value. (At times, the FOMC targets the funds rate indirectly by setting a target for borrowed reserves, which introduces a small amount of random variation in the funds rate around its underlying target.) The FOMC's majority view on whether to stimulate real growth or reduce inflation determines how the FOMC moves the funds. Also, the FOMC imposes considerable continuity on the direction of changes in the funds rate. Over extended periods, it either ratchets the funds rate up or down.

In their discussions, FOMC members never refer to a model of the economy that would allow them to set the funds rate by working backward from objectives. FOMC discussions and public statements

by the chairman, however, make clear that FOMC members believe that sustained changes in the funds rate will alter the growth of the public's nominal (dollar) expenditure. FOMC members also believe that alterations in the growth of nominal expenditure exert an impact on real growth initially, and only later on inflation. For example, in discussing a transition to price stability, Chairman Greenspan (1989c, p. 797) stated:

> During this transition period, growth would be reduced for a while from what it otherwise would have been. Because price-setting behavior in our economy has considerable momentum, the requisite slowing of demand would tend to translate, in the first instance, into a slowing of real output and only subsequently into restraint on prices.

An Analytical Description of FOMC Procedures

An analytical model of policy formulation relates objectives to intermediate targets and policy instruments. For the FOMC, the objectives are real output growth and the inflation rate. As noted above, the FOMC sets its economic priorities through informal discussion of the economy. Given its priorities for influencing real growth and inflation, the FOMC sets implicit targets for these objective variables as modest alterations from their perceived prevailing growth rates.

The FOMC uses the rate of growth of nominal GNP (the dollar value of gross national product) as an intermediate target. It lowers the funds rate moderately below the prevailing value if its priority is raising real output growth. Conversely, it raises the funds rate moderately above the prevailing value if its priority is lowering inflation. Although these changes in the funds rate are moderate in magnitude, they are sustained in the same direction until they alter the rate of growth of nominal GNP. The FOMC assumes that alteration in nominal GNP growth will move real output growth and inflation in the desired direction. The implicit target path the FOMC assigns to real output growth and inflation is given by its assumption that changes in nominal GNP growth impact initially on output growth, rather than inflation.

Lean against the Wind

To make the above discussion useful for understanding how the FOMC changes the funds rate, we must make two assumptions about the economy. Economists call the first of these assumptions the natural rate hypothesis. Specifically, we assume that the Fed can affect the real (inflation-adjusted) rate of interest only transitorily through

unanticipated changes in money. The FOMC must have procedures that allow it (at least most of the time) to track the economy's underlying equilibrium interest rate. If it did not, if it set the funds rate arbitrarily relative to the economy's equilibrium interest rate, the economy would always lurch between inflation and deflation. We also assume that fluctuations in aggregate output arise more often from disturbances to the amount of goods the public attempts to acquire, rather than the amount of goods it attempts to supply.

The Fed's own description of the way it changes the funds rate is summarized in the phrase "lean against the wind." That is, the FOMC raises the funds rate when economic activity strengthens and lowers it when economic activity weakens. How do these procedures produce a funds rate compatible with the constraints imposed by the natural rate hypothesis? When economic activity strengthens because the public attempts to acquire more goods, the equilibrium real rate of interest must rise. The price of goods today in terms of goods tomorrow must become more expensive in order to restrict aggregate demand to aggregate supply. The Fed's lean-against-the-wind procedures, which cause it to raise the funds rate as real economic activity strengthens, produce the required rise in interest rates.

Changes in the funds rate that track the economy's underlying equilibrium interest rate will be called "policy maintaining." Such changes are like regular housekeeping chores. They are necessary because the economy's underlying equilibrium interest rate changes. Although the funds rate changes, monetary policy is unchanged. For example, a policy-maintaining change in the funds rate occurs when the FOMC raises the funds rate in response to an observed increase in economic activity. This funds-rate increase is policy maintaining in the sense that it keeps nominal GNP growing at its prevailing rate. Changes in the funds rate that alter the existing rate of growth of nominal GNP will be called "policy altering." For example, the FOMC makes a policy-altering change if it lowers the funds rate to increase the rate of growth of GNP.

As noted above, the FOMC makes changes in the funds rate in small but persistent steps. It uses the reaction of the bond market as a measure of when the individual changes have cumulated to a change large enough to achieve the desired effect on the rate of growth of nominal GNP. For example, if the FOMC is in the process of lowering the funds rate in response to weakness in economic activity and bond rates rise, the FOMC backs off, at least temporarily, from further decreases.

Under the assumption that fluctuations in output derive primarily from fluctuations in aggregate demand so that strength in economic activity requires a higher interest rate, policy-maintaining changes in the funds rate *follow* changes in the rate of growth of real GNP. Policy-altering changes in the funds rate arise when changes in the funds rate *lag* behind changes in the growth rate of real GNP. Beginning in the early 1960s, the FOMC imparted inertia to the funds rate by raising it only well into periods of economic recovery. Similarly, it imparted inertia to the funds rate by lowering it only well into periods of economic weakness. As a consequence of this inertia, the behavior of the funds rate from the early 1960s through the early 1980s was primarily policy altering. To identify policy-maintaining behavior of the funds rate, we must concentrate on the period following the early 1980s.

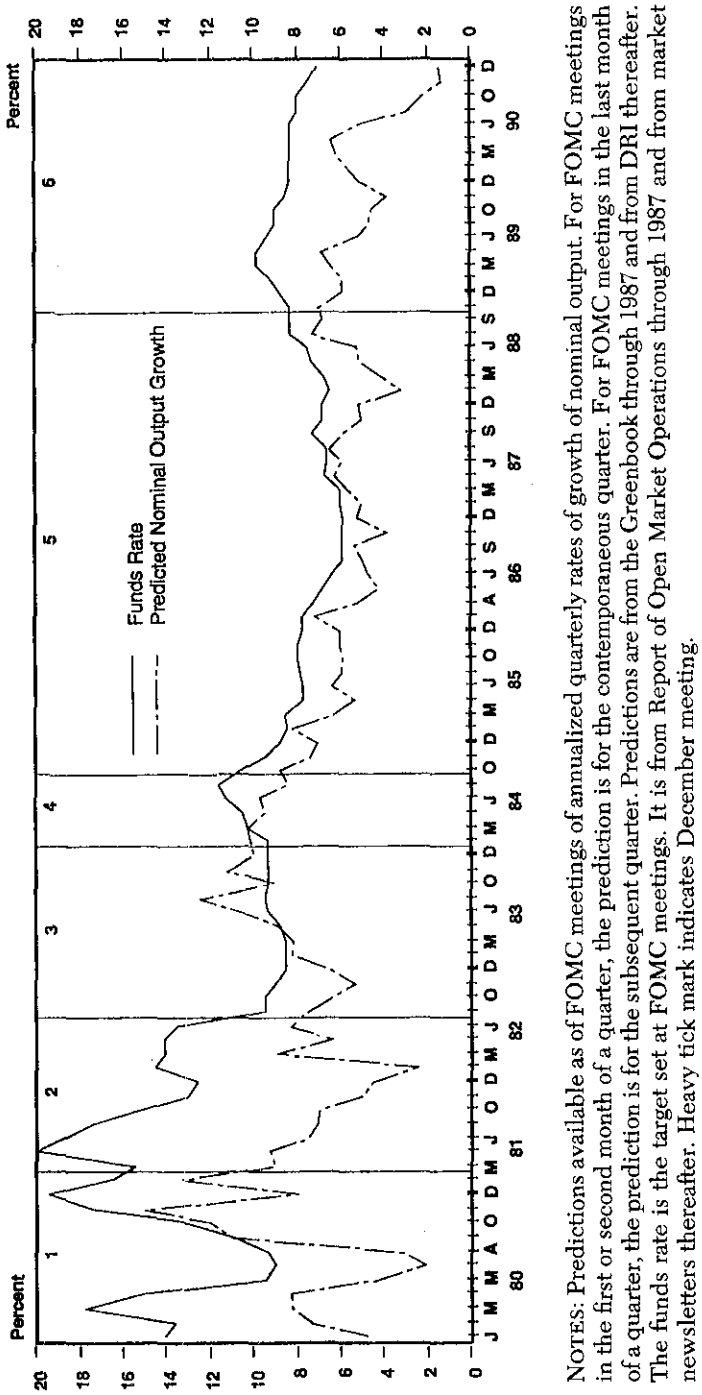
Figure 1 shows predictions, available as of FOMC meetings, of nominal GNP growth for the quarter in which the FOMC meeting falls. Figure 1 also shows the initial value of the funds rate after an FOMC meeting.[1] (There were 11 FOMC meetings in 1980 and 8 per year thereafter.) In period 1, February 1980 through February 1981, the behavior of the funds rate and nominal GNP is dominated by the common influence of the Carter credit controls, imposed in March 1980 and removed in July 1980. In period 2, March 1981 through May 1982, changes in the funds rate are policy altering. Although predicted nominal GNP growth falls sharply, the funds rate rises initially. It then falls, but rises again in spring 1982. Over the entire period, the decline in nominal GNP growth greatly exceeds the reduction in the funds rate.

Period 3, August 1982 through December 1983, is one of economic recovery. Initially, the funds rate, still high from the prior period of monetary tightness, falls sharply. It then is kept basically unchanged. In period 4, February 1984 through August 1984, the FOMC raises the funds rate even though predictions of GNP growth fall. This rise compensates for the moderation in the rise in the funds rate, relative

[1]Through 1987, the predictions in Figures 1 through 5 are from the table, "Gross National Product and Related Items," in the Board of Governors staff document, *Current Economic and Financial Conditions*, commonly referred to as the "Greenbook." (FOMC documents are released to the public after five calendar years.) Starting in 1988, the predictions are from the table, "Data Resources Forecast of the U.S. Economy-Control," in DRI/McGraw Hill, *Review of the U.S. Economy*. Through 1987, the funds rate is the value the desk expected to prevail at the beginning of the first full reserve settlement period following an FOMC meeting. It is taken from the New York Fed document, *Report of Open Market Operations and Money Market Conditions*. Thereafter, the funds rate is the daily average value for the first full week ending Wednesday following an FOMC meeting.

FIGURE 1

PREDICTED NOMINAL OUTPUT GROWTH AND FUNDS RATE



NOTES: Predictions available as of FOMC meetings of annualized quarterly rates of growth of nominal output. For FOMC meetings in the first or second month of a quarter, the prediction is for the contemporaneous quarter. For FOMC meetings in the last month of a quarter, the prediction is for the subsequent quarter. Predictions are from the Greenbook through 1987 and from DRI thereafter. The funds rate is the target set at FOMC meetings. It is from Report of Open Market Operations through 1987 and from market newsletters thereafter. Heavy tick mark indicates December meeting.

to the rise in nominal GNP growth, in the earlier period. In period 5, October 1984 through September 1988, changes in the funds rate are primarily policy maintaining. They follow changes in nominal GNP growth fairly closely. In period 6, November 1988 through October 1990, the lag in the decline in the funds rate relative to the decline in predicted nominal GNP growth reflects policy-altering behavior. The thrust of monetary policy became restrictive toward the end of 1988.

Humphrey-Hawkins Testimony

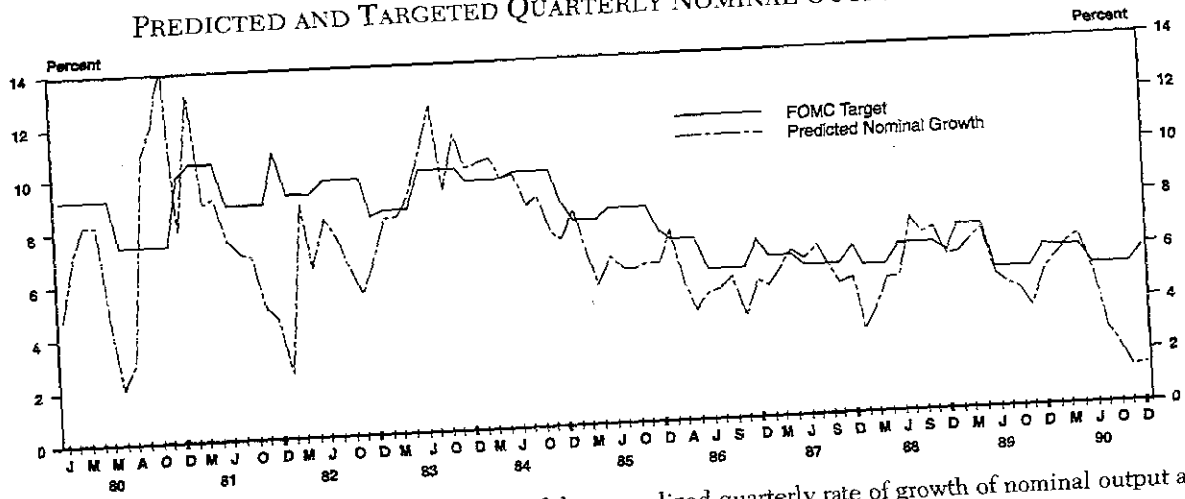
Since July 1979, at the February and July FOMC meetings, members have submitted their predictions of growth rates for nominal GNP, real GNP, and inflation for the current year. The chairman makes these predictions public as part of his Humphrey-Hawkins testimony to Congress. They are presented in the form of a range that includes a smaller range called the "central tendency." The midpoint of this central-tendency range for nominal GNP growth can be a proxy for the FOMC's intermediate nominal GNP target. The midpoints of the central-tendency range for real GNP growth and inflation can be a proxy for the FOMC's objectives.

It is unlikely that individual FOMC members view their own predictions as objectives. For example, if the nominal GNP prediction were considered to be an intermediate target, individual FOMC members would choose a higher or lower value depending upon their predilection for a more expansionary or more restrictive monetary policy. Individual predictions, in contrast, are necessarily contingent on how the individual members believe the FOMC will behave over the year. For example, the "Record of Policy Actions" for the February 1990 meeting states, "In making these forecasts, the members took account of the Committee's policy of continuing restraint on demand to resist any increase in inflation pressures and to foster price stability over time" (Board *Annual Report* 1990, p. 93). The average of the predictions of FOMC members then can be considered as based on the monetary policy that a majority expect will be adopted. In this sense, these predictions are considered by the majority of FOMC members as acceptable outcomes and can be used as proxies for FOMC objectives.

In Figure 2, the solid line is the midpoint of the central tendency of FOMC members' predictions of nominal GNP growth presented in the chairman's most recent Humphrey-Hawkins testimony. The dashed line shows predictions available at the time of the FOMC meeting of the quarterly growth rate of nominal GNP for the quarter

FIGURE 2

PREDICTED AND TARGETED QUARTERLY NOMINAL OUTPUT GROWTH



NOTES: Predicted nominal output growth is an estimate of the annualized quarterly rate of growth of nominal output available at FOMC meetings. If an FOMC meeting is in one of the first two months of a quarter, it is for the contemporaneous quarter. If the meeting is in the last month of a quarter, it is for the succeeding quarter. Predictions are from the Greenbook through 1987 and from DRI thereafter. Figures are drought-adjusted for the 8/88 to 3/89 meetings. Targeted nominal output growth is the midpoint of the central tendency range of fourth-quarter to fourth-quarter growth rates predicted by FOMC members and presented at the February or July Humphrey-Hawkins hearings. As of the July FOMC meeting, the target is inferred from the revised central tendency range for yearly growth and from estimated growth over the first two quarters. For December FOMC meetings, the target, which was presented at the previous July hearings, is for the subsequent year. Observations correspond to FOMC meetings and letters indicate month in which the FOMC meeting was held. Heavy tick mark indicates a December meeting.

in which the FOMC meeting occurred.[2] Figure 3 shows the deviations between the predictions of current quarter nominal GNP growth and the central tendency figures plotted in Figure 2 (the dashed minus the solid line). These deviations are used as proxies for misses of nominal GNP growth from the FOMC's intermediate target for nominal GNP growth and are plotted along with changes in the funds rate. Changes in the funds rate that correlate positively with these misses are assumed to be policy-maintaining changes in the funds rate. Other behavior of the funds rate is assumed to be policy altering. For example, policy-altering changes in the funds rate occur from March 1981 through May 1982. Despite the shortfall in nominal GNP growth from its central-tendency value, the funds rate increases as well as decreases.

Money and Monetary Policy

During his Humphrey-Hawkins testimony, the chairman also announces target ranges for growth (fourth quarter to fourth quarter) of the monetary aggregates—M2, M3, and debt. These target ranges, however, lack operational significance. This fact is noted by standard references to the instability of money demand. For example, Chairman Greenspan (1989b, p. 7) stated:

> In view of the apparent variability, particularly over the short run, in the relationships between the monetary aggregates and the economy, policy will continue to be carried out with attention to a wide range of economic and financial indicators. The complex nature of the economy and the chance of false signals demand that we cast our net broadly—gathering information on prices, real activity, financial and foreign exchange markets, and related data.

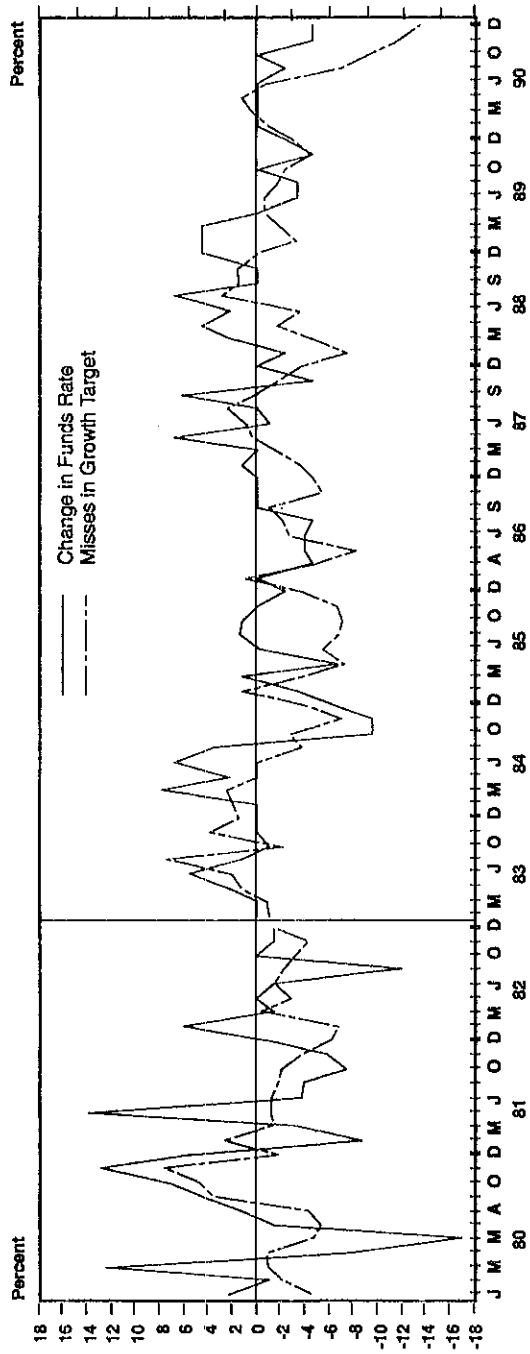
Occasionally, when the FOMC has felt that money growth was reflecting the behavior of nominal GNP growth, it has used money as one of a number of informational variables for inferring the behavior of nominal GNP growth. In this way, the behavior of money could be taken account of without any need to modify the lean-against-the-wind procedures that use nominal GNP growth as an intermediate target for controlling real output growth and inflation.

In general, however, the FOMC considers M2 targeting to be incompatible with its lean-against-the-wind procedures, which require that the funds rate and economic activity move together. Consider a situation where economic activity strengthens. Market rates of interest rise, not only absolutely, but also relative to the

[2]For FOMC meetings from August 1988 through March 1989, predictions of nominal GNP (and real GNP in Figure 4) include a drought adjustment calculated by the Commerce Department and highlighted in the Greenbook.

FIGURE 3

MISSES FROM TARGET OF QUARTERLY NOMINAL OUTPUT GROWTH AND FUNDS RATE CHANGES



NOTES: Misses from target are the differences between the predicted and targeted values shown in Figure 2. Left scale is for the 1980–1982 period. Right scale is for the subsequent period. The funds rate is the target set at FOMC meetings. It is from Report of Open Market Operations through 1987 and from market newsletters thereafter. Changes in the funds rate are multiplied by three. Heavy tick mark indicates December meeting.

average of rates paid on the deposit liabilities in M2. Until the early 1980s, most of the interest-bearing components of M2 were subject to Regulation Q ceilings. Even after the elimination of Reg Q, banks have moved the interest rates paid on the components of M2, other than retail certificates of deposit, only sluggishly in response to changes in market rates. As a consequence, when market rates rise, the cost of holding M2 rises, individuals move out of M2 into other liabilities like large certificates of deposit, and the rate of growth of M2 falls. It follows that strength in economic activity is initially associated with a reduction in M2 growth and, conversely, weakness in economic activity is initially associated with an increase in M2 growth. M2 growth, therefore, does not consistently give the same signals about how to change the funds rate as nominal GNP growth.

Since the early 1900s, however, annual M2 velocity has persistently returned to a value of about 1.6. Although deviations from this value occur because of cyclical changes in interest rates that alter the opportunity cost of holding M2, these changes cancel out over time and leave M2 velocity unchanged. In principle, the FOMC could take advantage of the long-run stability of M2 velocity by eliminating base drift in its M2 target. It could still allow the rate of growth of M2 to vary inversely with the level of interest rates, but not allow M2 to drift randomly over long periods. Operationally significant, multiyear M2 targets, however, would conflict with the FOMC's desire for discretion. The FOMC has always felt that multiyear targets for money would constrain its freedom to set the funds rate discretionarily period by period.

FOMC Policy Actions: 1986–1990

Toward the end of the 1980s, the FOMC attempted a "soft-landing" strategy. It tried to lower inflation without a recession by keeping real growth moderately below its long-run trend. The strategy failed, in large part, because of the FOMC's reluctance to lower the funds rate significantly when economic activity began to weaken. This reluctance arose because of a fear that reductions in the funds rate would undermine the credibility of its resolve to reduce inflation. The financial markets remained skeptical of the FOMC's resolve because of the contradiction between its objective of lowering inflation and the persistence of relatively high inflation rates. The trend rate of inflation rose toward the end of the 1980s as a consequence of the FOMC's earlier attempt in the mid-1980s to maintain economic growth rather than to lower inflation. The follow-

ing sections provide an overview of the FOMC's policy actions from 1986 through 1990.

1986: Expansionary Policy Actions

In 1986, the FOMC intended for monetary policy to produce a moderately stimulative impact on the economy. The midpoint of the FOMC's central tendency for real GNP growth, announced by the chairman in his February 1986 Humphrey-Hawkins testimony, was 3.25 percent. Chairman Volcker (Board *Annual Report* 1986, p. 36) testified: "The expanding job opportunities associated with the increase in output are expected to *lower* the unemployment rate gradually" (emphasis added). Throughout 1986, the FOMC believed that declining inflation allowed it room to lower the funds rate to stimulate the prevailing modest rate of growth of real GNP.

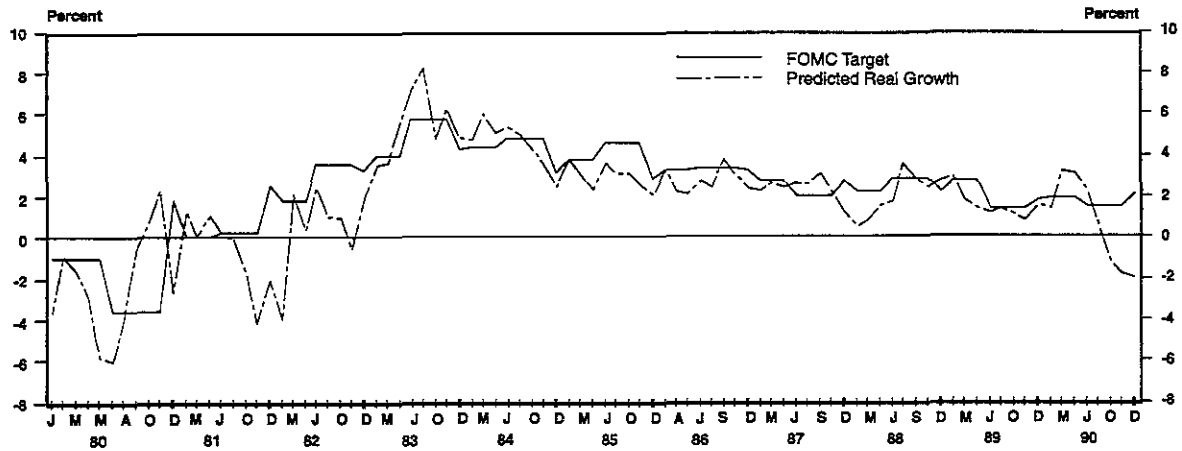
Figures 4 and 5, respectively, display the FOMC's central tendency for real GNP growth and inflation along with ongoing predictions of these variables. Starting in 1986, the predictions are from DRI, not the Board staff, but the various "Records of Policy Actions" for 1986 indicate that the predictions are in line with predictions available to the FOMC. The first sentence of the "Record" always summarizes the FOMC's consensus view of contemporaneous economic activity. For example, the "Record" for the February 12, 1986, meeting begins with the statement, "The information reviewed at this meeting suggested that economic activity was expanding at a moderate pace" (Board *Annual Report* 1986, p. 93). The tone of this statement summarized the FOMC's and Board staff's views about the economy throughout 1986 as reported in the "Record." The exception was the concern expressed by some members in the second quarter about weakness in energy-producing regions caused by the fall in the price of oil. This weakness, however, was viewed as transitory.

Figure 4 shows that ongoing predictions of real GNP growth were close to the FOMC's central tendency for both 1985 and 1986. In contrast, Figure 5 shows ongoing predictions of inflation lay well below the FOMC's central tendency for inflation for these years. Moderate real growth and falling inflation prompted the FOMC to lower the funds rate. In 1986, the funds rate fell from 8 to 6 percent.

The Board of Governors, as opposed to the full FOMC, took the lead in reducing the funds rate by reducing the discount rate. The Fed's operating procedures entail setting a target for the reserves banks borrow from the Fed. With these procedures, the funds rate equals the discount rate plus a positive amount that increases as

FIGURE 4

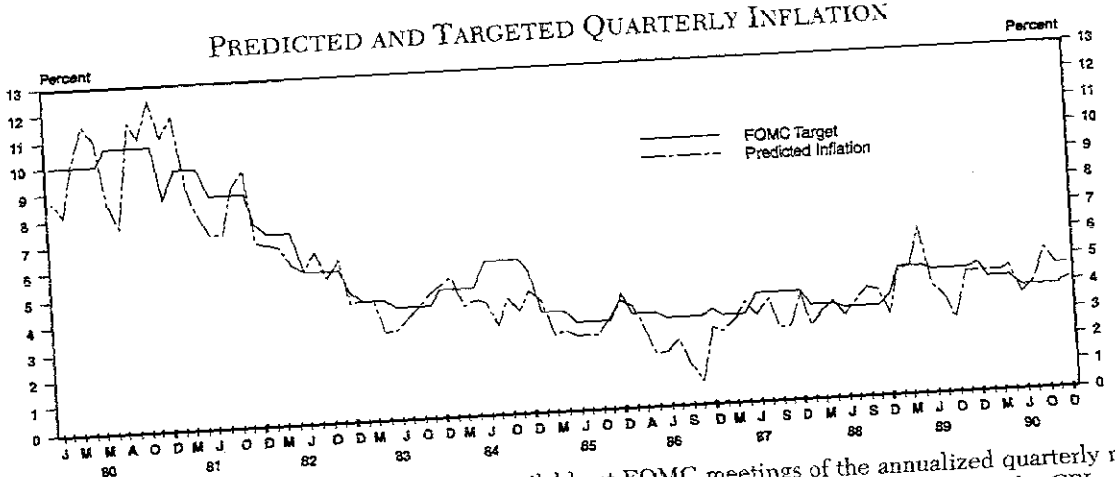
PREDICTED AND TARGETED QUARTERLY REAL OUTPUT GROWTH



NOTES: Predicted real output growth is an estimate of the annualized quarterly rate of growth of real output available at FOMC meetings. If an FOMC meeting is in one of the first two months of a quarter, it is for the contemporaneous quarter. If the meeting is in the last month of a quarter, it is for the succeeding quarter. Predictions are from the Greenbook through 1987 and from DRI thereafter. Figures are drought-adjusted for the 8/88 to 3/89 meetings. Targeted real output growth is the midpoint of the central tendency range of fourth-quarter to fourth-quarter growth rates predicted by FOMC members and presented at the February or July Humphrey-Hawkins hearings. As of the July FOMC meeting, the target is inferred from the revised central tendency range for yearly growth and from estimated growth over the first two quarters. For December FOMC meetings, the target, which was presented at the previous July hearings, is for the subsequent year. Observations correspond to FOMC meetings and letters indicate month in which meeting was held. Heavy tick mark indicates December meeting.

FIGURE 5

PREDICTED AND TARGETED QUARTERLY INFLATION



NOTES: Through 1988 predicted inflation is an estimate available at FOMC meetings of the annualized quarterly rate of growth of the implicit deflator for nominal GNP. From February 1989 through November 1989, predictions are for the CPI and, thereafter, for the CPI excluding food and energy. If an FOMC meeting is in one of the first two months of a quarter, the prediction is for the contemporaneous quarter. If the meeting is in the last month of a quarter, it is for the succeeding quarter. Predictions are from the Greenbook through 1987 and from DRI thereafter. Targeted inflation is the midpoint of the central tendency range of fourth-quarter to fourth-quarter inflation rates (GNP implicit price deflator through 1988 and CPI thereafter) predicted by FOMC members and presented at the February or the July Humphrey-Hawkins hearings. As of the July FOMC meeting, the target is inferred from the revised central tendency range for yearly inflation and from estimated inflation over the first two quarters. For December FOMC meetings, the target, which was presented at the previous July hearings, is for the subsequent year. Observations correspond to FOMC meetings and letters indicate month in which the FOMC meeting was held. Heavy tick mark indicates December meeting.

the level of borrowed reserves increases.[3] A key feature of these procedures is that, for a given borrowed reserves target, a change in the discount rate initially changes the funds rate by the same amount. Under borrowed reserves targeting, the full FOMC sets the target for *borrowed reserves*. As evidenced by the "Records of Policy Actions," under Chairman Volcker, discussion at FOMC meetings was in fact limited to the choice of a borrowed reserves target. The Board of Governors, however, sets the *discount rate*. The Board, therefore, can move the funds rate independently of the actions of the FOMC. The "Records" for 1986 indicate that the entire FOMC, which includes regional bank presidents, had a cautious attitude toward reducing the funds rate. The Board, however, moved the funds rate down aggressively through discount rate reductions.

At the February 11 FOMC meeting, available statistics indicated that "economic activity was expanding at a moderate pace" (Board *Annual Report* 1986, p. 93). The "Record" states, "In these circumstances, nearly all participants agreed that little or no change in reserve availability was warranted" (Board *Annual Report* 1986, p. 100). Specifically, the FOMC voted for an unchanged borrowed reserves target and, by implication, an unchanged funds rate. It also adopted the following "symmetric" directive, that is, a directive with contingent language that did not predispose the chairman to move the funds rate in a particular direction in the intermeeting period (Board *Annual Report* 1986, p. 102):

> Somewhat greater reserve restraint or somewhat lesser reserve restraint *might* be acceptable depending on behavior of the aggregates, the strength of the business expansion, developments in foreign exchange markets, progress against inflation, and conditions in domestic and international credit markets [emphasis added].

The use of the word "might" rather than "would" is designed to render funds rate changes unlikely in the intermeeting period.

The decisions made at the February FOMC meeting indicated a majority sentiment in favor of no change in the funds rate. Although the contingent language of the directive is extremely vague, it proba-

[3]The desk sets a level of nonborrowed reserves less than the desired (required plus excess) reserves of banks so that the banking system must borrow the targeted amount from the discount window. At the same time, the Fed limits how often individual banks can borrow. Given their borrowing history, banks will borrow when they believe that current market rates are high relative to expected future market rates. Consequently, there exists a (noisy) positive relationship between borrowed reserves and the difference between the funds rate and the discount rate. An increased target for borrowed reserves increases the difference between the funds rate and the discount rate and, given the discount rate, increases the funds rate and other money market rates (Goodfriend 1983).

bly indicated an emphasis on incoming data from the real sector. Incoming data indicated that real output was growing fairly strongly. Both inside and outside the Fed, the most widely watched statistic on the real sector is the monthly non-farm civilian payroll employment figure from the Labor Department. This statistic is the first available, comprehensive indicator of the behavior of real GNP. On February 7, the employment figure had registered a gain of 566,000, the largest gain in the decade of the 1980s. The average employment gain in the previous three months of 210,000 indicated steady growth in the economy. On March 6, however, the Board voted to reduce the discount rate by ½ percentage point. The reduction carried through to the funds rate, which fell from around 7⅞ to 7⅜.

Earlier, on February 24, 1986, the Board had voted 4 to 3 to reduce the funds rate by ½ percentage point to 7 percent. Opposition among Board members to the discount rate cut arose from a concern that a failure of foreign central banks to lower their discount rates in tandem would cause the dollar to depreciate (Board *Annual Report* 1986, p. 81). Newspapers reported that this split vote was the first time the Board had outvoted its chairman. The Board rescinded its action on the same day. It then voted unanimously to lower the funds rate on March 6. (The figure on payroll employment came out the day after, March 7. Presumably, the Board acted on March 6 to avoid the possibility of lowering the discount rate right after the release of a strong employment figure. In the event, the employment gain was a moderately strong 226,000.) Key foreign central banks did not lower their discount rates in 1986. Subsequent reductions by the Board in the highly visible discount rate, however, were apparently made to pressure them. The *Annual Report* (1986, p. 82) noted in connection with the July 10 reduction in the discount rate, "[A] reduction in the System's rate might encourage easing measures abroad later, if not immediately."

At the May meeting, the FOMC voted for an unchanged borrowed reserves (funds rate) target and for a symmetric directive. At its July and August meetings, the FOMC also adopted a symmetric directive, which signals no predispostion to change the funds rate in a particular direction. At the July and August meetings, respectively, it also voted to "decrease somewhat" and to "decrease slightly" the "existing degree of pressure on reserve positions." The use of the adjectives "somewhat" and "slightly" suggested a reduction in the funds rate of ⅛ to ¼ of a percentage point. After each of these three FOMC meetings, however, the Board lowered the discount rate and the funds rate by ½ percentage point. In 1986, with the Board taking the lead, the Fed concentrated on promoting real growth.

More generally, in the mid-1980s, monetary policy did not attempt to lower inflation below its trend rate of about 4.5 percent, but concentrated on stimulating economic growth. As described below, beginning in the middle of 1988, monetary policy began to be directed toward lowering inflation. At the same time, the trend rate of inflation had begun to rise. This behavior of inflation made it difficult for the Fed to make its policy of reducing inflation credible. The bond markets in particular were sensitive to signs of increasing inflation. As a consequence, when economic activity weakened, the FOMC was reluctant to lower the funds rate. It feared that reductions in the funds rate would lead to increases in bond rates. The resulting rate smoothing produced the kind of sustained monetary deceleration that has preceded other recessions.

1987: Reacting to Financial Markets

FOMC actions in 1987 were dominated by a concern over the adverse behavior of the bond market and the stock market. Through early April, the funds rate was still only somewhat above 6 percent, essentially unchanged from late August 1986. Toward the end of March 1987, however, concern in financial markets over the continued depreciation of the dollar caused bond yields to rise. The FOMC responded to sharply rising rates in the bond markets in late March by moving the funds rate up to about 6.75 percent after its May 19 meeting. As Chairman Volcker stated later in his July Humphrey-Hawkins testimony, "[T]he Federal Reserve has given a great deal of weight to . . . episodes of heavy downward pressure on the dollar [and] indications from long-term securities and commodity markets of heightened inflationary expectations" (Board *Annual Report* 1987, p. 58). Again, in early September, in response to a rise in bond yields prompted by a falling dollar, the FOMC raised the funds rate, this time to somewhat above 7 percent.

The predictions in Figures 4 and 5 of real growth and inflation in 1987 agree with qualitative statements in the "Record." Through the FOMC meeting on September 22, 1987, the summaries of both Board staff and FOMC members generally contained phrases such as "economic activity has continued to expand at a moderate pace." After the stock market crash on October 19, 1987, the Board staff and FOMC lowered sharply their predictions for the rate of growth of real GNP. The "Report" for the November 3 FOMC meeting stated (Board *Annual Report* 1987, pp. 136–37):

> The staff projection suggested that the decline in equity prices would lead to weaker economic growth. . . . Members commented that the staff forecast of somewhat reduced economic growth over

> the next several quarters was a reasonable expectation, but one that presumed the return of confidence and more normal conditions in financial markets. Accordingly, the risks of a different outcome, notably in the direction of more weakness, were viewed as much greater than usual.

Immediately after the crash, in a telephone conference, the FOMC lowered the funds rate to 6.75 percent from about 7.5 percent.

1988: Surprising Economic Strength

Instead of faltering after the October stock market crash, the economy continued to grow strongly. By spring 1988, the FOMC became concerned that strong growth would increase resource utilization enough to revive inflation. Figures 4 and 5 show, respectively, the FOMC's central tendency predictions for real GNP growth and inflation and DRI's predictions of the contemporaneous behavior of these variables. Figure 4 shows predicted real GNP growth strengthening and then remaining strong throughout 1988. This pattern of strengthening predictions accords with the qualitative descriptions in the "Record." The irregularly rising pattern of predicted inflation shown in Figure 5 explains much of the behavior of the FOMC from 1988 through fall 1990. Predicted inflation reached a trough in 1986 and then rose irregularly through 1990. Volatility in energy and food prices especially imparted volatility to inflation measures. This volatility in turn imparted volatility to financial markets.

Between the February 9 and March 29 FOMC meetings, the dominant concern among FOMC members changed from slow growth to rising inflation. On March 4, the payroll employment figure showed a rise in February of 531,000, with the January figure revised up to 174,000. Those figures came after a rise in employment of 3 million in 1987 and a reduction in the employment rate to 5.75 by year-end, the lowest level since 1979. The dominant theme of FOMC meetings in 1988 was first expressed in the March meeting. A majority believed that capacity utilization and the unemployment rate had fallen to the point where further declines would exacerbate inflation. At the same time, increasing demands were being placed on resources because of rapidly growing exports. By the end of 1987, relative to a trade-weighted average of the currencies of the other G-10 countries, the dollar had declined by almost 45 percent from its peak in February 1985. From its peak in 1986Q3 through 1988Q2, export growth caused the real merchandise trade deficit (1982 dollars) to decline by about $7 billion. A majority of FOMC members believed in 1988 that, in order to control inflation, interest rates would have

to rise to depress domestic demand sufficiently to allow for increased foreign demand.

1989: The Soft-Landing Strategy

Sometime in 1988, the Fed put together the soft-landing strategy to lower the rate of inflation without a recession by keeping the rate of growth of real GNP somewhat below its long-run trend. This strategy can be summarized using the model of the first part of the paper. The FOMC tried to reduce inflation through a moderate reduction in the rate of growth of nominal GNP, its intermediate target. The reduction in nominal GNP growth would reduce the rate of inflation, the ultimate target, but only after an initial reduction in the rate of growth of real GNP. Real GNP, however, would be kept growing through the moderation in the reduction in nominal GNP growth.

The strategy was contained in Chairman Greenspan's February 1989 Humphrey-Hawkins testimony. The desired reduction in GNP growth can be seen in the central-tendency projections the chairman supplied in his Humphrey-Hawkins testimony ("Monetary Policy Report," Board *Annual Report* 1989, p. 29, Table 1). In order to see the reduction, however, we must adjust for the 1988 drought. The drought was assumed to have reduced the growth rate of nominal and real GNP in 1988 and then to have increased it in 1989 by a corresponding amount (around ⅔ of a percentage point). If the 1989 central tendency prediction is reduced to account for a rebound due to the reduction in output from the 1988 drought, the FOMC's central tendency predictions for nominal and real GNP growth were lower in 1989 than in 1988.

The following excerpt from the February 1989 Humphrey-Hawkins testimony by Chairman Greenspan (1989a, pp. 164, 167) describes the soft-landing strategy:

> Overall inflation, in the area of 4 to 4½ percent, during 1988 was a little above the general range in which it had fluctuated in the mid-1980s. . . . [L]et me stress that the current rate of inflation, let alone an increase, is not acceptable, and our policies are designed to reduce inflation in coming years. This restraint will involve containing pressures on our productive resources and, thus, some slowing in the underlying rate of growth of real GNP is likely in 1989. The central tendency of GNP forecasts for this year of Board members and Reserve Bank presidents is 2½ to 3 percent; abstracting from the expected rebound from last year's drought losses, real GNP is projected to grow at closer to a 2 percent rate.

The quotation implies that in 1989 the FOMC set a target for real GNP growth somewhat lower than the long-term trend rate. The

assumption that the rate of inflation falls only after a sustained reduction in nominal GNP growth then implied an intermediate target for nominal GNP growth equal to this figure for below-trend real growth plus the prevailing rate of inflation. Specifically, the sum of the figures for inflation of 4.5 percent (approximately the 1988 rate) and for real growth of 2.5 percent implied a target for growth in nominal GNP of 7 percent for 1989. The latter figure is the midpoint of the FOMC's central tendency projection of GNP growth.

The desire by the Fed to lower the rate of inflation led to policy-altering behavior of the funds rate in early 1989. When the real sector strengthened in spring 1988, the FOMC began to raise the funds rate. The considerable stability of bond rates in 1988 suggested that the rise in the funds rate was appropriate for restraining increased aggregate demand. The strength in the real sector continued until early 1989, but then began to moderate when improvement in the trade deficit stalled. Because of its decision to reduce the inflation rate by targeting a low rate of growth of real output, when real output growth weakened in 1989, the FOMC maintained the funds rate at 9.75 percent, rather than lowering it. Incoming statistics on the economy continued weak, and the bond market signaled clearly that the thrust of policy was restrictive. The 30-year bond rate peaked on May 10 at 9.1 percent. With no change in the funds rate, it then began to fall sharply until, by the end of June, it was at 8 percent. Beginning in early June, the FOMC began to work the funds rate down through quarter-point reductions.

Declines in bond yields in the last half of 1989 indicated that the markets believed that the moderate decreases in the funds rate in 1989 were appropriate to offset weakness in the rate of growth of aggregate demand. A decrease in the funds rate in the beginning of January 1990, however, was followed by a rise in bond rates. Concern in the bond market over inflation limited the FOMC's willingness to lower the funds rate further until fall 1990.

1990: Recession

Inflation rose in 1990Q1. In part, the rise was due to severe winter weather that forced up food and energy prices. The trend rate of inflation, however, appeared to be moving up from 4.5 to almost 6 percent. A rise in broad measures of labor compensation reinforced concern about the behavior of the trend rate of inflation. The July 18 "Monetary Policy Report to the Congress" (Board *Annual Report* 1990, p. 51) stated:

> In the early part of 1990, economic activity appeared to be regaining momentum, a development that reduced previous concerns about

> recessionary risks. At the same time, even discounting weather-related spurts in food and energy prices . . . there appeared to be no abatement in underlying inflationary pressures. . . . [I]n keeping with the tenor of most of the economic data released during the quarter, other interest rates generally moved higher, particularly at the long end of the yield curve.

At its March 27 meeting, the FOMC was still concentrating on inflation (Board *Annual Report* 1990, pp. 104, 105):

> The members viewed sustained growth in business activity as a reasonable expectation for the next several quarters. . . . [T]he prospects for inflation remained the most disturbing aspect of the economic outlook.

In the uncertainty surrounding the invasion of Kuwait on August 2, the FOMC kept the funds rate pegged at around 8 percent. The August 21 "Record" stated (Board *Annual Report* 1990, p. 133):

> With the surge in oil prices tending to weaken economic activity while also intensifying inflationary pressures, an easing in policy would incur the risk of overcompensating for potential weakness in the economy at the expense of greater inflation, while a tightening move to counter inflation might stall an already weak economic expansion.

The FOMC was also concerned that a reduction in the funds rate would produce a rise in bond rates. Chairman Greenspan (1990, p. 930) testified on September 19 before the Joint Economic Committee:

> Another key issue one must address is how much of any change in short-term rates would carry over to the crucially important long-term rates, given the concern in financial markets about prospects for inflation. . . . Policy actions that are not perceived to be consistent with a stable, noninflationary economic environment could easily become counterproductive over the long haul.

A business cycle peak occurred in July 1990, before the invasion of Iraq. The increased price of oil produced by the invasion must have exacerbated the recession directly. It exacerbated the recession indirectly through the heightened concern it produced on the FOMC over inflation. That concern caused the FOMC to postpone the process of working the funds rate down in response to weakness in the economy. Nevertheless, the cycle peak occurred before the invasion. Payroll employment (survey data of strike-adjusted, non-farm, non-census workers) grew at an annualized rate of 2.5 percent in the first quarter of 1990, but virtually ceased growing in the second quarter, and fell in July. Aggregate hours worked (payroll employment survey) behaved similarly. After the release on December 7, 1990, of

figures showing a decline in payroll employment of 265,000 for November and a revised decline of 180,000 for October, the FOMC began to move the funds rate down sharply.

Evaluating the Soft-Landing Strategy

One can argue that the Fed's soft-landing strategy failed because of bad luck. In the winter of 1989–90, poor weather augmented inflation by pushing up food and energy prices. Overbuilding in commercial real estate and weakness in bank capital caused a general tightening of credit standards. Finally, the sharp rise in oil prices after the invasion of Iraq undoubtedly depressed real output. On the other hand, one can argue that any strategy must account for bad luck. From this perspective, the soft-landing strategy failed because of the difficulty of setting the Fed's instrument, the funds rate, to achieve a desired objective for real growth.

In any event, the monetary policy actions preceding the 1990 recession resemble those preceding past recessions. The rate of growth of real GNP peaked in 1987Q4. The funds rate, however, did not peak until 1989Q2 and then declined only slowly thereafter. The FOMC felt constrained in lowering the funds rate because of the behavior of the bond market. Bond yields declined very little between 1987Q4 and 1990Q3. After 1989Q4, the moderate decline in the funds rate was accompanied by a rise in bond yields. The bond markets remained preoccupied by inflation.

The Fed kept the funds rate up through monetary deceleration. In the mid-1980s, the trend rate of growth of M2 had been around 9 percent (apart from the high growth in 1983 associated with the introduction of money market deposit accounts). The trend rate of growth of M2 began to decline in 1987, but the depressing impact on nominal GNP growth was initially offset by a rise in the opportunity cost of holding real M2. Eventually, a decline in GNP growth followed the decline in M2 growth.

In an important respect, the experience of monetary policy in the 1980s has been encouraging. For much of the 1980s, changes in the funds rate were policy maintaining, rather than policy altering. The FOMC became more willing to alter the funds rate in response to changes in the rate of growth of real GNP, regardless of the phase of the business cycle. An increased willingness to make policy-maintaining changes in the funds rate lessened the inertia in funds-rate changes that produced the stop-go monetary policy of the 1960s and 1970s. The relative stability over most of the 1980s of CPI inflation (excluding food and energy) suggests that monetary policy has

become less of a source of macroeconomic disturbances. However, the Fed's recent strategy of working the inflation rate down without a recession failed. It appears that the Fed can pursue a monetary policy that maintains the rate of growth of nominal expenditure at a fairly stable value. The Fed encounters difficulty, however, when it attempts to alter the rate of growth of nominal expenditure.

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Asking the Right Question about Monetary Policy

Paul W. Boltz

Robert Hetzel presents an excellent analysis of what the Federal Reserve thought it was doing and why, and he provides a balanced review of what actually happened. I was particularly fond of the distinction he used to divide "policy maintaining" changes in the funds rate from "policy altering" changes. This distinction is akin, but not identical, to the Wall Street description of the Fed as "following rates" or "leading them." In this framework, the Fed's performance is worthy of the careful and well-nuanced analysis it receives. And while I might quibble here or there with Hetzel's review of the 1980s, the overall thrust of his paper strikes me as right on the mark.

The Volcker Standard

What the press came to call the "Volcker standard" worked pretty well, and Hetzel explains in detail the hows and whys. The problem is that the Volcker standard, or whatever you choose to call it, delivered lower inflation the old-fashioned way—with brutal recessions. When prosperity returned, inflation accelerated through the 1980s, except for 1986 when OPEC collapsed. To be sure, inflation did not move up as quickly as many had expected or get as bad, but 5.9 percent inflation in the first half of 1990, before Iraq's invasion of Kuwait, was not my idea of good news on the inflation front.

The Goal of Zero Inflation

The Federal Reserve has given considerable lip service to the goal of reducing inflation to zero or thereabouts in five years, as Rep.

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The author is Vice President and Financial Economist at T. Rowe Price Associates.

Stephen L. Neal (D., N.C.) proposed it should. However, the Neal proposal looks to me like the monetary policy equivalent of Gramm-Rudman-Hollings. So I would suggest that Hetzel explore precisely what the Fed should do differently in the future to keep inflation from creeping up. Alternatively, could the Fed have done something differently during the 1980s, short of recession, to slow inflation? The answer may be that the unemployment rate was pushed below the natural rate.

No Simple Solution for Monetary Policy

I do not know the answers, but I do not think they lie in any one approach to monetary policy. I tremble to think what would have happened if the FOMC had listened to monetarists in the 1980s, particularly in 1983 when Milton Friedman, writing in the The *Wall Street Journal*, predicted with characteristic gusto an imminent "surge" in inflation. The FOMC, the Fed staff, and market people like me have not forgotten those days. So I think it is important to ask the right question about monetary policy to get the right answer. I do not think the key question is "What single nominal variable should the Fed pay attention to?" As an epistemological matter, I do not know if there is any answer to that question, but it would surprise me if this very complicated world were so accommodating as to be simple in the area of monetary policy.

The Key Question

The question I would prefer—and Hetzel is well prepared to try to answer—is this: "What can the FOMC do within its institutional framework to make better monetary policy?" Precious little work has been done on this topic, especially by academic economists. As Eduard Bomhoff (1992) has pointed out, academics prefer highly abstract, often obtuse, formulations. My preferred question would recognize explicitly that the FOMC should look at many things to make its decisions. Hetzel's paper is a fine contribution to a start on answering the right question.

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