2. Monetary Base Control III

Recent Monetary Policy Strategies in the United States

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During the 1970s the U.S. Federal Reserve quantified its monetary policy increasingly in terms of desired growth rates of monetary aggregates. This process was enhanced by the intellectual ascendancy of monetarism and given legal status by the Congressional adoption of the Federal Reserve Reform Act of 1977 (which made law of House Concurrent Resolution 133, first passed in 1975) and the Full-Employment and Balanced Growth Act of 1978 (Humphrey-Hawkins Act). As a result of these laws the Federal Reserve now sets and publicly discloses money growth rate targets for the upcoming year. This paper briefly reviews the procedures for formulating monetary policy in the United States in recent years, starting when policy was expressed as monetary targets, and describes and analyzes the Federal Reserve's strategies for achieving these targets. The Federal funds rate operating strategy of the 1970s is discussed as background for a description and analysis of the new, post-October 6, 1979 reserve strategy. The paper then considers the difficulties for a reserve strategy posed by lagged reserve accounting, and the new and enhanced role of the discount window.

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I. Background

The formulation and implementation of monetary policy in the United States reflects the federal character of its central bank. The Board of Governors of the Federal Reserve System in Washington, D.C. oversees the activities of the System's 12 separate Federal Reserve banks. Each of these 12 reserve banks and their branches provides traditional central banking services to their member commercial banks within the geographical areas served by each. 1/

While nationwide regulatory decisions are generally made by the Board's seven Governors, monetary policy is made by the Federal Open Market Committee (FOMC) which consists of the Board's seven Governors, the President of the Federal Reserve Bank of New York, and the presidents of four additional reserve banks on a rotating basis, though all the reserve bank presidents informally participate in all FOMC meetings. The Federal Reserve's primary instruments for controlling the quantity of money and credit are reserve requirements, the terms on which member banks may obtain reserves through the discount window, and the central banks' supply of reserves through open market transactions. By far the most important of these is open market operations.

Open market operations are conducted under the supervision of the Manager of the Federal Reserve System's Open Market Account maintained at the Federal Reserve Bank of New York. Through open market operations the Fed injects or drains reserves from the banking system as a result of purchases or sales of

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1/ In the U.S. each bank's deposit-taking activity is confined to the single state in which its head office is chartered. As a result of the Depository Institutions Deregulation and Monetary Control Act of 1980, the reserve banks will have to charge for these services and make them available to nonmembers as well.

government securities and/or bankers' acceptances (generally in the form of repurchase agreements) by the System's Trading Desk at the Federal Reserve Bank of New York. The transactions of the Trading Desk are guided by instructions transmitted from the FOMC to the Manager of the System's Open Market Account. The Committee's instructions are contained in the minutes of its monthly meetings in Washington. The changing language of these directives through time provides a chronical of the evolving strategies by which U.S. monetary policy has been implemented.

The ultimate objectives of the Fed's monetary policy have changed little through time. A representative statement of these objectives can be found, for example, in the minutes of the September 17, 1979 meeting of the FOMC:

> Taking account of past and prospective developments in employment, unemployment, production, investment, real income, productivity, international trade and payments, and prices, the Federal Open Market Committee seeks to foster monetary and financial conditions that will resist inflationary pressures while encouraging moderate economic expansion and contributing to a sustainable pattern of international transactions.

This general statement of the factors the Committee takes "account of the past and prospective developments in" reflects, word for word, the Humphrey-Hawkins Act. However, considerable change has occurred in the Committee's perception of what central bank policies are required in order to meet these objectives and of the strategies to be pursued in implementing them. 1/

The relationship between these ultimate concerns of policy and the day-to-day activities of the Federal Reserve are remote at best. Therefore, in setting

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1/ An excellent history of this evolution can be found in Henry C. Wallich and Peter M. Keir, "The Role of Operating Guides in U.S. Monetary Policy: A Historical Review," Kredit und Kapital, January 1978, pp. 30-50.

its primary instruments of control the Federal Reserve focuses attention on so-called intermediate and operating target variables. These variables provide more timely information about the likely behavior of such goal variables as income and prices. Failure to find and refine an adequate operating variable and strategy is the principal cause of dissatisfaction with the outcome of U.S. monetary policy.

Students of monetary policy have tended to divide into those who believe that policy should be conducted in terms of and judged by the behavior of interest rates and those who focus on the behavior of the money supply. For a variety of reasons monetary aggregates have been increasingly used as intermediate target variables since the late 1960s. Use of monetary aggregates became increasingly formalized, first as a result of the concurrent resolution of the House and Senate passed in March 1975 which required quarterly reports to Congress on the Federal Reserve's money supply projections for the next four quarters, and most recently because of the Full-Employment and Balanced Growth Act of 1978 (Humphrey-Hawkins Act) which requires, beginning in February 1980, semi-annual reports to the banking committees of Congress on the Federal Reserve's growth targets for several monetary aggregates. Monetary targets are selected which are believed most consistent with the ultimate objectives of policy and the Federal Reserve then directs its efforts toward the achievement of these "intermediate" targets.

The increasing use of the money supply (though significantly hedged by the wide ranges adopted in announcing growth rate targets--typically two to three percentage points) has focused attention on the need for day-to-day operating targets stated in terms of economic variables over which the

Federal Reserve might hope to exercise greater day-to-day control than is the case for the money supply. In the 1970s the Federal funds rate was used as the operating target variable.

II. Federal Funds Rate Strategy

By the latter 1970s the Federal funds rate strategy for implementing the Reserve Board's objectives for the monetary aggregates had developed into a highly refined procedure. The strategy was based on the assumption of a stable relationship between the Federal funds rate and growth in the monetary aggregates and consisted of a set of rules for adjusting the funds rate in light of economic developments with the principal feedback coming from the realized growth of money relative to its targeted behavior. The empirically observed relationship between the funds rate and the money supply (a standard money demand function) was used to determine the funds rate consistent with the money supply target. The annual growth rate target ranges for the monetary aggregates were translated into short, two-month (tolerance) ranges used to trigger corrective adjustments in the Federal funds rate when actual money growth rates were sufficiently above or below their target.

The FOMC set relatively wide short-run tolerance ranges for the aggregates and very narrow trading ranges for the Federal funds rate. The language of the minutes of the September 17, 1979 meeting exemplifies the language of the "money market" directives of the late 1970s: 1/

> In the short run, the Committee seeks to achieve bank reserve and money market conditions that are broadly consistent with the longer-run ranges for monetary aggregates cited above while giving

1/ An "aggregates" directive called for adjustment of the funds rate if money growth rates deviated significantly from the midpoint of their tolerance ranges.

due regard to developing conditions in foreign exchange and domestic financial markets. Early in the period before the next regular meeting, System open market operations are to be directed at attaining a weekly average federal funds rate slightly above the current level. Subsequently, operations shall be directed at maintaining the weekly average federal funds rate within the range of 11-1/4 to 11-3/4 per cent. In deciding on the specific objective for the federal funds rate the Manager for Domestic Operations shall be guided mainly by the relationship between the latest estimates of annual rates of growth in the September-October period of M-1 and M-2 and the following ranges of tolerance: 3 to 8 percent for M-1 and 6-1/2 to 10-1/2 percent for M-2. If rates of growth of M-1 and M-2, given approximately equal weight, appear to be close to or beyond the upper or lower limits of the indicated ranges, the objective for the funds rate is to be raised or lowered in an orderly fashion within its range.

If the rates of growth in the aggregates appear to be beyond the upper or lower limits of the indicated ranges at a time when the objective for the funds rate has already been moved to the corresponding limit of its range, the Manager shall promptly notify the Chairman, who will then decide whether the situation calls for supplementary instructions from the Committee.

The Federal funds rate is determined in the interbank market so as to equate the supply and demand for reserves. Reserves consist of banks' deposits with the Federal Reserve (reserve accounts) and their vault cash and are held to satisfy legal reserve requirements, net customer demands for cash, and for the settlement of clearing balances between banks. Ceteris paribus, an imbalance between the supply and demand for reserves will move the funds rate in a corrective direction. Therefore, reserve supply and demand forecasts were prepared and utilized in guiding the Trading Desk Manager's decisions with regard to the day's trading activity. On the basis of such forecasts, reserve shortages or excesses were predicted which presumably the Desk must offset if the Federal funds rate objective was to be met.

While estimates of reserve demand are fairly accurate, 1/ estimates of reserve availability are more difficult due to the many factors affecting reserves beyond the Fed's immediate control (so-called "market factors"). Therefore, while estimates of reserve needs facilitated the Desk's attainment of the funds rate objective, little faith was placed in the exact magnitudes estimated. This is revealed in a discussion by Alan Holmes and Peter Sternlight of policy implementation in 1976.

> When reserves are estimated to be abundant (scarce) and the funds rate threatens to rise (fall) significantly above (below) the desired level, that situation calls into question the accuracy of the estimates of the supply of, and the demand for, reserves. The System's absence from the market in that event could be misleading, and the Manager is likely to enter the market to counteract undesirably firm (easy) conditions. 2/

The cautious reliance on estimates of net reserve needs was further indicated by the manner in which the magnitude of an open market operation was determined. Prior to October 1979, the Desk did not enter the market to purchase a predetermined value of securities (i.e., the forecasted reserve excess or shortfall), but rather adjusted the magnitude of the operation after seeing the quantities bid by the dealers at prevailing rates. However, the process of preparing the reserve needs estimates provided valuable training and experience for implementing the reserve strategy adopted October 6, 1979.

With a funds rate strategy the quantity of reserves is determined by the market, as the Federal Reserve supplies whatever is needed to maintain its

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1/ Lagged reserve accounting makes it possible for the Desk Manager to know exactly the dollar quantity of required reserves before the beginning of each reserve settlement week; otherwise the highly complex structure of differential requirement ratios would make required reserve estimates quite difficult. Excess reserves in the U.S. are negligible.

2/ Alan R. Holmes and Peter D. Sternlight, "The Implementation of Monetary Policy in 1976," Federal Reserve Bank of New York, Quarterly Review, Spring 1977, p. 43.

funds rate target. The funds rate, unlike reserve needs, is clearly visible and immediately available. It is very responsive to changes in relative reserve supply and demand, and, in particular, to market perceptions of Fed intentions. An additional advantage of targeting the funds rate is that when its movements reflect changes in reserve supplies, as when unforeseen changes in "market factors" would have affected the quantity of reserves, open market operations sufficient to maintain the funds rate will automatically offset the impact of these market factors and leave the total quantity of reserves unchanged.

The careful and tight control of the funds rate achieved in the 1970s did not yield satisfactorily close control of the monetary aggregates. The relationship between the funds rate and the aggregates proved slippery. Errors in predicting reserve demand will alter this relationship as will, among other things, changes in inflationary expectations by altering the relationship between real and nominal interest rates. However, there is an important political consideration as well. The lack of success in hitting money supply targets using the Funds rate strategy resulted not only from the shifting relationship between interest rates and deposits that led to varying deposit levels for a given funds rate, but also from the reluctance of the FOMC to adequately adjust the funds rate target, even when such an adjustment was indicated by the Committee's own professed strategy. By shifting attention from the Federal Reserve's (very limited and short-term) role in interest rate behavior, the shift to a reserve strategy helped ease political pressure on the Federal Reserve to dampen interest rate movements and to keep rates low. Judd and Scadding convincingly argue that, for a variety of reasons, the FOMC tends to adjust its operating target (whatever

it is) cautiously so that the choice of an interest rate operating target is tantamount, practically speaking, to adopting an interest rate intermediate target, while a reserve operating target is inseparable from use of the money supply as an intermediate target. 1/

After "inexplicably" slow money growth in early 1979 and persistently excessive money growth thereafter, despite increases in the funds rate from 10 to 12 per cent, and in the face of accelerating inflation, the Federal Reserve dramatically changed strategies. Rather than peg the funds rate within a very narrow range subject to remaining within a fairly wide range of money growth rates, the Fed announced on October 6, 1979 its intention to peg the growth of bank reserves subject to remaining within a greatly widened range (initially 400 basis points) for the funds rate.

III. Reserve Strategy

The key to central bank control of the money supply is its influence over bank credit via its influence on the cost of funds to banks. Ceteris paribus, an increase in the Federal funds rate increases the cost of bank funds which raises loan rates and reduces loan demand, which, in turn, lowers deposits (or the rate of deposit growth). These relationships are subsumed (often right out of sight) in the well-known money (or bank) multiplier formulation of the money supply process.

Reserves are a powerful instrument of monetary control because they exert a decisive influence over the cost of funds to banks. Viewing a reserve strategy in this light it is seen as a set of rules for adjusting the funds rate in ways that tend automatically to correct deviations in money growth

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1/ John P. Judd and John L. Scadding, "Conducting Effective Monetary Policy: The Role of Operating Instruments," Federal Reserve Bank of San Francisco, Economic Review (Fall 1979), pp. 23-37.

from its target path. The reserve strategy feedback rules imply far more frequent and flexible funds rate adjustments than the funds rate strategy it replaced.

As is revealed by the February 5, 1980 domestic policy directive, instructions to the Trading Desk have been significantly simplified by the new strategy.

> In the short run, the Committee seeks expansion of reserve aggregates consistent with growth over the first quarter of 1980 at an annual rate of about 4-1/2 per cent for M-1A and 5 per cent for M-1B, provided that in the period before the next regular meeting the weekly average federal funds rate remains within a range of 11-1/2 to 15-1/2 per cent. The Committee believes that, consistent with this short-run policy, M-2 as newly defined should grow at an annual rate of about 6-1/2 per cent over the first quarter.
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> If it appears during the period before the next meeting that the constraint on the federal funds rate is inconsistent with the objective for the expansion of reserves, the Manager for Domestic Operations is promptly to notify the Chairman who will then decide whether the situation calls for supplementary instructions from the Committee.

Prior to the regular March meeting of the FOMC the provisions of the last paragraph were invoked and the upper limit on the funds rate was raised to 16-1/2 per cent on February 22 and to 18 per cent on March 7. At its regular March 18th meeting the FOMC established a much widened funds rate range of 13-20 per cent clearly revealing its commitment to the new operating strategy.

The funds rate strategy generally assumed that the funds rate was linked to the money supply via the public's demand for money. With a reserve strategy, it is no longer necessary to estimate or know the quantity of deposits the public will hold at various interest rates, as interest rates are allowed to adjust until the public accepts whatever level of deposits are forthcoming as a result of the reserves supplied. Success of the strategy resides, instead, in the ability to accurately predict the multiplier, i.e., reserve demand, and to successfully control reserve supply.

Calculation of reserve demand, and hence the desired total reserve path, starts with the target path of the bank deposit component of M1. The bank deposit target is obtained by subtracting forecasted values of the currency and (in the case of M1B) the nonbank deposit components of the money supply from the FOMC's deseasonalized monetary target. 1/ Assumptions are made about the distribution of the resulting bank deposit path between member and nonmember banks. The member bank deposit path is used with other financial data in forecasting the behavior of all other reservable liabilities. From these forecasts a deposit multiplier is constructed by forecasting required and excess reserves. The required reserve forecast is obtained by multiplying the applicable reserve ratios by the projected levels of all reservable bank liabilities (time and savings deposits, CDs, nonbank RPs, Eurodollar borrowings and other managed liabilities, etc.) and the member bank demand deposit target. This requires forecasting their distribution among banks of various sizes and between member and nonmember banks. When converting excess reserves forecasts to weekly values account must be taken of reserve carryovers. 2/

These steps yield a reserve target path. This path provides the staff with estimates of the level of reserves which the combination of market factors and Desk operations should supply if money growth targets are to be achieved. It can be adjusted if incoming data suggests unforeseen changes in the multiplier are likely to persist as might result, for example, from unexpectedly slow or rapid growth in CDs or other reservable nonmonetary liabilities.

1/ The seasonally adjusted path is deseasonalized so that the week-to-week and month-to-month movements over the 12-month target period reflect previously experienced seasonal patterns.

2/ Warren L. Coats, Jr., "What Do Reserve Carry-Overs Mean for Free Reserves?" Journal of Bank Research, Summer 1976.

Hitting the reserve target is subject to greater error than is forecasting the target itself. The first reason is that forecasting reserve supply is currently more difficult than forecasting reserve demand, due to the important impact of fairly volatile "market factors" on reserve supply. The second reason is that lagged reserve accounting makes it technically impossible for the Fed to stick to its reserve target when deposits have been (two weeks earlier) above target. This is discussed below.

The Federal Reserve Bulletin itemizes 21 factors supplying or absorbing reserves. The major factors outside the direct control of the Federal Reserve affecting the supply of bank reserves are: currency in circulation, Federal Reserve float, U.S. Government deposits with the Federal Reserve, and foreign-related items in the Fed's balance sheet (gold stock, SDRs, foreign official deposits, etc.). Efforts are under way to reduce Federal Reserve float, by far the most volatile market factor, and it could, if desired, be eliminated altogether. With the final enactment of the Depository Institutions Deregulation and Monetary Control Act of 1980 resolving the Fed's "membership" problem by authorizing universal reserve requirements on all depository institutions, greater efforts in this direction will doubtless be made. 1/ The shift of U.S. Government deposits back to commercial banks has significantly reduced their contribution to the problem (though shifts between government and private deposits affect the multiplier because government deposits are reservable) and foreign-related items have never been too troublesome. Forecasts of the public's currency preferences have been reasonably accurate for the short run

1/ Membership in the Federal Reserve, hence the obligation to satisfy its reserve requirements, has been voluntary.

and hence not a major source of error in weekly or monthly forecasts. 1/ Furthermore, information on the contribution of market factors to reserve availability improves as the reserve settlement week progresses. 2/ While estimating market factors is a major difficulty with a reserve strategy, progress has been made and further progress is possible.

Special problems are created by lagged reserve accounting, which bases the current week's required reserves on deposit (and other reservable liability) levels of the two-weeks-earlier accounting period. Required reserves in each reserve settlement week are predetermined by bank behavior of two weeks earlier; hence at least that quantity of reserves (adjusted for carryovers) must be supplied by the Federal Reserve regardless of the reserve levels called for by the reserve strategy. As a result, the new strategy focuses attention on the behavior of nonborrowed reserves (the difference between total reserves and reserves borrowed from the Fed's discount window) and the central role played by the discount window.

The Board staff estimates the total reserve path called for in the directive as outlined above. This is converted into a nonborrowed reserve path by subtracting from total reserves the amount of discount window borrowing that

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1/ Reserves are the sum of the current week's member bank deposits at the Fed and their vault cash two weeks earlier. Therefore, a shift in the public's currency-deposit preferences will not, by itself, alter reserves in the current week. However, if a currency drain from vault cash leads banks to replenish the loss by shipping in currency from their Reserve Bank in the same week, reserves will fall immediately. See the author's "Regulation D and the Vault Cash Game," Journal of Finance, June 1973.

2/ "Over 1979 as a whole, the average revision to all operating factors between the estimate available at the beginning of the statement week and the final number was about $840 million (using Federal Reserve Bank of New York forecasts). The average errors decline as the week goes on, but even on the settlement day, the final day on which offsetting adjustments are possible, the average miss to the weekly average figure was about $150 million (equivalent to a projection miss on the final day's reserve level of about $1.0 billion)." Federal Reserve Bank of New York, Quarterly Review, Summer 1980, p. 11.

seems to best reflect the FOMC's attitudes about the appropriate stance of policy. A higher-than-usual "borrowing assumption" produces a lower nonborrowed reserve path (given the total reserves implied by the money supply target and money multiplier estimates), i.e., if the System supplies fewer nonborrowed reserves, banks will be forced to increase their borrowing in order to satisfy their reserve requirements. The Fed assumes that due to banks' reluctance to borrow and the using up of their borrowing privilege, this increased borrowing tends (sooner or later) to drive up the funds rate relative to the discount rate. 1/ This increase in the cost of funds puts pressure on banks to slow down or contract. The borrowing assumption made by the staff in generating the nonborrowed reserve target is, therefore, an important factor influencing the intensity of corrective pressure put on the banking system when monetary behavior deviates from its targets.

The total reserve objective is estimated as an average for the (usually four-week) period between FOMC meetings. By subtracting the borrowing assumption a period average target for nonborrowed reserves is also produced. As the monetary target does not change during the policy period, the total reserve target does not generally change either (unless there is a change in the multiplier). For a given borrowing assumption the same is true for the nonborrowed reserve target. The reserve targets simply reflect the values that must be hit (given the multiplier) if the monetary target is to be hit. While these targets do not generally change, estimates of actual deposit, hence reserve behavior will change all the time and would only accidentally coincide with their respective targets. If actual deposits are above track, required reserves

1/ A fuller discussion of this relationship and the assumption which underlies it follows in Section IV.

and total reserves will be above their targets. If the Fed sticks to its non-borrowed reserve target, it will force the banking system to borrow more than implied by the borrowing assumption. In this case the borrowing estimate will be greater than the borrowing assumption. This distinction is vital.

The weekly nonborrowed reserve targets for use by the Trading Desk are constructed by distributing the period average over the period in such a way as to smoothly distribute estimated actual weekly borrowing over the period. The borrowing estimate is the difference between the period average total reserve projection or forecast (as opposed to the total reserve target) and the period average nonborrowed reserve target. The weekly nonborrowed reserve target is the difference between the period average borrowing estimate and each week's total reserve forecast. The process is repeated on Friday of each week through the inter-FOMC meeting, policy period so that each week's target is revised on the basis of the most recently available data. 1/ While these weekly revisions alter the path of nonborrowed reserves over the policy period, they do not alter the period average.

If weekly nonborrowed reserve targets were not revised each week, as outlined above, a move in the money stock off track in week one would not generate an automatic corrective response until week three. For example, an above-path deposit level in week one will not raise required reserves, hence reserve demand

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1/ The bank accounting period in the United States runs from Thursday through Wednesday and on Friday morning the staff has preliminary money stock data for the week just ended (on the Wednesday two days earlier) and revised data for the week which ended nine days earlier. The latter figures are the money stock data that will be released to the public that afternoon. Because of lagged reserve accounting, the staff also has exact data on the current and up-coming week's required reserves. Therefore, the staff effectively knows the current and approximate up-coming week's reserve demands. This information is used in each week's updating of the total reserve forecast.

above its path, until week three. If the Fed stuck to its nonborrowed reserve path, banks would not be forced to increase their borrowing until week three. However, the procedure of adjusting the weekly nonborrowed reserve target so as to smooth estimated borrowing over the weeks remaining in the policy period means the immediately increased borrowing estimate resulting from the two-weeks-hence increase in required reserves lowers the first week's nonborrowed reserve target. This forces an increase in borrowing in week one which should drive up the funds rate in the first rather than the third week and thus putting banks under pressure to reduce lending and return to the target path for deposits. Therefore, despite lagged reserve accounting, pressures (funds rate adjustments) are generated as soon as deposit misses are known. However, this adjustment in the fund rate still comes one week later than it would with concurrent reserve accounting as it requires Fed knowledge that a miss has occurred. With concurrent reserve accounting changes in required reserves, hence in the funds rate, coincide with deposit misses, i.e., they happen automatically prior to the Fed's knowlege that corrective action is needed.

This procedure would be greatly simplified by a return to concurrent reserve accounting. The Federal Reserve is currently contemplating this step, which would also alleviate the need to operate on the basis of nonborrowed reserves rather than the more relevant total reserve variable, though the Fed might continue to use the discount window as a safety valve softening the impact of errors in reserve estimates.

The amount of corrective pressure generated by the new procedure depends on the funds rate response to the change in borrowing that results. There is little experience on which to judge whether the adjustment pressure that results is adequate or excessive, nor the speed with which deposits will respond

or return to their target path. If, for example, the deposit response to an increase in borrowing seems too slow, i.e., if total reserves remain above their target path for too long, adjustment can be speeded up by lowering the nonborrowed reserve path, thus forcing even more borrowing. If the current procedure seems to create excessive adjustment pressures, the miss in total reserves can be partially accommodated by adjusting the nonborrowed reserve path in the same direction. If deposits move further from their target path, corrective pressures automatically intensify. The new procedure is one in which the Fed is always groping toward an unknown and ever-changing "correct" Federal funds rate.

In effect, the nonborrowed reserve strategy undertaken in October 1979 is an automatic feedback rule for adjusting the funds rate to deposit misses where the magnitude of the adjustment reflects bank reluctance to borrow, and where the undesired funds rate responses to incorrectly estimated market factor impacts on nonborrowed reserves are moderated by the discount window. Whether using a funds rate or reserve operating strategy, it remains the Fed's influence on the funds rate that links its actions with deposit behavior. The problem with the funds rate as a target is not knowing where to set it and the political difficulties in adjusting it.

IV. Problem Areas

1. The discount window

With a reserve strategy constrained by lagged reserve accounting to supply a more or less predetermined level of total reserves, the Fed influences the cost of funds through its ability to control member bank borrowing. The Fed determines the amount of member bank borrowing as the difference between total

required reserves (and desired excess reserves) and the Fed's provision of nonborrowed reserves.

Understanding the relationship between borrowing and the cost of funds requires careful consideration of the actual operations of the discount window. Discount window managers of the 12 Reserve Banks apply a "fairly" constant set of standards for borrowing which make it more and more difficult for the same banks to borrow repeatedly and/or to borrow increasingly larger amounts. Assuming a varying amount of reluctance to borrow from the discount window among member banks due to the tradition of stigma attached to such borrowing and differing assessments of the non-pecuniary cost of such borrowing, those qualifying banks with the least reluctance will borrow first, etc. As the spread between the funds rate and the discount rate widens, a larger number of eligible borrowers will turn to the discount window. Each bank borrows where funds are cheapest, where reluctance to borrow through the discount window is treated as a part of the cost of that source of funds. The marginal bank borrowing from the Fed finds the Fed fundsdiscount rate spread just equal to the nonprice cost to it of borrowing from the discount window (i.e., the spread is a measure of its reluctance to borrow from the Fed which includes the actual additional administrative costs of discount window borrowing as well as psychic costs). As the spread widens, more and more borrowing will take place. But equivalently, as more and more banks are forced to borrow in order to obtain the desired quantity of total reserves, more banks are drawn in for whom the costs of discount window borrowing are higher. This pushes the funds rate up relative to the discount rate until the reserve market clears.

The Fed can influence the cost of funds from the discount window (hence generally) with the discount rate or some combination of that rate and administration of the window. With everything on target, nonborrowed reserves would normally be set (i.e. a borrowing assumption chosen) so that total desired reserves can be obtained with only the "normal" amount of borrowing, i.e., that amount for which no spread between the funds rate and discount rate emerges. A deposit overshoot calls (by the feedback rule) for an increase in the funds rate. This can be achieved, as now, by forcing banks to borrow a larger amount (while making it sufficiently unpleasant to do so) so that the funds rate rises, or by raising the discount rate explicitly and allowing banks to borrow all they like at that rate.

The indirect approach of administering the discount window is as good as the explicit approach of adjusting the discount rate if window administration gives rise to a reliably predictable Fed funds-discount rate spread for a given amount of borrowing. In practice that relationship has not been very reliable. Because of lagged reserve accounting, the Fed must allow banks to borrow through the discount window. The "whip" interpretation of discount window borrowing, i.e., that the funds rate discount rate spread widens as banks are forced to borrow more because the Fed makes it increasingly unpleasant for them to do so, sits uncomfortably with the Fed's and the banking community's knowledge that the Fed must and will allow banks to borrow what they need. It is a peculiar whip, the sting of which has proved unreliable.

Therefore making the cost of borrowing explicit, i.e., by relying on the discount rate rather than the whip, may improve control. This approach may suffer from the same political problems as the old money market strategy, but

it reestablishes its advantage of automatically neutralizing errors in market factor estimates while still employing the reserve-oriented feedback rule of the new strategy. Something close to this approach without the same political pressures attendant on direct rate-setting activities would result from pegging the discount rate at some fixed amount above the previous period's cost of funds (perhaps a weighted average of the properly adjusted 30-day CD, commercial paper, and Treasury bill rates, or maybe just the CD rate).

2. The Federal funds rate constraint

Pursuit of the nonborrowed reserve target continues to be constrained by an FOMC-determined range for the Federal funds rate. It is possible to justify the continued use of an interest rate constraint, particularly one with a significantly widened tolerance range, as part of a strategy single-mindedly interested in the money supply. As discussed earlier, the funds rate can move around for many reasons but large weekly changes, say on the order of 2 or 3 percentage points in any one direction, are more likely to reflect changes in reserve supply than in demand. Such large weekly moves can more safely be interpreted as signaling errors in forecasting market factors that would be (partially) offset by an open market operation sufficient to arrest further movement in the rate. Seen in this light, the constraint is a check on the still-troublesome errors in estimating actual reserve supply, not a reflection of a lingering concern for interest rates per se.

However, the same or similar arguments were made (though with somewhat less justification) for the "old" funds rate strategy and the problem remains of making sufficient inter-week adjustments in the range. While the FOMC has clearly adjusted the ranges far more frequently and dramatically since adopting