The Instruments of Monetary Policy

By Gordon H. Sellon, Jr.

The implementation of monetary policy by the Federal Reserve System has traditionally involved the use of three main policy instruments: open market operations, the discount rate, and reserve requirements. For many years, the use of open market operations has been the principal instrument of monetary policy. While the discount rate and reserve requirements may or may not be changed in a given year, open market operations have generally been carried out on a daily or weekly basis. As a result of the relatively infrequent use of discount rate and reserve requirement changes, discussions of monetary policy frequently understate their importance. Indeed, it has been fashionable to question whether the Federal Reserve really needs all three policy instruments.[1]

This article argues that the viewpoint claiming all three policy instruments are unnecessary is seriously out of date. The increased emphasis of the Federal Reserve on the control of inflation and the growth of money and credit has led to important changes in policy procedures and institutional arrangements that have both altered and enhanced the use of the discount rate and reserve requirements as policy instruments. A key development is the shift in Federal Reserve policy procedures from interest rate targeting to money and reserve targeting. Most analyses of this change have focused on its broad implications for such issues as monetary control and interest rate volatility. A point that is often overlooked, however, is that this change in policy procedures directly expands the role of the discount rate and reserve requirements as policy instruments. In addition, money and reserve targeting provides a framework in which legislative changes, such as the Monetary Control Act of 1980, and regulatory actions, such as the adoption of contempora-

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[1] Examples of this view can be found in Thomas Mayer, James Duesenberry, and Robert Aliber, *Money, Banking, and the Economy*, W. W. Norton, New York, 1981, pp. 500-19, and Warren L. Smith, "The Instruments of General Monetary Control," in Ronald L. Teigen, ed., *Readings in Money, National Income, and Stabilization Policy*, 4th ed., R. D. Irwin, Homewood, Ill., 1978, pp. 190-212

neous reserve accounting, further enhance the scope for discount policy and reserve requirements in the monetary policy process.

In light of these developments, this article reexamines the role of the discount rate and reserve requirements. The first section provides background information on the three instruments and an overview of their role in the policy process. The next three sections present a detailed discussion of important legislative, regulatory, and policy developments that have changed the role of discount rate policy and reserve requirements. The final section reexamines the usefulness of the discount rate and reserve requirements as policy instruments.

An overview of the policy instruments

Decisionmaking

Authority to change the three main instruments of monetary policy is divided between the Board of Governors and the regional Federal Reserve banks. Decisions on open market operations are made by the Federal Open Market Committee (FOMC), which consists of the seven members of the Board of Governors plus five of the 12 reserve bank presidents. Meeting eight times a year, the FOMC makes general decisions on the course of monetary policy and transmits these decisions in the form of a directive to the manager of the System Open Market Account at the Federal Reserve Bank of New York. The account manager, in consultation with the Board staff and a reserve bank president, makes day-to-day decisions on open market operations consistent with the FOMC directive.[2]

In contrast to open market operations, authority to change the discount rate and reserve requirements does not rest with the FOMC. In the case of reserve requirements, the Board of Governors has authority to implement regulatory changes in the level or structure of reserve requirements within legislative guidelines determined by Congress. Discount rate policy is somewhat more complicated. While the Board of Governors establishes regulations pertaining to the administration of the discount window at the regional banks, discount rate changes are initiated by the regional reserve banks. Thus, the boards of directors of the regional banks are required to meet at least every two weeks to recommend a discount rate. These recommendations are then transmitted to the Board of Governors, which has final authority to approve discount rate changes.[3]

Impact of the policy instruments

The three policy instruments do not affect economic activity directly but rather work through their effects on financial markets. Thus, the policy instruments have their initial impact on the demand for and supply of reserves held by depository institutions. Changes in reserves then influence market interest rates and the amount of money and credit created by financial institutions.

Reserve requirements provide the foundation of the policy process. Depository institutions are required by law to maintain a percentage of the value of transactions accounts and certain other deposit and nondeposit liabilities in the form of reserves. These reserves can be held either as vault cash or as deposits

[2] A detailed discussion of FOMC decisionmaking and the role of open market operations is presented in Paul Meek, *U.S. Monetary Policy and Financial Markets*, Federal Reserve Bank of New York, 1982.

[3] The best source of information on monetary policy decisions is the *Federal Reserve Bulletin*, published monthly by the Board of Governors. Policy actions in a given year are conveniently summarized in the *Annual Report* of the Board of Governors.

at Federal Reserve banks. Because credit creation by financial institutions is based on an expansion of deposit liabilities and deposit liabilities are backed by reserves, the power to set reserve requirements gives the Federal Reserve important leverage over deposit and credit creation.

While the existing level of reserve requirements serves as a constraint on deposit and credit creation, the Federal Reserve can also undertake discretionary changes in the level or structure of reserve requirements to tighten or ease credit restraint. Thus, to slow the growth of money and credit, the Federal Reserve might undertake a general increase in reserve requirements on all deposit liabilities. Alternatively, reserve requirement changes can be used more selectively to influence the growth of specific types of liabilities.

The Federal Reserve can also change the supply of reserves available to financial institutions in meeting their reserve requirements. Through the purchase or sale of government securities in the open market, the Federal Reserve can directly increase or decrease the supply of reserves. Depository institutions can obtain an additional supply of reserves by borrowing from the Federal Reserve through the discount window. By regulating access to the discount window and the discount rate charged on this borrowing, the Federal Reserve controls this secondary source of reserves.

The interaction between reserve demand and supply has an important impact on market interest rates and the growth of money and credit. To the extent that the amount of reserves supplied by the Federal Reserve is greater or less than the amount demanded by financial institutions, there is greater or lesser pressure on short-term market interest rates. Changes in interest rates, in turn, provide incentives for the public to alter its demand for money and credit. Thus, through the use of open market operations, discount rate policy, and reserve requirements, the Federal Reserve can influence interest rates, money, and credit.

Targets and instruments of monetary policy

The roles that open market operations, the discount rate, and reserve requirements play in the policy process depend on the ultimate objectives of policy as well as on the procedures used to achieve these objectives. In recent years the Federal Reserve has put increased emphasis on the goal of long-run price stability. As a means to this end, the Federal Reserve has focused on the short-run control of money growth as measured by the growth of narrow transactions-based aggregates such as M1 and by the broader aggregates, M2 and M3.

Control of monetary growth through the use of the three policy instruments can be approached in two distinct ways. First, the policy instruments can be used in a discretionary fashion. That is, the Federal Reserve can change open market operations, the discount rate, and reserve requirements in response to excessively strong or weak money growth. For example, in an expanding economy the Federal Reserve may want to tighten policy in order to reduce money growth. A more restrictive policy can be implemented by discretionary changes in one or more of the three policy instruments. Thus, the Federal Reserve can sell securities in the open market to reduce the supply of bank reserves directly, raise the discount rate to curb banks' incentive to borrow reserves at the discount window, or raise reserve requirements to increase banks' demand for reserves and reduce potential credit expansion. All three actions tend to raise market interest rates and reduce money growth.

Second, instead of responding to excessive money growth by discretionary actions, the Federal Reserve can try to structure the system of reserve requirements and the discount mechanism so as to reduce the likelihood of excessive money growth. In particular, the level of reserve requirements helps determine the responsiveness of market interest rates to changes in money demand and supply. A higher level of reserve requirements tends to improve automatic monetary control by magnifying the response of interest rates to changes in money demand. For example, a given increase in the public's demand for money raises interest rates by a larger amount, the higher the level of reserve requirements. This occurs because the higher level of reserve requirements constrains the amount of money that banks can supply. At the same time, the higher interest rate tends to have a feedback effect in reducing money demand. In this case, money volatility is reduced while interest rate volatility is increased by a higher level of reserve requirements.[4] Similarly, the structure of reserve requirements on different types of deposits and the terms of discount window borrowing may affect the volatility of money growth around its desired level. Thus, structural changes in the borrowing mechanism and reserve requirements that automatically tend to reduce the volatility of money growth may minimize the need to undertake discretionary policy actions.[5]

[4] In the case of a change in a factor affecting money supply directly, such as a shift in banks' desired holdings of excess or borrowed reserves, higher reserve requirements may reduce the volatility of both money and interest rates.

[5] The distinction between discretionary and automatic monetary control can be pictured in terms of a graph showing the determination of the interest rate and quantity of money by a downward sloping money demand curve and an upward sloping money supply curve. In this framework, discretionary policy actions shift the money supply curve while automatic policy actions change the slope of the money supply curve.

The following three sections examine some of the major legislative, regulatory, and operational decisions that have changed the role of discount policy and reserve requirements in the policy process. In each case, the focus is on whether the structural change strengthens or weakens the contribution of the policy instruments to discretionary and automatic monetary control. In reading the first two sections, which cover legislative and regulatory changes, it is important to recall that most of these changes occurred after the Federal Reserve adopted a reserve targeting procedure in October 1979.[6] Thus, the discussion in these two sections assumes that the Federal Reserve is using a reserve targeting procedure. This is a technical but quite important assumption that is discussed in more detail after presentation of the institutional material.

The Monetary Control Act of 1980

The most important legislative development affecting the role of the policy instruments in recent years is the Depository Institutions Deregulation and Monetary Control Act of 1980. This legislation extends Federal Reserve System reserve requirements and discount window access to all depository institutions. Before the act, only those institutions choosing membership in the Federal Reserve System were subject to Federal Reserve regulations on reserve requirements. In addition, nonmember institutions were not eligible to borrow at the discount windows except in unusual circumstances. Member banks found the requirement to hold noninterest bearing reserve balances increasingly burdensome in the high inflation, high interest rate environment of the 1970s. Consequently, a growing

[6] The exception is the Federal Reserve's use of reserve requirements on managed liabilities, which dates from the late 1960s.

number of institutions chose to relinquish their membership.[7] The loss of membership posed two problems for monetary policy. On the one hand, policymakers feared that monetary control would become increasingly complicated with a decreasing fraction of transactions deposits subject to reserve requirements. At the same time, the voluntary nature of membership severely curtailed discretionary increases in reserve requirements as a policy instrument since institutions could withdraw from the system to avoid the higher reserve requirements.

Passage of the Monetary Control Act effectively eliminated the erosion in the reserve requirement mechanism. At the same time, however, all institutions subject to reserve requirements were granted access to Federal Reserve services including the discount window. Since the policy implications of discount window access are potentially different from those of extended reserve requirements, it is useful to examine the two developments separately.

Extension of reserve requirements

Under the Monetary Control Act, all depository institutions' transactions accounts, nonpersonal time and savings deposits, and certain Eurocurrency transactions were made subject to Federal Reserve System reserve requirements.[8] Thus, reserve requirement coverage under the act is extended to nonmember banks, savings institutions, and credit unions. After a phase-in period, depository institutions are subject to a 3 percent reserve requirement on the first $28.9 million of net transactions accounts and a 12 percent reserve requirement on transactions accounts in excess of the base amount.[9] The Board of Governors is authorized to vary reserve requirements on transactions accounts in excess of the $28.9 million base in a range of 8 to 14 percent, with an additional supplemental requirement of 4 percent possible under special conditions.[10]

Reserve requirements on nontransactions liabilities were also modified. Reserve requirements against personal time and savings deposits were eliminated under the act. They were maintained on nonpersonal time deposits, however. Initially set at 3 percent, they can be varied in a range from 0 to 9 percent. The Board also has the authority to determine the maturity of nonpersonal time deposits that are subject to reserve requirements. Finally, the Board can set reserve requirements for certain Eurocurrency liabilities. These requirements are initially set at 3 percent, the same ratio as that for nonpersonal time and savings deposits. Table 1 provides a summary of the new system of reserve requirements and a comparison with the system in effect before the Monetary Control Act.

The new structure of reserve requirements

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[7] Nonmember institutions were subject to state reserve requirement regulations. Generally, these regulations were seen as less restrictive than Federal Reserve regulations.

[8] The Garn-St Germain Depository Institutions Act of 1982 modifies the 1980 Monetary Control Act by providing that $2 million of reservable liabilities of each depository institution be subject to a 0 percent reserve requirement This exemption amount is adjusted each year for the next calendar year by 80 percent of the percentage increase in total reservable liabilities of all depository institutions measured on an annual basis as of June 30. For more detail, see any issue of the *Federal Reserve Bulletin*, Table 1.15, footnote 5.

[9] For banks and thrift institutions that were not members of the Federal Reserve System on or after July 3, 1979, the phase-in period for the new reserve requirement structure ends September 3, 1987

The amount of transactions deposits against which the 3 percent reserve requirement applies is modified annually by 80 percent of the percentage increase in transactions accounts held by all depository institutions determined as of June 30 each year.

[10] For the conditions under which a supplemental reserve requirement may be imposed, see the *Annual Report*, Board of Governors, 1980, pp. 209-10.

TABLE 1
Reserve requirements of depository institutions
(Percent of deposits)

Type of deposit and deposit interval	Member bank requirements before implementation of the Monetary Control Act		Type of deposit and deposit interval	Depository institution requirements after implementation of the Monetary Control Act	
	Percent	Effective Date		Percent	Effective Date
Net demand			**Net transaction accounts**		
$0 million-$2 million	7	12/30/76	$0-$28.9 million	3	12/29/83
$2 million-$10 million	9½	12/30/76	Over $28.9 million	12	12/29/83
$10 million-$100 million	11¾	12/30/76			
$100 million-$400 million	12¾	12/30/76	**Nonpersonal time deposits**		
Over $400 million	16¼	12/30/76	By original maturity		
			Less than 1½ years	3	10/6/83
			1½ years or more	0	10/6/83
Time and savings					
Savings	3	3/16/67	**Eurocurrency liabilities**		
			All types	3	11/13/80
Time					
$0 million-$5 million, by maturity					
30-179 days	3	3/16/67			
180 days to 4 years	2½	1/8/76			
4 years or more	1	10/30/75			
Over $5 million, by maturity					
30-179 days	6	12/12/74			
180 days to 4 years	2½	1/8/76			
4 years or more	1	10/30/75			

Source: *Federal Reserve Bulletin*, January 1984, p. A7.

has a number of important implications for monetary policy. Generally speaking, the structure is designed to enhance the Federal Reserve's control over the narrowly defined aggregate, M1, consisting of currency, demand deposits, and other transactions accounts. Two features of the new system work to improve M1 control.[11]

The extension of reserve requirements to transactions accounts at all depository institutions contributes to automatic control of M1. The level of reserve requirements on transactions accounts determines the degree of interest rate pressure that occurs in response to stronger or weaker demands for transactions

[11] The discussion in this section is based on a more detailed treatment in J. A. Cacy and Scott Winningham, "Reserve Requirements Under the Depository Institutions Deregulation and Monetary Control Act of 1980," *Economic Review*, Federal Reserve Bank of Kansas City, September-October 1980, pp. 3-16.

balances. Before the Monetary Control Act, the effective reserve requirement on transactions deposits was declining over time as banks left the Federal Reserve System and as new types of transactions accounts with lower reserve requirements were introduced. This downward trend in the level of effective reserve requirements led to a progressive reduction in automatic control of M1. Thus, passage of the act stabilized the effective reserve requirement on transactions deposits and prevented further erosion in monetary control.[12]

The new structure of reserve requirements also improves automatic control of M1 by eliminating undesired variability in money growth due to investor shifts of funds among different types of transactions and nontransactions accounts. The new system improves monetary control in three ways.

First, shifts in transactions accounts between member and nonmember institutions no longer affect M1. Under the old system, a transfer of deposits from a member bank subject to reserve requirements to a nonmember institution would increase excess reserves in the banking system, permitting a multiple expansion of M1. Under the new system, since all transactions deposits have the same reserve requirement, regardless of institution, this type of shift does not affect excess reserves or M1.[13]

Second, in the new system of reserve requirements, all types of transactions accounts at a given institution will have the same reserve requirement. In contrast, under the old system, demand deposits had a higher reserve requirement than other transactions accounts. Thus, shifts between demand deposits and other transactions accounts will no longer affect excess reserves and potential M1 expansion.

Finally, shifts between transactions accounts included in M1 and personal time and savings deposits not included in M1 will have less impact on M1 under the new system. Under the new system, a shift from transactions deposits to personal savings deposits initially reduces M1. However, this effect is subsequently offset by a reduction in required reserves since personal savings deposits are not reservable. This reduction in required reserves permits institutions to carry out a secondary expansion of M1. Under the old system, where personal savings deposits were reservable, a similar transfer of funds released fewer required reserves. Thus, the secondary expansion of M1 would not offset as much of the initial reduction in M1.[14]

While the new structure of reserve requirements tends to enhance the Federal Reserve's ability to control M1, control over the broader aggregates such as M2 and M3 may be weakened. The reason is that reserve requirements on many of the components of the broader aggregates have either been reduced or eliminated. This means that increased demand for these deposits by the public tends to result in a relatively small increase in required reserves

[12] The overall impact on the level of reserve requirements for transactions balances is complicated since member institutions are generally subject to lower reserve requirements and nonmember institutions are subject to higher reserve requirements. The important point, however, is that without the act, reserve requirements on transactions accounts would have declined below the level established in the act.

[13] This result needs to be qualified. As noted above, the first $2 million of reservable liabilities of each depository institution is subject to a 0 percent reserve requirement, while net transactions accounts are subject to a 3 percent reserve requirement on the first $28.9 million, and 12 percent on amounts in excess of the base figure. Thus, shifts of funds between institutions of different sizes will continue to affect required and excess reserves.

[14] Other shifts may strengthen or weaken M1 control. For example, under the new system, shifts between assets such as Treasury bills and time deposits have a smaller impact on M1 because such shifts have a smaller effect on required reserves. On the other hand, deposit shifts between transactions accounts and nonpersonal time and savings deposits continue to affect M1.

and little upward pressure on market interest rates.[15]

In summary, reform of the reserve requirement system under the Monetary Control Act strengthens monetary control by improving the Federal Reserve's ability to control transactions deposits. At the same time, these reforms tend to reduce automatic control over the broader monetary aggregates. Still, the Federal Reserve retains some flexibility in setting reserve requirements on the components of the broader aggregates. As described in the next section, discretionary changes in reserve requirements on these components have been used more frequently as a policy instrument in recent years.

Extension of discount window privileges

The Monetary Control Act also requires changes in discount policy. Before 1980, borrowing from the Federal Reserve was generally limited to member banks. The act broadened discount window access to all depository institutions subject to reserve requirements.

Under current discount window regulations, borrowing is divided into two categories: adjustment credit and extended credit. Adjustment credit is designed to provide institutions a short-term cushion of funds to balance unexpected outflows from reserve accounts. In contrast, extended credit provides a longer term source of funds to institutions having strong seasonal patterns in loan demand or sustained liquidity pressures.

Broadened access to the discount window could have an adverse effect on the Federal Reserve's ability to control monetary growth. A problem could arise, for example, if newly eligible institutions tended to rely heavily on the discount window as a source of funds during a period in which the Federal Reserve was trying to restrain money and credit growth. In practice, however, two developments have minimized the problem.

First, nonmember institutions, such as savings institutions and credit unions, are expected to use special industry lenders, such as the Federal Home Loan banks and corporate central credit union facilities, before turning to the discount window. Indeed, since 1980, these institutions have undertaken relatively little borrowing under the adjustment credit program. Rather, their use of the discount window has generally been confined to borrowing under the extended credit program.

Second, borrowing that has occurred under the extended credit program has not been permitted to add to the total supply of reserves in the banking system. When borrowing occurs under the extended credit program, the Federal Reserve offsets this borrowing by subtracting an equal amount of reserves through open market operations. Thus, broadened access to the discount window under the Monetary Control Act has not had an adverse effect on monetary control.

Regulatory developments

In addition to legislative developments affecting the role of the policy instruments, the Federal Reserve has initiated a number of regulatory changes in recent years aimed at improving the monetary control process. Three of the most significant developments are the adoption of a contemporaneous reserve accounting system, the use of reserve requirements on managed liabilities as a discretionary

[15] Control of the broader aggregates is also complicated by certain deposit shifts similar to those discussed for M1. Under the new system of reserve requirements, shifts between transactions deposits and nontransactions deposits will have a larger effect on the broader aggregates because of the lower reserve requirements on the nontransactions components. For a further discussion, see Cacy and Winningham.

policy instrument, and the use of a discount rate surcharge mechanism.

Contemporaneous reserve accounting

From September 1968 to January 1984, financial institutions operated under a system of lagged reserve requirements (LRR). Required reserves in a given week were calculated on the basis of deposit levels two weeks earlier. This system was designed to make it easier and less costly for institutions to meet required reserves and to simplify the conduct of daily open market operations by removing the uncertainty associated with forecasting contemporaneous deposit levels.

Critics of lagged reserve accounting argued that the system impaired short-run monetary control. Because of the two-week lag between deposits and required reserves, increases in deposit growth in a particular week would not lead to an immediate increase in required reserves and so would not exert upward pressure on interest rates. Without upward pressure on interest rates, banks would have little incentive to curtail loan and deposit growth. Thus, lagged reserve accounting was seen as impairing the automatic control features of the reserve requirement mechanism.

Under the new contemporaneous reserve requirements (CRR) effective in February 1984, depository institutions that report weekly to the Federal Reserve have to maintain required reserves behind transactions deposits on an essentially contemporaneous basis. That is, these institutions compute their required reserves behind transactions deposits on the basis of average daily deposits over a two-week period that begins on a Tuesday and ends on a Monday. Reserves must then be maintained over a two-week period beginning on Thursday, two days after the start of the computation period, and ending on Wednesday, two days after the end of the computation period.[16]

Contemporaneous reserve accounting is designed to improve monetary control by speeding up the adjustment process for reserves held behind transactions deposits. Unlike the two-week lag for LRR, under CRR, from the time that an institution knows its required reserves at the end of the computation period, it has only two days to adjust fully to its required reserves. The basic idea is that when faced with this shorter adjustment period, institutions will attempt to acquire reserves to support growth of transactions deposits on a more timely basis or, alternatively, will attempt to liquidate assets to reduce their required reserves. In this way, faster money growth will be translated into higher interest rates and reduced loan and credit growth on a more timely basis.

It is difficult to determine whether this change in accounting procedures will significantly improve short-run automatic monetary control. Much depends upon how institutions choose to make reserve adjustments. If they reduce required reserves by curtailing loan and deposit growth, CRR may improve monetary control. However, if institutions tend to make more frequent use of the discount window or make reserve adjustments through excess reserves or managed liabilities, CRR may not significantly improve monetary control.[17]

Reserve requirements on managed liabilities

Historically, discretionary changes in reserve requirements have been used much less frequently than either open market opera-

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[16] For a more detailed discussion of the mechanics of CRR, see R. Alton Gilbert and Michael E. Trebing, "The New System of Contemporaneous Reserve Requirements," *Review*, Federal Reserve Bank of St. Louis, December 1982, pp. 3-7.

tions or discount rate policy. At least three reasons have been advanced to explain the relatively infrequent use of reserve requirement changes. First, a given change in reserve requirements can be a rather blunt policy instrument. That is, an across-the-board increase in reserve requirements affects all institutions, large or small, whether or not they are contributing to a problem of excessive money and credit growth.[18] Second, frequent changes in reserve requirements make it difficult for banks to plan their asset and liability management decisions. Third, before passage of the Monetary Control Act the voluntary nature of Federal Reserve membership may have limited the use of reserve requirements as a policy instrument.

In recent years, the Federal Reserve has focused its discretionary changes in reserve requirements not on demand deposits or other transactions accounts but rather on certain managed liabilities such as large denomination CD's and Eurodollar borrowings. This regulatory development has increased the flexibility of reserve requirements as a discretionary policy instrument by allowing the Federal Reserve to target reserve requirement changes to larger institutions that make extensive use of managed liabilities to fund credit expansion.

The focused use of reserve requirements is a response by the Federal Reserve to the rapid development and creative use of managed liabilities by banks during the 1960s and 1970s. From the banks' standpoint, an attractive feature of managed liabilities is that they are generally subject to lower reserve requirements than demand deposits. Thus, if the banking system can bring about a shift in the composition of its liabilities from demand deposits to managed liabilities, it can effectively lower reserve requirements and thus extend more credit with the same supply of reserves.

While beneficial to banks, managed liabilities can pose problems for monetary policy. In a period in which the Federal Reserve is trying to restrain the growth of money and credit, extensive use of managed liabilities may permit banks to counter policy actions by expanding the amount of credit creation possible with a given amount of reserves. In addition, since increased use of managed liabilities may be associated with slower growth of demand deposits, such transactions measures of money as M1 may give a misleading impression of the tightness of monetary policy. Thus, growth in M1 may shrink at the same time that banks are expanding loans and credit.

Reserve requirements on managed liabilities affect the behavior of banks by changing the cost of these liabilities relative to other sources of funding loan expansion. By raising reserve requirements on a specific type of liability, for example, its use can be discouraged relative to other funding sources. At various times the Federal Reserve has used this instrument in three distinct ways: to control the overall level of managed liabilities, to change the composition of managed liabilities, and to change the average maturity of managed liabilities. Some examples may clarify these uses.

In October 1979, the Federal Reserve tried to reduce growth in the overall level of man-

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[17] A more complete treatment of this issue is found in David S. Jones, "Contemporaneous vs. Lagged Reserve Accounting: Implications for Monetary Control," *Economic Review*, Federal Reserve Bank of Kansas City, November 1981, pp. 3-19.

[18] The Federal Reserve attempted to reduce this problem in 1972 by adopting a system of graduated reserve requirements based on size of deposits. This system replaced a structure in which reserve requirements depended on geographic location. Under a graduated system, reserve requirement changes can be directed at particular deposit size categories and thus at different size institutions. The new system of reserve requirements described above is a graduated system but has a smaller number of deposit size graduations than the old system.

aged liabilities by imposing an 8 percent reserve requirement on the amount by which an institution's total managed liabilities exceeded a base period amount.[19] This action was designed to slow the expansion in bank credit financed through managed liabilities by increasing the cost of the additional use of these liabilities. Subsequently, in April 1980, this marginal reserve requirement was raised to 10 percent as part of the Credit Control Program before being reduced to 5 percent in June 1980 and 0 percent in July 1980 as credit growth slowed.

Discretionary changes in reserve requirements also have been used to affect the composition of managed liabilities. For example, in September 1969 the Federal Reserve imposed a 10 percent marginal reserve requirement on Eurodollar borrowings by U.S. banks. The reason for this action was that banks were apparently avoiding domestic credit restraint by developing overseas sources of funds. Thus, the marginal reserve requirement on foreign borrowing was designed to eliminate the cost advantage of foreign sources of funds. At other times, reserve requirements on Eurodollars have been adjusted to encourage their use. For example, in August 1978, the marginal reserve requirement on Eurodollars was lowered to encourage U.S. banks to borrow abroad and help support the foreign exchange value of the dollar.

Finally, reserve requirement changes have been used in an effort to change the maturity of particular types of managed liabilities. For example, in September 1974 and again in October 1975, the Federal Reserve established differential reserve requirements on large-denomination time deposits with different maturities. Lower reserve requirements were set on time deposits with longer maturities. The purpose of this action was to encourage banks to lengthen the maturity of their time deposits by lowering the relative cost of longer term sources of funds.

It is important to note that these examples of the use of reserve requirements on managed liabilities occurred before passage of the 1980 Monetary Control Act. Provisions of the act have reduced the flexibility of this use of reserve requirements somewhat. For example, the act continues to permit, under ordinary circumstances, differentiated reserve requirements by personal vs. nonpersonal time deposits, by maturity of nonpersonal time deposits, and by nonpersonal time deposits vs. Eurocurrency liabilities. However, reserve requirements on all managed liabilities as employed in October 1979 are no longer permissible. In addition, only in extraordinary circumstances as determined by five board members and after consultation with appropriate congressional committees may reserve requirements be differentiated by types of nonpersonal time deposits or may marginal reserve requirements be imposed on selected types or on all nonpersonal time deposits.

The use of reserve requirements on managed liabilities adds to the flexibility of reserve requirements as a discretionary policy instrument. As noted in the next section, this use of reserve requirements may play a potentially valuable role in control of the broader monetary aggregates.

The discount rate surcharge

As in the case of reserve requirements, it has traditionally been difficult to target discount policy to specific size institutions. To make discount policy more flexible, in March

[19] A marginal reserve requirement applies to increases in a deposit category above a base period amount. Changes in the marginal rate affect the cost of additions to the base period amount but do not force an institution to alter the base period amount.

1980 the Federal Reserve introduced a discount rate surcharge applying to large banks that made frequent use of the discount window. The purpose of the surcharge was to prevent large banks with access to the money markets from borrowing excessively while at the same time providing smaller banks with continued access to the discount window.

As initially structured, the discount rate surcharge applied to banks with deposits over $500 million that borrowed for two consecutive weeks or for more than four weeks in a calendar quarter. The initial surcharge rate was 3 percent. Thus, large banks subject to the surcharge would pay the basic discount rate plus a 3 percent surcharge. The surcharge was removed in May 1980 but was reintroduced in November 1980, and it remained in effect until November 1981. During this latter period, the surcharge rate changed from 2 to 4 percent.

A discount rate surcharge can improve monetary control in two ways. First, the surcharge can be varied independently of the basic discount rate. Thus, the flexibility of discretionary discount rate changes is enhanced to the extent that changes in the surcharge rate can be directed at larger institutions. Second, the surcharge mechanism can improve the automatic nature of the monetary control system. Depending on the relationship among the federal funds rate, the basic discount rate, and the surcharge rate, large banks may have a reduced incentive to use the discount window as a source of reserves. Thus, in a period of monetary restraint, large banks subject to the surcharge may be encouraged to limit deposit and credit extension because of the higher cost of obtaining reserves through the discount window.[20]

The choice of monetary policy targets

The role that the discount rate and reserve requirements play in the policy process depends not only on institutional factors but also on the Federal Reserve's choice of policy targets. Curiously, most textbook discussions of the policy instruments place little or no emphasis on the relationship between policy targets and instruments. In contrast, this section argues that recent Federal Reserve decisions to target money and reserves rather than interest rates have expanded the scope to use the discount rate and reserve requirements.[21] Two issues are emphasized in this discussion: the use of a reserve approach rather than an interest rate approach to monetary control, and the implications of targeting several monetary aggregates.

Interest rate vs. reserve targeting

In October 1979, the Federal Reserve made a much-publicized change in its monetary control procedures. Until then, the Federal Reserve attempted to control monetary growth through control of short-term interest rates, specifically through control of the federal funds rate. Under this system, the FOMC chose a target interest rate that was believed to be consistent with a desired money growth rate and changed the interest rate target only if money growth deviated significantly from its desired path. In October 1979, the Federal

[20] The discount rate surcharge is analyzed in more detail in Gordon H. Sellon, Jr., and Diane Seibert, "The Discount Rate: Experience Under Reserve Targeting," *Economic Review*, Federal Reserve Bank of Kansas City, November 1982, pp. 3-18.

[21] The evolution of Federal Reserve targeting procedures and its policy implications are discussed in Gordon H. Sellon, Jr., and Ronald L. Teigen, "The Choice of Short-Run Targets for Monetary Policy," Part I, *Economic Review*, Federal Reserve Bank of Kansas City, April 1981, pp. 3-16, and Part II, May 1981, pp. 3-12.

Reserve shifted to the use of a nonborrowed reserve target in order to control money growth. In this framework, the FOMC chooses a target path for nonborrowed reserves that is thought to be consistent with desired money growth. The nonborrowed reserve target is then maintained unless money growth deviates substantially from its desired path.[22]

The 1979 change in operating procedures was designed to improve automatic control of money growth. Under an interest rate targeting procedure, increased money demand is initially accommodated by the Federal Reserve. That is, as increased demand for money expands banks' demands for required reserves, the Federal Reserve supplies more nonborrowed reserves to maintain the target interest rate. Under a reserves targeting procedure, in contrast, the supply of nonborrowed reserves is held constant in the face of increased demand for reserves. Thus, banks must either obtain additional reserves through the discount window or cut back loan and deposit growth to reduce their demand for required reserves.

What is the role of the policy instruments under the two operating procedures? Given the flexibility of open market operations on a daily or weekly basis, it is the principal policy instrument under either system. That is, under an interest rate targeting procedure, open market operations are used to maintain the target interest rate in the presence of changes in reserve demand and supply. Similarly, under a nonborrowed reserves procedure, open market operations are used to maintain the target level of nonborrowed reserves. The real question, then, is whether the discount rate and reserve requirements make an independent contribution to monetary control under either system.

Under an interest rate targeting procedure, the discount rate and reserve requirements play little part in the monetary control process. As long as open market operations are directed toward maintaining a constant interest rate, discretionary changes in the discount rate and reserve requirements have little impact on money and credit growth.[23] For example, a discount rate increase is normally thought to increase market interest rates. Under an interest rate target, however, open market operations routinely offset the effect of the discount rate increase by providing more nonborrowed reserves. Thus, while the discount rate increase may reduce reserves provided through the discount window, open market operations provide an equal amount of nonborrowed reserves, leaving the total supply of reserves and interest rates unchanged.[24] Similarly, an increase in reserve requirements is normally thought to result in greater demand for reserves and upward pressure on interest rates. With an interest rate target, however, open market operations again provide additional reserves. Since the increased demand for reserves is met by an additional supply of reserves, there is no upward pressure on interest rates or stimulus to reduce money and credit growth.[25]

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[22] A good discussion of the change in operating procedures is found in "Monetary Policy and Open Market Operations in 1979," *Quarterly Review*, Federal Reserve Bank of New York, Summer 1980, pp. 50-64.

[23] Under an interest rate approach, discount policy can affect the amount of discount window borrowing and may have some impact on the distribution of reserves in the banking system. Similarly, reserve requirements may not affect M1 control directly but may have an impact on other aspects of bank behavior.

[24] Discount policy under interest rate and reserve targeting is analyzed in more detail in Gordon H. Sellon, Jr., "The Role of the Discount Rate in Monetary Policy. A Theoretical Analysis," *Economic Review*, Federal Reserve Bank of Kansas City, June 1980, pp. 3-15.

[25] The role of reserve requirements under different targeting procedures is discussed in Ira Kaminow, "Required Reserve Ratios, Policy Instruments, and Money Stock Control," *Journal of Monetary Economics*, Vol. 3, No. 4, October 1977, pp. 389-408.

Discount rate policy and reserve requirements play a potentially more important role under reserve targeting. The reason is that with a nonborrowed reserve target, open market operations do not automatically offset discount rate and reserve requirement changes. For example, a discount rate increase tends to put upward pressure on market interest rates and to reduce money growth. In this instance, open market operations are directed at keeping nonborrowed reserves constant rather than increasing nonborrowed reserves as under the interest rate targeting approach.

Similarly, with a nonborrowed reserve target, an increase in reserve requirements puts upward pressure on market interest rates and reduces money growth. Since open market operations are directed at maintaining a fixed supply of nonborrowed reserves, the increased demand for reserves is not accommodated as it would be under an interest rate target. In general, then, the decision to target nonborrowed reserves opens up a greater scope for the use of discount rate policy and reserve requirements.[26]

Multiple aggregate targets

Since the beginning of formal monetary targeting in the mid-1970s, the Federal Reserve has set targets for a variety of monetary aggregates ranging from transactions-based M1 to such broader aggregates as M2 and M3, as well as measures of credit or debt. The primary reason for multiple targets is the belief that no one aggregate is sufficiently reliable to be used as the exclusive focus of monetary policy. While the Federal Reserve has generally emphasized control of M1, on several occasions the behavior of M1 has been deemphasized and increased weight placed on the broader aggregates. The most recent example is the decision in late 1982 and 1983 to deemphasize M1 because of distortions in its behavior caused by deregulation and financial innovation.

Problems arise, however, in trying to control a broadly defined monetary aggregate consisting of both transactions and nontransactions components. One difficulty is that there is little automatic control of the nontransactions components. Indeed, the restructuring of reserve requirements under the Monetary Control Act and the adoption of contemporaneous reserve accounting were aimed primarily at improving control of transactions deposits. These structural changes worsen or, at best, have no effect on control of nontransactions deposits.

At the same time, the financial deregulation of recent years may have increased the difficulty of controlling the broad aggregates through the use of open market operations and discount rate policy. As nontransactions deposits have come to pay market rates of interest, the interest sensitivity of the broader aggregates has probably declined. Thus, much larger changes in interest rates through open market operations or discount rate policy may be required to achieve the same degree of control over these aggregates.

These considerations suggest a broader

[26] It is important to distinguish clearly the concepts of automatic and discretionary control when evaluating the impact of reserve requirement changes. With a nonborrowed reserves target, in practice, the Federal Reserve would probably cushion the immediate effect of a reserve requirement change by altering nonborrowed reserves. At the same time, however, the new reserve requirement changes the slope of the money supply function and thus affects the degree of automatic monetary control. Thus, in practice, under a nonborrowed reserves procedure, reserve requirement changes would probably not be made to bring about immediate reserve adjustments, but rather, would be aimed at improving automatic monetary control. In contrast, with an interest rate target, reserve requirement changes do not contribute either to discretionary or to automatic monetary control since the form of the money supply function does not enter into the determination of the equilibrium interest rate and quantity of money.

potential role for the use of reserve requirements as a policy instrument. Two different approaches to the use of reserve requirements to control the broader aggregates are possible. The first approach, discussed earlier, is the discretionary use of reserve requirement changes on certain types of managed liabilities. By using these reserve requirements to alter the relative cost of different liabilities, the Federal Reserve can directly affect the growth rates of particular components of the broader aggregates. As noted above, however, provisions of the 1980 Monetary Control Act have reduced the flexibility of this type of reserve requirement change.

A second approach to the use of reserve requirements would be to improve automatic control over the broader aggregates. One suggestion in this regard is the use of so-called "shadow reserve requirements," where nonreservable components of a broad aggregate can be assigned reserve requirements in the process of computing a nonborrowed reserve target.[27] That is, growth in these deposits above a desired level would be treated as if these deposits were subject to reserve requirements. A corresponding downward adjustment in the nonborrowed reserve target would be made to offset this growth. In this way, excessive growth in these deposits would lead to upward pressure on interest rates that would tend to reduce the demand for these deposits and slow the growth of the broader aggregates.

The role of the policy instruments

In light of these legislative, regulatory, and policy developments, it is appropriate to reconsider the roles that the three instruments play in the monetary policy process. The thesis of this article is that these institutional developments generally enhance the importance of discount policy and reserve requirements. This position contrasts sharply with the traditional academic view that highlights the role of open market operations and deemphasizes the contribution of discount rate policy and reserve requirements to monetary policy. The traditional view appears to be based on the observation that historically the Federal Reserve has made relatively infrequent use of discount policy and reserve requirements as policy instruments. The major difficulty with this view is a failure to recognize that the role of the policy instruments depends crucially on the Federal Reserve's choice of policy targets and that the choice of policy targets has evolved considerably in recent years.

As shown in the preceding section, the Federal Reserve's decision to target short-term interest rates or reserves is the principal determinant of the role of discount rate policy and reserve requirements. The choice of an interest rate targeting approach implies that short-run monetary policy can be conducted through the use of a single policy instrument. Given the administrative flexibility of open market operations, discount rate policy and reserve requirements contribute little to monetary policy. In contrast, under a reserve targeting approach, all three instruments have an independent effect on interest rates and money growth. Thus, within this framework, legislative and regulatory actions that change the structure of discount policy and reserve requirements can make an important contribution to monetary control.

The traditional view of the policy instruments developed over a period when the Federal Reserve generally pursued an interest rate targeting approach to monetary policy. In this

[27] The case for the use of "shadow reserve requirements" is developed in Marcelle Arak, "Control of a Credit Aggregate," *Quarterly Review*, Federal Reserve Bank of New York, Winter 1982-83, pp. 10-15.

context, the traditional view accurately portrayed the subsidiary role of discount rate policy and reserve requirements. With the advent of reserve targeting, however, the traditional view clearly needs modification and more attention needs to be paid to the potential contributions of discount rate policy and reserve requirements.[28]

Role of the policy instruments under reserve targeting

While all three policy instruments are potentially important in the reserves approach to monetary control, they are not interchangeable. Each instrument has specific advantages and disadvantages that condition its use in particular situations and define its role in the policy process.

The use of open market operations continues to be the principal discretionary policy instrument under reserves targeting. Open market operations are used on a daily and weekly basis both to achieve the target level of reserves and to adjust this target in response to stronger or weaker money growth. The use of open market operations has two advantages as a discretionary policy instrument. First, open market operations have greater administrative flexibility than a change in discount rate policy or reserve requirements. Open market operations can be carried out on a daily basis in amounts tailored to meet existing reserve needs. Second, open market operations tend to be less subject to announcement effects. Open market operations are done frequently enough that their use is not viewed as a reliable signal of major policy changes. At the same time, however, this latter feature can turn into a disadvantage when the Federal Reserve wants to signal a policy change to financial markets.

Under a reserve targeting approach, reserve requirements can contribute to both automatic and discretionary monetary control. Reserve requirements affect the degree of automatic monetary control in two ways. First, the level of reserve requirements determines the amount of interest rate pressure that occurs in response to faster or weaker money growth. Before the Monetary Control Act, the downward trend in effective reserve requirements on transactions deposits led to a progressive weakening in automatic monetary control. With passage of the act, the effective reserve requirement on transactions deposits was stabilized, thus contributing to automatic monetary control. At the same time, changes in the structure of reserve requirements removed unnecessary variability in the money supply due to certain types of shifts among transactions and nontransactions deposits in different depository institutions. The adoption of contemporaneous reserve accounting should also improve automatic monetary control to the extent that it accelerates the response of bank reserve demand and interest rates to faster or weaker money growth.

Reserve requirements play a less important role as a discretionary policy instrument. A change in the overall level of reserve requirements continues to be a blunt and administratively complex policy instrument. Thus, general reserve requirement changes are likely to be infrequent under reserve targeting. With the

[28] In October 1982, the Federal Reserve decided to place less weight on M1 as a policy target because of impending innovations in the financial system. This decision required changes in the Federal Reserve's short-run operating procedures, as described by Governor Wallich in the accompanying article. Under these revised procedures, the level of nonborrowed reserves continues to be the short-run operating target. However, changes in required reserves are accommodated by changes in nonborrowed reserves unless a decision is made to alter the degree of reserve provision. In this system, discount rate changes have an effect on market rates similar to that under a pure nonborrowed reserves procedure, but reserve requirement changes would probably contribute little to automatic monetary control.

advent of several money targets, however, selective reserve requirement changes on specific types of deposits may have become a more useful discretionary instrument. The new structure of reserve requirements is designed to improve automatic control over transactions deposits. As such, it makes little contribution to automatic control of the major nontransactions deposits included in the broader aggregates. Thus, in this framework, changes in reserve requirements on nontransactions deposits can play an important role in controlling growth in the broader aggregates.

The role of discount rate policy under reserves targeting is more complicated than the other two instruments. In principle, discount rate policy has implications for both automatic and discretionary monetary control. In practice, however, there is considerable controversy over whether discount policy strengthens or weakens monetary control and whether discount rate changes are a useful discretionary instrument.

Whether discount rate policy aids or hinders automatic monetary control depends on differing views as to why institutions use the discount window. Those believing that borrowing weakens monetary control argue that banks typically use the discount window as an inexpensive source of funds for loan and credit expansion. Thus, it is argued, if the discount windows were closed or the discount rate set equal to market rates, banks would be forced to compete for a fixed supply of reserves and would limit loan and credit expansion. In contrast, those believing that the discount window improves monetary control argue that borrowing cushions the money supply from unexpected changes in the distribution of reserve demand and supply. Without a discount window, these disturbances would increase money volatility and force the Federal Reserve to take offsetting open market operations.[29]

The use of the discount rate as a discretionary instrument is also somewhat complicated. Generally speaking, under reserve targeting, discount rate changes and open market operations have similar effects on interest rates and money growth. For example, in responding to excessive money growth, the Federal Reserve can tighten policy by using open market operations to reduce the supply of nonborrowed reserves or by increasing the discount rate to discourage banks from obtaining reserves through the discount window. There is an asymmetry to the use of discount rate changes that is often overlooked, however. A change in the discount rate affects the supply of reserves only to the extent that it alters banks' incentive to use the discount window. If market rates are below the discount rate, banks undertake minimal discount window borrowing. In this case, discount rate changes have little effect on borrowing and so have little impact on market interest rates and money growth. Thus, this asymmetry tends to limit the usefulness of discretionary changes in the discount rate.[30]

In a situation where the discount rate is below market rates, a discount rate change may have an advantage over open market operations. Discount rate changes tend to be more visible. That is, they may have significant effects on market interest rates by signaling changes in the direction of monetary policy. The role of these announcement effects has been the subject of controversy. Some have defended the use of discount rate changes to signal policy changes by citing the difficulty of using open market operations to provide this information. Others have argued that

[29] For a discussion of these opposing views, see Sellon, "The Role of the Discount Rate in Monetary Policy," especially pp. 11-15.

[30] The impact of discount rate changes under reserves targeting is analyzed in more detail in Sellon and Seibert.

the announcement effects of discount rate changes may be unreliable.[31] That is, financial markets may not receive the correct policy signal. To the extent that discount rate changes convey important information about future monetary policy, however, discount rate changes have an additional role to play in the monetary policy process.[32]

Summary and conclusions

In recent years a number of important legislative, regulatory, and policy developments have altered the role of the discount rate and reserve requirements in the monetary policy process. The key development is the change in the Federal Reserve's targeting procedures. The use of a reserves approach to monetary control and the emphasis on multiple monetary targets have widened the scope for discount rate policy and reserve requirements. Within this new policy framework, structural changes in the reserve requirement and discount mechanisms have further enhanced the role of these instruments. Thus, the traditional view that deemphasizes the contribution of the discount rate and reserve requirements should be replaced by a more balanced view of the role of the policy instruments.

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[31] A good discussion of this viewpoint is contained in Warren L. Smith, "The Instruments of General Monetary Control," pp. 199-203.

[32] A recent study suggests that discount rate changes have significant announcement effects that reinforce the basic thrust of monetary policy. See V. Vance Roley and Rick Troll, "The Impact of Discount Rate Changes on Market Interest Rates," *Economic Review*, Federal Reserve Bank of Kansas City, January 1984, pp. 27-39.