

A Review of Federal Reserve Policy Targets and Operating Guides in Recent Decades

In March 1951, the Federal Reserve regained the power to conduct an active monetary policy that it had relinquished during the Second World War. The occasion was the signing of the Treasury-Federal Reserve Accord permitting a move away from the pegged interest rates that had helped to hold down the cost of Treasury financing. The Accord made it possible for the Federal Reserve to make adjustments to its monetary policy stance in pursuit of its ultimate goals of economic expansion and price stability. While those goals have not changed in the ensuing three and a half decades, the intermediate and operational targets of policy have been subject to several significant shifts. This article traces the development of Federal Reserve monetary policy and operating targets since the Accord and discusses the modifications that were made to them.

The Federal Reserve needs intermediate targets and indicators of policy because it does not have the means to achieve the ultimate goals directly. The Fed-

eral Open Market Committee (FOMC), which directs monetary policy for the Federal Reserve, developed intermediate targets that were linked, at least indirectly, to the ultimate goals and subject to indirect Federal Reserve control. Because the FOMC lacked the tools to realize even the intermediate objectives over short periods of time, it also developed reserve operating targets that it could achieve promptly, using the policy tools available to it. The Board of Governors of the Federal Reserve System had the authority to affect the banks' demand for reserves through the policies it established with respect to reserve requirements, the discount rate, and the rules of access to the discount window. The FOMC had the means to affect the supply of bank reserves by instructing the Trading Desk at the Federal Reserve Bank of New York to carry out open market purchases or sales of securities. These policy tools could be manipulated to bring about some desired behavior of the operating targets.

Overview

In the 1950s and 1960s, the behavior of bank credit generally served as the primary intermediate objective. It was joined by money beginning in the latter part of the 1960s. Various monetary aggregates became the primary intermediate targets in the 1970s. Money received its greatest emphasis in the late 1970s and early 1980s. During the 1980s, as the demand for money seemed to change in a fundamental way, the Committee treated its monetary targets more flexibly and sought to supplement them with other indicators. The immediate operating targets have, in a sense, come full circle since the 1950s: the FOMC initially tar-

This article draws heavily on the annual reports prepared by the Manager of the System Open Market Account for the FOMC and on policy records and directives. Beginning with the 1962 report, large portions of the Manager's reports have been published. The annual report for 1962 appeared in the *Federal Reserve Bulletin* (as did some of the reports for the 1970s). The reports for 1963 through 1969 appeared in the *Annual Report* of the Board of Governors of the Federal Reserve System. Subsequently, the reports appeared in the New York Reserve Bank's *Monthly Review* or *Quarterly Review*.

Additional information was obtained through conversations with John Larkin, Fred Levin, Paul Meek, Robert Roosa, Irwin Sandberg, Peter Sternlight, and Robert Stone, who were at the Desk during many of the years covered. Stephen Axilrod and Donald Kohn of the Board of Governors also provided insights. Other source material is listed in footnotes and in the Appendix.

ged to free reserves and then shifted to federal funds rates, to nonborrowed reserves, and most recently to borrowed reserves, a measure similar in many ways to free reserves.¹

All of the target variables and indicators that have been used over the years are interrelated. Whenever reserve measures have been the primary operating target, interest rates have played a role in modifying the policy response, and vice versa. But the existence of such relationships does nothing to diminish the importance of the principal target; the selection of this target influences how the Federal Reserve will respond to price behavior and to new developments in the economy.

1953-65: bank credit and free reserves

The Federal Reserve gradually resumed its pursuit of monetary policy goals after the Treasury-Federal Reserve Accord freed it from the obligation to support a pattern of pegged rates on Treasury debt issues. Before the Accord, the Treasury had insisted that the Federal Reserve continue the practice, begun during World War II, of standing ready to buy or sell Treasury securities at posted rates. By 1950, the FOMC was convinced that rates were being held too low, particularly in view of the stimulus to economic growth and to speculative buying associated with the Korean War. The low rates were contributing to excessive provision of reserves and significant inflation. The FOMC believed that a return to an independent monetary policy was essential if inflation were to be contained. It negotiated with the Treasury for a number of months to reach the Accord.²

After the Accord, the Federal Reserve gradually withdrew its support of rates.³ The FOMC created a subcommittee to investigate how the Federal Reserve could best carry out an active monetary policy and

encourage the return of an efficiently functioning Government securities market with "depth, breadth, and resiliency." The subcommittee made its recommendations at the end of 1952.⁴ It emphasized that the securities markets would function better if policy operations were conducted in ways that showed the public that the Federal Reserve was no longer setting interest rates, and that gave a large number of dealers the oppor-

⁴"Federal Open Market Committee Report of Ad Hoc Subcommittee on the Government Securities Market," reprinted in *The Federal Reserve System after Fifty Years*, Hearings before the Subcommittee on Domestic Finance of the House Committee on Banking and Currency, 88th Cong., 2d sess. (Washington, D.C. GPO, 1964), vol. 3, pp. 2005-55.

Box: Reserve Measures

Free reserves are defined as excess reserves less borrowed reserves, or alternatively, as nonborrowed reserves less required reserves. Free reserves are derived from two reserve identities. Total reserves of the banking system equal required reserves plus excess reserves. Total reserves also equal borrowed reserves plus nonborrowed reserves. Total reserves are reserve balances held by depository institutions (DIs) at the Federal Reserve and vault cash that is applied toward meeting requirements. (Before the Depository Institutions Deregulation and Monetary Control Act of 1980, only banks that were members of the Federal Reserve held reserves. Now any DI that accepts transactions accounts can be subject to reserve requirements.) Required reserves are total reserves that DIs must hold to comply with Federal Reserve regulations. They are specified in Federal Reserve Regulation D and are fractions of various maintenance period average deposit levels. Excess reserves are reserve balances that DIs hold that are not needed to meet requirements. Since DIs do not earn interest on excess reserves, they attempt to limit their holdings. However, DIs cannot hit reserve targets precisely, and they can be penalized for failing to meet their requirements on average or for ending the day with their reserve account overdrawn. Hence it is hard to avoid holding some excess reserves. Excess reserves moved in a relatively narrow range for long periods of time, then became more variable in the 1980s, and consequently became harder to estimate. Borrowed reserves are reserve balances acquired from the Federal Reserve's discount window facility. (Extended credit borrowing by banks in difficulty is often treated as akin to nonborrowed reserves.) Nonborrowed reserves are all reserves arising in other ways, primarily through open market operations and through changes in other factors on the Federal Reserve balance sheet.

¹Mechanically, the behavior of free and borrowed reserves only differ when excess reserves change. The various reserve measures are defined in the Box.

²Allan Sproul, who participated in the negotiations as President of the Federal Reserve Bank of New York, offered an interesting commentary on the process in "The 'Accord' — A Landmark in the First Fifty Years of the Federal Reserve System," in Lawrence S. Ritter, ed., *Selected Papers of Allan Sproul*, December 1980, reprinted from the Federal Reserve Bank of New York *Monthly Review*, November 1954.

³The Federal Reserve followed a so-called even keel policy during Treasury financing periods through the early 1970s. Until that time, most Treasury coupon securities were sold as fixed-price offerings. Around the financing periods, the Fed avoided changes in policy stance and tried to prevent changes in money market conditions. Major financing operations occurred four times a year, around the middle of each quarter. However, extra unscheduled financing operations occurred when the Treasury found itself short of money. Debt issuance was put on a regular cycle in the 1970s.

tunity to make markets with minimal interference from the Fed. To achieve these goals, the subcommittee recommended that open market operations be confined to the short-term Treasury bill market, where the price impact of an operation ought to be the smallest. That would give the securities dealers the opportunity to make active markets in a range of securities and allow the forces of supply and demand to determine the structure of rates. Only if the market for coupon securities were clearly disorderly, and not just adjusting to new information, would the Fed step in to buy or sell coupon securities.

The report also expressed dissatisfaction with the Desk's operating technique. During the interest rate pegging period, the Trading Desk had often used one of a group of 10 dealers as a broker or agent to arrange orders in the market. The dealers that were not part of that group complained that they were unfairly excluded from dealings with the Federal Reserve. The dealers that did act as agents were also dissatisfied because they could not transact business with the Fed for their own portfolios when they were acting as agent. Both groups of dealers felt it was difficult to make two-way markets as long as the Federal Reserve was willing to buy or sell securities at known rates in response to public demand.

The FOMC adopted most key recommendations of the subcommittee. It actively pursued a countercyclical policy using an array of measures to evaluate economic activity and inflationary forces. Between 1953 and 1960, it pursued what came to be known as a "bills only" policy, confining its open market operations to the bill sector except when the coupon market was "disorderly." Throughout the 1950s, there was considerable debate within the System about whether coupon operations should be reintroduced to promote orderly markets or whether coupon markets should be left to function as much as possible without interference from the Fed. On only two occasions during this period were market conditions formally judged to be sufficiently disorderly to justify the Desk's purchase of Treasury coupon issues.

To create a climate where the dealers could make markets on an equal footing, the Trading Desk developed the competitive "go around" technique, still in use today, in which all of the dealers were contacted simultaneously and given the opportunity to make bids or offers. It also increased the number of dealers with which it would trade and specified criteria that dealers had to meet to qualify for a trading relationship.

During these years the FOMC took longer-term guidance from a number of indicators in choosing an appropriate policy stance. It gave special emphasis to the behavior of bank credit (commercial bank loans

and investments) as an intermediate policy goal. It sought to speed up bank credit growth in periods when economic activity showed weakness and slow it down in periods of rapid growth. Bank credit statistics were available just after the end of the week for large banks but were only available with a lag of several weeks for small banks. Thus, bank credit was not suitable for day-to-day operating guidance.

The instructions for the Desk's day-to-day operations focused on free reserves — referred to as net borrowed reserves when borrowed reserves are greater than excess reserves — and money market conditions. By money market conditions, the FOMC meant not only short-term interest rates but also indications of the ready availability of funding to the securities dealers.⁵ The written directive provided by the FOMC to the Desk was deliberately nonspecific, avoiding even a hint of targeting interest rates. For example, in November 1957, the FOMC directed the Desk to conduct operations "with a view to fostering sustainable growth in the economy without inflation, by moderating pressures on bank reserves." The Manager of the System Open Market Account surmised from the discussion at the FOMC meeting what the Committee wanted.⁶

Free reserves were targeted in order to provide some anchor to the policy guidelines. A relatively high level of free reserves represented an easy policy, with the excess reserves available to the banks expected to facilitate more loans and investments. Net borrowed reserves left the banks without unpledged funds with which to expand lending; they were viewed as fostering a restrictive policy stance. It was assumed that banks would adjust loans and investments when reserve availability changed.

⁵The FOMC took into account that the level of the discount rate would influence interest rates and the banks' perception of reserve availability. However, it did not (and does not) have the authority to change the discount rate and took the rate as a given within the context of short-term policy making.

⁶At that time, there was no provision for the Trading Desk to make modifications to the policy stance between meetings in the event of unexpected developments. The FOMC met very frequently — generally every two weeks through the middle of 1955 and every three weeks subsequently. They often had telephone meetings between regular meetings.

The Committee members were kept informed of what was happening through written reports describing the reserve forecasts, money market conditions, Trading Desk operations, weekly lending patterns of large banks, and background information on other securities markets. Reports were prepared in the open market operations area at the end of each statement period and before each FOMC meeting. An FOMC member also had the opportunity to participate in a daily conference call at which Desk personnel described recent developments affecting reserve demands and supplies and the behavior of the money markets. A wire summarizing the daily conference call was sent to the FOMC members. The written and oral reports have continued through the years, although the topics emphasized have changed as the priorities of policy have changed.

The linkages between free reserves and bank credit were viewed at the time as somewhat complex.⁷ High rather than rising free reserve levels were believed to foster rising bank credit since banks would perpetually have more excess reserves than they wanted and would continually expand lending. High net borrowed reserve levels would, in a parallel manner, encourage persistent loan contraction. However, defining the point where free or net borrowed reserves were neutral—that is, fostering neither rising nor falling bank credit levels—was believed to be possible conceptually but not empirically. Other factors complicating the linkage were the distribution of reserves, loan-deposit ratios, the maturities of bank portfolios, the strength of loan demand, and the stage of the business cycle. Still, the Federal Reserve did not consider any of these difficulties to be fatal to the procedure so long as bank credit growth was monitored over time.

Operationally, the Trading Desk worked with a free reserve target that had been implied by the discussion at the most recent FOMC meeting. Research staff members developed and refined techniques during the 1950s and 1960s for forecasting each day what free reserves would be over the reserve maintenance period by forecasting both nonborrowed and required reserves. Maintenance periods were one week long for reserve city banks (member banks with offices located in cities with Federal Reserve banks or branches) and two weeks long for country banks (all other member banks). Computation and maintenance periods were essentially contemporaneous. The reserve factor estimates, which affected nonborrowed reserves, were subject to sizable errors, even though considerable resources were devoted to obtaining timely information about past and likely future behavior of the more volatile factors. Forecasts of required reserves were a problem initially but were improved in the 1960s as data flows were accelerated. Furthermore, reserves were not always well distributed across classes of banks, a condition that sometimes contributed to disparate behavior of free reserves and interest rates. These forecasts guided the Desk in making the appropriate reserve adjustments. It could buy or sell Treasury bills when forecasts suggested that free reserves were below or above the objective. Temporary reserve injections could be made with repurchase agreements (RPs), although the agreements were not used nearly as much as they were later.

⁷See (Peter D. Sternlight), "The Significance and Limitations of Free Reserves," Federal Reserve Bank of New York *Monthly Review*, November 1958, pp. 162-67, and "Free Reserves and Bank Reserve Management," Federal Reserve Bank of Kansas City *Monthly Review*, November 1961, pp. 10-16. A critique of free reserves and a survey of the literature are provided by A. James Meigs in *Free Reserves and the Money Supply* (Chicago: University of Chicago Press, 1962).

Because of the uncertainties in the forecasts of free reserves, and because the FOMC was also interested in money market conditions, the Desk watched "the tone and feel of the markets" each day in deciding whether to respond to the signals being given by the reserve forecasts. Reading the tone of the markets was considered something of an art. Desk officials watched Treasury bill rates and dealer financing costs. They factored in comments from securities dealers about difficulties in financing positions. Desk officials were primarily concerned with the direction in which interest rates were moving, rather than their level, and with the availability of funding. The tone of the markets might suggest whether the free reserve estimates were accurate. If the banks were short of free reserves, they would sell Treasury bills, a secondary reserve, and put upward pressure on bill rates. The banks would also cut back on loans to dealers, thus making dealer financing more difficult.

The federal funds rate played a limited role as an indicator of reserve availability in this period, but it began to receive increased attention during the 1960s. The interbank market was not very broad as the 1960s began, but activity was expanding.⁸ During the 1960s, the reports of the Manager of the System Open Market Account increasingly cited the funds rate in the list of factors characterizing money market ease or tightness. Until the mid 1960s, the funds rate never traded above the discount rate. During "tight money periods," when the Desk was fostering significant net borrowed reserve positions, funds generally traded at the discount rate, and the rate was not considered a useful indicator of money market conditions. When free reserves were high, funds often traded below the discount rate and showed noticeable day-to-day variation. At such times, they received greater attention as an indicator of reserve availability.

There was considerable surprise when funds first traded above the discount rate, briefly in October 1964 and more persistently in 1965. Why, it was asked, would any bank pay more for overnight funding than the Federal Reserve charged? In fact, large banks were becoming more active managers of the liability side of their balance sheets. Borrowing from other banks, away from the Federal Reserve, played a role in this management. Though it was not noted at the time, the changes in liability management techniques were making free reserves an increasingly uncertain predictor of bank credit growth. The relationship between bank credit and free reserves depended upon banks

⁸Mark H. Wiles, "Federal Funds during Tight Money," Federal Reserve Bank of Philadelphia *Business Review*, November 1967, pp. 3-11, and "Federal Funds and Country Bank Reserve Management," Federal Reserve Bank of Philadelphia *Business Review*, September 1968, pp. 3-8.

responding passively to reserve availability. In 1961, banks developed negotiable Certificates of Deposit (CDs), which they could use to accommodate increased loan demand without having unused free reserves. Interest rate ceilings on CDs under Regulation Q occasionally brought a sudden halt to this kind of expansion. The next logical step was to finance loan demand by purchasing overnight federal funds and renewing the contract each day. Takings in the funds market were not subject to reserve requirements or Regulation Q interest ceilings. (Such ceilings were dropped for most large CDs in 1970.) The discount window could not be used on such a steady basis. The Federal Reserve actively discouraged frequent or prolonged borrowing, thus reinforcing banks' longstanding reluctance to borrow.

In 1961, several developments led the FOMC to abandon its "bills only" restrictions. The new Kennedy Administration was concerned about gold outflows and balance of payments deficits and at the same time wanted to encourage a rapid recovery from the recent recession. Higher rates seemed desirable to limit the gold outflows and help the balance of payments, while lower rates were wanted to speed economic growth.

To deal with these problems simultaneously, the Treasury and the FOMC attempted to encourage lower long-term rates without pushing short-term rates down. The policy was referred to in internal Federal Reserve documents as "operation nudge" and elsewhere as "operation twist." The Treasury engaged in advance refundings and maturity exchanges with Trust accounts. The Federal Reserve attempted to flatten the yield curve by purchasing coupon securities while simultaneously selling Treasury bills. The procedure continued for another year and then ceased to be discussed after short-term rates rose in 1963. The Manager's reports focused mostly on operational difficulties in purchasing coupon issues after a long period of absence from that sector and reached no judgment on the effectiveness of the policy. Academic economists' studies have suggested that the effect on the yield curve was minimal, while practitioners had mixed views of its success.

Second half of the 1960s: transition to new targets and indicators

The formal policy procedures were changed only modestly over the latter half of the 1960s, but the period was marked by questioning and a search for alternative intermediate targets and techniques for achieving them. Inflation, which had been low over the previous decade, was a growing problem, and the annual reports expressed considerable concern about the lack of tax increases (until late 1968) to finance the

Vietnam War involvement and the "Great Society" programs. Interest rates rose and became more variable.

Economists, both within and outside the Federal Reserve, questioned the assumed linkages underlying the policy process, including the connections of free reserves and bank credit to the ultimate policy goals of economic expansion and price stability. Quantitative methods were increasingly applied to test the hypothesized relationships among operational, intermediate, and ultimate policy objectives. Some studies suggested that more attention should be paid to money growth and to the behavior of total reserves or the monetary base.

In response to these developments, the FOMC expanded the list of intermediate guides to policy. The directives continued to focus on bank credit but added money growth, business conditions, and the reserve base. Free reserves continued to be the primary gauge for operations. When excess reserve behavior proved difficult to predict, borrowed reserves received increasing weight.

As the federal funds market became more active, the funds rate gained more prominence as an indicator of money market conditions. The annual report for 1967 explicitly cited the funds rate as a goal in itself rather than merely an indicator of the accuracy of free reserve estimates. It said that daily open market operations "focused on preserving particular ranges of rates in the federal funds market and of member bank borrowings from the Reserve Banks."⁹ The report expressed concern that reserve forecast errors might lead to unintended money market firmness that market participants could misinterpret.

Although the FOMC met every three to four weeks, it was concerned that developments between meetings might alter appropriate reserve provision. Consequently, in 1966 it introduced a "proviso clause" that set forth conditions under which the Desk might modify the approach adopted at the preceding meeting. The FOMC would have preferred to use bank credit as the trigger to change money market conditions, but data still were available only with a lag. Hence, it used a proxy for bank credit in the proviso clause. After some experimentation, it adopted what it called the bank credit proxy, which consisted of daily average member bank deposits subject to reserve requirements

⁹"Open Market Operations during 1967," a report prepared for the Federal Open Market Committee by the Open Market Operations and Treasury Issues Function of the Federal Reserve Bank of New York, February 1968, p. 4. The published version of this report, "Review of Open Market Operations in Domestic Securities in 1967," in Board of Governors of the Federal Reserve System, *54th Annual Report, 1967*, (1968), pp. 208-75, had a somewhat different introduction. It omitted the discussion of operational complications that had contained the reference to the funds rate.

Logically the bank credit proxy, which represented most of the liability side of the banks' balance sheets, should have moved in a similar fashion to bank credit, which was most of the asset side of the banks' balance sheets (other than reserves), but they often differed. One source of distortion was the growing use of non-reservable liabilities to finance credit extension. Banks encountered rising interest rates as inflation heated up, and the rate ceilings mandated by Regulation Q often limited the banks' ability to raise rates enough to attract deposits. Furthermore, higher interest rates made reserve requirements more burdensome. Consequently, banks raised money in the Eurodollar market to finance lending. In 1969, the bank credit proxy was expanded to include liabilities to foreign branches, the largest nondeposit liability. Nonetheless, the proxy continued to deviate from bank credit as reserve ratios changed.

If the bank credit proxy moved outside the growth rate range discussed at the FOMC meeting, the Desk would generally adjust the target level of free or net borrowed reserves modestly, on the order of \$50 million or so according to rough recollections of officials participating at the time. Sometimes the proviso clause permitted either increases or decreases in the objective for free reserves. Frequently it allowed adjustments only in one direction.

To decide each day on its operations, the Desk looked at the reserve forecasts, short-term interest rates, and availability of financing to the dealers. If the need for reserves was confirmed by a sense of tightness in the markets, the Desk generally responded soon after the 11:00 a.m. conference call. During this period it used a larger share of outright transactions than it currently does, partly because it engaged in less day-to-day fine tuning, but it did make active use of RPs and, after their introduction in 1966, of matched sale-purchase transactions. In 1968, the Board of Governors adopted a system of lagged reserve accounting under which reserve requirements were based on average deposit levels from two weeks earlier, with all member banks settling weekly. The change made it easier to hit free reserve targets—ironically, shortly before free reserve targeting ended.

1970 to 1979: targeting money growth and the federal funds rate

In 1970, money growth formally replaced bank credit as the primary intermediate target of policy, and the federal funds rate replaced free reserves as the primary guide to day-to-day open market operations. The transition was gradual, with the first few years of the decade characterized by frequent experimentation and modification of the procedures. Nonetheless, the

framework until October 1979 generally included setting a monetary objective and encouraging the funds rate to move gradually up or down if money were exceeding or falling short of the objective.

Bank credit and its proxy continued for a while in the list of subsidiary intermediate targets, but they received decreasing attention. The Desk also continued to watch the behavior of both free and borrowed reserves, mostly as indicators of how many reserves were needed to keep the federal funds rate at its desired level. The procedures exploited the positive relationship between borrowing and the spread between the funds rate and the discount rate. The relationship was imprecise, but it gave the Desk an idea of how many free or net borrowed reserves were likely to be consistent with the intended funds rate. The Desk used the forecasts of reserve factors to gauge the appropriate direction and magnitude for open market operations.

Initially in 1970, the FOMC selected weekly tracking paths for M1, which were generally the staff projections of likely behavior. It simultaneously continued to specify desired growth of the bank credit proxy and indicated preferred behavior for M2, but those measures received less weight than M1.¹⁰ It instructed the Desk to raise the federal funds rate within a limited band if the monetary aggregates were well above the tracking path or to lower the funds rate within that band if the aggregates were below the tracking path.

In 1972, a number of significant modifications were made. The weekly tracking path for M1 was supplemented (and was later replaced) by two-month growth rate ranges that used the month before the FOMC meeting as a base. The change was designed to reduce the weight given to the rather volatile weekly money numbers and to quantify significant deviations. At the end of that year, the Committee also sharpened the distinction between targeting desired money growth and targeting expected money growth. Initially, the M1 tracking path had been based on Board staff expectations. Setting the desired growth path equal to the projection ran the risk of aiming for money growth that was too high or too low to be consistent with noninflationary growth. By late 1972, the Committee took note of that problem. It developed independent estimates of monetary aggregate growth that were expected to be consistent with moving gradually toward lower inflation. It introduced six-month growth targets designed to achieve these goals. Econometric models, supple-

¹⁰At the time, M1 consisted of currency and privately held demand deposits. Other checkable deposits were added to the definition in 1980. M2 consisted of M1 plus time and savings deposits other than large CDs at commercial banks. Thrift institution deposits, overnight RPs, Eurodollars, and money market funds were not included until 1980.

mented by the judgments of the staff, were used to develop the six-month and one-year estimates. The models allowed money growth to respond to economic activity and interest rate behavior. The weekly and two-month estimates were derived judgmentally, allowing for a range of technical factors.

The FOMC also introduced a reserve operating mechanism in 1972 that was designed to influence the supply of money. It was to be used simultaneously with the interest rate guideline, which worked through the demand for money. The FOMC made the addition to address a weakness in the existing procedure, namely, the need to rely on staff estimates of the funds rate required to achieve desired money growth. The funds rate worked by affecting the interest rates banks both paid and charged customers and hence the demand for money. But the demand for money was also a function of nominal income and anticipated inflation (which was only partially captured by the behavior of nominal interest rates). The Board staff built models of money demand, as did other Federal Reserve research departments. There was much debate throughout the decade about these models and their accuracy. Some observers felt that the models would have done well enough over periods judged to be of meaningful length (six months to a year) if the FOMC had really allowed interest rates to move as much as the models required. Others felt that it was not practical to control money adequately by working through the demand side, either because the models were not reliable enough or because the interest rate consequences could be too disruptive to markets.

The development of a reserve guideline to aid in achieving monetary targets was based on the reserve-money multiplier model of money control. The model implied that controlling total or required reserves would constrain money growth through the operation of the reserve requirement ratio. The FOMC was concerned, however, that a pure reserve provision strategy would cause undesired short-run volatility of interest rates. The FOMC briefly tried reserve targeting in 1972 but, to limit money market volatility, it put a constraint on the funds rate.

A technical problem complicated the use of a reserve guideline. Controlling total or required reserves was considered the best means of affecting deposits, yet these measures were subject to change for reasons unrelated to the behavior of money. In particular, interbank and federal government deposits were excluded from all the money definitions but were subject to reserve requirements. Government deposits at the time varied far more than they have in recent years. All tax and loan account monies were kept in commercial bank demand deposits subject to reserve requirements until

1977 when a legal change permitted note option accounts that pay interest and are not subject to reserve requirements. To take account of the reserve requirements on deposits not in the money definitions, the Federal Reserve developed a measure that excluded reserves against government and interbank deposits. It was called reserves on private deposits or RPD. While RPD behavior was closer to that of M1 than was total reserve behavior, the linkage was not very close because reserve requirements differed widely according to the size and membership status of the bank. Movements of deposits between large and small banks or member and nonmember banks changed the ratio of RPD to M1. Changes in the ratio of currency to deposits also affected the relationship between RPD and M1.

Using staff estimates of the various ratios, the FOMC set two-month growth target ranges for RPD designed to be consistent with the desired growth in M1, and instructed the Desk to alter its reserve provision in a way that was intended to achieve them. The actions were also supposed to be consistent with achieving a specified federal funds rate each week, which could be moved within a band between meetings. Usually the specified band was 1 to 1¼ percentage points wide over the intermeeting period and somewhat narrower each week. Intermeeting intervals were four to five weeks long. As it turned out, the relatively narrow funds rate constraints often dominated, and the Desk frequently missed the RPD target. RPD targets were declared unachievable, although the funds rate constraint precluded a true test. In 1973, the Committee changed RPD's status from operational target to intermediate target, placing it in the same category as M1 and M2. Since information on the behavior of M1 was about as good as information on RPD, RPD gradually fell into disuse. It was dropped as an indicator in 1976.

Subsequent modifications to techniques mostly related to the nature of the monetary targets. In 1975, in response to the requirement of a congressional resolution, the Federal Reserve adopted annual monetary target ranges and announced them publicly. A growth cone was drawn from the base period, which was the calendar quarter most recently concluded. Every three months, the target range was moved forward one quarter. The procedure meant that by the time the annual target period was completed, the target had long since been superseded. Frequently, the targets were overshoot, and complaints about upward base drift were legion. The Full Employment and Balanced Growth Act of 1978, known as the Humphrey-Hawkins Act, established the current procedure requiring the Federal Reserve to set targets for calendar years and to explain any misses.

In addition to setting the annual targets in February and reviewing them in July as required by the Humphrey-Hawkins Act, the Committee continued to set two-month ranges. In theory, the two-month money growth targets were supposed to be consistent with returning to the annual target range if the money measures were outside the range, and with holding the aggregates within the ranges if they were already there. However, the Committee was often skeptical of staff forecasts. Furthermore, the Committee sometimes felt that the estimated changes in the funds rate needed to get money back on target were unacceptably large. It sometimes approved growth rates that stretched out the period for bringing money back on track, and on occasion it acknowledged that target growth probably would not be achieved within the year.

During most of the 1970s, the FOMC was particularly reluctant to change the funds rate by large amounts at any one time. Part of that reluctance reflected a wish to avoid short-term reversals of the rate. Keeping each rate adjustment small limited the risk of overdoing the rate changes and then having to reverse course. Those priorities restricted the options available to search for the appropriate rate at times when the FOMC was uncertain about the correct rate. The adjustments in the funds rate often lagged behind market forces, allowing trends in money, the economy, and prices to get ahead of policy.

The FOMC usually made only small changes in the funds rate at the meeting, frequently, the rate was not changed and the range surrounded the most recent rate target. The Committee also put relatively narrow limits on the range of potential adjustments that could be made between meetings if money growth went off course. In the early 1970s, the intermeeting funds rate range was generally $\frac{5}{8}$ to $1\frac{1}{2}$ percentage points wide. By the latter part of the decade, its width was usually about $\frac{1}{2}$ to $\frac{3}{4}$ percentage point, and on a couple of occasions only $\frac{1}{4}$ percentage point. In addition, the specifications for the aggregates were often set in a way that made it likely that the funds rate would be adjusted in one direction only, effectively cutting the range in half.

In implementing the funds rate targeting procedure, the Desk became increasingly attuned to preventing even minor short-term deviations of the funds rate from target. It felt some constraint not to make reserve adjustments in an overt way unless the funds rate moved off its target. When reserve estimates suggested that a large adjustment was needed but the funds rate did not confirm it early in a statement week, the Desk would worry about delaying its market entry because it might not be feasible to do a very large open market transaction late in the week. To provide

needed reserves without an announcement effect, the Desk increasingly used internal transactions with foreign accounts. After the introduction in 1974 of customer-related RPs—agreements on behalf of official foreign accounts—the Desk used the agreements when the funds rate was on target but a reserve need was projected. (Market participants had routinely assumed that outright transactions for customers had no policy significance, and they initially regarded customer-related RPs the same way.)

If the estimated need to add or drain reserves was too large for these techniques, the Desk often pounced on very small funds rate moves off target to justify an operation. For instance, if estimates suggested that additional reserves were needed, the Desk would often enter the market to arrange an RP when the funds rate rose $\frac{1}{16}$ percentage point above the preferred level. If, on the other hand, the funds rate fell despite the estimated need to add reserves, the Desk typically would allow a $\frac{1}{8}$ percentage point deviation to develop before it would arrange a small market operation to drain reserves. There was an operational limit to how late in the day transactions could be done for same day reserve effect. The cutoff was supposed to be 1:30 p.m., but if the desired funds rate move occurred just after that time, the Desk often responded if it was anxious to do an operation. The end of its operating time was close to 2:00 p.m. by 1979.

The Desk's prompt responses to even small wiggles in the federal funds rate led banks to trade funds in a way that tended to keep the rate on target. Except near day's end on the weekly settlement day, a bank short of funds would not feel the need to pay significantly more than the perceived target rate for funds. Likewise, a bank with excess funds would not accept a lower rate. Rate moves during the week were so limited that they provided little or no information about reserve availability or market forces. Probably few, if any, in the Federal Reserve really believed that brief small moves in the funds rate were harmful to the economy. The tightened control developed bit by bit without an active decision to impose it.

1979 to 1982: monetary aggregates and nonborrowed reserves

In October 1979, the FOMC radically changed the operating techniques it used for targeting the monetary aggregates. It explicitly targeted reserve measures computed to be consistent with desired three-month growth rates of M1. The constraint on the federal funds rate applied only to weekly averages, not to brief periods during the week. Its width was 4 to 5 percentage points, wide enough to allow the adjustments needed to achieve the monetary target. Persistent

overshoots of money targets and severe inflation had changed priorities. Interest rate volatility, so feared when the RPD targets were developed in 1972, seemed more tolerable.

Operationally, the FOMC chose desired growth rates for M1 (and M2) covering a calendar quarter and instructed the staff to estimate consistent levels of total reserves. The process resembled that used to estimate RPDs. The staff estimated deposit and currency mixes to derive average reserve ratios and currency-deposit ratios. The estimation technique employed a mix of judgment and analysis of historical patterns. From the total reserve target, the Desk derived the nonborrowed reserve target by subtracting the initial level of borrowed reserves that had been indicated by the FOMC. The initial borrowing level was intended to be consistent with the desired money growth. If it were inconsistent, money and total reserves would exceed or fall short of path. If the Desk only provided enough reserves to meet the nonborrowed reserve path, borrowing would automatically rise if money growth (and total reserve demands) were excessive, or fall if such growth were deficient. The borrowing move would affect reserve availability and the funds rate and would encourage the banks to take actions that would accomplish the desired slowing or speeding up of money growth. If the pace of adjustment implied by the mechanism did not seem appropriate, instructions were occasionally given to accelerate or delay the borrowing adjustment. The FOMC could make alterations to the basic mechanism at a meeting or direct the Desk to make them under specified conditions between meetings.

To reduce overweighting of weekly movements in money, the total and nonborrowed reserve paths were computed for intermeeting average periods, or two subperiods if the intermeeting period were longer than five weeks. (In 1979 the FOMC met 9 times and in 1980 it met 11 times; in 1981 it moved to the schedule of 8 meetings a year in use today.) A consequence of this averaging technique was that errors in the early part of the period had to be offset by large swings in borrowing in the final week. Informal adjustments were sometimes made to smooth out those temporary spikes or drops in borrowing that were deemed inconsistent with the longer term pattern. While the adjustments were considered necessary to avoid severe swings in reserve availability and interest rates, they gave the appearance of "fiddling" and have led to considerable confusion in the literature. Each week the total reserve path and actual levels were reestimated, using new information on deposit-reserve and deposit-currency ratios.

In implementing the policy, the Desk emphasized that

it was targeting reserves and not the funds rate by entering the market at a standard time to perform its temporary operations. It confined outright operations to estimated reserve needs extending several weeks into the future. It arranged them early in the afternoon for delivery next day or two days forward. The federal funds rate was not ignored; it was used as an indicator of the accuracy of reserve estimates, although it was not always that reliable. On the margin, it could accelerate or delay by a day or so the Desk's entry to accomplish a needed reserve adjustment, but its role was much diminished.

Wide swings in the federal funds rate had been anticipated, although there was some surprise at the degree of volatility. Swings in the short-term growth rates of the monetary aggregates also were wider than generally had been expected, although the risk of some overadjustment of money had been recognized from the beginning. Some observers saw it as a necessary antidote to the earlier procedure, which often moved the funds rate too little too late. In part, the sharp movements in both interest rates and money probably reflected the underlying conditions. The effort to end the inflation that had built up over one and a half decades and had come to permeate economic relationships forced major adjustments. Expectations about inflation and economic activity were very fluid during those years; they fluctuated sharply as people evaluated new information and judged whether the anti-inflation policies were likely to succeed.

The control mechanism itself almost assured that money growth would cycle around a trend unless the FOMC intervened in the process. If money rose above its desired level, required reserves would rise by a fraction of the overshoot determined by the reserve ratio. Following the procedures would cause borrowed reserves to rise as well. They would not decline until money growth, and hence total reserve growth, slowed. The higher borrowing would slow money growth, but with a lag. By the time the procedures called for lower borrowing, it would have been high too long, assuring that money growth would fall below the desired level in what appeared to be a "damped cycling process." Borrowing would then fall short too long, setting up the next round of acceleration of money growth.

1983 to the present: monetary and economic objectives with borrowed reserve targets

A breakdown in the relatively close linkage between M1 and economic activity, rather than dissatisfaction with the procedures, led to the next set of changes, although there was also some sentiment that short-term rate volatility had been excessive. By the latter part of 1982, it was becoming apparent that the

demand for money, particularly M1, was strong relative to income, so that growth within the target range would have been more restrictive than seemed desirable under the circumstances. Some of the increase in the demand for money was attributed to the ongoing deregulation of interest rates on various classes of deposits. In particular, NOW accounts were making it more attractive to hold savings in M1. In addition, the maturing of a large volume of special tax-favored "all savers" deposits in October of that year was expected to add substantially to M1 holdings. The FOMC had hoped that M2 would continue to be a reliable indicator, and for a few months at the end of 1982 it attempted to use it as a guide to building total and nonborrowed reserve targets. However, money market deposit accounts (MMDAs), authorized beginning in December 1982, proved very attractive, and the demand for M2 rose sharply.

In the absence of a stable relationship between money and economic activity, the FOMC followed ad hoc procedures for guiding reserve provision, hoping that the distortions to the relationship would prove to be short-lived. The FOMC focused on measures of inflation and economic activity to supplement the aggregates. Instead of computing total and nonborrowed reserve levels linked to some aggregate and deriving a level of borrowing that moved with the deviations of the aggregate from target, it chose the borrowed reserve level directly. It intended to adjust it up or down whenever money seemed to be deviating from path in a meaningful way (after making allowance for distorting factors and taking account of the supplemental indicators).

The monetary aggregates did not quickly resume their prior relationship with economic activity. Declining inflation made holding money more attractive, and interest rate sensitivity increased, since rates on some components of M1 were close to market rates but slow to change. Policy decisions continued to be guided by information on economic activity, inflation, foreign exchange developments, and financial market conditions. In time, money growth was moved from a predominant position in the directive to join the list of factors shaping adjustments to the borrowing level. What apparently started out as a temporary procedure has persisted, with modifications, for six years.

Under current procedures, forecasts of reserve availability are compared to a maintenance period average objective for nonborrowed reserves that is believed to be consistent with achieving the desired amount of borrowing. The decision each day whether to provide or drain reserves is guided to a considerable extent by the estimated difference between the forecast volume of nonborrowed reserves and the objective for the two-

week maintenance period. The Desk uses money market conditions, this time specifically the funds rate, to supplement the reserve forecasts, particularly in choosing the days on which operations are conducted and the instruments used to make the reserve adjustments. For instance, if the funds rate is significantly above the range that is expected to correspond to the intended borrowing level (based on the discount rate that is in place), the Desk is more prompt in meeting an estimated reserve need to indicate that the funds rate probably is out of line. But it generally continues to intervene at a standard time and accepts more variation in the funds rate than in the 1970s. Particularly, there are opportunities for market sentiment concerning the likely course of interest rate pressures to exert an influence on those pressures.

Summary

Over the post-World War II period, the FOMC made several significant changes in both the intermediate and operating targets of policy. Concerns about inflation were often a driving force for change. The inflation that accompanied the Korean War led the Federal Reserve to negotiate with the Treasury a means to resume an active monetary policy. The techniques developed after the 1951 Accord reflected the predominant Committee view that bank credit cost and availability played a major role in determining economic activity and that inflation resulted when the economy overheated. Free reserves and money market conditions were adjusted to influence bank credit. Some FOMC members believed that a strong link existed between interest rates and economic activity, but most members, recalling their experience with forced rate pegging in the 1940s, were disinclined to target interest rates directly. The procedure adopted in the early 1950s appeared to work in a generally satisfactory way for a time, and its use persisted for more than one and a half decades.

The change from bank credit to a monetary aggregate as an intermediate target began to evolve in the late 1960s. It was made because observers came to see the relationships between Federal Reserve actions and ultimate outcomes as more complex than previously thought, and because of distress about rising inflation. Some academic research suggested that the behavior of money was a better leading indicator of economic activity and prices than were bank credit or interest rates. Reliance on the federal funds rate rather than free reserves developed as the federal funds market became more active and as the passage of time made associations between funds rate targeting and the rate pegging episode of the 1940s less likely. The changes were formally implemented at the start of the

1970s.

In 1979, the FOMC shifted operating targets dramatically. It did so because the monetary objectives had been overshot repeatedly and inflation had accelerated to unacceptable rates. Use of the funds rate as the operational target was thought to be partly to blame because, as the adjustment tool, rates were changed too cautiously. The monetary aggregates remained the intermediate target, but additional efforts were made to avoid persistent overshooting. Nonborrowed reserves, which were more directly linked to M1, became the operating target.

By contrast, the 1982 adjustments primarily stemmed from problems with M1, and to some extent with the broader money measures, as intermediate targets. By that time, considerable progress had been made in slowing inflation. The modifications were motivated by an apparent breakdown in the traditional relationship between the monetary aggregates, especially M1, and economic activity. Although operating targets had to be modified when the monetary aggregates were de-

emphasized, the primary operating target, borrowed reserves, was a variant of the previous nonborrowed reserve target.

Since 1982, the Committee has watched what might be called intermediate indicators rather than targets. It has continued to monitor the aggregates and to set targets for M2 and M3. The target setting has been guided by insights that have been gained about how interest rate deregulation and changing expectations of inflation have altered the relationship between the monetary aggregates and the economy and prices. Nonetheless, the relationships are not sufficiently precise to support close short-run targeting of the aggregates at this stage. In the absence of a reliable intermediate target, the Committee has followed developments of the economy and prices directly and has observed a variety of economic statistics, in addition to the monetary aggregates, that point to future moves in the goal variables.

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Appendix: Selected Readings on Monetary Policy Implementation

Readers interested in knowing more about Federal Reserve policy targets and operating guidelines since the 1950s will find the following sources helpful:

Axilrod, Stephen H. "Monetary Aggregates and Money Market Conditions in Open Market Policy." *Federal Reserve Bulletin*, February 1971, pp 79-104.

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Roosa, Robert V. *Federal Reserve Operations in the Money and Government Securities Markets*. Federal Reserve Bank of New York, July 1956.

Appendix: Selected Readings on Monetary Policy Implementation (continued)

Spindt, Paul A., and Vefa Tarhan. "The Federal Reserve's New Operating Procedures, A Post Mortem." *Journal of Monetary Economics*, vol. 19, no. 1 (January 1987), pp. 107-23.

Sproul, Allan "The 'Accord'—A Landmark in the First Fifty Years of the Federal Reserve System." In Lawrence S. Ritter, ed., *Selected Papers of Allan Sproul*. December 1980, pp. 51-73. Reprinted from Federal Reserve Bank of New York *Monthly Review*, November 1954.

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Wallich, Henry C. "Techniques of Monetary Policy." Remarks before the Missouri Valley Economic Association, Memphis, Tennessee, March 1, 1980.

Wallich, Henry C., and Peter M. Keir. "The Role of Operating Guides in U.S. Monetary Policy: A Historical Review." *Federal Reserve Bulletin*, September 1979, pp. 679-91.

Willes, Mark H. "Federal Funds during Tight Money." Federal Reserve Bank of Philadelphia *Business Review*, November 1967, pp. 3-11.