

Reserve Requirements and the Discount Window in Recent Decades

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Most students of money and banking in the United States would identify open market operations, reserve requirements, and the discount rate as the basic tools of monetary policy. They would add that open market operations are the primary, most actively employed tool because of their flexibility and ease of use. Nonetheless, the other tools also play vital supportive roles in the policy process.

The historical roles of open market operations in the conduct of monetary policy were examined in some detail in an earlier article by the author.¹ This article provides parallel treatment for reserve requirements and the discount window. Both articles focus on the years since the 1951 Treasury-Federal Reserve Accord, an agreement that freed the Federal Reserve from the obligation to peg interest rates on U.S. Treasury debt and enabled it to resume an independent monetary policy.

Review of open market procedures

Because of the interrelationships among the policy tools, it may be helpful to summarize the earlier article's findings on open market operations before beginning the review of reserve requirements and the discount window. Since the Accord, the Federal Open Market Committee (FOMC) has used various money and credit measures, as well as assessments of the underlying economic and price picture, as intermediate objectives

to guide the settings of its operating instruments. Reserve measures and interest rates have alternated as the FOMC's primary guide for day-to-day operations.

In the first two decades after the Accord, the Trading Desk at the New York Federal Reserve Bank carried out the FOMC's instructions for achieving the desired average behavior of various measures of bank credit. Operating decisions were keyed to free reserves—reserves in excess of those needed to meet reserve requirements less reserves borrowed at the discount window—and to the tone and feel of the money markets. By the 1970s, the monetary aggregates had replaced credit measures as intermediate targets and the day-to-day emphasis shifted toward controlling the overnight interbank rate, called the federal funds rate.

During the 1970s, adjustments to the federal funds rate were generally small, and at times there was a reluctance to make necessary increases in the rate. Partly as a result, money growth persistently exceeded its targets, and inflationary pressures reached clearly unacceptable levels by the latter part of the decade. In 1979, the FOMC changed its approach to policy. Under the new procedures, it targeted levels of nonborrowed reserves, a measure that was closely linked through reserve requirement ratios to desired growth rates of a narrowly defined measure of money, M1. In addition, it allowed the federal funds rate to move over a much wider range than before to increase the likelihood that money growth would be brought under control. Although these procedures contributed to increased fluctuations in both money and interest rates, they did help to bring down average money growth and inflation.

At the same time, however, the creation of money

¹Ann-Marie Meulendyke, "A Review of Federal Reserve Policy Targets and Operating Guides in Recent Decades," *Intermediate Targets and Indicators for Monetary Policy: A Critical Survey*, Federal Reserve Bank of New York, July 1990, pp. 452-73. Reprinted from this *Review* vol. 13, no. 3 (Autumn 1988), pp. 6-17.

substitutes and the deregulation of interest rates were making M1 a less reliable guide to future behavior of economic activity and prices. Consequently, the FOMC moved away from these procedures late in 1982. It adopted a borrowed reserve procedure in 1983 that resembled the free reserve technique of the 1960s. The degree of reserve pressure—defined as the volume of reserves that banks as a group were forced to borrow at the discount window—was adjusted judgmentally when developments in the economy, money, or prices suggested that a change was appropriate. Over time, the borrowing relationship that underpinned this approach has become less dependable. Consequently, the Desk has once again come to rely more closely on the behavior of the federal funds rate, although the rate has not become a formal target.

Reserve requirements

This section reviews the various roles of reserve requirements in the monetary policy process. It describes how the monetary authorities, charged with determining appropriate reserve requirements, have responded to the distinct and sometimes conflicting interests of the Federal Reserve, the banks, and the Treasury.

Particular attention is given to the different parties' views of the optimal level of reserve requirements. Historically, banks have sought to minimize reserve requirements. Because the reserves that banks must hold against their deposits do not pay interest, the requirements act as an implicit tax on deposit creation. By contrast, the Treasury has sometimes resisted efforts to lower requirements because reserves provide it with an indirect source of revenue.

The Federal Reserve, approaching the issue from a somewhat different perspective than either the Treasury or the banks, has viewed requirements as a mechanism that can help to stabilize the demand for reserves. It has sought to make them high enough to promote that stability but low enough to minimize the distortions in resource allocation that inevitably accompany any tax.

The Board's most recent cuts in requirements were intended to reduce the implicit tax on banking. The lowered requirements reduced the effective tax to less than \$1 billion (see box). The change helped depositories improve earnings and deal more effectively with both strains on their capital and dramatically increased insurance premia. But while these effects were beneficial, the recent reductions also brought required reserves to levels that no longer met many banks' reserve needs for clearing purposes. Consequently, the total demand for reserves became more difficult to predict, and the use of open market operations became more complicated.

The history of reserve requirements since the 1951 Accord encompasses numerous regulatory changes and legislative initiatives that dealt with these conflicting interests. Effective required reserve ratios have been cut substantially on balance over the years, both to reduce the distorting impact of the implicit tax on the behavior of banks and their customers and to change reserve pressures. Required reserve levels since the Accord are shown in Chart 1. Required reserve balances at the Federal Reserve are currently very similar in level to those of the early 1950s despite the massive growth in deposits over the intervening decades.

The roles of reserve requirements

Over the years, analysts have attributed several different roles to reserve requirements in the policy process. The literature since World War II has most commonly cited two—money control and revenues for the Treasury.² Reserve requirements could affect the process of monetary control both by their existence and through changes in the mandated ratios of reserves to deposits. The existence of requirements increases the stability in the banking system's demand for reserves. It also provides the linkage that allows changes in reserve levels, accomplished through open market operations, to encourage a change in monetary deposits. In theory, in a system where required reserves are a specified fraction of deposits, an increase in the amount of reserves provided to the banking system should be associated with an increase in reservable deposits in an amount that is a multiple of the reserve increase. The size of the multiple would be the inverse of the required reserve ratio, as in the classic textbook reserve multiplier process. In practice, the relationships linking reserves and deposits are far from precise, partly because not all deposits are subject to the same reserve requirement ratios and partly because excess and borrowed reserve levels can vary.

The primary direction of causality linking deposits and reserves will depend upon the Federal Reserve's guidelines for reserve provision. Regardless of its operating procedures, the Fed has found the existence of reserve requirements to be a valuable tool of monetary policy because of its contribution to creating a stable demand for reserves.³ A number of observers have argued that reserve requirements are not essential

²See Marvin Goodfriend and Monica Hargraves, "A Historical Assessment of the Rationales and Functions of Reserve Requirements," Federal Reserve Bank of Richmond *Review*, March-April 1983, for an excellent review of the rationales for reserve requirements.

³Gordon H. Sellon, Jr., discusses this issue in "The Instruments of Monetary Policy," Federal Reserve Bank of Kansas City *Economic Review*, May 1984, pp. 3-20.

because banks would demand reserves in any case to settle transactions with other banks and to avoid overdrafts.⁴ Many Federal Reserve commentators have rejected this claim, contending that the voluntary demand for reserves would probably not be stable in the absence of requirements because the banks would always be trying to minimize excess reserves but would have varying degrees of success depending on each

period's reserve flows.⁵

The Board of Governors of the Federal Reserve System may also change reserve requirement ratios to influence monetary policy. To force a contraction in deposits, the Board can raise requirements; to encourage more expansion, it can lower requirements. Although such measures may accomplish desired adjustments in reserve availability, they tend to be a blunt instrument, not well suited to fine tuning. The Federal Reserve discovered that problem in the 1930s, when legislation first gave it the power to change reserve requirements. In recent decades, it has generally used open market operations to cushion the imme-

⁴For examples, see Deane Carson, "Is the Federal Reserve System Really Necessary?" *Journal of Finance*, vol. 19, no. 4 (December 1964), pp. 652-61; and Robert E. Hall, "A Free Market Policy to Stabilize the Purchasing Power of the Dollar," in Barry Seigel, ed., *Money in Crisis: The Federal Reserve, The Economy, and Monetary Reform*, Pacific Studies in Public Policy (Cambridge, Massachusetts: Ballinger, 1984), pp. 303-21. Thomas Mayer, *Monetary Policy in the United States* (New York: Random House, 1968), pp. 39-43, discusses the theoretical arguments against requirements but concludes that they are useful, giving reasons similar to those cited in the text.

⁵Richard D. Porter and Kenneth J. Kopecky, "The Role of Reserve Requirements as a Public Policy Tool," *Conference on Reserve Requirements and the Role of the Federal Reserve System*, Washington, D.C., January 18-19, 1979.

Box

The effective tax on reserve requirements is sensitive to the level of both required reserves and interest rates. Consequently, the tax has been subject to substantial variation over time.

The tax can be measured as reserves times the interest forgone on those reserves. The best interest rate to use is the federal funds rate less any interest paid on reserves (zero in the United States). Determination of the appropriate reserve measure is less straightforward. It probably makes the most sense to include only those reserves that would *not* be held if reserve requirements did not exist. Vault cash is held primarily for general business purposes rather than to meet reserve require-

ments, and should therefore probably be excluded. On these grounds, some portion of reserve balances should also be excluded since they are held to settle transactions with other banks. It is hard to know where to draw the line on what to exclude, however, so rough estimates of the tax have been made using the full amount of required reserve balances at the Federal Reserve. (June figures were used for selected years since reserve requirements are seasonally high in December.) As the following table indicates, the "real" tax has varied considerably from 1951 to the present but shows a dramatic net decline since 1981.

Estimates of the Cost of Reserve Balances

(In Millions of Dollars)

Date	RR balances	Fed funds rate	"Tax"	Tax in current dollars [†]
1951	18,480	1.50 [‡]	280	1,520
1961	15,960	1.73	280	1,320
1971	24,660	4.91	1,210	4,180
1981	26,290	19.10	5,020	7,770
1984	19,440	11.06	2,150	2,900
1990	33,100	8.29	2,740	2,960
1991	22,680	5.90	1,340	1,380
1992	20,310	3.76	760	760

[†]Deflated by the CPI for all urban consumers, all items.

[‡]For 1951, the rate shown is the three-month new Treasury bill rate.

diate impact of a reserve requirement change.

Analysts since the Second World War have also focused on the role of reserve requirements in providing revenues to the Treasury through the implicit tax on deposit creation. Required reserves on which no interest is paid reduce bank earnings—at least to the extent that the level of reserves exceeds what banks would hold voluntarily. They enhance the revenues of the Federal Reserve because the Fed buys interest-bearing Treasury debt when it supplies the reserves. The Treasury benefits because the Federal Reserve turns its profits over to the Treasury. How burdensome a given level of requirements will be for banks depends on several factors, but especially on the level of nominal interest rates: the higher the rates, the greater the earnings forgone. Mindful of the tax effects of increasing reserve requirement ratios, the Federal Reserve has often turned to other tools when it wanted to tighten policy.

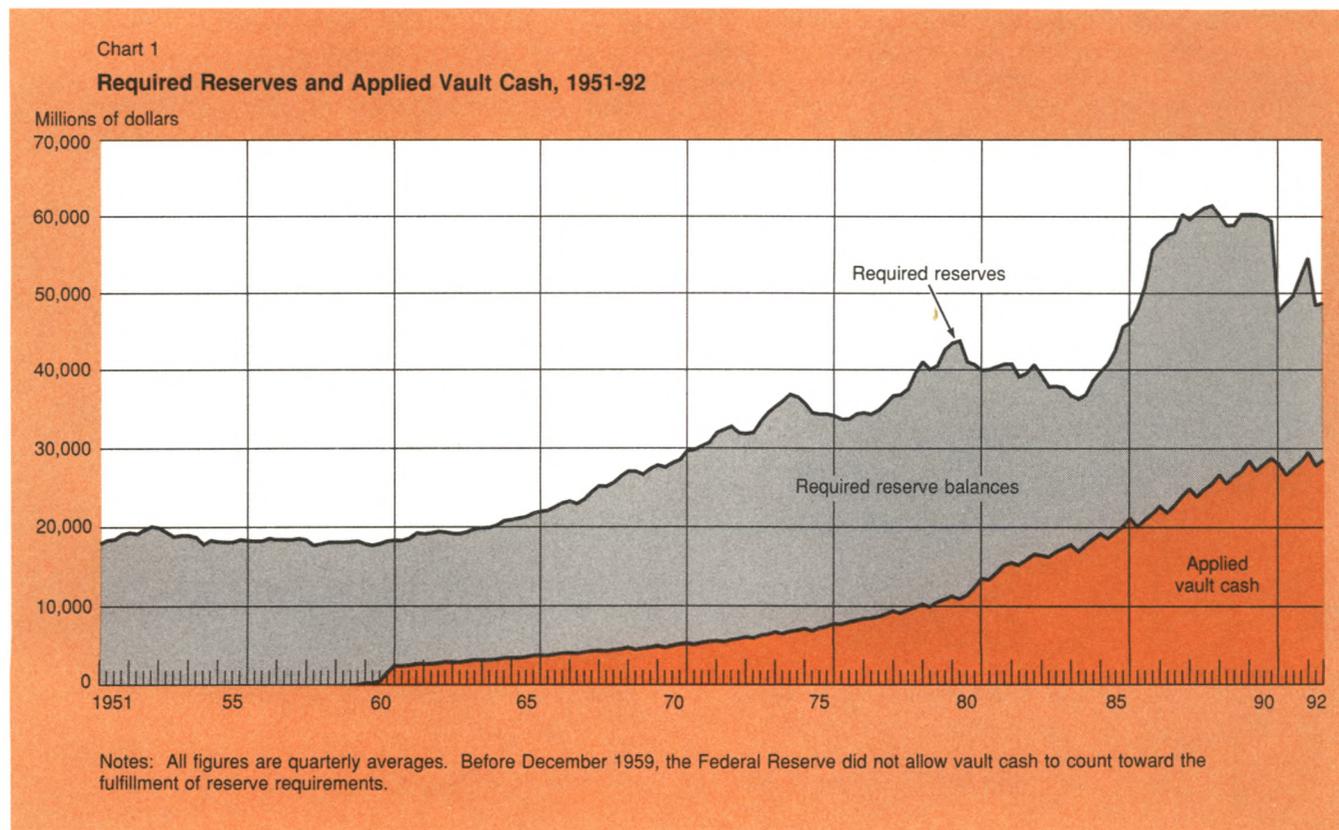
Policy responses to conflicts between Treasury revenues and money control

Federal Reserve and government policies toward reserve requirements from the end of World War II

through 1980 were significantly influenced by ongoing strains arising from the different reserve objectives of the government, the Federal Reserve, and the banks. Membership in the Federal Reserve was voluntary for state-chartered banks, so they could escape the reserve tax by dropping their membership. (State requirements were lower and generally could be met by maintaining balances at other banks, for which services were provided, and sometimes by holding Treasury bills, which paid interest.) The Federal Reserve wanted reserve requirements to be broad based enough to facilitate money control.⁶ The Fed believed that reserve requirements could be set in a way that would strengthen the linkages between reserves and money and between reserves and short-term interest rates. The existing structure encouraged departures from Federal Reserve membership that weakened those linkages.

The Federal Reserve proposed two solutions to this conflict during the 1970s. First, it called for universal membership so that all banks would be subject to the

⁶G. William Miller, "Proposals on Financial Institution Reserve Requirements and Related Issues," testimony before the House Committee on Banking, Finance and Urban Affairs, July 27, 1978.



Fed's reserve requirements. Second, it proposed paying interest on required reserves to offset the banks' revenue loss and to make membership in the Federal Reserve System attractive.⁷ The generally high nominal interest rates prevailing during the 1970s made requirements particularly onerous and increased the incentive to surrender membership. Negotiations to address these issues culminated in the Monetary Control Act of 1980 (MCA). The act extended reserve requirements to all depository institutions while allowing membership to remain voluntary. It also lowered required reserve ratios to reduce the implicit tax on member banks.

Although the lower requirements helped to ease the effective tax on banks, the reduction was offset by the exceptionally high interest rates that prevailed in the early years of the 1980s. These rates raised the implicit tax, reducing potential earnings of many depositories and constraining their ability to pay competitive rates. Wide spreads between market rates and deposit rates encouraged depositors to move funds into instruments exempt from reserve requirements. The Federal Reserve continued to ask for the right to pay interest on required reserve balances (in conjunction with allowing interest on demand deposits) but its appeals were not successful.⁸ During the eight-year phase-in period for the new reserve requirement structure mandated by the MCA, there were only minimal changes to reserve requirements beyond those specified in the act.

The role of requirements in money control was especially important between 1979 and 1982 when the Fed was seeking to control M1 by adjusting nonborrowed reserves.⁹ Thereafter, as the Fed moved away from M1 control, the reserve-M1 linkage received less attention. Nevertheless, even now the linkage is used to forecast required reserves and banks' demand for reserves.

The role of required reserves in bank liquidity

In the nineteenth and early twentieth centuries, most analysts believed that an important function of required reserves was providing liquidity to the banks. Most postwar commentary on reserve requirements has, however, downplayed the idea. Many writers have

pointed out that if banks have to hold reserves to meet requirements, they cannot simultaneously use those reserves to make loans or handle unexpected withdrawals.¹⁰ That conclusion is almost certainly appropriate when the object is to provide liquidity over time.

Nonetheless, reserve balances do provide a very important form of liquidity for periods shorter than the time interval over which requirements must be met on average (one or two weeks in recent decades). These balances constitute a clearing mechanism for interbank check and wire transfers. Far from being sterile balances sitting idly at the Federal Reserve, as they are described in many textbooks, reserves actually flow from one depository institution's account to another's many times a day.

The short-run liquidity role of reserve requirements garnered some attention within the Federal Reserve during the 1980s. At that time, the Fed was seeking an explanation for observed increases in excess reserves.¹¹ Understanding the importance of the Fed's findings requires a brief review of the composition and uses of required reserves.¹²

Since 1959, banks have been able to satisfy reserve requirements by holding vault cash and/or reserve balances at the Federal Reserve. Beginning in 1968, the vault cash applied to meeting reserve requirements in the current period was the vault cash banks had held in an earlier period. Consequently, vault cash could not play a role in meeting the banking system's marginal reserve requirements once a reserve maintenance period began. Since the reserve requirement restructuring of the 1980s, many depository institutions, including small commercial banks, thrifts, and credit unions, have been able to meet their reserve requirement with vault cash alone. It does not appear, however, that the requirements determine the institutions' holdings of vault cash; instead, these institutions base their holdings on anticipated customer demands for currency and a strong preference not to be embarrassed by short-

⁷Both the Federal Reserve's proposals for legislation and some alternative proposals appear in Miller, "Proposals on Financial Institution Reserve Requirements."

⁸See statement by J. Charles Partee before the Subcommittee on Financial Institutions Supervision, Regulation and Insurance of the House Committee on Banking, Finance and Urban Affairs, October 27, 1983, reported in the *Federal Reserve Bulletin*, November 1983, pp. 850-51.

⁹To improve the linkage between reserves and deposits, the Federal Reserve did switch from lagged reserve accounting to almost-contemporaneous reserve accounting, a change that was announced in 1982 but not put into effect until 1984.

¹⁰Before the founding of the Federal Reserve, there was no regular mechanism to produce extra reserves to meet seasonal credit needs. Small banks kept part of their reserves in the form of deposits at large banks and used those reserves to meet their seasonal needs. The withdrawal of interbank deposits from the large cities actually extinguished reserves, forcing interest rates to climb sharply higher at those times. These liquidity problems have been widely discussed. See, for instance, Thomas Mayer, James S. Duesenberry, and Robert Z. Aliber, *Money, Banking, and the Economy*, 3d ed. (New York: W.W. Norton and Company, 1987), pp. 28-29.

¹¹The large volumes of daylight overdrafts also alerted the Federal Reserve to some banks' heavy dependence on reserve balances for clearing activities.

¹²The following discussion draws heavily from Ann-Marie Meulendyke, "Monetary Policy Implementation and Reserve Requirements," internal working paper, September 1992, pp. 3-5.

ages of cash. For institutions that consistently meet or more than meet their reserve requirements with vault cash ("nonbound" institutions), reductions in the level of the requirements are of no consequence.¹³

Those medium and large depository institutions that do not cover their whole requirement with vault cash ("bound" institutions) have to hold on average during each reserve maintenance period sufficient reserve balances at the Federal Reserve to meet the remainder of their requirement (called required reserve balances). But those reserve balances also serve as the means of payment for the clearing and settlement process. Any depository that does even a portion of its own clearing

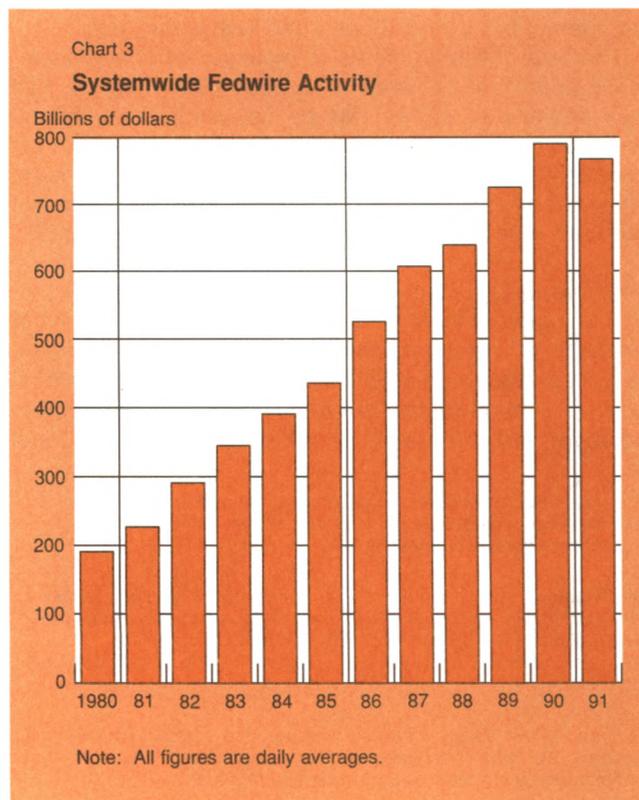
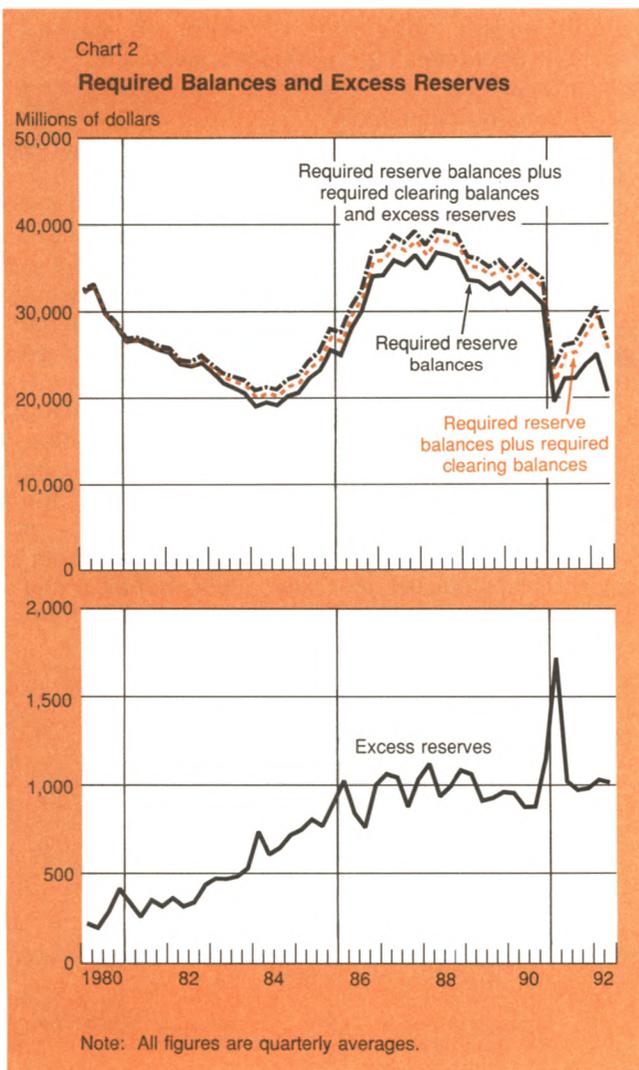
of checks or funds wires has to maintain a reserve balance to facilitate that clearing.

The volume of transactions executed each day using reserve accounts as a means of payment has long been high relative to the balances held in the accounts. For many depositories, reserve balances turn over many times a day. That turnover rate has had an upward trend. The trend reflects cuts in reserve requirements that occurred between 1980 and 1984, and again in 1990 and 1992, and increases in the volume of transactions being processed by the Federal Reserve.¹⁴ Charts 2 and 3 show recent patterns in these measures.¹⁵ The daily flows have a large predictable component, but

¹³The Federal Reserve excludes surplus vault cash from its measures of total and nonborrowed reserves.

¹⁴Since 1980, depositories have been able to establish required clearing balances to provide some reserve management flexibility. These are additional reserve balances that depositories agree in advance to hold. In return, they receive credits to pay for priced Federal Reserve services. The level of priced services used by a depository provides an effective maximum demand for required clearing balances. Required clearing balances were fairly small until after the 1990 cut in reserve requirements, when many large banks started to hold them.

¹⁵Fedwire transactions have the largest impact on reserve balances, but other wire transfer operations and check processing transactions also lead to reserve transfers. These other transactions raise the turnover rate for reserve balances even further.



considerable potential for surprise remains. The Federal Reserve generally processes instructions to pay out reserve balances even if the action puts the sending bank into overdraft. The Fed imposes a penalty charge on any institution that ends the day overdrawn. Consequently, depository institutions have to aim for a significant positive end-of-day balance to minimize the risk of an inadvertent overdraft, regardless of their reserve requirements.

Depository institutions can deal with these additional precautionary reserve needs by holding excess reserves, but this strategy is costly since no interest is paid on reserves. When required reserve balances declined in the early 1980s and again at the end of 1990, depositories continued to try to minimize excess reserve holdings, but they were restricted in their ability to do so. As noted below, if banks built up a cumulative excess reserve position early in the period, either deliberately or because of an unexpected reserve inflow, they could be unable to work off the excess reserves without risking an overnight overdraft if they experienced a reserve shortfall. In trying to cope with the narrowing ranges of reserve balances that were acceptable in the management of reserves, depositories devoted considerable resources to monitoring internal reserve flows. In the process, they became less tolerant of excess reserves early in maintenance periods because of their diminished ability to work them off in subsequent days. These developments restricted the depositories' day-to-day flexibility in managing reserves, caused more frequent unintended bulges in excess reserves, and added to end-of-day volatility in the federal funds rate.

Reserve requirements in the 1950s and early 1960s

At the time of the Treasury-Federal Reserve Accord of 1951, reserve requirement ratios on demand deposits of Federal Reserve member banks were 24 percent for banks located in "central reserve cities" (New York and Chicago), 20 percent for member banks in "reserve cities" (other cities with Federal Reserve Banks or branches), and 14 percent for "country banks" (the term for all other member banks). The reserve ratio for time and savings deposits was 6 percent for member banks in all locations.

During the fifteen years between 1951 and 1966, requirements were raised on five occasions and were lowered ten times.¹⁶ The changes in reserve require-

ments were sometimes made in conjunction with complementary changes in the discount rate, while at other times the moves were made independently. Open market operations were used to cushion the changes in reserve requirements, so that hardly any of the immediate impact of the reserves released or absorbed was felt as a change in excess or borrowed reserves.

In those years, the Federal Reserve formally described reserve requirements as a policy tool used to make reserves more or less plentiful so as to alter credit availability and money market interest rates—the near-term policy goals of the time.¹⁷ Its decisions about reserve requirements were, in practice, constrained by the exodus of small banks from the Federal Reserve System in the 1950s. Legislation passed in 1959 addressed an apparent inequity between large and small banks in an attempt to make membership more attractive for the small banks. Country banks had lower nominal reserve requirements, but they often had to tie up relatively large sums in non-interest-earning reserve balances that did not serve any other purpose. (A reserve city bank generally handled payment clearing for them.) Because of their customer bases, most country banks had to hold relatively high amounts of vault cash, but they could not use these holdings to satisfy requirements. The 1959 act permitted the Fed to count vault cash toward meeting reserve requirements. That change—implemented in three steps during 1959 and 1960—reduced effective requirements, especially for country banks. It was hoped that the lower requirements would encourage those banks to remain members of the Federal Reserve.

Contemporary views of reserve requirements

A commonly held view about reserve requirements was expressed by a presidential commission appointed in 1963 to study financial institutions. The commission concluded that "there is, within broad limits, little basis for judging that in the long run one level [of reserve requirement ratios] is preferable to another in terms of facilitating monetary policy."¹⁸ The commission felt that the effects of requirements on bank earnings and Treasury revenues should be the primary factor considered in choosing reserve ratios. Although it saw the advan-

Footnote 16 continued

ratios were slightly modified in 1966 when tranches were introduced for both demand and time deposits. At the same time, savings accounts were separated from time deposits for required reserve calculations.

¹⁶Reserve requirement ratios were changed for several reasons over these years. Although many of the changes were undertaken to make reserves more or less costly as part of the monetary policy process, changes were also made to meet seasonal reserve demands and to implement the 1959 legislation aimed at equalizing reserve ratios at central reserve and reserve city banks. In addition,

¹⁷Board of Governors of the Federal Reserve System, *Annual Report*, various years.

¹⁸Report of the Committee on Financial Institutions to the President of the United States: Walter W. Heller, Chairman. Washington, D.C.: Government Printing Office, 1963, p. 12.

tages to bank profitability of a significant cut, it believed that the cost to the Treasury would be too great.

Some academic literature of the time offered other views on reserve requirements and monetary control. Several articles and books dealt with the concept of fractional reserve requirement ratios and described the strengths and weaknesses of that structure. Tolley analyzed the tax implicit in reserve requirements.¹⁹ He suggested that the level of reserve requirement ratios and hence of the amount of the tax had come about by accident. He then tried to establish a rationale for such a tax. He believed that under a gold standard, a system in which real resources had to be devoted to producing money, a fee was appropriate to encourage people to economize on the use of money. But when the cost of producing money is trivial, as it is with fiat money, the only justification for a charge is that the government could benefit from the revenues arising from the Federal Reserve's provision of reserves. Tolley went on to observe, however, that the government's gains would cause misallocation of resources as banks took actions to reduce the effect of the tax. Such a distortion would argue for very low reserve requirements. But Tolley thought very low requirements might make monetary control difficult because shifts between currency (which is effectively subject to a 100 percent reserve requirement) and deposits would have a large impact on the amount of money created, as would mistakes in estimating reserve provision. Hence he recommended that interest be paid on required reserves so that requirements would not need to be reduced.

Friedman also discussed how shifts in preferences between currency and deposit holdings could ease or tighten reserve conditions.²⁰ He reiterated the arguments from the 1930s for 100 percent reserve requirements. Such requirements had been proposed as a solution to the unpredictable multiplier effects of fractional reserve accounting arising from the differential treatment of deposits and currency. Friedman also recognized the undesirable tax effect of 100 percent requirements and described the inevitable incentive for money and credit provision to move outside the regulated area of banking. To combat that problem, he recommended paying interest on reserves. Later, the Federal Reserve seriously considered the proposal to pay interest on reserves; it has periodically requested authority to do so from the Congress.

¹⁹George S. Tolley, "Providing for Growth of the Money Supply," *Journal of Political Economy*, December 1957, pp. 477-85.

²⁰Milton Friedman, *A Program for Monetary Stability* (New York: Fordham University Press, 1959), pp. 65-76.

Reserve requirements in the latter part of the 1960s and 1970s

Reserve requirements continued to be raised and lowered to reinforce tightening or easing moves implemented with other tools during the rest of the 1960s and 1970s. Requirements were increased four times and decreased seven times during these years.²¹ Sensitivity to the membership problem sometimes made the Federal Reserve Board hesitant to raise requirements. On occasion, the Board raised them just on large time deposits—deposits mostly issued by the large banks, which were the least able to give up the services provided by Fed membership. The combination of higher inflation and higher interest rates that emerged during these years drew increasing attention to the tax burden of reserve requirements and the related question of differential treatment of member and nonmember banks.

The Federal Reserve appointed a study group headed by Robert Black to review reserve requirement ratios. The group reported its recommendations in 1966.²² The primary result of that study was the decision to move from near-contemporaneous reserve requirements with one-week reserve maintenance periods for reserve city banks and two-week periods for country banks to weekly reserve periods for all member banks with a two-week lag between the computation and maintenance periods. This change was believed to make calculating requirements easier for the banks and the New York Fed's Trading Desk.²³

Lagged reserve requirements weakened the direct linkage between reserves and money, making it harder, in theory, to manipulate reserves as a means of controlling money. For the most part, the Federal Reserve did not see any reason to be concerned because it was not attempting to control money in this way. Instead, the Fed was attempting to affect money growth indirectly by influencing the demand for money. It altered the cost of obtaining reserves and hence the cost at which credit was provided.²⁴

²¹The count does not include the 1972 restructuring that raised requirements for some banks and lowered them for others, as described later in the text.

²²Robert P. Black, *Report of the Ad Hoc Subcommittee on Reserve Proposals*, May 13, 1966.

²³The other change was to permit banks to carry forward reserve excesses up to 2 percent of required reserves for one reserve period. (Banks already had the authority to carry forward 2 percent of reserve deficiencies.)

²⁴Lyle E. Gramley and Samuel B. Chase, Jr., "Time Deposits in Monetary Analysis," *Federal Reserve Bulletin*, October 1965, pp. 1380-1404.

In 1972, another Federal Reserve reform addressed the problem of retaining member banks. For both reserve city and country banks, reserve requirement ratios were to be graduated on the same schedule by volume of deposits. The change represented a significant cut in reserve requirements for small banks in Federal Reserve cities and caused some large banks outside of Federal Reserve cities to face higher requirements. The series of graduated steps in the required reserve schedule further weakened the relationship between required reserves and monetary deposits, an outcome that distressed those economists who wanted to see the Federal Reserve control reserves in order to control money growth. At the time, the Federal Reserve was targeting the federal funds rate and reserve requirements were lagged, so the concerns were not immediately relevant to operations.²⁵

Nonetheless, Federal Reserve membership continued to decline. The Federal Reserve proposed paying interest on reserves on a couple of occasions in the 1970s to halt the decline, but the revenue loss to the Treasury engendered strong congressional opposition.²⁶

The Monetary Control Act and reserve requirements in the 1980s

At the end of the 1970s, the Federal Reserve once again tried to achieve universal membership. Although it did not literally accomplish that, it did achieve, through the 1980 MCA, the most important goal associated with expanded membership: the extension of reserve requirements to all depository institutions. Furthermore, the Fed was permitted to collect deposit data on an ongoing basis from all but the smallest depositories, enabling it to improve both estimates of actual money and forecasts of future money. Reserve requirement ratios for member banks on transactions deposits were cut over a four-year period from a top rate of 16¼ percent to a top rate of 12 percent. A low reserve tranche was also established of 3 percent on the first \$25 million of deposits, with the amount of the tranche allowed to rise over time.²⁷ Nonmember banks and thrifts that faced the increases in requirements were

given an eight-year phase-in period to reach the final levels of requirements specified in the act. The Federal Reserve Board retained the option to adjust reserve ratios within specified bands.

The MCA was directed toward improving the Fed's ability to control money. It focused on deposits in M1, the primary intermediate policy variable at the time. It did not, however, provide any scope for using reserves to control M2, a secondary target at the time the act was passed but the primary monetary target later in the decade. Money market mutual fund balances remained exempt, and the MCA actually took away from the Federal Reserve the power to impose reserve requirements on personal time and savings deposits.

Aside from the changes to reserve requirements mandated by the legislation, only minor modifications were made to reserve requirements during the 1980s.²⁸ Because the structure of requirements had been set within specified limits by the MCA, it was generally felt that policy-related changes in the ratios would have been difficult to implement during the eight-year phase-in period, so there was little point in considering them. Since the legislation had not given the Federal Reserve the option to pay interest on reserve balances, the Board might have hesitated to raise requirements because of the implied increase in the tax burden.²⁹ Furthermore, the Federal Reserve believed it could achieve its objectives just as well through open market operations and discount window policy.

Excess reserve behavior and potential problems with reserve requirements

The Federal Reserve saw increasing evidence during the 1980s that depository institutions were having difficulty managing reserves. These observations suggested that reserve requirements might be inadequate for smooth monetary operations. Normal levels of excess reserves rose fairly steadily in the years following passage of the MCA. Some of the increase was the inevitable result of extending reserve requirements to nonmember depository institutions.³⁰ But member bank

²⁵Nonetheless, shortly afterwards the Federal Reserve did take limited steps to use reserve targeting when it experimented with reserves on private deposits. See Meulendyke, "A Review of Federal Reserve Policy Targets and Operating Guides," pp. 463-64.

²⁶Specific proposals to pay interest on reserves were introduced in the Congress in 1977 and 1978. See Stuart E. Weiner, "Payment of Interest on Reserves," Federal Reserve Bank of Kansas City *Economic Review* January 1985, pp. 20-21.

²⁷In 1982, the Garn-St Germain Act modified the reserve requirement structure further to introduce a zero requirement tranche.

²⁸In March 1983, the Board eliminated reserve requirements on time deposits with an initial maturity of two and one-half years or more. In September 1983, it reduced the minimum maturity for exemption from requirements to eighteen months.

²⁹The MCA did provide for payment of interest on supplemental reserve requirements under restricted circumstances if such requirements were needed for monetary control. The provision has not been used.

³⁰At some point during the phase-in period, vault cash no longer met all of the larger nonmember institutions' requirements, and they opened reserve accounts at the Federal Reserve. Only then could these institutions have excess reserves. (Previously, they may have had excess reserves from their own perspective in the form of surplus vault cash and deposits at correspondents, but the Federal Reserve does not count these in its reserve measures.)

excess reserves were also rising, in a pattern that contrasted with their behavior during much of the 1970s, when they had generally hovered in a range near \$200 million. The search for explanations led to several discoveries. It was observed that excess reserves tended to move inversely to required reserves not met by vault cash, both period to period and over time, as balances held at Federal Reserve Banks trended lower.³¹ The sharp drop in required reserve balances between 1980 and 1984 occurred as lower reserve requirements were being phased in for member banks under MCA and the spread of automatic teller machines was encouraging rapid expansion of vault cash holdings (Chart 1).

Average required reserve balances rose again in the next few years, but excess reserves continued to expand at member banks as well as at nonmember banks. Conversations with officials at a number of banks underscored the growing role of large payments flowing through their reserve accounts. The volume of wire transfers over Fedwire—the Federal Reserve's wire transfer system—grew rapidly (Chart 3), making it increasingly difficult for banks to predict reserve balances. Since the Federal Reserve penalized end-of-day overdrafts, banks had to be careful not to aim for too low a reserve balance lest an unexpected late day outflow (or an expected receipt that did not arrive) should leave them overdrawn. These discoveries suggested that for a number of banks, reserve balances needed to meet requirements were not very different in size from those needed to manage clearing and settlement and to avoid overdrafts.

These factors were taken into account by the Federal Reserve in estimating the aggregate demand for excess reserves.³² But they did not lead to serious discussions of the structure of reserve requirements during the 1980s.

Cuts in reserve requirements in the 1990s

The Federal Reserve Board eliminated reserve requirements on nontransaction deposits at the end of 1990. In explaining its action, the Board indicated that the existing structure had been designed "primarily to permit greater precision of monetary control when policy focused on reserve aggregate targeting." It went on to describe the changing conditions that had prompted its move:

In subsequent years, as the Federal Reserve moved away from the procedures in effect in the early 1980s, which required a broad reserve base, reserve requirements on nonpersonal time accounts have become somewhat of an anachronism. Moreover, the current 3 percent requirement has placed depository institutions at a disadvantage relative to other providers of credit, spawning efforts to circumvent the requirement.

The Board took action at this time also in response to mounting evidence that commercial banks have been tightening their standards of creditworthiness, [a development that] has in recent months begun to exert a contractionary influence on the economy... Lower reserve requirements at any given level of money market interest rates will reduce costs to depository institutions, providing added incentive to lend to creditworthy borrowers.³³

The reduction in reserve requirements boosted earnings for some depository institutions but, as indicated earlier, it had the undesirable side effect of complicating reserve management for many institutions. With lower routine levels of required reserve balances, their ability to accept reserve variability from day to day within a two-week reserve maintenance period without either incurring an expensive overdraft or being stuck with unusable excess reserves was reduced. Depositories found they had to use considerable resources to hold down excess reserves. The action also complicated operations of the Open Market Trading Desk at the New York Federal Reserve Bank, especially in the first few months of 1991.³⁴

Relatively modest reserve excesses often inspired sharp declines in the federal funds rate, even on days that were not the ends of maintenance periods. Depositories had less ability to absorb and make use of the excess reserves because they could not run large deficiencies in subsequent days without ending overdrawn. When a number of depositories discovered toward the end of a day that they had excess reserve positions and tried to sell the funds into the interbank federal funds market, their efforts often pushed the funds rate down sharply, sometimes almost to zero. At that time of day, it is too late for open market operations to be undertaken to affect that day's reserves, since same day transfers of Treasury debt cannot be arranged after the Fed's securities wire closes, officially at 2:30 p.m. eastern

³¹David Jones, "Excess Reserves under MCA," November 10, 1983, and David Small and Brian Madigan, "An Analysis of Excess Reserves," July 1, 1986, internal memoranda, Board of Governors of the Federal Reserve System.

³²Ann-Marie Meulendyke, *U.S. Monetary Policy and Financial Markets*, Federal Reserve Bank of New York, 1990, chap. 6.

³³*Federal Reserve Bulletin*, February 1991, p. 95.

³⁴See "Monetary Policy and Open Market Operations during 1991," this *Review*, Spring 1992, pp. 80-88, for a discussion of these developments and a description of their impact on the Desk's reserve management.

time. Hence, depositories as a group could not eliminate the excesses except by repaying discount window loans. In 1991, routine borrowing from this source was already at very low levels, so little could be repaid.

Low reserve balances also increased the likelihood of an incipient overdraft. Depositories that discovered they were overdrawn late in the day generally tried to cover the overdrafts by borrowing in the federal funds market. If funds were scarce systemwide, sufficient reserves might not be available. Depositories could obtain reserves from the discount window, but in the early months of 1991, many banks were unusually reluctant to borrow lest such a step be read as a sign that they were in trouble. That reluctance to borrow often caused federal funds to be bid to very high levels before some banks finally turned to the window to cover the shortages.³⁵

The role of the discount window in policy implementation

Like reserve requirements, the discount window has played a supporting role to open market operations in the monetary policy process. This section describes the guiding principles for discount window borrowing. It reviews the two main features of that borrowing, the rules that govern the use of the facility and the rate or rates that are charged. It then provides a chronological review of developments in the behavior of borrowing from the 1950s to the present.

The philosophy behind the discount window mechanism

Federal Reserve views of the discount window's roles changed considerably between the founding of the Fed-

eral Reserve in 1914 and the 1930s as open market operations gradually replaced discount window borrowing as the primary source of Federal Reserve credit. Then, between 1934 and 1950, the discount window fell into disuse, and there was little consideration of the roles of the window as a policy tool.

The Federal Reserve's concept of the policy role of the discount window was reexamined after the 1951 Accord and again in the latter half of the 1960s. Both studies led to some modifications in the rules for borrowing but did not change the underlying philosophy. Most of the rule changes since the early 1970s have been small and have addressed specific concerns.

Since the Accord, the Federal Reserve's discount window policy has discouraged persistent reliance on borrowing. That stance has ensured that borrowed reserves generally represent only a modest share of total reserves. The Fed believes that the discount window should serve as a safety valve, a temporary source of reserves when they are not readily available from other sources.³⁶

The window in recent decades has been available to healthy banks for occasional, but not continuous, use.³⁷ Borrowing has been rationed through a variety of means that have encouraged a "reluctance to borrow." The degree of reluctance shown by the banks has varied considerably over the years, even in the absence of changes in the guidelines for borrowing.

At the same time, the Fed has counted on there being some amount of borrowing because borrowing is an element in the reserve adjustment process. In this context, the window has played a vital role in meeting unexpected reserve needs. Various open market operating procedures depend on some degree of stability in the banks' demand for borrowed reserves, but the administrative guidelines and changing bank attitudes have made this stability difficult to achieve. For much of the time since the mid-1960s, the discount rate has been below competing market rates, in particular the overnight federal funds rate. Consequently, administrative restrictions rather than the rate have had the biggest role in limiting the amount of borrowing. Banks have responded to the profit incentive to borrow, but in doing so they have had to factor in some nonprice costs—such as potential loss of future access to the window—that are difficult to estimate.

During the 1980s, increasing financial difficulties and

³⁵A series of papers prepared by the staff of the Federal Reserve Bank of New York after the 1990 cut in required reserve ratios considers the operational difficulties of low required reserve ratios and evaluates possible solutions. Overall, the papers suggest that the best solution to the reserve management problems encountered with low reserve balances would be to pay interest on reserves so that requirements could be increased without raising the costs to depository institutions.

The collection of papers also evaluates other alternatives. A return to more routine use of the discount window would provide the banking system with valuable flexibility, but overcoming the current strong reluctance to borrow appears to be a difficult challenge.

In the absence of such changes, only one of the other alternatives could provide more than modest help to the reserve management process: permitting banks to end the day overdrawn. Nonetheless, permitting overdrafts would have significant drawbacks. If this approach were to be seriously considered, permitted overdrafts would have to be collateralized and made subject to a modest charge. Even so, it seems to go against the thrust of efforts to reduce daylight overdrafts and could be seen as weakening the essential discipline of a reserve requirement structure.

Other approaches deserving consideration include expanding reserve carryovers and shortening the vault cash lag, variants of which have recently been introduced by the Board of Governors. These approaches, however, would raise reserve management flexibility only slightly.

³⁶All borrowing from the Federal Reserve must be fully collateralized.

³⁷At times, the Fed also provides extended credit at market-based rates to banks whose financial difficulties have cut them off from regular sources of financing. Banks using the facility must work with their regulators toward a solution. That type of borrowing is not a monetary policy tool, and thus is not a focus of this piece.

bank failures led banks to become more reluctant to borrow, even under conditions that would formerly have led them to use the window. The rise in banking crises made many banks fearful that if they borrowed, rumors that they were in financial trouble would arise. Thus, the demand for borrowing became even less predictable, reducing the value of the relationship between borrowing and the spread between the federal funds rate and the discount rate that was exploited in the policy process.

The direct cost represented by the rate charged for discount window borrowing has also played some role in the policy process. Changes in the rate have normally attracted general attention to the state of monetary policy, giving rate changes the potential for an announcement effect. The extent of the announcement effect has varied over time, depending on the verbal message given with the rate change and the way borrowing was being used in carrying out policy. Sometimes the Fed has sought to signal policy changes when it changed the rate. At other times it deliberately downplayed the significance of the move.

Changes in the discount rate are voted by the Boards of Directors of the twelve Federal Reserve Banks and approved by the Board of Governors. The governors generally approve changes in the rate when they want to signal a change in the stance of policy or when market rates have moved significantly away from the discount rate, so that the discount rate is "catching up" with the changes. Rate changes have normally complemented the guidelines established by the FOMC for the conduct of open market operations.

The discount rate per se has not, in the post-Accord period, been regarded as a primary means of influencing the amount of discount window borrowing. Indeed, because short-term interest rates have frequently exceeded the discount rate since the mid-1960s, rationing of the use of the window has had to be accomplished through means other than the rate. There have been numerous recommendations over the years that the rate be given the primary role in rationing credit, either because the approach was more straightforward and less arbitrary than rationing administratively or because the use of a below-market rate implied a subsidy. The specifics of the relationship between the discount rate and open market policy changed modestly when the techniques of policy implementation were changed but have consistently relied on administered disincentives to borrow.

The discount window in the 1950s through the mid-1960s

Borrowing jumped dramatically in the early 1950s. It rose from an average of \$130 million in 1950 to an

average of \$800 million in 1952. By December 1952, it had reached \$1.6 billion. Interest rates rose after the Accord, and the discount rate lagged behind. (Chart 4 shows borrowed reserves and their share of total reserves between 1950 and 1965, along with the discount rate and short-term interest rates.) The cost structure made borrowing attractive for the first time since the early 1930s. An excess profits tax instituted in 1951 increased the incentive to use the discount window because borrowings served as an offset in computing the tax.

A Federal Reserve System committee was established in 1953 to examine the history of the rationales for borrowing. The committee concluded that the established "tradition against borrowing" should be encouraged because it contributed to the soundness of individual banks and the banking system.³⁸ The committee report served as the basis of the 1955 revisions to Regulation A, the regulation governing use of the window.³⁹

The report observed that the founders of the Federal Reserve had expected the discount window to be the primary source of Federal Reserve credit. In the early years of the Federal Reserve, many member banks borrowed a substantial portion of the reserves they needed from the window; indeed, it was not unusual for a bank to borrow continuously. By contrast, in the years before the founding of the Federal Reserve, a bank that was heavily dependent on borrowed funds, rather than on its own capital and deposits, was believed to be more vulnerable to failure.

The committee noted that the development of open market operations during the 1920s as an alternative source of Federal Reserve credit made possible a gradual move to discourage heavy borrowing. Once again, banks that borrowed persistently came to be seen as more likely to fail, and this view was reinforced during the early 1930s when the number of bank failures soared. Mindful of this negative image, the banks themselves became reluctant to borrow and instead built up holdings of excess reserves during the latter part of the 1930s. This course of action was simplified by the monetization of the vast gold inflows inspired by the revaluation of gold in 1934 and by the approach of war in Europe in the latter years of the decade.⁴⁰

By the early 1950s, however, a decade and a half with low numbers of bank failures had apparently reduced the banks' own reluctance to borrow to such an extent

³⁸System Committee on the Discount and Discount Rate Mechanism, "Report on the Discount Mechanism," March 12, 1954.

³⁹*Federal Reserve Bulletin*, January 1955, pp. 8-14.

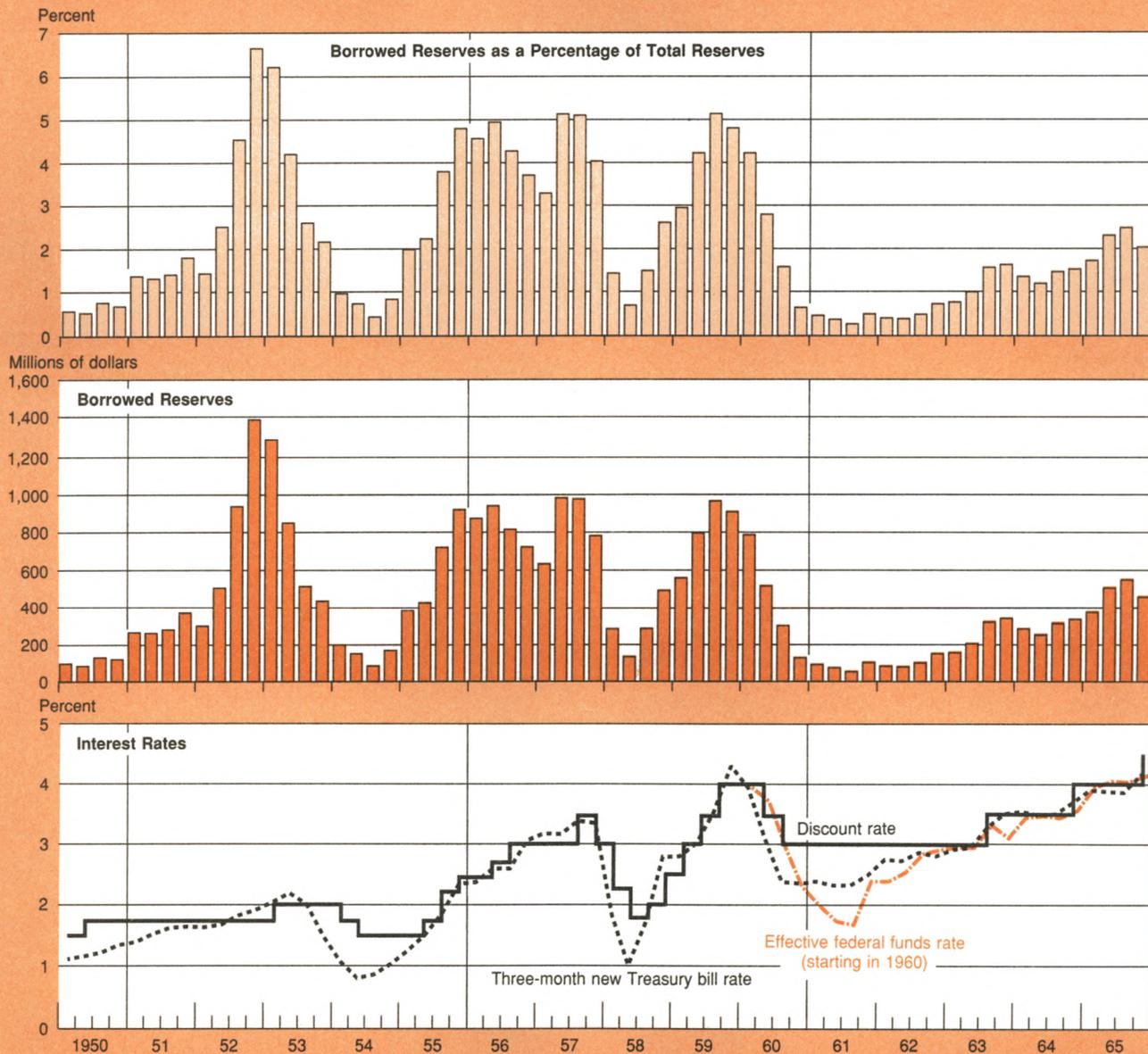
⁴⁰Meulendyke, *U.S. Monetary Policy and Financial Markets*, chap. 2.

that many banks were inclined to return to the window when doing so became profitable. The committee felt this behavior should be discouraged. It reiterated the belief that a bank that used its own resources to meet increased demands for credit was healthier than one that was dependent on borrowed funds. In its 1954

report, the committee recommended that routine reserve provision be accomplished almost entirely through open market operations. The report also recommended limiting the term of borrowing to fifteen days under normal circumstances. It noted that most banks had emerged from the war with substantial portfolios of

Chart 4

Borrowed Reserves and Selected Interest Rates, 1950-65



Notes: All figures are quarterly averages except for the discount rate. The discount rate is the rate in effect on the last day of the quarter.

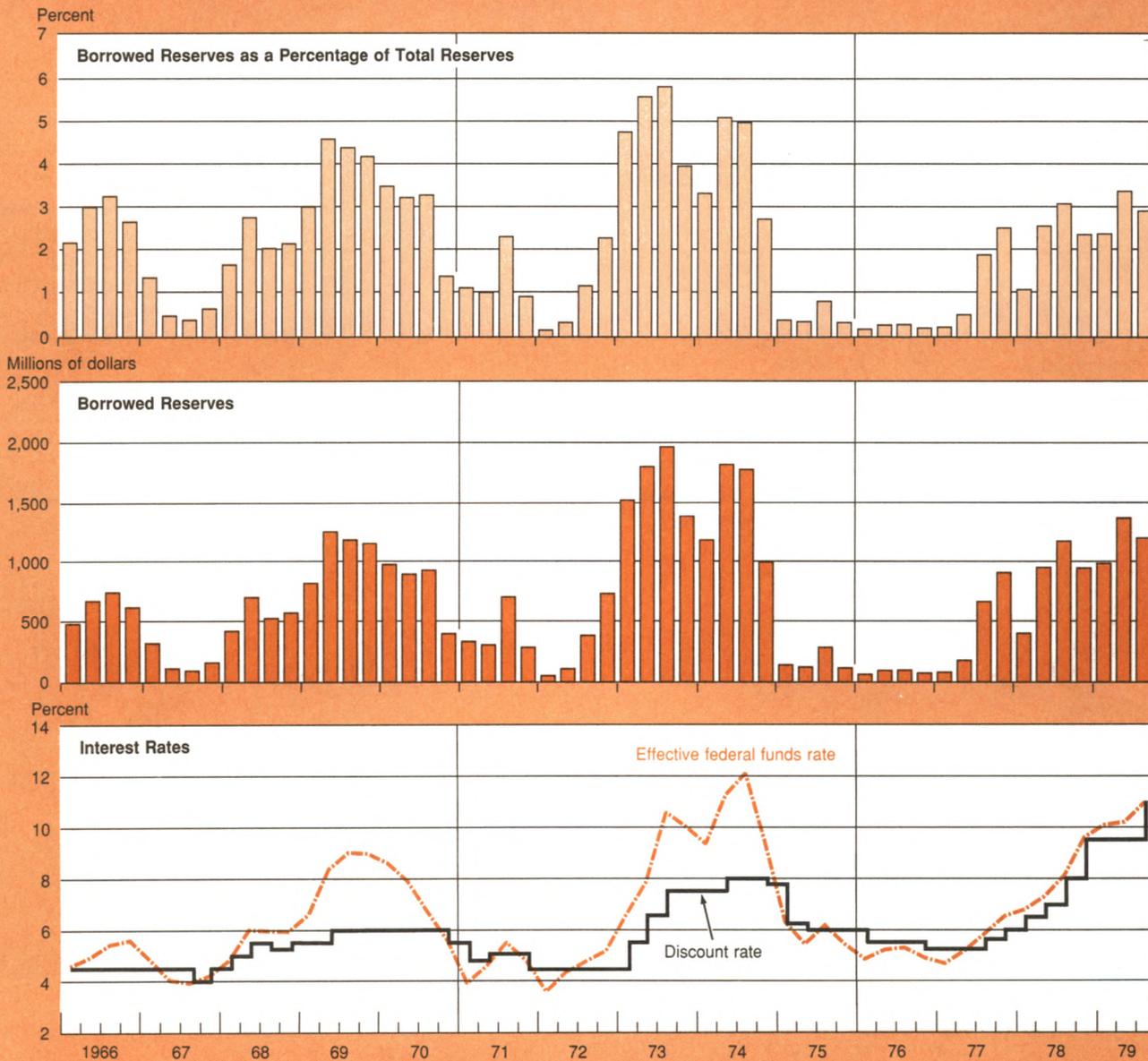
government securities that could be sold to raise additional funds for seasonal or other purposes. The regulations that were subsequently adopted guided discount officers in distinguishing between "appropriate" and "inappropriate" borrowing. Borrowing was considered

inappropriate when the funds were used for normal business activities. In particular, the committee disapproved of borrowing to profit from interest rate differentials.

The role of the discount window during the rest of the

Chart 5

Borrowed Reserves and Selected Interest Rates, 1966-79



Notes: All figures are quarterly averages except for the discount rate. The discount rate is the rate in effect on the last day of the quarter.

1950s and early 1960s generally followed the pattern set out by the committee's guidelines. There was some debate about whether the reluctance to borrow was motivated by the banks' own caution or by Federal Reserve restrictions. Some banks almost never borrowed, suggesting an internally generated reluctance. Many banks, however, apparently took account of the full cost of borrowing, including potential loss of future access, and borrowed when it was profitable. In that context, borrowing was rarely a large bargain. In fact, the discount rate was often slightly above short-term Treasury bill rates, although both borrowing and the incentive to borrow varied cyclically. Normally, borrowing was only a modest share of total Federal Reserve credit.

The Board of Governors approved periodic adjustments to the discount rate and issued a statement of purpose with each adjustment. Often the changes lagged market rates, and the Board explained its action as an effort to catch up with market rates. When the discount rate was low relative to other short-term rates, borrowing often rose. (The primary alternative rate was the Treasury bill rate in the 1950s; the federal funds market grew in importance during the 1960s.)

Some academic economists criticized the discount mechanism. They did not like the fact that banks were given mixed signals about borrowing, with the relatively low discount rate often encouraging use of the window while the administrative guidelines were discouraging it. They felt that the rules made it difficult to judge whether policy was tight or easy.⁴¹ The authors preferred a rate that was set above market rates—a penalty rate—but urged that no administrative restrictions be placed on borrowing.

Discount window policy in the late 1960s and 1970s

Higher interest rate levels in the latter half of the 1960s, especially the "tight money" episode of 1966, encouraged more borrowing (Chart 5). The decline in membership was also garnering attention, and there was concern that the discount window was not sufficiently available to small member banks. A series of studies were undertaken during the late 1960s under the guidance of a steering committee of Federal Reserve Governors and Presidents.⁴² The studies reviewed the history of the discount mechanism, compared the discount win-

dow with the tools and techniques of foreign central banks, evaluated some of its problems, and presented several possible reforms. The steering committee endorsed the practice of permitting banks to borrow only intermittently. It wanted to continue the administrative disincentives to frequent borrowing, but it was troubled that some banks seemed to get little or no benefit from the window. The summary report recommended some changes to make borrowing more convenient, especially for small unit banks with large seasonal swings in loan demand and limited access to the national credit markets. The report's recommendation of a special seasonal borrowing privilege for small member banks was adopted in 1973 and remains in effect, although it has been modified somewhat in recent years.⁴³

The report also proposed that one form of adjustment credit should consist of a basic borrowing privilege that would give all (member) banks some access at reasonable cost to Federal Reserve credit based on published guidelines for amount and frequency of borrowing. Even the proposed basic borrowing privilege did not envision continuous borrowing: if a bank needed additional credit, its borrowing would be subjected to scrutiny. The approach was not adopted, although the proposed frequency schedule did influence the informal guidelines used by the discount officers in subsequent years. Finally, the study brought to light considerable inconsistencies in the administration of the window by the different Federal Reserve Banks. Efforts were made to improve coordination in order to minimize those differences.

During the 1970s, Federal Reserve monetary policy focused on adjusting the federal funds rate to respond to deviations in money growth from desired ranges. The discount window generally played a subsidiary role in the process.⁴⁴ Changes in the discount rate were often motivated by changes in market rates, as they had been

⁴³The seasonal borrowing privilege was extended to nonmember banks under the MCA. In 1992, the Board began charging a market rate on seasonal borrowing tied to the federal funds rate and certificate of deposit rates.

⁴⁴Economists have debated the importance of the discount rate as a mechanism for changing policy. Sometimes Federal Reserve announcements indicated that the rate was changed to catch up with market rates. At other times they cited monetary policy concerns. At issue is whether these announcements had an impact beyond that of open market operations. See Timothy Cook and Thomas Hahn, "The Information Content of Discount Rate Announcements and Their Effect on Market Interest Rates," *Journal of Money, Credit, and Banking*, vol. 20, no. 2 (May 1988), pp. 168-80; Raymond E. Lombra and Raymond G. Torto, "Discount Rate Changes and Announcement Effects," *Quarterly Journal of Economics*, February 1977, pp. 171-76; and Daniel L. Thornton, "The Market's Reaction To Discount Changes: What's Behind The Announcement Effect?" Federal Reserve Bank of St. Louis, Working Paper Series, November 1991, pp. 2-23.

⁴¹See Friedman, *A Program for Monetary Stability*, pp. 38-41; A. James Meigs, *Free Reserves and the Money Supply* (Chicago: University of Chicago Press, 1962); and Warren Smith, "The Discount Rate as a Credit-Control Weapon," *Journal of Political Economy*, April 1958, pp. 171-77.

⁴²Board of Governors of the Federal Reserve System, *Reappraisal of the Federal Reserve Discount Mechanism*, 1971.

in earlier decades, although occasionally changes were intended to create an announcement effect.⁴⁵ The amount of borrowing generally increased as the federal funds rate rose relative to the discount rate, a relationship that suggested that banks were seeking to maximize profits through their borrowing decisions. The Open Market Trading Desk took that relationship into account when choosing how many nonborrowed reserves to provide, since the amount of desired borrowing affected the reserve levels consistent with the desired funds rate.

Relation between discount policy and reserve targeting from 1979 to 1982

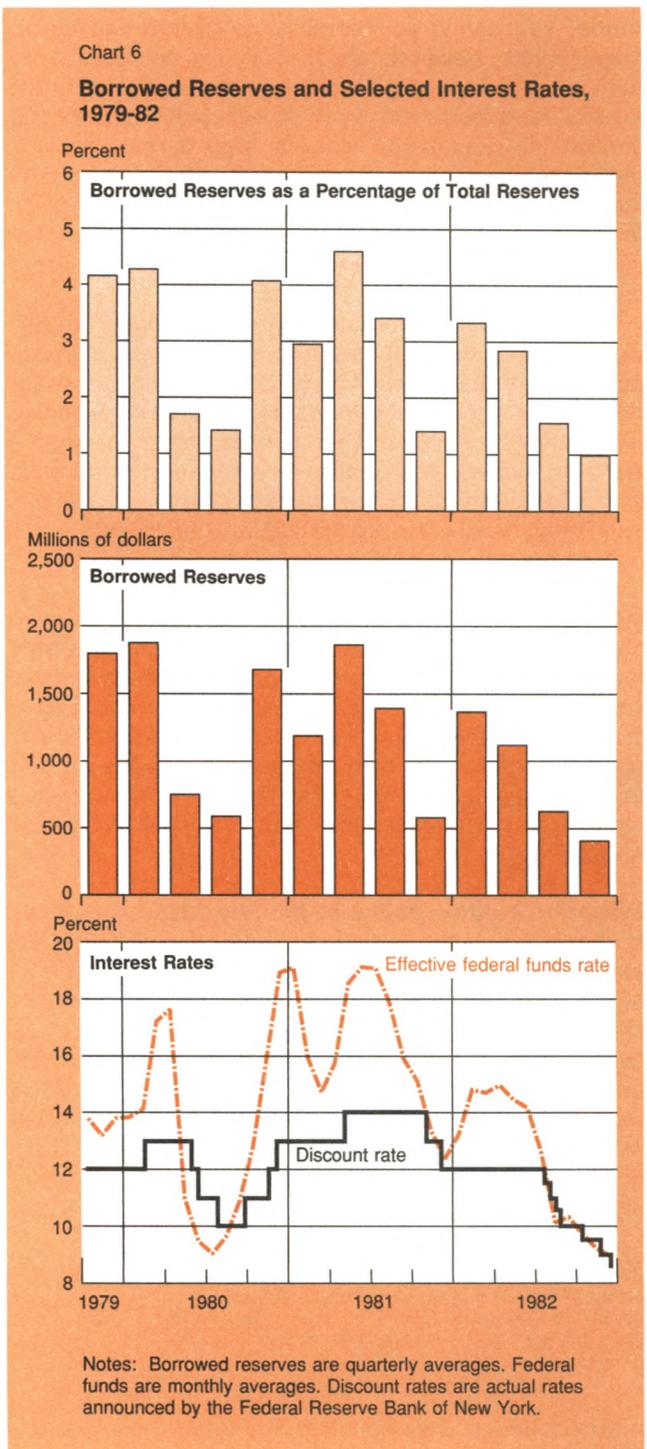
Borrowing took on increased importance after the October 1979 changes to reserve operating procedures. Under the new procedures, the Trading Desk provided only the level of nonborrowed reserves estimated to be consistent with targeted M1. If depositories needed additional reserves to meet their requirements because M1 was above target, they would have to borrow them at the discount window. In practice, the system was structured so that there was some borrowing even when M1 was on target. Only when M1 was far below target for a while in 1980 was borrowing allowed to drop to frictional levels, leading the federal funds rate to fall below the discount rate.

The adjustment mechanism depended heavily on the enforced reluctance to borrow. When banks borrowed to satisfy their reserve requirement, they reduced their future access to the discount window. Consequently, when the banking system as a whole had to borrow a higher volume of reserves to meet requirements, individual banks would bid up the federal funds rate as they tried to avoid being one of the banks that turned to the window. The process gave banks the message to cut back on deposit-expanding activities. Chart 6 gives key borrowing and interest rate relationships during these years.

The move to the new procedures inspired discussion of the appropriate guidelines for setting and changing the discount rate. Some Board members initially had expected that the discount rate would be changed more frequently than before to keep it more closely aligned with market rates. In practice, the basic discount rate was changed fairly frequently—sixteen times between October 1979 and October 1982—but it still moved much less than the funds rate. At times, unprecedented weekly average spreads developed between the funds rate and the discount rate.

⁴⁵In November 1978, reserve requirements, the discount rate, and the funds rate target were all raised simultaneously as a dramatic gesture to attack the rising rate of inflation and the weakening exchange value of the dollar.

During two periods of exceptionally restrictive provision of nonborrowed reserves, in 1980 and again in 1981, the volume of borrowing ran very high. The Board



introduced a surcharge on frequent borrowing by large banks as part of the Administration's credit restraint program in March 1980.⁴⁶ The frequency limits for access at the basic rate were similar to those that had been proposed a decade earlier for the basic borrowing privilege. In addition, banks did not have unlimited access to the discount window even when they paid the surcharge. The funds rate often exceeded even the combined basic rate and surcharge—which reached a high of 18 percent in 1981.⁴⁷

Borrowed reserve targeting in the 1980s and early 1990s

Borrowed reserve targeting replaced nonborrowed reserve targeting in 1983 as the primary guide for choosing desired reserve levels. The shift in emphasis removed the automatic linkage between reserves and money targets. Borrowed reserve targeting made more formal use of the relationship between the amount of borrowing and the spread of the federal funds rate over the discount rate that arises from the restrictions on heavy use of the discount window. As was the case under the previous procedures, forcing increased borrowing tended to lead banks to bid up the federal funds rate relative to the discount rate as they sought to avoid having to borrow. Reduced borrowing encouraged less aggressive bidding for federal funds, and the rate would fall. The FOMC raised borrowed reserve objectives when it wanted to tighten policy and lowered them when it wanted to ease policy.⁴⁸ Chart 7 shows key borrowing and rate relationships during these years.

A change in the discount rate was viewed as a substitute for a change in the borrowing assumption. Whenever the discount rate was raised or lowered, the FOMC made an explicit decision whether that action by itself accomplished the desired policy adjustment. On some occasions, the amount of assumed borrowing was left unchanged so that the average federal funds rate would

be expected to rise or fall by the same amount as the discount rate. At other times, the borrowing allowance was changed in a direction that lessened the impact of the discount rate change. For example, the FOMC would raise the borrowing assumption when the discount rate was lowered so that the average funds rate would fall by less than the discount rate.

Increased reluctance to borrow in the 1980s and early 1990s

A series of banking crises and failures beginning in 1982 reintroduced a source of reluctance to borrow that had largely disappeared after the 1930s. Once again, banks became concerned that borrowing at the discount window might be interpreted as a sign that they were so weakened financially that they could not borrow funds from normal sources. The concern was especially high in 1984, when Continental Illinois National Bank suffered a crisis of confidence, experienced runs by its large depositors, and was forced to borrow massive amounts from the Federal Reserve to keep operating. Continental's experience made many other banks more hesitant to borrow, and wider spreads of the funds rate over the discount rate emerged for a given amount of borrowing fostered by the Federal Reserve. As more banking crises developed and then were resolved, the reluctance to borrow became alternately more and less severe, but it never returned to its pre-1984 pattern.

By the fall of 1987, the borrowing relationship became sufficiently uncertain that the Federal Reserve felt compelled to reduce its reliance on it as a guide to policy. Since that time, the Fed has given greater weight to indicators of money market conditions such as the federal funds rate. Nonetheless, the extreme reluctance to borrow and the resulting uncertainty about how banks will respond to changing levels of reserve availability have also introduced some volatility to the funds rate. When banks have not wanted to borrow, they have reacted to a reserve shortage by bidding up the funds rate to very high levels before they finally turn to the discount window. Indeed, on one occasion in 1990, the funds rate reached 100 percent, a level not seen even when interest rates and borrowing levels were routinely much higher a decade earlier. Although efforts have been made to explain to the banks and the public that occasional borrowing is an appropriate action to relieve temporary shortages of reserves, the message has so far had limited impact.

The reluctance to borrow has compounded the reserve management difficulties associated with low reserve requirements, described in the previous section. The low requirements reduced depositories' ability to handle normal day-to-day variation in reserve flows because the range of reserve levels that fell between

⁴⁶A more detailed discussion of the rationale underlying the program of credit restraint is given in a statement by Frederick H. Schultz, Vice Chairman, Board of Governors of the Federal Reserve System, before the Subcommittee on Access to Equity Capital and Business Opportunities of the House Committee on Small Business, April 2, 1980. It is reprinted in the *Federal Reserve Bulletin*, April 1980.

⁴⁷The surcharge was initially imposed in March 1980. It was then removed in May of that year, only to be reimposed in September. In 1981, the surcharge underwent further changes. It was increased in May, reduced in September, reduced again in October, and finally eliminated in November.

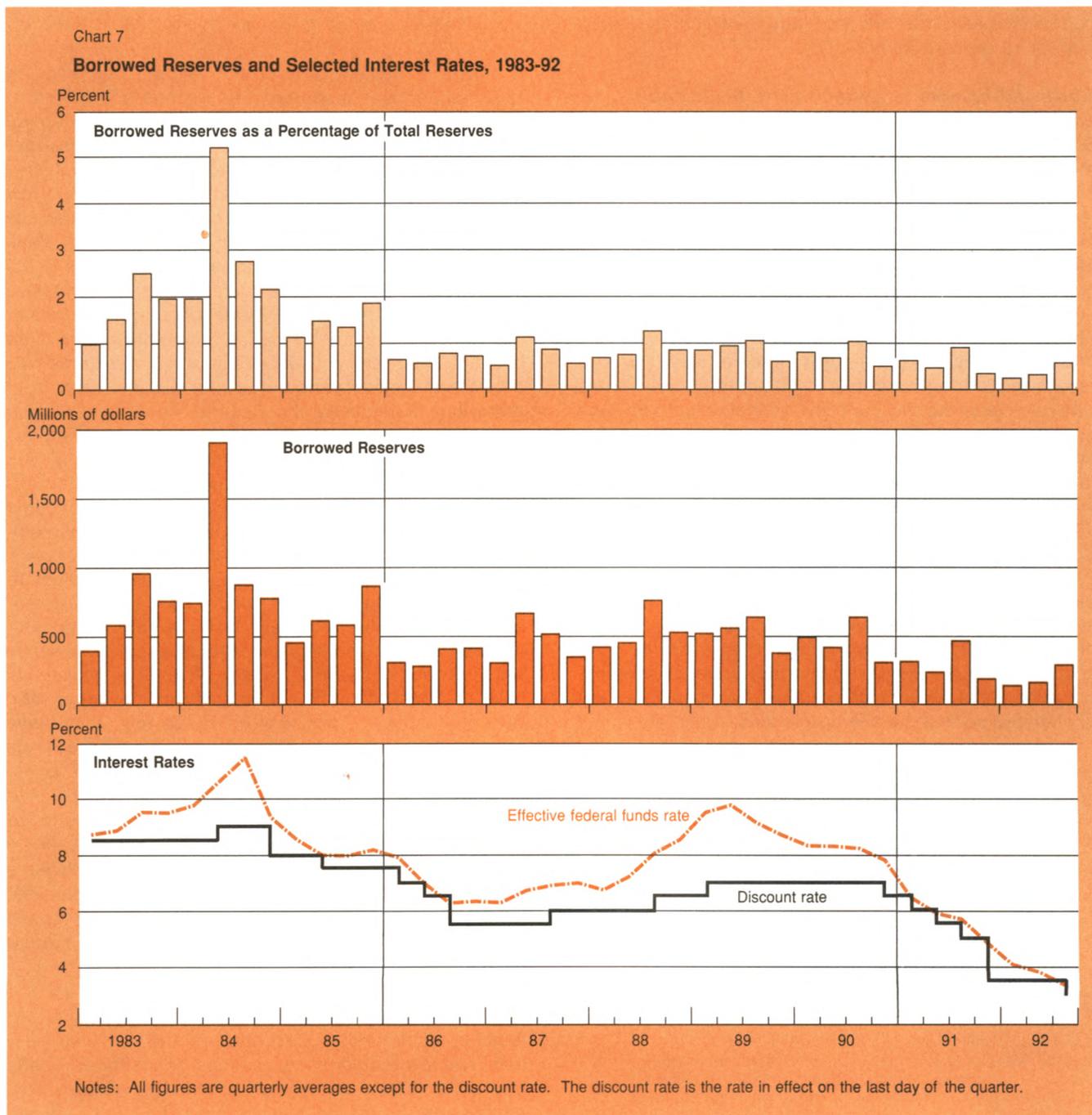
⁴⁸Marvin Goodfriend, "Discount Window Borrowing, Monetary Policy, and the Post-October 6, 1979 Federal Reserve Operating Procedure," *Journal of Monetary Economics*, September 1983, pp. 343-56, offers a critique of that relationship and suggests that it will inevitably be unreliable.

excess reserves and overdrafts narrowed. The extreme reluctance to borrow weakened one means for banks to recover from an unexpected reserve shortage.

Conclusions

Required reserves and the discount window can be

important supplements to open market operations in implementing monetary policy. Open market operations function more smoothly when both required reserves and the discount window are used in ways that contribute to a stable and predictable demand for reserves. The difficulties in managing reserves that arose in



recent years when these two tools were not functioning as intended underscored their potential value.

Required reserve ratios have fallen substantially on balance over the last four decades, primarily because untenable distortions arose from the implicit tax associated with relatively high requirements on which no interest was paid. The decline in ratios has been dramatic—from a top rate of 24 percent in 1951 to a top rate of 10 percent today. Furthermore, vault cash now meets over half of requirements, in contrast to 1951 when it could not be used for that purpose. Thus, required reserve balances are now only slightly above 1951 levels despite a sevenfold increase in checkable deposits.

Although the reductions in distortions associated with the declining reserve requirement tax have been helpful to the functioning of the banking system, the recent low levels of required reserve balances relative to the needs of the banks for clearing and settlement purposes have reduced the stability of the demand for reserves. Thus, policymakers must continue to balance conflicting considerations in choosing the appropriate level of required reserves.

The discount window has, overall, been a useful tool of monetary policy since the Accord. It has supple-

mented open market operations as a source of reserves and provided flexibility to handle reserve shortages late in the day when open market operations are not feasible. The Federal Reserve has found some amount of discount window borrowing helpful in regulating the availability of reserves on the margin. Nonetheless, the Fed has discouraged the banks from becoming heavily dependent on borrowed reserves. Administered limitations on borrowing have offset the influence of discount rates that were generally below market rates, ensuring that the discount window would not become a major source of total reserves.

Recently, in the wake of a number of bank failures, the reluctance to borrow has been reinforced by banks' worries that their reputations could be tarnished if they were seen as needing credit from the window. As a result, the discount window has been less useful as an adjunct to open market operations because the banks' borrowing patterns have become less dependable. Until general confidence in the banking system is restored—a process that is under way but far from complete—the discount window's value to the policy process is likely to remain diminished and open market operations will suffer reduced flexibility.