The Changing Role of Reserve Requirements in Monetary Policy

By Stuart E. Weiner

Reserve requirements have traditionally been viewed as an integral part of the monetary control process. In conjunction with central bank control over the supply of reserves, reserve requirements have been seen as placing an upper limit on deposit creation, helping central banks directly control the growth of money and credit.

Yet, reserve requirements are on the wane worldwide. Central banks have been reducing or eliminating them in an effort to make banks and other subjected depository institutions more competitive. In the past two years, for example, the Federal Reserve has lowered requirements on transactions deposits and eliminated requirements on time deposits. The central banks of Switzerland, New Zealand, Australia, and Canada have eliminated their requirements. And the German Bundesbank reportedly has considered lowering its requirements. How does one reconcile these actions with the traditional view of reserve requirements and monetary control?

The answer is, in many countries the traditional view no longer holds. Reserve requirements are no longer seen as a vehicle to directly control the money stock but rather as a vehicle to facilitate control over short-term interest rates. As such, depending on a country's institutional framework, there may be scope for reducing or even eliminating reserve requirements.

This article examines the monetary policy implications of lower reserve requirements. The article focuses on the United States, Canada, and Germany. The first section outlines the traditional "multiplier" view of reserve requirements, showing that in this context the recent reductions in requirements would be cause for concern. The second section shows, however, that in a broader context, one in which most central banks now operate, the recent reductions are not necessarily cause for concern. Indeed, one can view the reductions as secondary to more fundamental policy decisions made much earlier. The third section provides a more detailed analysis of current operating procedures, stressing that reserve requirements may still have an important, albeit different, role to play in the monetary policy process.

RESERVE REQUIREMENTS IN A MULTIPLIER FRAMEWORK

Discussions of reserve requirements and monetary policy have typically taken place in the context of the multiplier model of the money supply. This model has come to provide the basic textbook

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framework for examining many monetary control issues. In this framework, reserve requirements play a crucial role.

The multiplier model

The multiplier model emphasizes the direct link between reserve requirements and monetary control. The simplest version of the model assumes that all money, M, is held in the form of bank demand deposits, D, that is,

(1) $M = D$.

Banks are required to hold a fraction of their assets as required reserves, RR, against these deposits,

(2) $RR = rrr * D$.

The central bank sets the required reserve ratio, rrr, at a value between 0 and 100 percent and also supplies the reserves. Rewriting (2) yields

(3) $D = (1/rrr) * RR$.

And, substituting (1) into (3) implies

(4) $M = (1/rrr) * RR$.

Thus, the money supply is a multiple of reserves. If the central bank wishes to expand the money supply, it adds reserves; if it wishes to contract the money supply, it drains reserves. The "multiplier," $1/rrr$ provides the link between changes in reserves and changes in the money supply. The multiplier, in turn, is determined by the level of reserve requirements. The higher the required reserve ratio, the smaller the multiplier, and vice versa.[1]

Reserve requirements clearly play an important role in this model. First, for a given level of reserves, they impose an upper limit on the money supply. Algebraically, the money supply can be no higher than $(1/rrr)$ times RR. In practical terms, what this is saying is that banks face a limit on the amount of deposits they can create for a given amount of reserves.

Second, reserve requirements are a crucial factor in determining the size of money supply "misses." Suppose, for example, the central bank seeks to attain a certain level of the money supply but finds out too late that reserves are too plentiful. The unexpected surplus in reserves will lead to an undesired surplus in money. The size of the money supply overshoot will depend critically on the level of reserve requirements—the higher the required reserve ratio, the smaller the multiplier, hence, the smaller the overshoot. The reverse is also true, of course—the lower the required reserve ratio, the greater the overshoot.

This key result, that lower reserve requirements imply less monetary control in the presence of reserve disturbances, carries over into more complex versions of the multiplier model. Introducing currency into the model, for example, changes the form of the multiplier but not the basic result.[2] Nor does incorporating more than one type of deposit.[3] The message remains the same: monetary control suffers the lower are reserve requirements.

The decline in reserve requirements

Notwithstanding the above discussion, reserve requirements are on the decline worldwide. Several central banks have reduced or eliminated statutory requirements in recent years. At the same time, deregulation and innovation have allowed a growing portion of deposits to escape reserve requirements. Consequently, many countries have experienced steady declines in effective required reserve ratios, that is, in the ratio of required reserves to the money supply.

Table 1 shows the decline in statutory reserve requirements in the United States, Canada, and Germany over the past 20 years. The most dramatic decline has occurred in Canada. A key provision of comprehensive financial market legislation proclaimed in June 1992 sets the marginal reserve requirement to zero and eliminates all reserve requirements over a two-year phaseout

Table 1

Statutory Reserve Requirements, Selected Years

(Percent)

	1974	1989	1992
Transactions deposits			
United States	18[a]	12	10[b]
Canada	12	10	0[c]
Germany	19.1[d]	12.1	12.1
Term deposits			
United States	8[a]	3	0
Canada	4	3	0[c]
Germany	13.25[d]	4.95	4.95

[a] Effective January 1 through December 11, 1974.

[b] Effective April 2, 1992.

[c] The marginal reserve requirement is zero. Overall reserve requirements are being phased out over a two-year period that began in mid-1992.

[d] Effective January 1 through August 30, 1974.

Note: Figures shown are highest marginal ratios; in some cases, applicable marginal ratios may vary according to specific type of deposit, location of depository institution, or level of deposit liabilities.

Sources: Federal Reserve System; Bank of Canada; Deutsche Bundesbank.

period.[4] The United States also has seen recent declines. In December 1990, the Federal Reserve eliminated reserve requirements on term deposits. In April 1992, it lowered requirements on transactions deposits. German reserve requirements also are markedly lower today than 20 years ago, and German officials reportedly have considered lowering them further (Evans).

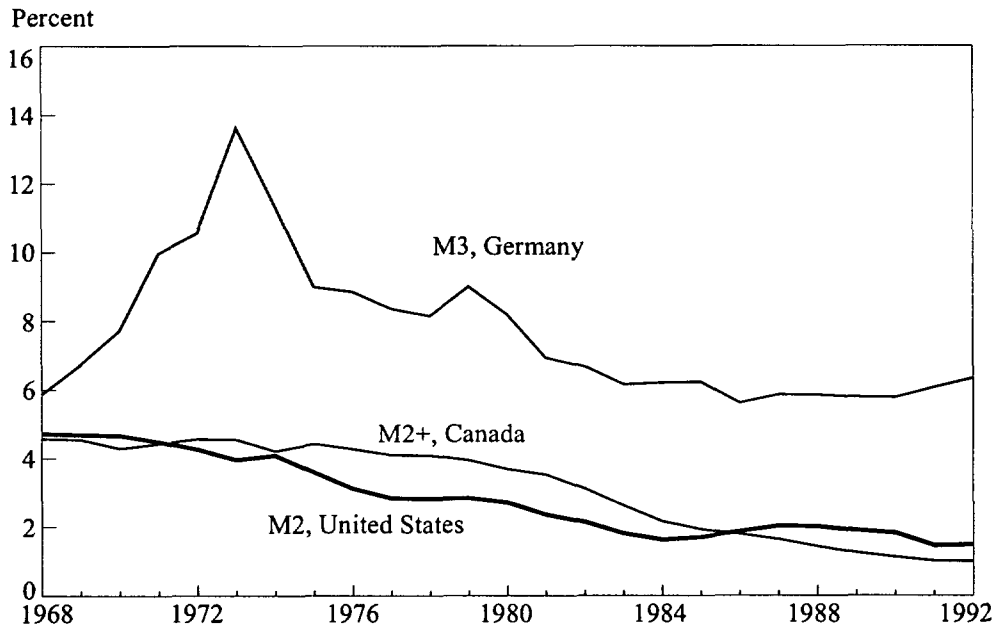
The principal reason central banks have been reducing reserve requirements is to ease the burden on subjected depository institutions and thereby allow them to become more competitive. Reserve requirements impose a cost on depository institutions and their customers. Because reserves typically do not earn interest—and in the United States, Canada, and Germany they do not—reserve requirements force depository institutions to forego interest income. Some reserves would be held in the absence of reserve requirements but a portion would not. The interest that is foregone on involuntarily held reserves is in effect a tax that is either borne directly by the institutions and their shareholders or passed on to customers via lower deposit rates, higher borrowing rates, or reduced services. Like any other selective tax, the reserve tax distorts the allocative process. It makes banks and other subjected institutions less competitive, channeling financial resources away from them and toward potentially less productive uses at institutions not subject to reserve requirements.[5]

Central banks are very aware of the burden of reserve requirements. In announcing its December 1990 reserve requirement reduction, for example, the Federal Reserve noted that "lower reserve requirements . . . will reduce costs to depository institutions" (Board of Governors 1990). In announcing its April 1992 reduction, the Federal Reserve stressed that "the reduction . . . will reduce funding costs for depositories and strengthen their balance sheets. Over time, it is expected that most of these cost savings will be passed on to depositors and borrowers" (Board of Governors 1992).[6] Similarly, the Bank of Canada has emphasized that the recent financial market legislation "will result in increased competition" (Bank of Canada 1991a), and the German Bundesbank has acknowledged that reserve requirements "create a certain competitive bias" against German banks vis-a-vis Euromarket competitors (Pohl). Hence, the move toward lower reserve requirements.[7]

Reductions in statutory requirements, however, are not the only reason for a decline in effective reserve ratios. Deregulation and innovation have also played important roles. Precisely because reserve requirements are a tax, financial institutions have a strong incentive to avoid them,

Chart 1

Effective Required Reserve Ratios

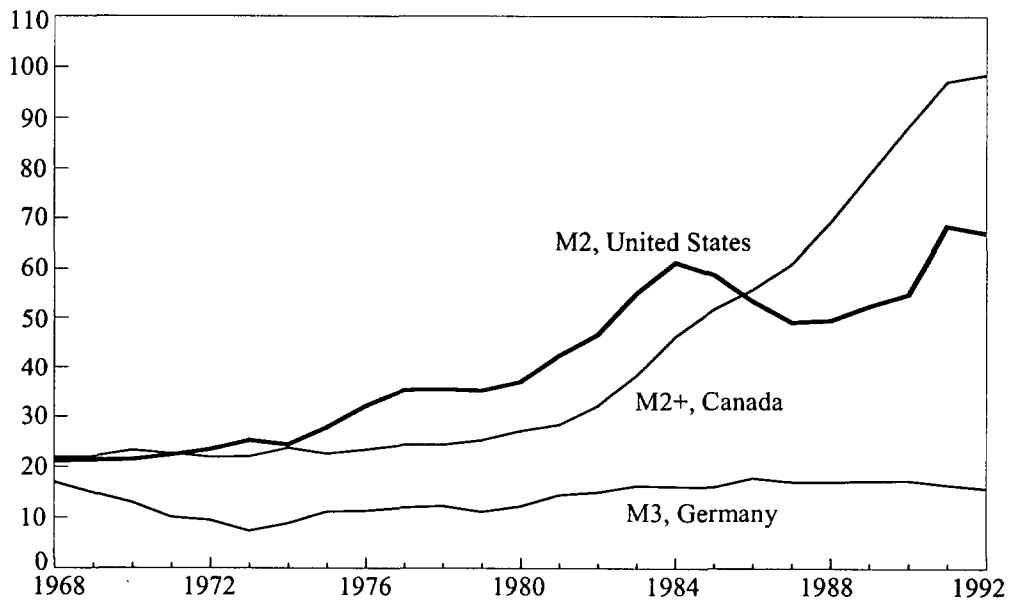


Note: Calculated as required reserves divided by monetary aggregate, based on nonseasonally adjusted, nonbreak adjusted average annual data. Figures for 1992 computed as average of January-May for Germany and Canada, as average of January-June for the United States.
Source: Federal Reserve *Bulletin;* Bank of Canada *Review; Monthly Report of Deutsche Bundesbank.*

either by taking advantage of changes in rules or by innovating around existing rules. Much of the decline in the Canadian effective reserve ratio in the 1980s, for example, was attributable to strong growth in nonreservable deposits at trust and mortgage loan companies, including mortgage loan subsidiaries of chartered banks. This growth was made possible by earlier deregulation.[8] Much of the decline in the U.S. ratio in the 1970s was attributable to banks leaving the Federal Reserve system, a very blunt form of innovation. And there are numerous other examples.[9] Acting in tandem with the reductions in statutory requirements, deregulation and innovation have contributed to the steady decline in effective reserve ratios.

The extent of the decline in effective reserve ratios is shown in Chart 1. From a high of 13.6 percent in 1973, the German effective reserve ratio has declined to 6.3 percent in 1992. Likewise, the Canadian ratio has fallen from 4.5 percent to 1.0 percent over the same period, while the U.S. ratio has fallen from 4.0 percent to 1.5 percent. And as effective reserve ratios have declined, effective money multipliers—defined as the ratio of the money supply to required reserves, that is, the reciprocal of the reserve ratio—have risen (Chart 2).[10] In the context of the multiplier model discussed above, the decline in reserve ratios (increase in money multipliers) would appear to be cause for concern from a monetary control standpoint. Feldstein, for example, has argued that it is. The next section takes up this issue.

Chart 2
Required Reserve Money Multipliers



Note: Calculated as required reserves divided by monetary aggregate, based on nonseasonally adjusted, nonbreak adjusted average annual data. Figures for 1992 computed as average of January-May for Germany and Canada, as average of January-June for the United States.
Source: Federal Reserve *Bulletin;* Bank of Canada *Review; Monthly Report of Deutsche Bundesbank.*

RESERVE REQUIREMENTS IN A BROADER FRAMEWORK

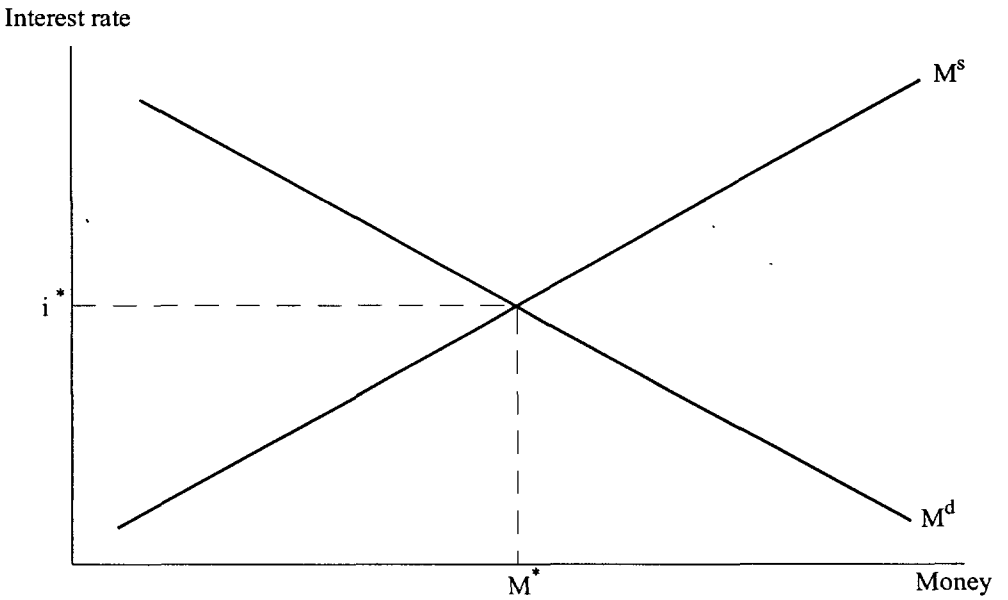
Should the decline in reserve requirements alarm monetary policymakers? The multiplier model of the previous section suggests yes. A richer model developed in the first part of this section also initially suggests yes. But by enriching that model even further and incorporating central banks' current focus on interest rates, the answer becomes no.

Money supply and demand

The multiplier model of the preceding section indicates that the decline in reserve requirements could impair monetary control. One might suspect, however, that a richer model, a model that explicitly considers money demand as well as money supply and allows both money demand and money supply to be sensitive to interest rates, would yield different results. In fact, the results of the much simpler model continue to hold. As long as the central bank continues to operate in a way that relies on the direct link between reserves and the money supply, monetary control suffers when reserve requirements decline.

In examining this issue, it is useful to adopt a money supply and demand framework like that depicted in Figure 1. Money stock levels are measured on the horizontal axis and market interest rates are measured on the vertical axis. The equilibrium levels of the money stock and interest rate, M^* and i^*, respectively, are determined where money supply equals money demand, that is, at the intersection

Figure 1
Supply of and Demand for Money



of the money supply and money demand curves.

The money supply curve is derived from a series of equations similar to those underlying the multiplier model. For simplicity, it is again assumed that all money is held in the form of demand deposits, that is,

(5) $M = D$.

Also as before, banks are required to hold a fraction of their assets as reserves against these deposits,

(6) $RR = rrr^* D$.

However, banks are now permitted to hold excess reserves as well, so that total reserves are the sum of required reserves and excess reserves,

(7) $TR = RR + ER$.

By assumption, excess reserves do not earn interest. As a result, excess reserves are negatively related to the market interest rate. An increase in the market interest rate, for example, will lead banks to hold fewer excess reserves because excess reserves become more costly in terms of the interest foregone.

As in the multiplier model, the central bank sets the required reserve ratio, *rrr*, and supplies the reserves, *TR*. However, a distinction is now made between two types of reserves provided: nonborrowed reserves, which the central bank supplies via open market operations, and borrowed reserves, which the central bank supplies via direct lending at an administered interest rate. Thus, total reserves

can also be expressed as the sum of nonborrowed and borrowed reserves,

(8) $TR = NBR + BR.$

Like excess reserves, borrowed reserves are assumed to be sensitive to interest rates. Specifically, borrowed reserves are positively related to the market interest rate. An increase in the market interest rate, for example, will lead banks to borrow more from the central bank as alternative sources of funds become relatively more expensive.

Equations (5) through (8) can now be combined to derive the money supply curve. Rewriting (6) yields

(9) $D = (1/rr)*RR$.

Substituting (5) into (9) implies

(10) $M = (1/rr)*RR.$

From (7) and (8),

(11) $RR + ER = NBR + BR,$

or, rearranging terms,

(12) $RR = NBR + BR - ER.$

Finally, substituting (12) into (10) yields

(13) $M^S = (1/rr)(NBR + BR - ER).$

Thus, the money supply is determined by the required reserve ratio and the levels of nonborrowed reserves, borrowed reserves, and excess reserves. The money supply curve slopes upward because increases in the market interest rate encourage borrowings and discourage excess reserves, boosting the money supply.

The money demand curve, in contrast, slopes downward on the assumption that money assets do not pay a market rate of return. When the market interest rate declines, the opportunity cost of holding money also declines, reducing the incentive for households and businesses to economize on their money holdings. Hence, the demand for money increases. Conversely, when the market interest rate rises, the demand for money falls.

Lower reserve requirements reduce monetary control in this framework. Disturbances in either money demand or money supply will cause greater movement away from the desired money stock.

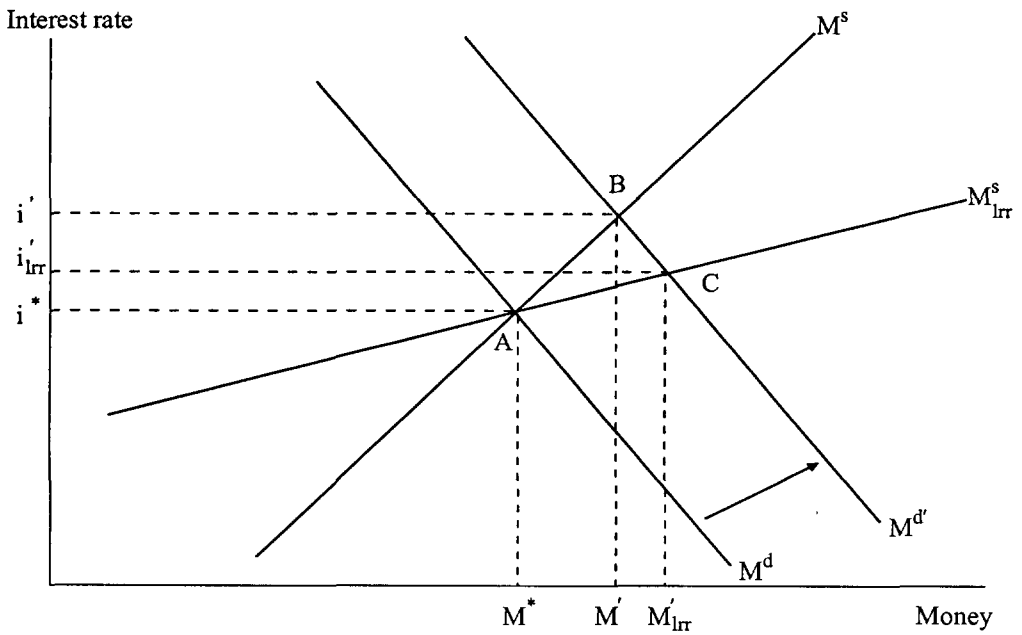
Figure 2 shows the effect of a disturbance in money demand. Suppose M^* is the central bank's target level of the money stock, M^d and M^s are the money demand and money supply curves, and the economy initially is in equilibrium at point A. Now suppose the money demand curve shifts to $M^{d'}$. This shift could arise either because of an increase in the transactions demand for money due, say, to higher income growth, or because of an increase in the demand for money vis-a-vis other assets in the public's investment portfolio. Whatever the reason, the economy moves to the new equilibrium point B, and the money stock increases to M'. The central bank finds that its target has been exceeded.

The overshoot would be even greater, however, with lower reserve requirements. Manipulation of equation (13) reveals that a lower required reserve ratio implies a flatter money supply curve. Analytically, at a given interest rate, banks have more free reserves with which to make loans and create deposits.[11] The flatter money supply curve $M^s{}_{lrr}$ reflects such a decline in reserve requirements. Note that the same money demand disturbance now leads to equilibrium point C, and the money stock now increases to M'_{lrr}, a larger deviation from M^*. Thus, monetary control is worsened.

The same result holds in the case of a money supply disturbance. This point is illustrated in Figure 3. M^s is assumed to be the initial money supply curve, and $M^s{}_{lrr}$ is assumed to be the money supply curve after reserve requirements have been lowered. Suppose the initial money supply curve shifts rightward to $M^{s'}$, a result, say, of banks unexpectedly deciding to increase borrowings or lower excess reserves. The economy moves to equilibrium point B, and the money stock increases

Figure 2

Money Demand Shock in Presence of Lower Reserve Requirements



to M'. An identical shift in Ms_{lrr}, in contrast, moves the economy to equilibrium point C and increases the money stock to M'_{lrr}, a level exceeding M'. So again, monetary control is worsened.

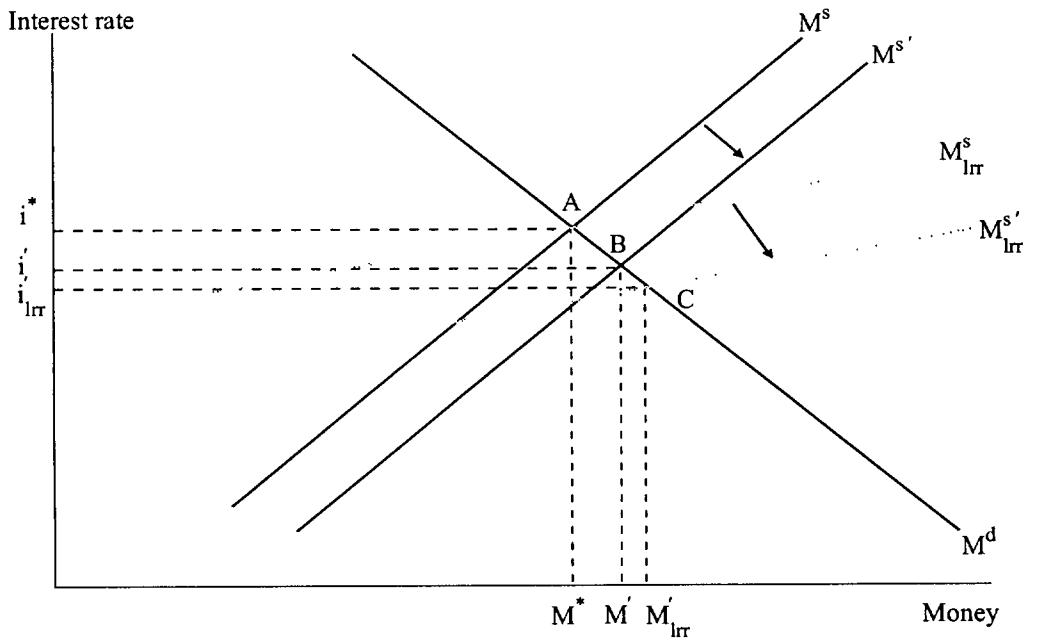
Operating procedures and intermediate targets

The results discussed so far all seem to indicate that lower reserve requirements impede monetary control. But a crucial underlying assumption has been that central banks seek to achieve monetary control by exploiting the direct link between reserves and the money supply. This approach to policy, referred to as a "reserves operating procedure," is not the only approach available to central banks. Central banks may instead seek to control the money stock by controlling short-term interest rates, that is, by following an "interest rate operating procedure." Or, central banks may choose to deemphasize monetary control altogether and focus on interest rates as their principal "intermediate target." In such situations, it may be possible to reduce or even eliminate reserve requirements without deleterious effect. The money supply and demand framework developed above again proves useful in examining these issues.

First, however, it is necessary to carefully define some terms. The distinctions among "ultimate goal variables," "intermediate targets," "operating procedures," and "instruments" are very important in discussing the monetary policy implications of lower reserve requirements. Ultimate goal variables are the long-run objectives of the central

Figure 3

Money Supply Shock in Presence of Lower Reserve Requirements

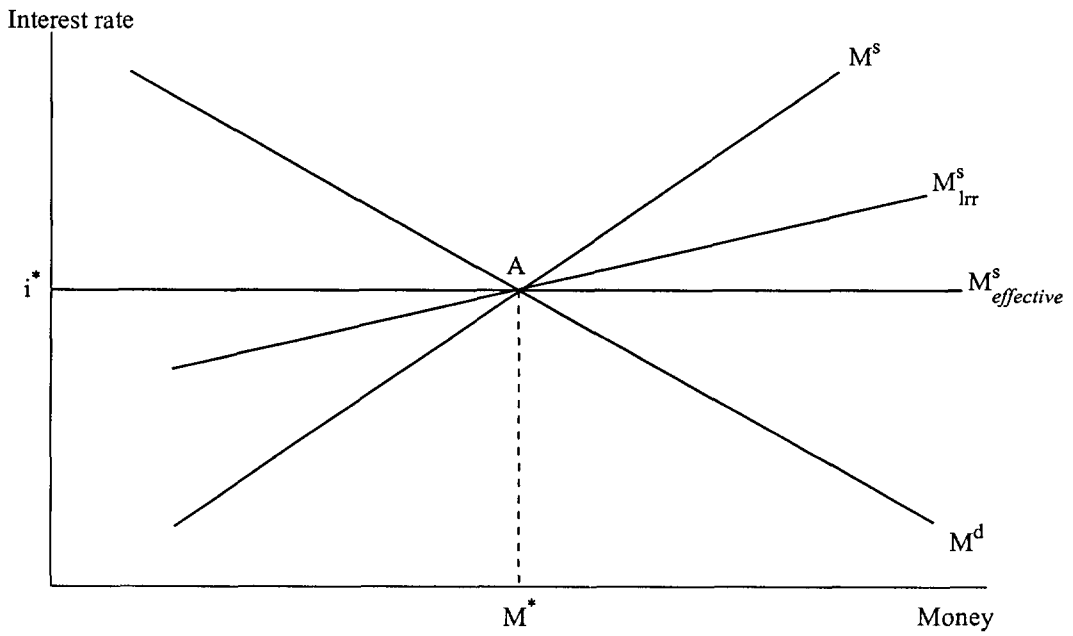


bank. In most countries, these objectives are price stability and sustainable real growth. Central banks cannot directly control ultimate goal variables, however, so they seek instead to control some intermediate target that is thought to be closely related to the ultimate goal variables. Candidates for intermediate targets may include the money stock, medium or long-term interest rates, the exchange rate, or a credit aggregate. Even intermediate targets are difficult to control over a short period of time, however, so central banks establish an operating procedure to guide them in their day-to-day policy actions. Central banks may elect to target reserves, for example, or alternatively may attempt to keep short-term interest rates at a certain level. Finally, in implementing policy on a day-to-day basis, central banks have two primary instruments at their disposal, open market operations and direct lending to depository institutions.[12]

Lower reserve requirements impede monetary control only in the case where the central bank has adopted a reserves operating procedure to achieve its money stock intermediate target. This policy pairing was implicit in the discussion of the preceding subsection. There it was assumed the central bank sought a certain level of the money stock, M^*, and provided an amount of reserves it thought consistent with that money stock. Disturbances in either money demand or money supply then led to deviations from the targeted money stock, deviations made worse by lower reserve requirements.

But as an alternative the central bank could have attempted to achieve its money target by

Figure 4
Interest Rate Operating Procedure



controlling short-term interest rates. That is, it could have adopted an interest rate operating procedure. Under such a procedure, reserve requirements become irrelevant from a direct monetary control standpoint.

The money supply and demand diagram in Figure 4 illustrates this point. Its basic features are identical to those of earlier diagrams. As before, M^* is assumed to be the central bank's target level of the money stock, and M^s and M^s_{lrrr} are the money supply curves before and after a reduction in reserve requirements. What is different in Figure 4 is the mechanism for achieving M^*. Rather than providing a predetermined level of reserves and relying on the direct link between reserves and the money supply to achieve M^*, the central bank focuses instead on achieving the market interest rate i^* associated with equilibrium point A—and M^*. That is, it provides whatever reserves are required to achieve i^* and, hopefully, M^*. In effect, the central bank continuously shifts the upward sloping M^s or M^s_{lrr} curve to the right and left, adding and draining reserves, the intent being to hold the effective money supply curve horizontal at the chosen interest rate in the hope it will cross the money demand curve at the targeted money stock. This horizontal effective supply curve is shown as $M^s_{effective}$ in Figure 4.[13]

A crucial implication is that the level of reserve requirements is now irrelevant. The fact that lower reserve requirements lower the slope of the money supply curve is unimportant—the effective money supply curve is $M^s_{effective}$ in either case. Thus, reserve requirements no longer play a

direct role in monetary control.[14]

Going one step further, there is no inherent reason why a central bank need target the money stock. It could be the case that another intermediate target, say, a medium-term interest rate, is deemed to be more closely related to the ultimate goal variables. If so, monetary control can be deemphasized or even abandoned, in which case reserve requirements again become irrelevant as a vehicle for directly controlling the money stock.

Thus, if a central bank chooses to target the money stock via an interest rate operating procedure, or chooses to target some intermediate target other than the money stock, reserve requirements lose their traditional monetary control function. Many central banks, including the Federal Reserve, the Bank of Canada, and the German Bundesbank, have made such choices.

Policy choices

Observers both inside and outside the respective institutions agree the Federal Reserve, the Bank of Canada, and the German Bundesbank are currently following interest rate operating procedures paired with varying degrees of adherence to a money stock intermediate target.[15] Although the three banks have different techniques for implementing policy, their overriding policy orientations are quite similar.

The Federal Reserve's current operating procedure is to target the federal funds rate, the interest rate banks charge each other for overnight loans. The federal funds rate, in turn, strongly influences other short-term market interest rates.

The Federal Reserve's current intermediate target can best be described as a hybrid. The Federal Reserve continues to set annual target ranges for M2 and M3, the broadest measures of the money stock. But the Federal Reserve also carefully monitors medium and long-term interest rates, credit availability, the exchange rate, and incoming data on real growth and inflation. Monetary aggregates' status as intermediate targets has slipped in recent years. As Chairman Greenspan recently explained in discussing the current operating procedure, "policy tactics have evolved away from according top priority to short-run control of any monetary aggregate and hence also away from an operating procedure that targets on a reserve aggregate" (Greenspan 1992a).

The Bank of Canada has adopted a comparable policy approach. It too focuses on short-term interest rates in its day-to-day policy, and it too has reevaluated its intermediate targets. In his most recent annual report, for example, Governor Crow noted that "In putting its policy into effect, the Bank operates at the short end of the financial market. . . . This involves influencing the rate on overnight financing in the money market" (Bank of Canada 1991a). Regarding intermediate targets, the Bank of Canada no longer establishes formal monetary targets but instead monitors an array of economic variables much like that of the Federal Reserve.[16] Indeed, an alternative characterization of both the Bank of Canada's and the Federal Reserve's current approach is that neither has an intermediate target per se but rather a collection of "information variables," variables that help guide policy decisions but are not targets themselves. For example, Charles Freedman, Deputy Governor of the Bank of Canada, recently described the Bank of Canada's policy structure as one without a formal intermediate target.

German monetary policy has a similar orientation, although geared somewhat more toward traditional monetary control considerations. Like the Federal Reserve and the Bank of Canada, the Bundesbank follows an interest rate operating procedure. Bundesbank officials have described the procedure as one in which, to varying degrees, "key interbank rates are normally kept within narrowly conceived tolerance ranges" (Dudler).[17] Unlike the Federal Reserve and the Bank of Canada, however, the Bundesbank has not deemphasized the money stock as an intermediate target. The Bundesbank continues to set an annual target

for M3, the broadest measure of the German money supply, and M3 remains its principal intermediate target. However, the Bundesbank is flexible when deemed necessary. For example, exchange rate considerations have forced the money target to be compromised on occasion.[18]

What are the relative merits of one intermediate target over another or one operating procedure over another? It is beyond the scope of this article to go into much detail, but it is useful to sketch some of the relevant issues.

Most analyses of intermediate target choice focus on the types of disturbances hitting an economy.[19] An economy subject to frequent shocks in money demand emanating from portfolio shifts, for example, is best served by an interest rate intermediate target. Such an approach insulates the real economy from unwanted fluctuations, and while the money stock may increase or decrease unexpectedly, such movements have no effect on the inflation rate. An economy subject to frequent shocks in money demand emanating from unexpected changes in consumer or business spending, on the other hand, is best served by a money stock intermediate target. By allowing interest rates to adjust, a money stock target prevents large fluctuations in real growth and at the same time keeps inflation close to its desired level.[20] Money supply disturbances, such as unintended overprovision or underprovision of nonborrowed reserves or unexpected changes in borrowed or excess reserves, can be accommodated under either an interest rate or a money stock intermediate target.

Most analyses of operating procedure choice proceed along similar lines. A reserves operating procedure is more effective in dealing with spending disturbances, while an interest rate operating procedure is more effective in dealing with portfolio disturbances. An interest rate operating procedure is also superior in the case of money supply shocks.

Thus, according to these studies, a central bank will presumably choose its intermediate target and operating procedure on the basis of the types and relative frequency of disturbances impacting an economy. Mention should be made as well of another group of studies that seeks to explain central banks' policy choices in terms of certain nondisturbance factors, for example, financial market concerns or credibility considerations.[21] Whether the choices made by the Federal Reserve, the Bank of Canada, and the Bundesbank are consistent with these frameworks is left for others to study.

What is relevant here is the implication of the operating procedure/intermediate target choice for the role of reserve requirements. To restate: if a central bank chooses to target the money stock via an interest rate operating procedure (the Bundesbank), or chooses to target some intermediate target other than the money stock (the Federal Reserve and the Bank of Canada, both of which use an interest rate operating procedure in any case), reserve requirements lose their traditional monetary control function. That is, reserve requirements no longer serve as a vehicle for directly controlling the money stock. Nevertheless, reserve requirements may still have a role in monetary policy, that of facilitating control over short-term interest rates. This issue is taken up in the final section.

CURRENT ROLE OF RESERVE REQUIREMENTS

The previous section stressed that many central banks, including the Federal Reserve, the Bank of Canada, and the German Bundesbank, are currently following interest rate operating procedures. In such an environment, reserve requirements are unnecessary from a direct monetary control standpoint. However, depending on the institutional structure within a country, reserve requirements may still have an important monetary policy role to play. By definition, an interest rate operating procedure requires close control over short-term interest rates. Reserve requirements may prove useful, or even necessary, in facilitating this control. It has been argued, in particular, that reserve require-

ments are needed on these grounds in the United States and Germany but are not needed in Canada.

The interbank market

Most central banks following interest rate operating procedures do so by targeting interbank interest rates. These are the rates banks and other depository institutions charge one another for short-term, typically overnight, loans. Interbank rates, in turn, strongly influence other short-term interest rates. As noted previously, for example, the Federal Reserve targets the federal funds rate, which has an important effect on other short-term private rates as well as on U.S. Treasury bill rates. Similarly, the Bank of Canada focuses on the overnight money market rate, while the Bundesbank pays close attention to the overnight call money rate, also referred to as the day-to-day money rate.[22]

Like any other market interest rate, an interbank rate is determined through the interaction of the supply of and the demand for funds. In this case, the supply ultimately comes from the central bank, while the demand comes from depository institutions.[23]

Depository institutions have two reasons for desiring interbank funds.[24] One, they may want to use interbank funds to help meet their reserve requirements. A depository institution short on reserves can raise funds in several ways. It can call in loans or sell securities out of its portfolio, for example. Alternatively, it can borrow funds in the interbank market.

The second reason depository institutions may want to use interbank funds is to help meet their clearing needs. Although payments systems vary widely across countries, one common feature is the maintenance of accounts at the central bank or elsewhere through which depository institutions settle their payments with one another. To replenish or augment an account used for check clearing or wire transfers, for example, a depository institution may wish to turn to the interbank market to raise funds.

Two conditions are necessary for an interest rate operating procedure to be effective. First, the central bank must have close control over the supply of interbank funds on a weekly or even daily basis. Second, the demand for interbank funds must be reasonably predictable. If these two conditions are met, the central bank will be able to anticipate and offset unwanted movements in the target interbank rate. If the conditions are not met, the interbank rate will fluctuate undesirably. To the extent reserve requirements help stabilize the demand for interbank funds, they facilitate an interest rate operating procedure.[25] It is in this context that the Federal Reserve, the Bank of Canada, and the Bundesbank now discuss the monetary policy merits of reserve requirements.

Current practices

The Federal Reserve operates in what might be considered a traditional institutional framework. Banks and other depository institutions are subject to reserve requirements. Depository institutions can meet their reserve requirements either through their holdings of vault cash or by maintaining reserve balances at the Federal Reserve. For many institutions, vault cash holdings are adequate. For others, reserve balances must also be held. Reserve balances are not idle funds, however, but rather can be used to clear transactions with other depository institutions. Many institutions use their reserve balances to clear and settle checks, for example. Reserve requirements are said to be binding if an institution is forced to hold more reserve balances than it would want to hold solely for clearing purposes.

The Federal Reserve is able to exercise very close control over the supply of interbank funds. To be sure, control is not perfect—on any given day, unanticipated supply factors (for example, currency drains or float increases) can generate an underprovision or overprovision of reserves. But in general the Federal Reserve has a very good idea of the level of funds in the interbank market and can

take steps via open market operations to adjust that level when necessary.[26] Thus, the first condition for a successful interest rate operating procedure is met.

The second condition, a predictable demand for interbank funds, is also reasonably well met. Again, surprises are not uncommon. Banks will often hold fewer or greater excess reserves than expected or borrow more or less at the discount window than anticipated. But on average such surprises are manageable. It has been argued that binding reserve requirements facilitate this relatively stable demand by ensuring that a given level of reserve balances will be held.[27]

The potential importance of reserve requirements in this context was illustrated following the December 1990 elimination of reserve requirements on nontransactions deposits. Many depository institutions found that reserve requirements were no longer binding, implying that their holdings of reserve balances were dictated by clearing needs alone. Such needs were often difficult to forecast. Other institutions were still bound by the requirements, but because the overall requirements were now lower, institutions were less willing to hold excess reserves early in the reserve-averaging period for fear of not being able to run sufficient offsetting deficits later in the period. These and other considerations led depository institutions to act less predictably in the interbank market. The result: the federal funds rate showed considerable volatility for many weeks thereafter.[28]

The April 1992 reduction in reserve requirements on transactions deposits, in contrast, was not nearly as disruptive. For one thing, depository institutions had gained valuable experience in managing lower reserve balances. Second, they were given more time to prepare for the change. And third, and probably most important, the level of reservable deposits was sufficiently high to generate a relatively high level of required reserves even after implementation of the reduction. As a result, the Federal Reserve was able to maintain close control over the federal funds rate.[29]

Are further reductions in reserve requirements possible? The potential tradeoffs are clear. Further reductions would further lower the reserve tax, benefiting U.S. depository institutions and their customers. But further reductions might also bring greater interest rate volatility, diminishing the efficacy of current Federal Reserve procedures.[30]

The Bank of Canada operates in a very different institutional framework. Within two years, reserve requirements will be completely eliminated. But because of the unique structure of the Canadian payments system and the framework it has instituted, the Bank of Canada is confident its interest rate operating procedure will not be adversely affected.

The Canadian financial system is highly concentrated. A dozen or so banks, trust and mortgage loan companies, and credit unions account for the lion's share of assets held by Canada's roughly 800 depository institutions. Within the banking sector, for example, the six largest banks controlled 90 percent of all bank assets at the end of 1991.[31]

The payments system in Canada is also highly centralized. Canada has a national payments system operated by the Canadian Payments Association but settling on the books of the Bank of Canada. Thirteen large depository institutions, including eight banks, have "Direct Clearer" status. Direct Clearers are required to hold clearing balances at the Bank of Canada. While these balances do not earn interest, they can be maintained at low levels—the "requirement" is that they not be negative at the end of the day. Through these accounts, daily net clearing gains and losses vis-a-vis other Direct Clearers are settled. Direct Clearers represent not only themselves but may also act as clearing agents for other depository institutions (that is, indirectly clearing members of the Canadian Payments Association). Thus, in effect, all payment items are settled on the books of the Bank of Canada.[32]

The Bank of Canada puts these arrangements to good use in implementing its interest rate operating procedure. On the supply side, the Bank is able to exercise close daily control over the supply of interbank funds by transferring federal govern-

ment deposits into and out of the settlement accounts of the Direct Clearers. This technique, the "draw-down/redeposit mechanism," is the Bank of Canada's principal operating tool. On the demand side, the framework ensures that the direct clearers have a more or less determinate target each day. As well, the Bank closely monitors and gauges the demand for settlement balances by contacting the large direct clearers.[33]

Thus, in a manner very different from the Federal Reserve, the Bank of Canada meets the two conditions necessary for an effective interest rate operating procedure. Notably, reserve requirements play no role.

The Bundesbank operates in an environment much closer to that of the Federal Reserve. The German banking system is relatively diffuse, with the payments system not inextricably linked to the central bank.[34] Like its two counterparts, the Bundesbank is successful in maintaining close control over the supply of interbank funds.[35] Like the Federal Reserve, it sees reserve requirements as an important factor helping to stabilize the demand for interbank funds.

Helmut Schlesinger, President of the Bundesbank, recently declared reserve requirements "an indispensable targeting instrument... unmistakingly enhance[ing] the efficiency of monetary policy" (Schlesinger). His predecessor, Karl Otto Pohl, held similar views, explaining that "If there were no reserve requirements, the banks would attempt to minimize their balances at the Bundesbank to the greatest extent possible... something which could lead to extreme interest rate responses on the money market" (Pohl).[36] German banks, like U.S. banks, would prefer not to pay a reserve tax. But their doing so in effect helps the Bundesbank control short-term interest rates.

SUMMARY

It remains an open question whether the Federal Reserve and the Bundesbank will follow the Bank of Canada and further reduce reserve requirements. It is clear, though, that monetary policy discussions will turn on interest rate considerations, not on direct monetary control considerations. While to varying degrees central banks still seek to target the money stock over longer periods of time, in the short run most use an interest rate operating procedure. Under such a procedure, reserve requirements play a different monetary policy role than that traditionally espoused. Reserve requirements are seen not as an instrument for directly controlling the money stock but rather as a tool for facilitating control over short-term interest rates. It is in this context that future debates over reserve requirements will take place.

ENDNOTES

1 Early multiplier studies include Brunner, and Brunner and Meltzer. More recent treatments include Garfinkel and Thornton, Cacy and Winningham, and virtually any money and banking or intermediate macroeconomics textbook. Many multiplier models choose to emphasize the monetary base (reserves plus currency) rather than reserves; that is, the "multiplier" is calculated as the money stock divided by the base. In such models, it is still the case that a decrease in reserve requirements leads to a larger multiplier, implying a reduction in monetary control.

2 By introducing currency into the model, where c equals the public's desired currency-to-deposit ratio, the multiplier becomes $(1+c)/rr$. Note that, as in the simpler case, a decrease in the required reserve ratio increases the multiplier, implying less monetary control.

3 It is straightforward, for example, to accommodate nonreservable time deposits. It is also straightforward to accommodate interest-insensitive excess reserves (interest-sensitive excess reserves are modeled explicitly in the money supply and demand framework of the next section). For an example of a fully developed multiplier model, see Mishkin, pp. 356-58.

4 Strictly speaking, then, it is not the Bank of Canada per se but the Canadian federal government that has eliminated reserve requirements. Included in the legislation are a number of other provisions designed to enhance competition among financial institutions. Of course, it has been left to the Bank of Canada to implement the elimination of reserve requirements, a process the Bank began on November 18, 1991