Monetary Aggregates and Federal Reserve Open Market Operations

By PAUL MEEK AND RUDOLF THUNBERG*

In 1970 the Federal Open Market Committee (FOMC) began to establish longer term objectives for the growth of selected monetary and credit aggregates as an integral part of its instructions for the conduct of open market operations in Government securities and other short-term credit instruments. This move was a natural extension of the Committee's greater emphasis on such quantities in recent years, but it did not imply any lack of concern with interest rates and financial flows in the credit markets generally. Indeed, the Committee gave precedence to calming financial markets in May through July, and beginning in August underscored its expansive monetary policy by calling for an easing in credit markets over the months ahead. The FOMC also continued to eschew significant policy changes during large Treasury financings.

The greater emphasis on aggregates involving the banking system did bring about changes in the Committee's formulation and tracking of its policy strategy. It also required some modification in the conduct of open market operations by the Manager of the System Open Market Account and his staff at the Trading Desk of the Federal Reserve Bank of New York. The present paper describes the nature of these changes.

THE CHANGE IN THE FOMC'S INSTRUCTIONS

The focal point of change was the second paragraph of the directive to the Federal Reserve Bank of New York, which is voted at each FOMC meeting.[1] For several years prior to 1970, the Committee's operating instruction usually called for the maintenance of specified money market conditions until the next FOMC meeting, subject to a proviso clause that called for modifying operations if bank credit appeared to be deviating significantly from current projections.[2] This instruction meant that the Manager would begin by seeking to hold mainly the following within ranges designated by the Committee: the Federal funds rate, member bank borrowings from the Reserve Banks, and free or net borrowed reserves (excess reserves less such member bank borrowings). With discount window administration within the framework provided by Regulation A and the discount rate in force, the Committee, in effect, established the terms and conditions on which reserves were to be made available to member banks through open market operations.[3] The Federal Reserve chose the opportunity cost of reserves to commercial banks as its instrumental variable for affecting the monetary and credit aggregates and interest rates in the credit markets.

The proviso clause, which originated in 1966, introduced a conditional element into the instructions to the Manager. It rested on a quantitative staff estimate of the growth in a selected aggregate over the weeks ahead that would result from maintenance of the specified money market conditions. When the FOMC was concerned about overly rapid growth in the aggregate, usually the bank

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[1] "Monetary Aggregates and Money Market Conditions in Open Market Policy", *Federal Reserve Bulletin* (February 1971), pages 79-104, gives a detailed account of the evolution of the directive and the role of the aggregates in 1970. System policy makers have, of course, used data on the monetary aggregates in their analysis for many years.

[2] The directive issued on December 16, 1969, for example, had the following second paragraph: "To implement this policy, System open market operations until the next meeting of the Committee shall be conducted with a view to maintaining the prevailing firm conditions in the money market; provided, however, that operations shall be modified if bank credit appears to be deviating significantly from current projections or if unusual liquidity pressures should develop."

[3] Paul Meek, *Discount Policy and Open Market Operations (Fundamental Reappraisal of the Discount Mechanism)*, pages 4-8.

credit proxy,[4] it expected the Manager to move toward a higher Federal funds rate and higher member bank borrowings at the discount window whenever the aggregate persistently expanded more rapidly than expected. Conversely, if the FOMC were concerned with shortfalls, it would expect the Manager to relax the pressures on bank reserve positions when the aggregate was weak. The Committee's discussion gave the Manager guidance as to what constituted a significant deviation.

The FOMC's new approach to the directive in 1970 is exemplified by the second paragraph of the directive adopted at its March 10 meeting:

> To implement this policy, the Committee desires to see moderate growth in money and bank credit over the months ahead. System open market operations until the next meeting of the Committee shall be conducted with a view to maintaining money market conditions consistent with that objective.

The policy record for that meeting indicates that the Committee was setting as its objectives a growth rate of 3 percent for the money supply (currency outside banks and private demand deposits) and 5 percent for the adjusted bank credit proxy over the second quarter. The Manager was told to adjust money market conditions as might be needed to achieve these longer run objectives. The Committee's discussion provided guidance as to the trade-off between the two quantitative objectives should one or both diverge from the growth rate desired.

Beginning in its August meeting, the Committee added "some easing of conditions in credit markets . . . over the months ahead" as an objective of open market operations. The coupling of this objective with the quantitative objectives represented an amplification of the Committee's policy intent, emphasizing its commitment to a moderately expansionary policy. It was recognized that the capital markets, in particular, were subject to supply, demand, and expectational factors as well as to the influence exerted by System open market operations. Within the context of the quantitative objectives, the Manager was expected to foster conditions at the short-term end of the credit markets that would tend to work in time toward an easing of long-term interest rates.

THE APPROACH TO POLICY STRATEGY

The 1970 directives embody a shift of emphasis in policy making, rather than a basic change in Committee members' analytical views of how the economy works. To be sure, the Committee made the rates of growth to be achieved in the money supply and/or the adjusted bank credit proxy over a longer run period, often a calendar quarter, the focal point of its policy discussion. But the framework thus provided left each participant in the policy process free to assess the relative importance of fiscal policy, interest rates, the total flow of funds, or the monetary and credit aggregates themselves. Since the economic and financial analysis reviewed at each meeting looks four to six quarters into the future, the calendar quarter or somewhat longer provided a useful time horizon for policy implementation.

The directive helped make clearer the distinction between the intermediate financial objectives of policy and the instrumental variables for realizing them. The intermediate objectives are desired rates of growth in the monetary and credit aggregates over a specified time period, supplemented or even supplanted on several occasions in 1970 by special attention to credit market conditions. One would expect the quarterly objectives to change only infrequently, as the Committee changes its evaluation of the economic outlook or its estimate of the relation between the intermediate policy objectives and ultimate economic goals. In 1970, the Committee did, in fact, change its objectives only gradually over the year.

The form of the directive has fostered a willingness on the part of the FOMC to change money market conditions as this seemed necessary to the achievement of its objectives, whether couched in terms of growth rates of aggregates or credit market conditions. The directive itself incorporates a conditional instruction to the Manager to make such changes if necessary. And the FOMC has also changed the settings of the instrumental variables at its regular meetings.

The Committee pursued its quantitative objectives quite flexibly in 1970, fully mindful of its responsibility for fostering a smoothly functioning financial system and for protecting it from unusual strains. As will be discussed more completely below, open market operations continued to strive for reasonably steady money market conditions from day to day in the face of large short-run

[4] Originally, the bank credit proxy was total member bank deposits subject to reserve requirements. As nondeposit liabilities became important sources of funds for money market banks, such liabilities were added to deposits to comprise an adjusted bank credit proxy. They include Euro-dollar borrowings and commercial paper issued by bank holding companies or other affiliates.

fluctuations in the factors affecting the demand for, and supply of, bank reserves. Beyond this, the Committee directed that operations moderate, first, the pressures that developed in the bond markets in May and, then, the liquidity pressures that grew out of the insolvency of the Penn Central Transportation Company in June. The addition of easier credit market conditions to its objectives in August added a further dimension to the stimulative thrust of the Committee's policy.

The policy process did not change a great deal under the 1970 directives, but the aggregates did provide a focus for policy discussions.[5] The directive that emerged from the FOMC meeting carried with it the emphases of the meeting itself—for example, the trade-offs between the various aggregates or the degree of concern with financial markets.[6] There was also a specification of both the intermediate objectives and the instrumental money market variables to be pursued in the short run. For each aggregate there was a path of monthly values that the staff projected as consistent with the target for the quarter or other time period. From April on, this was supplemented by a path of weekly values spanning the period until the next Committee meeting. It is perhaps appropriate to call these values tracking paths rather than target paths. The staff was aware that a tracking path could not be derived with great precision, and the Committee was well aware that the Manager could not hit these values. But it did expect him to respond to significant deviations of the aggregates from the path unless the validity of the path appeared dubious because of unforeseen Treasury operations or other developments.

THE STRATEGY OF OPEN MARKET OPERATIONS

In implementing the Committee's decisions, the Manager of the System Open Market Account pursues an operational strategy whose targets depend upon the length of the time period involved.[7] For each statement week, money market conditions provide a target that the Manager can usually approximate, although large errors in trying to predict the factors affecting nonborrowed reserves sometimes make it difficult to achieve the desired conditions. For each quarter, the aggregates provide a target to be approached through successive changes in money market conditions. This strategy thus aims at control of quantities over a longer time period—a procedure which many students of monetary policy have concluded is desirable. But it does so without trying to iron out week-to-week fluctuations in the aggregates. Indeed, no evidence has been presented that these short-run changes in money and credit interfere with, rather than facilitate, economic stability.

During the first statement week after the FOMC meeting, the Manager seeks to maintain money market conditions within the ranges specified by the Committee. Essentially, this strategy involves using open market operations to accommodate week-to-week changes in required reserves by varying nonborrowed reserves so that member bank borrowings at the discount window and/or the Federal funds rate remain within the desired range. A key part of the Manager's operational problem is the practical difficulty of forecasting the behavior of the market factors affecting the nonborrowed reserves of member banks.[8] Given the variability from year to year of patterns in the behavior of Federal Reserve float, currency in circulation, the Treasury's balances at the Reserve Banks, and other factors affecting reserves, the confidence limits that surround the statistician's best estimates are wide. The daily average deviation of the actual reserve effect of the market factors each week from the projections made by the New York Bank staff at the beginning of the statement week was about $250 million during 1970. (See Chart I for an illustration for the fourth quarter.) The choice of an accommodative weekly strategy rests to a considerable degree on the fact that this margin of uncertainty is large relative to the increments to the reserve base called for by a policy of achieving specified growth rates for the aggregates. (The average weekly addition to total member bank reserves in 1970 was less than $25 million.)

In this environment the Manager finds the Federal funds market an invaluable source of information concerning the current impact of market factors on non-

[5] For a detailed description of the procedures at FOMC meetings, see "Monetary Aggregates and Money Market Conditions in Open Market Policy", *op. cit.*

[6] See Alan R. Holmes, "A Day at the Trading Desk", this *Review* (October 1970), pages 234-38.

[7] Jack M. Guttentag argued persuasively in "The Strategy of Open Market Operations", *The Quarterly Journal of Economics* (February 1966), pages 20-26, that a complete strategy should involve different targets for control periods of different lengths.

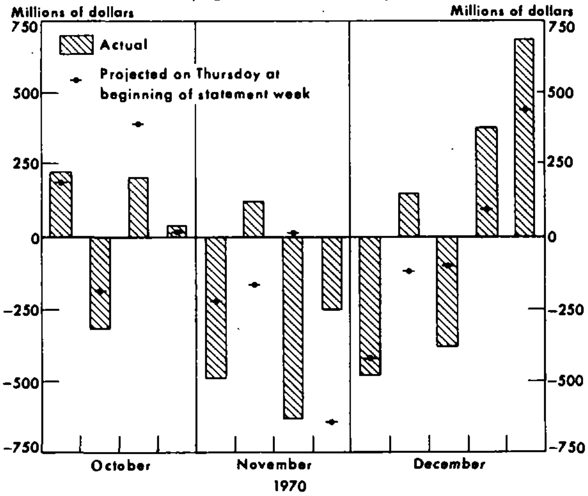
[8] The term, market factors, is used to designate sources and uses of nonborrrowed reserves other than System open market operations. By definition, week-to-week changes in nonborrowed reserves are the sum of changes in market factors and the System's portfolio.

Chart I

CHANGES IN UNCONTROLLED FACTORS AFFECTING NONBORROWED RESERVES

PROJECTED AND ACTUAL

Calculated from weekly averages of daily figures, not seasonally adjusted



Note: Uncontrolled factors include Federal Reserve float, currency in circulation, Treasury currency outstanding, Treasury cash holdings, Treasury deposits at Federal Reserve Banks, foreign and other nonmember bank deposits at the Federal Reserve Banks, other Federal Reserve assets and liabilities, and cash held in the vaults of member banks two weeks earlier, but exclude Federal Reserve holdings of securities.

Sources: Board of Governors of the Federal Reserve System and Federal Reserve Bank of New York.

borrowed reserves. The Manager begins each statement week with full knowledge of the required reserves of member banks since these depend upon deposits in a prior period. Given some idea of the frictional volume of excess reserves likely to be needed in the banking system, the Manager knows approximately what total member bank reserve needs for the week will be. Accordingly, a burgeoning demand for Federal funds in relation to supply strongly suggests a shortfall in nonborrowed reserves below the level needed to keep member bank borrowings at the discount window in the FOMC's range. Failure to supply nonborrowed reserves through open market operations in this instance will tend to result in a rise in the Federal funds rate and in member bank borrowings at the Federal Reserve Banks, since excess reserves are already near a frictional minimum. Conversely, an abundance of reserves in the Federal funds market suggests that market factors are supplying a greater volume of nonborrowed reserves than is needed to stabilize the Federal funds rate or to maintain borrowing at the discount window within a given range. Failure to absorb nonborrowed reserves will lead to a decline in the Federal funds rate and in borrowing at the discount window unless it is already at a frictional minimum. If borrowing is at such a minimum, a rise in excess reserves is bound to result.

The System's weekly strategy insulates the banking system reasonably well from swings in nonborrowed reserves due to market factors, but it accommodates week-to-week changes in required reserves at the same time. This approach enables the banking system to respond very flexibly to the volatile short-run demands of its customers for money and credit, since the System supplies and absorbs reserves on demand in an effort to keep the Federal funds rate within its prescribed range.[9] Under this accommodative posture, the week-to-week changes in the money supply clearly stem from shifts in demand rather than from reserve injection. These shifts do, in fact, produce large variations in the money supply. The absolute change in the narrowly defined money supply, before seasonal adjustment, averaged $2 billion from week to week in 1970. This compares with long-term growth that averaged about $200 million per week for the year as a whole.

Keeping a close tab on the aggregates provides a procedure for trying to assure that an open market strategy designed to accommodate short-run shifts in demand does not lead to a significant departure of the aggregates from their desired growth rate over the span of several months. Operationally, one is left with the problem of deciding whether the aggregates are departing significantly from their desired path. Then, there is the question of how much money market conditions are to be changed in an effort to nudge the aggregates back in the desired direction. As both 1969 and 1970 demonstrated, one must also be alert to the possibility that changes in banking practices lead to distortions of the underlying data.

Taking the money supply as an example, the basic point of departure is the weekly tracking path, covering the period between FOMC meetings. This path is presented by the Board staff as likely to be consistent with attaining the level desired by the Committee for the terminal month of its time horizon, often the calendar quarter. It is essentially a judgmental path, subject to a wide margin of error, which combines the desired growth and the staff's best estimate of the likely impact on the money supply of such factors as Treasury cash receipts, expenditures, and

[9] See Paul Meek and Jack W. Cox, "The Banking System—Its Behavior in the Short-Run", this *Review* (April 1966), pages 84-91.

financings as projected at the time of the meeting. The weekly values may jump around considerably, and the possibility of poor specification exists.

Each Friday morning the Manager of the Account receives new data on the past behavior of the money supply and new projections of its future behavior. The Board staff reports preliminary daily average data for the statement week ended on the latest Wednesday and also revised data for the previous statement week. In addition, both the Board staff and the New York Bank staff prepare revised projections of the behavior that they expect over the weeks through the next FOMC meeting on the assumption of no change in the money market conditions recently prevailing. Similarly, they give their projections of how the aggregates will behave for each month of the calendar quarter, assuming the continuation of those conditions.

These projections are subject to large revisions from week to week, as new data become available and as past data are revised. In addition, sometimes wide differences open up between the projections of the two staffs. Given the considerable uncertainty over the accuracy of the projections and the validity of the tracking path, the Manager does not change money market objectives between Committee meetings unless a pattern of deviations seems to be emerging. In practice, such changes typically involve shifting the target for the Federal funds rate range by ¼ to ½ percentage point. A further shift in the same direction would depend on the extent to which the deviation that prompted the shift persisted or grew.

SOME EXAMPLES FROM 1970

The FOMC pursued a moderately expansive monetary policy in 1970. The first step away from the restrictive policy of 1969 took place at the January 15 meeting when the Committee voted to aim for modest growth in money and bank credit. Subsequently, the money supply turned out considerably stronger than expected in January, and projections of growth for the first quarter were strengthened. On the other hand, projections of the adjusted credit proxy were lowered successively over the period between Committee meetings. In the circumstances, the Manager continued to foster firm money market conditions—notably a Federal funds rate that averaged 9⅛ percent in the four weeks ended February 11, compared with an average of 8⅞ percent in the previous four weeks. Meanwhile, the Board of Governors had announced on January 20 an upward revision of the Regulation Q ceilings on interest rates payable on time deposits to bring them somewhat more in line with going yields on market securities.

At the February 10 meeting, the FOMC set "moderate growth in money and bank credit over the months ahead" as its objective and directed the Manager to move toward somewhat less firm conditions in the money market. In doing so, the Committee not only chose greater growth in the aggregates than at the preceding meeting but also changed its targets for the money market variables in a way intended to bring about this growth. In following instructions, the Manager was frustrated initially by a large shortfall of nonborrowed reserves below projections and by conservative management of bank reserve positions around the Lincoln's Birthday holiday. By February 20, however, System injection of reserves succeeded in pushing the Federal funds rate down to 8½ percent. Meanwhile, the incoming money supply data appeared weak relative to the Committee's intentions, and the adjusted bank credit proxy appeared likely to grow a shade less rapidly than desired over the quarter. Accordingly, the Manager exerted still more downward pressure on the Federal funds rate, so that it averaged 7¾ percent in the week ended March 11. As the conviction spread among market participants that a shift in monetary policy was in process, short-term interest rates fell and the attrition of certificates of deposit (CD's) outstanding at banks under way since December 1968 halted at the beginning of February. The groundwork was laid for the resumption of growth in the adjusted credit proxy that developed in March.

At the March 10 and April 7 meetings, the Committee adopted directives that called for maintaining money market conditions consistent with moderate growth in money and bank credit. In April the Committee chose second-quarter growth rates of 3 percent for the money supply and 5.5 percent for the adjusted bank credit proxy as appropriate, compared with preliminary estimates that these aggregates had grown by 3 percent and 0.5 percent, respectively, over the first quarter.[10] By the Friday after the Tuesday meeting, revised data for the week ended April 1 and preliminary data for the following week in-

[10] The data used in the examples taken from 1970 are those which were before the FOMC and the System Account Manager at the time. The November 1970 revision of the data increased the rate of growth in the narrowly defined money supply by 1.7 percentage points in the first ten months over the 3.8 percent rate originally reported. The fact that money supply data are subject to significant revision—sometimes with a lengthy time lag—adds another dimension of caution in interpreting the significance of short-run movements in the series.

dicated that both the money supply and the adjusted credit proxy were well above the tracking paths expected to be consistent with the Committee's objectives (see Chart II).[11]

With the terms of the Treasury's May financing scheduled to be announced later in the month, the Manager undertook to nudge the Federal funds rate up promptly by about ½ percentage point to an 8-8½ percent range to give time for market participants to adjust their expectations before the financing itself. In subsequent weeks, both the money supply and the bank credit proxy remained stronger than desired. As the firmer money market tone persisted, observers began to suspect it reflected System action, and some linked it to greater concern with the aggregates, since the Committee's January directive had just been published. A rise in short-term rates began, but it was moderate and orderly at first. In large part, this reflected dealers' expectations of heavy Treasury bill buying from state and local governments and from the reinvestment of $3 billion in tax anticipation bills being redeemed on April 22. When such bill buying proved disappointing in relation to dealers' swollen inventories, dealers sold bills aggressively in the market so that Treasury bill rates rose abruptly by about ½ percentage point. The appearance of data suggesting greater economic strength and concern that fiscal policy was turning stimulative, reinforced by the wage settlement with the postal workers, contributed to the sharp revision of market expectations. The rise in short-term rates made CD's uncompetitive and the growth in CD's slowed down.

At this point the Trading Desk had to give primary attention to moderating the turbulence in the Government securities market to provide a semblance of steadiness against which the Treasury could price its new issues for sale to dealers and investors. In fact, market participants initially seemed receptive to the Treasury's offering of a $3.5 billion eighteen-month note for cash and of two notes in exchange for maturing issues. However, the announcement on April 30 of the entry of United States troops into Cambodia generated market fears that placed the Treasury's financing in jeopardy. The Manager once again intervened by buying Treasury bills in quantity, bringing to $1.7 billion the volume of bills purchased in the six days preceding the Committee's May 5 meeting. In the main these reserve injections were offset by reserve drains from other factors. Staff estimates at the May 5 meeting suggested that annual rates of growth of about 4 percent for both the money stock and the adjusted credit proxy might be attained over the second quarter with money market conditions similar to those prevailing.

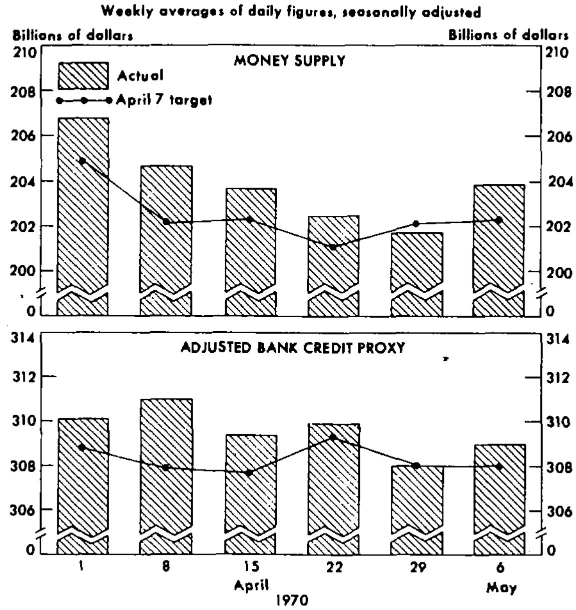
The FOMC in three meetings during May and June found it necessary to give special emphasis to moderating pressures in financial markets, although it continued to specify tracking paths for the aggregates. By the July 21 meeting, however, the Committee felt that it could increase the emphasis placed on achieving the long-run growth rates in the monetary aggregates that were considered appropriate to the economic situation. The FOMC decided that growth in the money supply at a 5 percent annual rate or somewhat more would be desirable in the third quarter. (The Committee considered a rapid growth in the credit proxy acceptable because of the shift of credit flows, from the commercial paper market to the banks,

Chart II

MONEY SUPPLY AND ADJUSTED BANK CREDIT PROXY

TARGETED AND ACTUAL

Weekly averages of daily figures, seasonally adjusted



Note: Money supply is private demand deposits and currency outside banks. "Actual" money supply figure is before November 1970 revision of series. Adjusted bank credit proxy is total member bank deposits subject to reserve requirements plus certain nondeposit items, principally Euro-dollar liabilities and bank-related commercial paper.

Source: Board of Governors of the Federal Reserve System.

[11] In part, the rise in the money supply in the April 1 week reflected a decline in cash items in process of collection because of the closing of European money markets on the Friday and Monday surrounding Easter Sunday. However, the money supply remained high even after the effect of this special factor—incorporated in later revisions—declined.

then under way in the wake of the Penn Central insolvency.) As the period unfolded, the money supply fell persistently short of its tracking path.[12] The Manager allowed some relaxation of money market conditions, so that the Federal funds rate fluctuated chiefly in a 6½ to 7 percent range rather than the 7 to 7⅝ percent range prevailing in the preceding interval between meetings. Member bank borrowings from the Reserve Banks continued high during the interval at about $1.2 billion, primarily because of special accommodation extended at the discount window to banks lending to firms having trouble rolling over their maturing commercial paper.

Reviewing developments at its August 18 meeting, the Committee decided that some further easing of money market conditions would be necessary to achieve the desired growth of 5 percent or more in the money supply over the third quarter. The FOMC also included an easing of conditions in the credit markets as an objective of open market operations. In consequence, the Manager supplied reserves liberally, pushing down the Federal funds rate to a 6⅛-6⅜ percent range early in the latter part of August. While technical factors around the Labor Day weekend led to a stiffening of the Federal funds rate for a time, member bank borrowings at the Reserve Banks dropped back to about $650 million in the four weeks ended September 16—in part because of a further decline in special accommodation at the window as the pressures in the commercial paper market abated further. On balance, yields on most short-term instruments and Treasury notes and bonds declined by the September 15 FOMC meeting, while yields on corporate and municipal bonds changed little as the volume of new offerings in these markets continued heavy.

At each of the next three meetings, from September 15 to November 17, the FOMC repeated its call for still easier conditions in the credit markets. Such easing was considered desirable to encourage recovery in residential construction and state and local government spending as well as to foster moderate growth in money and attendant bank credit expansion. At the September 15 and October 20 meetings, the FOMC set a growth target of 5 percent for the narrowly defined money supply over the fourth quarter, with about double that rate of growth being considered appropriate for the adjusted bank credit proxy. From mid-September to mid-November, the Federal funds rate declined by about ¾ percentage point to 5¾ percent and the three-month Treasury bill rate fell by a full percentage point to about 5¼ percent. Long-term interest rates declined only modestly, however, before mid-November. Until early November, it appeared that the FOMC's money supply target for the fourth quarter would be achieved, but then it was learned that the October level had turned out lower than expected and projections for November were revised sharply downward.

By the time of the November 17 FOMC meeting, staff projections indicated money supply growth of only 2½-3 percent over the quarter, given prevailing money market conditions. Without giving up its target of 5 percent growth in the money supply over the longer run, the Committee was prepared to accept a 4 percent growth rate in the fourth quarter, rather than embrace the sharply lower money market rates that the staff thought would be needed to achieve the original objective within the few remaining weeks. The FOMC expected faster growth in the money supply in the first quarter of 1971 when the economy would presumably be rebounding from the General Motors strike. The FOMC called for some further easing of money market conditions to achieve the 4 percent goal. From mid-November to mid-December, the Federal funds rate fell by about ¾ percentage point to 5 percent and the three-month Treasury bill rate fell by ½ percentage point to about 4¾ percent. Longer term interest rates also finally moved decisively lower. For example, the average yield on long-term Treasury bonds fell by about ½ percentage point, *The Weekly Bond Buyer's* index of yields on twenty tax-exempt bonds fell by an even greater margin, and yields on new high-quality utility bonds declined by nearly a full percentage point.

Data on the money supply were strengthened progressively to the point that, by the time of the December 15 FOMC meeting, the Board staff was projecting a 5 percent growth rate for the fourth quarter with no further easing in money market conditions. The Committee decided that the recently attained comfortable money market conditions should be maintained, provided that the expected rates of growth in money and bank credit at least be achieved. In fact, the money supply appeared about on track until December 28, when the Manager learned of a sizable shortfall in the December 23 week. While a shift toward slightly easier conditions was made at this point, one could hardly expect such action to have much effect on the December money supply, and the fourth-quarter growth rate turned out to be 3.4 percent.

[12] There was a growing awareness around this time that payment practices in New York City in connection with transfers of international funds were distorting the money supply data. The effect on the third-quarter growth rate was not known until a number of weeks later, however, when new data had been collected and analyzed.

SOME LESSONS OF THE 1970 EXPERIENCE

With a full year's operations as a background, it is possible to make a few observations on the actual workings of open market operations under the directives adopted by the FOMC in 1970. The quantitative approach facilitated the development of a policy strategy directed at a longer time horizon than the period between meetings. The experience of the past year lends some encouragement to the view, moreover, that targets of quarterly growth rates of the aggregates can be pursued by means of a money market conditions strategy of open market operations that is accommodative in the very short run. The narrowly defined money supply, for example, expanded at rates of 5.9 percent, 5.8 percent, and 6.1 percent in the first three quarters of the year, before registering 3.4 percent in the final quarter.[13]

The 1970 experience also made clear a number of problems. There was the problem of measurement that led to the upward revision of money supply growth from 3.8 percent to 5.5 percent for the first ten months of the year. Whereas the money supply moved roughly in line with the Committee's desires in terms of the data available at the time, the *ex post* growth rate of the money supply (as revised) exceeded during the first three quarters the Committee's intentions at the time. And in the final quarter the growth rate fell short of the Committee's target of a 5 percent annual rate despite a progressive relaxation of money market conditions over the quarter. One should not claim too much precision—even over a period of several months—for the influence exerted by the central bank over the narrowly defined money supply.

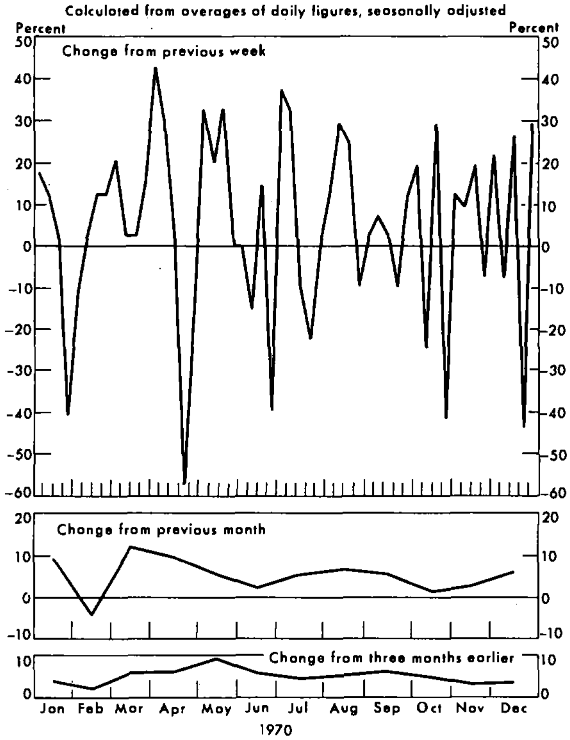
Somewhat greater emphasis on the aggregates did not involve attempts to stabilize the growth rate of the money supply or bank credit aggregates on a weekly or even a monthly basis. Indeed, the weekly and monthly variability of the aggregates continued to be quite wide in 1970 (see Chart III). The experience of 1970 suggests strongly that tight short-run control over the aggregates—even if it were possible—is not necessary to achieve a reasonable degree of control over periods of a quarter or longer.

Chart III

CHANGES IN MONEY SUPPLY

PERCENTAGE CHANGES AT ANNUAL RATES

Calculated from averages of daily figures, seasonally adjusted



Source: Board of Governors of the Federal Reserve System.

Attempts at tighter short-run control over the aggregates would probably entail unacceptable side effects and would almost certainly be doomed to failure. Even if one assumed away the major operational problem of coping with the variability of float and other market factors, a strategy of weekly control would require that information on the targeted aggregates were up to date and accurate, that weekly noise could be screened out effectively in judging the significance of deviations from targeted paths, and that there were a highly predictable and extremely rapid linkage between System action and the particular quantity targeted. None of these conditions seem likely to be fulfilled unless the time period for control of the aggregates is extended to several months.

The first problem encountered in seeking to control the narrowly defined money supply or bank credit in the short run is that the current levels of these aggregates are unknown. Quite apart from the major revision in the money supply series mentioned above, there are often

[13] These represent the growth rates after the annual revision announced on November 27 (which was also intended to eliminate an understatement of the money supply stemming from the effects of certain international transfers on cash items in the process of collection). See "Revision of the Money Stock", *Federal Reserve Bulletin* (December 1970), pages 887-909. Before this revision the narrowly defined money supply was reported to have grown at annual rates of 3.8 percent, 4.2 percent, and 5.1 percent in the first three quarters of the year.

large differences between projections of the aggregates made at the beginning of a statement week, the preliminary estimates of the actual figures available at the end of the statement week, and the revised figures available several weeks thereafter. The difference between the projected and estimated, or between the estimated and final, levels frequently far exceeds the incremental amount by which the money supply or bank credit proxy would have to be increased weekly to keep it on a path of constant week-to-week growth.[14]

Aside from the confidence limits attached to weekly preliminary data, week-to-week shifts in the demand for money generate considerable statistical noise that renders it difficult to make a sensible judgment of the trend on the basis of a single week's preliminary data. To respond to each week's numbers would only foster sharp short-run variation in the Federal funds rate and increase the uncertainties within which commercial banks have to manage their individual reserve positions. It is difficult to see what gain would accrue from such a *modus operandi*, which would force the banking system to accumulate a larger buffer of excess reserves as insulation from the variability of central bank action.

Even if control of the aggregates in the short run were attempted, the present state of the art does not provide any means of hitting short-run targets. Stated differently, at present the precise linkage between day-to-day open market operations and short-run changes in the money supply is not known. Research conducted at this Bank has indicated that weekly movements in private demand deposits (the principal component of the money supply) are strongly influenced by variables relating to Treasury receipts and disbursements and seasonal factors. Changes in nonborrowed reserves—the variable most immediately affected by open market operations—have little direct measurable effect on weekly changes in demand deposits, although they assume greater significance over monthly or quarterly periods.

The attention paid to the aggregates has underscored strongly the System's need to find operational answers in quantitative terms to some of the most basic questions of monetary policy. For example, what rates of growth in which of the monetary and credit aggregates seem most likely to help achieve the desired performance in the real economy, and what lags are involved? How much should the behavior of the credit markets and long-term interest rates condition the specification of the target growth rates of the aggregates? How does one translate quarterly target rates into monthly and weekly tracking paths to be used to help determine the significance of weekly developments? What rules of response should the Manager of the Open Market Account follow to avoid either under- or overreacting to weekly deviations in the aggregates? A great deal of further research and further practical experience is needed to find satisfactory answers to fundamental questions such as these.

Despite greater emphasis on the aggregates, the FOMC continues to be concerned with money market conditions. The Committee has been somewhat more willing to allow changes in such conditions than before, and it has fostered changes in a sustained and purposeful manner that reinforced its basic policy thrust. The Committee has eschewed sharp changes in money market conditions late in a quarter, even when the quarter's goal for the aggregates seemed unlikely to be achieved. Instead, it has tended to fold this information into the formulation of its targets for the subsequent quarter. On the whole, this approach has made for continuity in money market conditions and has helped avoid fluctuations that might well have whipsawed market expectations and added to the problem of achieving target rates of change in the aggregates.

The greater steadiness in the growth of the narrowly defined money supply in 1970 does not seem to have been at the cost of larger week-to-week movements in interest rates than in the past. To be sure, interest rates—especially short-term rates—moved down significantly during the past year, but this reflected the shift to an expansionary monetary policy gradually interacting with the lessening of demand pressures on the credit markets. The accommodative strategy of open market operations in the short run—even while aiming at targeted growth rates of aggregates over longer periods—meant that operations were not a source of week-to-week variability in interest rates.

There were occasions, to be sure, when shifts in the thrust of open market operations were reflected in sharp movements in interest rates. The most notable example occurred in April, when open market operations shifted toward greater restraint as it appeared that the aggregates were growing significantly faster than desired by the Committee. The sharp reaction in market rates was, of course, only partly the result of the System's shift in emphasis. Market participants were just beginning to become aware of the System's greater concern with the aggregates, and some feared that the new emphasis in open market operations might foreshadow a wrenching of short-term rates

[14] Subsequent revisions of seasonals, of course, change weekly data still further from that known to the FOMC and its staff at the time.

back and forth in an effort to keep the aggregates on a straight and narrow path. Thus, the problems of April were partly transitional in nature. With greater market awareness and understanding of the new approach to open market operations, market reactions to the shading of money market conditions might reasonably be expected to be less exaggerated in the future.

There were times when market participants interpreted the data as suggesting a possible future need for System action. For example, the sluggishness of the money supply in October and November tended to confirm expectations that monetary policy would remain stimulative, leading to portfolio accumulation by banks and others. At other times, concern over the rapid growth of the money supply in late August-early September may well have resulted in some liquidation of short-term holdings. In any case, market participants seem to have become less sensitive to moderate changes in money market conditions, considering them as only one component of the broader analysis needed of the economic determinants of policy objectives.

The experience of April through June suggests that one must always bear in mind the shifts in demand for reserves that can occur within a period of a few months. At the time, the Desk was providing reserves much more aggressively than it would have had it been guided solely by an aggregates target. In retrospect, it appears that (abstracting from the subsequent revision in the figures) the System's action was necessary to maintain the desired growth in the face of a significant increase in liquidity demand arising out of the Cambodian and Penn Central crises. One should not exaggerate the ability of the Account Manager and the staff to discern the underlying thrust of these forces on a week-to-week basis.

CONCLUDING COMMENT

In summation, the Committee's increased attention to the monetary aggregates in 1970 should be viewed more as part of a continuing effort to improve policy making and its implementation than as the end product of that effort. The year's experience offered hope that judicious use of the aggregates might improve policy response to changing circumstances, although financial markets must remain an important concern. There remained a number of problems involved in defining and measuring different variants of the money supply and bank credit. The short-run volatility of the aggregates often made for considerable operational uncertainty in open market operations. Important analytical problems continued in assessing the behavior of the aggregates in relation to the FOMC's long-range economic objectives. The Committee used the monetary aggregates flexibly, not rigidly, in pursuit of its policy aims in 1970. A flexible approach may well lead to further shifts in operational emphasis from time to time, as perceptions of economic relationships and conditions change.