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University of Richmond

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E. Claiborne Robins School of Business
University of Richmond

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Monetarists have long been advising policy makers to conform policy decisions to a rule which would set the long-run monetary growth at a rate consistent with real economic growth. The contention is that variability in the rate of growth of the money supply, combined with excessive rates of growth, result in economic havoc accompanied by high rates of inflation and that attempts to employ discretionary counter-cyclical monetary policy are destabilizing.

The monetarist viewpoint gained support in the 70's as the predictions from Keynesian models became increasingly unreliable. To quote James Tobin: "Monetarism won the hearts and minds of many economists and most central bankers in the 70's." [10, p. 506] Evidence of the increasing acceptance of the monetarist viewpoint among legislators also, was the passage of House Concurrent Resolution 133 in 1975. In response to the joint resolution the Federal Reserve began to announce publicly growth rate targets for monetary aggregates. With the passage of the Full Employment and Balanced Growth Act of 1978, the requirement that the Federal Reserve specify long-run monetary aggregate targets to the Congress was mandated. The Federal Reserve fully complied with the legislation, but continued to operate on the basis of an interest rate target until the policy change of October 1979. This paper analyzes

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* Assistant Professor of Economics, E. Claiborne Robins School of Business, University of Richmond. The author would like to give thanks for the generous support from the Marriner S. Eccles Research Fellowship which allowed the completion of her dissertation, out of which this paper emerged. Also, thanks is due to Lance Girton, dissertation chairman, and to the anonymous reviewers, the employment of whose helpful suggestions resulted in a better paper.

monetary policy decisions in the years 1980-83 in an attempt to determine the weight given to meeting the announced long-run targets recognizing that departures from that goal might be deemed necessary by changing economic conditions. The first section briefly outlines the much talked about policy change in October 1979 which has been interpreted as a Fed commitment to the monetarists' desired policy. The second section delineates the models which were estimated to analyze policy decisions following the October 1979 policy change and to determine the extent to which policy was made in an attempt to meet the stated long-run targets. The empirical results from estimation of the models in section two are presented in the following section. The fourth section delineates a rationale for the observed policy behavior and the final section presents a conclusion.

1. Details of the Policy Change

On October 6, 1979, the announcement was made that the immediate target on the basis of which day-to-day policy decisions were made would shift from an interest rate target, the federal funds rate, to a monetary aggregate target, non-borrowed reserves. During the federal funds rate regime, monetary aggregates played the role of the intermediate target, but the immediate target was the federal funds rate. The federal funds rate band was set at the level thought to be consistent with the stated long-run monetary targets. However, the narrowness of the band, generally 50 to 100 basis points, indicated that stabilization of the interest rate was the primary goal of Fed policy.

As the rate of inflation rose steadily during the seventies, and inflationary psychology became the mental attitude of even the

relatively uninformed, the Federal Reserve came under severe attack for fueling inflation by allowing excessive rates of growth in the money supply. These conditions prompted the October 1979 change in operating procedures. The intended result of the change was to gain closer control over the growth of monetary aggregates. The "Record of Policy Actions of the FOMC" for the October 6 meeting opened with this statement:

> This meeting of the Committee was called by the Chairman to consider actions that might be taken, in conjunction with actions being contemplated by the Board of Governors, to improve control over the expansion of money and bank credit in the light of developing speculative excesses in financial and commodity markets and additional evidence of strong inflationary forces in the economy. Special attention was given to the conduct of open market operations in order to contain growth in the monetary aggregates within the ranges previously adopted by the Committee for the year ending in the fourth quarter of 1979. [4, p. 472]

Later in the "Record" the exact nature of the actions taken was delineated.

> Given that objective, most members strongly supported a shift in the conduct of open market operations to an approach placing emphasis on supplying the volume of bank reserves estimated to be consistent with the desired rates of growth in monetary aggregates, while permitting much greater fluctuations in the federal funds rate than heretofore. [4, p. 974]

Prior to October 1979, though monetary aggregates had been one target of concern to policy makers from as early as the beginning of 1970, money market conditions, or movements in interest rates, were the paramount concern of policy makers [Wallich, 1979]. October 1979 marked the end of this regime. No longer would policy be aimed at stabilizing the federal funds rate within a narrow band, rather the federal funds

rate would be allowed to vary over a much wider range, while non-borrowed reserves were adjusted to meet long run growth targets.

Immediately following the policy change, short run targets for monetary aggregates, rather than a narrow federal funds rate band, were stated as the primary objective for policy in the policy directive. A broad range for the federal funds rate band became written into the policy directive as a proviso, i.e., as a trigger mechanism for the reconvening of the FOMC, rather than as a day-to-day operating target. Also, the width of the band increased dramatically, to 400 basis points in the October directive. [4, p. 977] However, the change in policy was downplayed to some extent. A Federal Reserve staff report written in February 1981, evaluating the new monetary control procedure, asserted:

> The change in procedure, it should be pointed out represented a technical innovation rather than a change in the broader objectives of monetary policy or in the monetary targets themselves. [9, p. A-1]

The statement pointed out that control of monetary aggregates was not a new policy objective, but due to the unsuccessful record, a change in the method employed to meet those targets was deemed necessary. Volcker, in testimony before Congress said:

> Our basic targets were not changed. But the new measures, which involved among other things a change in operating procedures should provide added assurance that those objectives will be reached. [11, p. 889]

October 1979 is marked as a watershed in monetary policy. Apparently the Federal Reserve had decided to adopt a monetarist policy - to conform policy decisions to the attainment of the long-run monetary aggregate targets. Yet these long-run targets were not attaind for either M1 or M2 during the following three years. The next section

proposes three models which are used to test the hypothesis that the Federal Reserve did, in fact, announce short-run targets which would have made achievement of the long-run targets a reality if they had been attained.

2. The Models

The models used to analyze short run policy decisions assume that these decisions can be represented by the short run monetary growth targets as stated in the policy directive. These short run growth targets specified by the FOMC, unlike the monetary aggregates themselves, are left to the discretion of the FOMC. This guarantees that the Fed is, in fact, able to control the decision variable in this study. From the statements which surrounded the October 1979 policy change one would expect the short-run policy decisions of the FOMC to reflect a desire to meet long-run targets, i.e., a monetarist policy strategy. In order to test the veracity of this expectation the models hypothesize that the stated short-run targets are set in an attempt to keep monetary growth in line with the stated long-run target with possible qualifications, i.e., partial adjustments to reflect changing economic conditions. Two estimating equations are derived from two different models which embody these assumptions.[1]

The first equation of the first model is:

$$(M^* - M_{t-1}) = \alpha(\bar{M}_t - M_{t-1}) + \beta_1(\bar{I}_t - I_t^E) + \beta_2(\bar{Y}_t - Y_t^E) + \beta_3(P_t - \bar{P}_t^E) + \beta_4(\bar{U}_t - U_t^E) + \varepsilon_t \qquad 1)$$

where:[2]

M^* = short run target level for M-2

M_{t-1} = actual level of M-2 in preceding month

$\bar{M}_t$ = long run target level for M-2

I = federal funds rate

Y = index of industrial production

P = price level

U = unemployment rate

bar = long run desired value

E = expected value

$\varepsilon_t \sim N(0, \sigma^2)$

α = partial adjustment coefficient for adjustment of the short run target to meet the long run target

β's = adjustment coefficients for the various economic factors.

This equation supposes that the short-run target is set in response to deviations from the long run monetary target in the preceding period and expected deviations of key economic variables from the long-run desired levels for those variables in the current period. Equations 2a) - 2d) specify the expected values for the goal variables to be a function of the lagged value of that variable (times a growth rate where applicable) and of the difference between the actual money supply and the expected money supply, assuming the money supply is growing at a constant linear rate.[3]

$$I_t^E = I_{t-1} + \phi_1[M_t - (M_{t-1} + g)] + U_1 t \quad 2a)$$

$$Y_t^E = Y_{t-1}\,\lambda + \phi_2\,[M_t - (M_{t-1} + g)] + U_2 t \quad 2b)$$

$$P_t^E = P_{t-1} + \phi_3\,[M_t - (M_{t-1} + g)] + U_3 t \quad 2c)$$

$$U_t^E = U_{t-1} + \phi_4\,[M_t - (M_{t-1} + g)] + U_4 t \quad 2d)$$

where: g = constant increment,

$U_{1234t} \sim N(0,\sigma^2)$,

ϕ's = adjustment coefficients reflecting adjustment in expected values for economic variables due to unexpected deviations in the money supply,

λ = constant growth rate for income.

All other variables are defined in equation 1).

The third equation states that the money supply level is equal to the short run target plus an error term.

$$M_t = M_t^* + V_t \qquad 3)$$

where: $V_t \sim N(0,\sigma^2)$

By substitution and simplification an estimating equation can be derived.

$$M_t^* = a + b_1 \bar{M}_t + b_2 M_{t-1} + b_3(\bar{I}_t - I_{t-1}) + b_4 \bar{Y}_t - b_5 Y_{t-1} - b_6 P_{t-1} - b_7 U_{t-1} + \delta_t \qquad 4)$$

where:

$a = +g(\beta_1\phi_1 + \beta_2\phi_2 + \beta_3\phi_3 + \beta_4\phi_4)/\Delta + \beta_4 \bar{U}_t/\Delta$

$b_1 = \alpha/\Delta$

$b_2 = 1 - \alpha + \beta_1\phi_1 + \beta_2\phi_2 + \beta_3\phi_3 + \beta_4\phi_4/\Delta$

$b_3 = \beta_1/\Delta$

$b_4 = \beta_2/\Delta$

$b_5 = \beta_2\lambda/\Delta$

$b_6 = \beta_3/\Delta$

$b_7 = \beta_4/\Delta$

$\delta_t = -v_t(\beta_1\phi_1 + \beta_2\phi_2 + \beta_3\phi_3 + \beta_4\phi_4) - u_t(\beta_1 + \beta_2 + \beta_3 + \beta_4)/\Delta$

$\Delta = 1 + \beta_1\phi_1 + \beta_2\phi_2 + \beta_3\phi_3 + \beta_4\phi_4$

$\delta_t \sim N(0\ \sigma^2)$

$\bar{U}_t$ = constant

$\bar{P}_t$ = 0.

A second model was also employed to test the same hypothesis. This model used annualized percentage growth rates for the monetary control variables. This coincided exactly with the way in which short run targets were stated by the FOMC in the policy directive. The first equation, depicting the adjustment hypothesis, was:

$$SR^*_t - LR^*_t = \alpha(M_{t-1} - \bar{M}_{t-1}) + \beta_1(I^E_t - \bar{I}_t) + \beta_2(Y^E_t - \bar{Y}_t) + \beta_3(P^E_t - \bar{P}_t) + \beta_4(U^E_t - \bar{U}_t) + \varepsilon_t \quad 5)$$

where:

SR^*_t = annual percentage growth rate stated as the short run target in the policy directive

LR^*_t = mid point of the annual percentage growth rate stated as the long run target in the policy directive

α = partial adjustment coefficient, value <0 indicating adjustment, and all other variables are defined as in the previous model.

The next two equations of this model were specified exactly as equations 2a) - 2d) and 3) in the first model. Again, by substitution, an equation which could be estimated was derived:

$$(SR^*_t - LR^*_t) = a + b_1\bar{M}_t + b_2M_{t-1} + b_3M^*_t + b_4(I_{t-1} - \bar{I}_t) + b_5\bar{Y}_t + b_6Y_{t-1} + b_7P_{t-1} + b_8U_{t-1} + \gamma \quad 6)$$

where:

$a = -g(\beta_1\phi_1 + \beta_2\phi_2 + \beta_3\phi_3 + \beta_4\phi_4) - \beta_4\bar{U}_t$

$b_1 = -\alpha$

$b_2 = (\alpha - \beta_1\phi_1 - \beta_2\phi_2 - \beta_3\phi_3 - \beta_4\phi_4)$

$b_3 = \beta_1\phi_1 + \beta_2\phi_2 + \beta_3\phi_3 + \beta_4\phi_4$

$b_4 = \beta_1$

$$b_5 = -\beta_2$$

$$b_6 = \beta_2\lambda$$

$$b_7 = \beta_3$$

$$b_8 = \beta_4$$

$$\gamma = V_t(\beta_1\phi_1 + \beta_2\phi_2 + \beta_3\phi_3 + \beta_4\phi_4) + \beta_1U_{1t} + \beta_2U_{2t} + \beta_3U_{3t} + \beta_4U_{4t} + \varepsilon_t$$

This model is similar to the first model, but, by using a different dependent variable, one which is measured in the same units as the stated policy, it acts as a check on the results of the first model. This second equation was estimated for the same time period as the first, and the results are reported in the next section.

M-2 was chosen as the monetary aggregate on which to focus for two major reasons. The first reason was that during the period under study monetary aggregates were redefined twice.[4] This complicated the use of M-1 as the policy control variable. Also during the study period, institutional changes affected the weight attached to M-1 measures. For example, during the policy meeting on October 5, 1982, no short run target for M-1 was stated due to two institutional developments whose effects on M-1 were subject to great uncertainty.[5] However, it was felt that these developments would not lead to as much uncertainty surrounding M-2. Therefore, because of the changes in measurement and the uncertainty surrounding M-1, it was decided that the use of M-2, rather than M-1, as the policy decision variable was preferable.

3. Empirical Results

The two equations derived from the two models were both estimated for the period January 1980 through October 1983 by ordinary least squares. Detailed specification of the variables used is provided in

the data appendix. Results from estimation of the equation derived from the first model, equation 4), are reported in Table 1, and the results from equation 6) are reported in Table 2.

The results from the first model indicate that the Federal Open Market Committee, during the period under study, did not systematically adjust short-run targets, either to eliminate the gap between the actual level of M-2 and the midpoint of the long-run target, or in response to expected deviations of the ultimate goal variables from their long-run desired values. In the first equation the estimated value of α, the adjustment coefficient indicating adjustment to long-run target level is not significantly different from zero as $b_1 = \alpha/\Delta$ was not significantly different from zero, and $b_2 = 1 - \alpha + \beta_1\phi_1 + \beta_2\phi_2 + \beta_3\phi_3 + \beta_4\phi_4/\Delta$ is very close to one and significant at the 1 percent level. None of the adjustment coefficients on the economic variables is estimated to be significantly different from zero, as none of the coefficients b_3 through b_7 was estimated to be significantly different from zero at the 5 percent level of significance.

Estimation of the second equation yielded slightly different results: b_2, b_3 and b_5 are statistically significant at the 5 percent level of significance. The analysis of these coefficients requires cognizance of the combinations of parameters from the multiequation model which comprise these coefficients. Recalling that:

$$b_2 = (\alpha - \beta_1\phi_1 - \beta_2\phi_2 - \beta_3\phi_3 - \beta_4\phi_4) \text{ and}$$

$$b_3 = \beta_1\phi_1 + \beta_2\phi_2 + \beta_3\phi_3 + \beta_4\phi_4,$$

we can analyze their estimated values. Obviously: $b_2 = \alpha - b_3$, and the estimations of b_2 and b_3 approximately reflect this expected relationship as $b_1 = -\alpha$ is not significantly different from zero. Further

examination of their composition yields more insight. Because neither b_4, nor b_7, nor b_8 are significantly different from zero, it can be concluded that neither β_1, nor β_3, nor β_4 are significantly different from zero. Therefore, the component of b_2 and b_3 which accounts for their significance can be deduced to be $\beta_2\phi_2$. From the estimation of $b_5 = -\beta_2$, β_2 is estimated to be -.71. This coincides with the expectation the $\beta_2<0$, i.e., if the expected level of industrial production exceeds the target level the difference between the short run monetary growth rate target, in terms of percent annualized growth, and the similar long run target should be negative. So, in contrast to the first model, this second model indicates some responsiveness on the part of the FOMC to the level of industrial production, i.e., some degree of countercyclical behavior. Nevertheless, the magnitude is small, less than 1 percent difference in annualized terms. Going one step further, it is obvious that from these estimations it must be concluded that ϕ_2 is less than zero. This implies that one's expectation of the index of industrial production in time "t" is lower than the previous period's index times a constant growth rate, if the actual level of the money supply in time "t" turns out to be greater than the expected level of the money supply.

The important point with respect to the hypothesis being tested is the fact that the conclusion from the first model is upheld by estimation of the second model. Again, $b_1 = -\alpha$, where α is the partial adjustment parameter, is not significantly different from zero.[6] Both models indicate that short run targets were not consistently set in order to meet the previously specified long run targets.

The fact that the results from both models indicate that there was no consistent month-by-month reaction to the deviations in the goal variables from desired levels[7] was not too surprising. The FOMC considers many economic variables in the discussion which precedes policy decisions. The possibility that with a large number of indicators being considered, any one might take on a varying weight from one policy decision to the next is certainly feasible. Also, the realization that policy decisions must be the consensus of a majority who may have differing perspectives, and who may weigh trade-offs differently, makes the lack of systematic response to any one variable an expected outcome. On the other hand, the fact that short-run M-2 targets are not set in response to the deviations of M-2 from the mid-point of its long-run target range was not expected, especially in the light of the fact that the policy change in October of 1979 was aimed at bringing monetary aggregates in line with targeted ranges. Because these results were inconsistent with Federal Reserve's stated intent of the October 1979 policy change, the first model was simplified to test only the hypothesis that short-run M-2 targets were set in response to deviations of M-2 from the midpoint of the target range. The simpler model which was estimated was:

$$M^*_t - M_{t-1} = \alpha(\bar{M}_t - M_{t-1}). \qquad 7)$$

where: all variables were defined as before.

Estimation of this equation yielded:

$$M^*_t - M_{t-1} = \underset{(-.34)}{-.44}(\bar{M}_t - M_{t-1}) \qquad 8)$$

where the number in parentheses is the t-statistic.

Again, results from the estimation of equation 7 indicate that the short- run target was not adjusted in response to deviations from the midpoint of the long-run target.

The somewhat surprising conclusion that short-run targets, over which the Fed has control, are not adjusted with the intent of meeting long-run targets, over which the Fed also has control, prompts one to seek some explanation for this policy behavior which apparently contradicts the expected outcome based on the public statements of policy-makers during this period which appeared to reflect a commitment to a strict monetarist policy.

4. A Rationale for Policy Behavior

Though it has been said, and Federal Reserve statements might be interpreted to indicate, that the Federal Reserve "turned monetarist" following the October 1979 policy change, the empirical evidence presented in this paper refutes this assertion. Justification of a non-monetarist policy is easily mustered. Reasons for not religiously following a monetary aggregate target are not new to anyone familiar with the monetary policy area. Poole [1970] demonstrated that only in the case of a stable money demand function would targeting money tend to eliminate, rather than to exacerbate, fluctuations in output. It is also widely recognized that attempts to decrease the variability in the money supply lead to increased variability in interest rates; i.e., there is a trade-off. In fact, the policy statement of October 1979 asserted that the FOMC had chosen to let interest rates vary more widely in order to control monetary aggregates more closely.

From official Federal Reserve statements, the deduction that the FOMC had taken what Richard Davis, staff economist, has labeled a

"practical monetarist" approach was a logical one. It appeared that the Fed agreed that:

> excessive monetary growth is a necessary condition for inflation and reduction in monetary growth as a necessary condition for restoring reasonable price stability.[2, p. 17]

Nevertheless: FOMC members recognized that controlling monetary aggregates bears a cost: ". . . rigorous control of money growth implies sacrifice of any ability to influence interest rates." [2, p. 23] Interest rate targeting had long been the central focus of Federal Reserve policy. But the cost of this preoccupation was loss of control over the money supply. However, theory teaches that deviations of monetary aggregates from target due to shifts in money demand should be accommodated rather than resisted:

> In theory, once unexpected deviations in money growth are known to represent genuine "shifts" in money demand, it will probably become appropriate to accommodate to them by readjusting money targets.[2, p. 25]

But, even when deviations were large, there was no readjustment of long run money targets during the study period.

For the years 1980, 1981, and 1982 actual M-2 growth exceeded the upper target, yet no adjustment in the long run target was made. Three reasons can be postulated for this phenomenon: first, the uncertainty surrounding the determination of a "genuine shift"; second, the effect an alteration in the long-run targets would have on expectations; and third, the practice of the FOMC to rebase at the beginning of each new year. The policy directive of October 5, 1982 is a clear demonstration of the uncertainty surrounding monetary aggregates. Writing with respect to the short-run targets for M-2 and M-3 the directive stated:

> . . . somewhat slower growth bringing those aggregates around the upper part of the ranges set for the year would be acceptable and desirable in the context of declining interest rates. Should economic and financial uncertainties lead to exceptional liquidity demands, somewhat more rapid growth in the broader aggregates would be tolerated. [8, p. 766]

Both "somewhat slower" and "somewhat more rapid growth" are regarded as tolerable depending on the unfolding of the uncertain future. Obviously, "genuine shifts" are not readily predictable. Expectations also play a key role in monetary policy, especially in an inflationary environment where expectations create an inflationary psychology which intensifies the problem. Even raising short-run target growth rates produced fears:

> Some sentiment was expressed for moderately faster monetary expansion. Pursuit of the latter policy course, it was suggested, would probably exacerbate inflationary expectations, especially in the light of the outlook for large deficits in the federal budget, and thereby exert upward pressure on interest rates. [7, p. 420]

Finally, the fact that the Federal Reserve customarily (though for 1983 the February-March average was used) uses the average of the actual fourth quarter money figures as a base for the following year's policy removes the pressure to alter long-run target levels, and to bring monetary aggregates into the targeted range as the year's end draws nigh.

Rebasing is not the only aspect of policy behavior which indicates that perhaps targets are adjusted to actual values, rather than vice versa. After three years of M-2 growth in excess of the targeted range, the growth rate target for M-2 was increased. In the years 1980, 1981, and 1982 the targeted range for M-2 was 6% to 9% annual growth from the fourth quarter to the fourth quarter, but in 1983 the targeted range was

7 percent to 10 percent annual growth from the February-March actual average to the fourth quarter. Not only did the percentage growth rate increase, but even the minimal discipline of rebasing on the fourth quarter average was removed. The chance that M-2 would again overshoot the target was minimized and, in fact, M-2 did not overshoot.

After considering the reasons for allowing monetary aggregates to deviate from target, the fact that there is no statistical evidence that short-run targets were set in response to deviations from long-run targets is not so surprising. What is surprising is the continued assertion that the "Fed has turned monetarist."

5. Conclusion

Monetarist theories have clearly gained acceptance in the recent past. Legislative action in the form of House Concurrent Resolution 133, 1975, and the Humphrey-Hawkins Bill, 1978, have demonstrated that a majority of legislators lend credence to the monetarist assertion that monetary policy ought to be guided to some extent by monetary aggregate targeting. However, the empirical evidence presented in this paper indicates that the Federal Reserve is not convinced of the propriety of a strict monetarist policy. There are clearly qualifications to the efficacy of following such a policy. These have been examined. Rather, the evidence suggests that monetary policymakers recognize these qualifications and have chosen to follow a strategy of discretionary policy rather than be limited by strict monetarist rules.

FOOTNOTES

1. A number of other models, of slightly different specifications were also tried in the course of the research. They yielded similar conclusions to the ones reported.

2. Specific delineation of the variables used in the estimation of the derived equations to follow is provided in the data appendix.

3. The use of constant linear growth was chosen to coincide with Federal Reserve publications. Constant linear growth results in straight line graphs in monetary aggregate-time space. On the other hand, a constant growth rate would yield straight line graphs in the natural log of the monetary aggregate-time space. Federal Reserve publications of monetary targets depict the target level as a straight line in monetary aggregate-time space, not log space. Obviously, constant linear growth reflects growth rates which are highest at the beginning of the year and decline throughout. The choice between frameworks is the choice between a change from month to month according to a constant increment, constant linear growth, and a change according to a constant percentage of the preceding month's observation. The Fed has opted for a constant increment change, constant linear growth, in all of its publications, so models which correspond with this procedure were used. However, an equation derived from a model which employed a constant growth rate was also estimated in the course of the research. This equation, linear in logarithms, yielded results similar to the reported results.

4. For details see Federal Reserve Bulletin, February 1980, pp. 98, 99; February 1982, pp. 105-110.

5. For details see Federal Reserve Bulletin, December 1982, pp. 761-766.

6. The choice of an appropriate model depends to a large extent on the conformity of the error structure to the assumptions necessary to validate the use of ordinary least squares. It should be noted that the Durbin-Watson statistic from the second model does not allow one to reject serial correlation among the error terms, whereas the Durbin-Watson from the first model, though in the indeterminant range, is very close to the upper limit (1.78). Therefore, on the basis of an error structure criterion, the first model can be judged more credible.

7. The exception is the quantitatively insignificant coefficient indicating some response to the level of the index of industrial production.

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DATA APPENDIX

Variable	Description	Source
M^{*}[1]	Short run target level of M-2	The short run target is given as an annualized percent growth rate. The given value divided by twelve, plus one multiplied by the actual level of M-2 yielded the following month's short run target level.
$\bar{M}$	Midpoint of long run target level of M-2	The long run target is also given as an annualized percent growth rate in the policy directive. The midpoint of this percent growth rate plus one was multiplied by the stated base, the fourth quarter average in 1980, 1981, and 1982 the February-March average in 1983, to get the next fourth quarter average. Monthly levels were extrapolated assuming constant linear growth.
M	Actual level of M-2	Federal Reserve Bulletin Statistical tables
$\bar{I}$	Federal Funds Rate target	Midpoint of the target band as reported in the policy directive as recorded in "The Record of Policy Actions of the FOMC," Federal Reserve Bulletin.
$\bar{Y}$	Target level of the index of industrial production	Calculated by assuming constant linear growth in the economy of 3.3% annual growth. 3.3% was derived from average growth rates given by Edward J. Shapiro in Macroeconomic Analysis, Fourth Edition, Harcourt Brace Jovanovich, Inc., page 389.
Y	Index of Industrial Production	Actual value from Federal Reserve Bulletin, statistical tables
$\bar{P}$	Desired percent change in the CPI	This variable was assumed to be equal to zero.

Variable	Description	Source
P	Percentage change in CPI from the preceding period.	Actual value from Federal Reserve Bulletin statistical tables
$\bar{U}$	Desired rate of civilian unemployment	This was assumed to be equal to 6%. (Any constant would yield the same results.)
U	Civilian unemployment Rate	Actual value from Federal Reserve Bulletin statistical tables.
SR*[1]	Short run target for M-2 in percent annualized growth	Taken from the Policy Directive
LR*	The midpoint of the long run target for M-2 in % annualized growth	Taken from the Policy Directive

[1] During the period under study, 39 FOMC meetings were held. The dates of the meeting are listed below. The statistical analysis was done for monthly observations. Therefore, the variables from the policy directive did not exactly coincide with the monthly observations of the other variables. For this reason it was assumed that if there were no policy meeting in a specific month the previous month's targets were still applicable. If the meeting occurred after the 15th of the month, the previous meeting's targets were used for that month while the newly-decided-upon targets were used the following month.

Dates of FOMC meetings: 10/6/79; 11/20/79; 3/18/80; 4/22/80; 5/20/80; 7/9/80; 8/12/80; 9/16/80; 10/21/80; 11;18/80; 12/18-19/80; 2/2-3/81; 3/31/81; 5/18/81; 7/16/81; 10/5-6/81; 11/17/81; 12/21-22/81; 2/1-2/82; 3/29-30/82; 5/18/82; 6/30/82; 7/1/82; 8/24/82; 10/5/82; 11/16/82; 12/20-21/82; 2/8-9/83; 3/28-29/83; 5/24/83; 7/12-13/83; 8/23/83; 10/4/83; 11/14-15/83; 12/19-20/83

Table 1
Empirical Results from Equation 4

Equation: $M_t^* = a + b_1\bar{M}_t + b_2M_{t-1} + b_3(\bar{I}_t - I_{t-1}) + b_4\bar{Y}_t - b_5Y_{t-1} + b_6P_{t-1}^{f} - b_7U_{t-1} + \delta_t$

Coefficient	Independent Variable	Estimate	T Statistic
a	intercept	186.702	1.68
b_1	midpoint of the long run target of M-2,level	-.029	-1.43
b_2	actual value of M-2, lagged, level	1.08	29.72
b_3	difference between the midpoint of the designated federal funds rate band and the actual federal funds rate in the preceding period	.13	.66
b_4	desired level of the index of industrial production	-1.69	-1.72
b_5	the actual level of the index of industrial production, lagged	-.03	-.19
b_6	the percent change in the CPI from the preceding period, lagged	-1.48	-1.63
b_7	the civilian unemployment rate, lagged	.68	.47

$\bar{R}^2 = .9999$
N = 46
DW = 1.75

Table 2
Empirical Results from Equation 6

Equation: $(SR^* - LR^*)_t = a + b_1\bar{M}_t + b_2M_{t-1} + b_3M^*_t + b_4(I_{t-1} - \bar{I}_t) + b_5\bar{Y}_t + b_6Y_{t-1} + b_7P_{t-1} + b_8U_{t-1} + \delta_t$

Coefficient	Independent Variable	Estimate	T-statistic
a	intercept	-65.77	-1.85
b_1	midpoint of the long run target for M-2, level	- .12	- .30
b_2	actual level of M-2, lagged	- .70	-13.52
b_3	short run target level for M-2	.67	13.87
b_4	difference between the actual federal funds rate, lagged and the midpoint of the target range	- .30	- .48
b_5	desired level of the index of industrial production	.71	2.25
b_6	actual level of the index of industrial production, lagged	.03	- .70
b_7	percent change of the CPI from the preceding period, lagged	- .13	- .47
b_8	civilian unemployment rate, lagged	- .88	- .21

$\bar{R}^2$ = .869
DW = .726
N=46