

# Universal reserve requirements and monetary control

Robert D. Laurent

The Depository Institutions Deregulation and Monetary Control Act (DIDMCA) authorized the gradual adoption of universal reserve requirements as a step toward improved monetary control. This paper examines the relationship between universal reserve requirements and monetary control. The first section examines why universal reserve requirements might be expected to improve monetary control. The second section discusses the crucial role of the monetary control operating procedure in achieving the potential benefits of universal reserve requirements. The third section discusses possible pitfalls in using the stability of the “money multiplier” (to which stability universal reserve requirements are meant to contribute) as an indicator of potential monetary control.

## The role of reserve requirements in monetary control

The extension of reserve requirements to all depository institutions—universal reserve requirements—was intended to improve monetary control. To understand the significance of universal reserve requirements, consider a commonly held view of the process by which the monetary authority influences the money stock. The process begins with the monetary authority conducting open market operations to set the level of reserves. A change in the level of reserves causes banks to adjust their earning assets, and thereby the deposits of the banking system, until required reserves are in equilibrium with the preestablished level of reserves. This level of required reserves should ideally correspond to the target level of the monetary aggregate desired by the monetary authority. The process can be described as a three-link chain as in the schematic below:



In the simplest of all possible situations, the process would have the monetary authority

engage in open market operations to set the quantity of reserves precisely at the desired level. Any deviation between reserves and required reserves would induce a response on the part of banks that changed deposits and equated required reserves to reserves. *The role of reserve requirements is to provide a connection between required reserves and the target monetary aggregate so that this level of required reserves (equal to the level of reserves provided by the monetary authority) both results from, and corresponds to, the target monetary aggregate.*

The schematic three-link chain connecting open market operations to the monetary aggregate can be used to illustrate the problems of non-universal reserves and, thus, the potential benefits of universal reserve requirements. Consider the case where required reserves exactly match the level of reserves provided by the monetary authority, but some of the demand deposits included in the target monetary aggregate are held in banks on which reserve requirements are imposed and some are held in banks on which no reserve requirements are imposed.<sup>1</sup> Suppose that the public shifts some demand deposits from banks with reserve requirements to those without reserve requirements. This has no effect on the level of required reserves, since the fall in deposits due to the public held at banks with reserve requirements is exactly offset by the increase in deposits “due to” other banks. Initially, there is also no change in the level of deposits in the banking system because the increase in the level of deposits held by the public at banks without reserve requirements exactly offsets the decrease in the level of deposits held by the public at banks with reserve requirements.

However, an important change has occurred. Banks without reserve requirements have had an equal increase in their deposits due to the public and in their reserves “due from” banks with reserve requirements. These banks have no reserve requirements so they will

<sup>1</sup> Robert D. Laurent is an economist at the Federal Reserve Bank of Chicago.

purchase more loans and securities from the public and produce an expansion in the target monetary aggregate even though there has been no change in either the total reserves or the required reserves of the banking system. Conversely, a shift in the public's preference from banks without reserve requirements to banks with reserve requirements would have the opposite effect of contracting the target monetary aggregate without any change in reserves or required reserves. *Such shifts in the public's deposit preferences can produce an entire range of monetary aggregate levels consistent with a given level of reserves and required reserves, and thereby complicate monetary control.*

The imposition of universal reserve requirements would insulate the linkage between required reserves and the monetary aggregate from changes in the public's preferences between member and non-member banks. However, the linkage could still be subject to disturbances resulting from shifts between categories of deposits having different reserve requirements. *What is desirable in a reserve accounting system for accurate monetary control is that required reserves move with, and only with, movements in the reservable deposit component of the monetary target.*<sup>2</sup> Then, if all banks had the same level of reserve requirements, any deposit shift between banks would leave the monetary aggregate unchanged, because the increase in excess reserves at the receiving bank would exactly offset the decrease at the bank losing deposits.

This stabilization of the link between required reserves and the target monetary aggregate could help stabilize the chain connecting open market operations and the target monetary aggregate. This is the advantage of universal reserve requirements described by proponents as a stabilizing influence on the linkage between reserves and money.<sup>3</sup> In the schematic presented earlier, the "money multiplier" is represented by the combined second and third links. So the benefits of universal reserve requirements might be described as contributing to the stabilization of the "money multiplier" by stabilizing the third link between required reserves and the target money aggregate.<sup>4</sup>

### **The operating procedure and the gains from universal reserve requirements**

The previous section of the paper examined how universal reserve requirements could facilitate monetary control by stabilizing the linkage between required reserves and the target monetary aggregate. This section considers the question: Under what operating procedures would stabilization of the linkage between required reserves and the monetary aggregate, were it to occur, actually improve monetary control?

The schematic presented earlier seemed to indicate that, if universal reserve requirements stabilized the third link between required reserves and the target monetary aggregate, it would necessarily improve monetary control. If the monetary authority conducted open market operations in such a way as to achieve its target level of reserves and if the banking system accurately matched required reserves to reserves, then universal reserve requirements would strengthen the linkage between open market operations and money.

What must be considered now is the possibility that monetary policy may not be conducted in the manner described. If not, then monetary control may not be improved by the imposition of universal reserve requirements.

To understand why, one must examine more closely the middle link of the monetary control process—the one connecting reserves and required reserves. Most expositions of the money control process seem to assume that the level of reserves automatically produces a matching level of required reserves. But, the actual mechanism that causes a change in reserves to produce a change in required reserves is seldom described.

One mechanism consistent with required reserves automatically matching reserves is the process of deposit creation described in introductory money and banking textbooks. In the scenario presented in these textbooks, each bank automatically responds to its reserve excess or deficiency by buying or selling an equal amount of earning assets. As customers redistribute the increase or decrease in deposits, they affect other banks and these banks experience a change in their excess reserves. The process continues through a series of progressively

smaller adjustments until deposits have changed enough to move required reserves into equality with reserves. This mechanistic model is a useful pedagogical device that nicely illuminates the relationship between the individual bank and the banking system in the deposit creation process.

*However, it is important to understand—and it is frequently overlooked—that the key variables in the transmission mechanism between reserves and required reserves are actually the current and expected prices of reserves (i.e., the current and expected future federal funds rates).* An individual bank feels neither limited to, nor stuck with, the particular level of reserves it has obtained by attracting deposits. There is always available a federal funds market where banks can exchange reserves with other banks. What is important in determining whether a bank acts to increase or decrease its holdings of assets purchased from the public is the price of present reserves and the expected price of future reserves. If the current and expected future federal funds rates fall, then banks will find the purchase of earning assets from the public (and the creation of deposits) attractive, while a rise in the current and expected future federal funds rate will lead banks to reduce holdings of earning assets purchased from the public and cause deposits to contract.

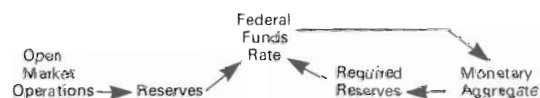
The federal funds rate is determined by the interaction of the supply and demand for reserves. The supply of reserves is the second variable in the chain and the demand for reserves (essentially required reserves) is the third variable in the chain. The federal funds rate equilibrates, and is determined by, reserves and required reserves. Standing, as it does, between reserves and required reserves, the federal funds rate is the key operative in the second link of the entire chain connecting open market operations to the target monetary aggregate.

It was implicitly assumed in the schematic presented earlier that the monetary authority first picks a level of reserves consistent with its desired level of money. The relationship between the supply of reserves and the demand for reserves determines the federal funds rate. The equilibrating process is straightforward. For example, if the monetary authority increases reserves, the level of excess reserves also rises and causes the federal funds rate to fall. As the cost of reserves falls, individual banks adjust by buying more earning

assets from the public and cover the loss of reserves by borrowing in the federal funds market. For the banking system as a whole, this involves no change in the level of reserves, but the increased purchases of earning assets from the public lower the interest rate on earning assets and increase the level of deposits. As the level of deposits increases, required reserves increase until they are in equilibrium with the higher level of reserves at a lower federal funds rate. Other interest rates are also lower in the new equilibrium.

The key point to emphasize is that, in deciding to exchange earning assets with the public (and thereby to change the deposits of the banking system), banks respond to changes in the federal funds rate and not to the level of reserves. *The real role of reserves in this reserve targeting—money multiplier view of monetary control is to help set the appropriate federal funds rate.*

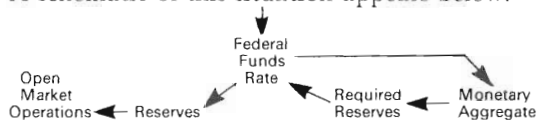
The inclusion of the federal funds rate in a reserve targeting money supply process produces a schematic that looks like:



In this process the monetary authority sets reserves through open market operations and the relationship between reserves and required reserves determines the federal funds rate. This rate, in turn, determines the changes in banks' holdings of earning assets purchased from the public and the change in the monetary aggregate. Through reserve requirements, this determines the change in the level of required reserves, which changes the federal funds rate. This process continues until banks have moved the monetary aggregate (and required reserves) into equilibrium with the level of reserves provided. In the final analysis, the process might be represented by the simple three-link schematic presented initially but the actual operation depends crucially on the federal funds rate.

The desired effect of the imposition of universal reserve requirements is to link more closely required reserves and the target monetary aggregate. However, since the federal funds rate is the determining factor in producing changes in the money stock, this tightened link does not necessarily improve monetary control.

Universal reserve requirements do not improve monetary control if, for example, the monetary authority tries to control money by directly setting interest rates. Again, in this case the money stock is determined by the interest rate (federal funds rate) target.<sup>5</sup> This determines the level of required reserves and in turn obligates the monetary authority to move reserves to match the level of required reserves so as to keep the federal funds rate on target. A schematic of this situation appears below:



The monetary authority determines the federal funds rate, which determines the money stock and the level of required reserves, which, in conjunction with the target federal funds rate, determines the level of reserves. The fact that universal reserve requirements could make the linkage between reserves and money tighter is often cited as evidence that they would improve monetary control. That would be true if the monetary authority set the level of reserves and money adjusted to reserves. *However, under an interest rate targeting procedure the causation runs from money to reserves.* Therefore, the increased stability of the “money multiplier” is simply an accounting artifact and does not imply any improvement in monetary control.

It can plausibly be argued that the monetary control procedures utilized by the Federal Reserve have never strictly corresponded to the reserve targeting procedure for which universal reserve requirements are designed.<sup>6</sup> During the time between the resumption of discretionary monetary policy in 1951 and the late 1960s, the Federal Reserve did not try to control the money supply. From the late 1960s until 1979, the Fed sometimes targeted money, but clearly tried to control it by varying a directly set federal funds rate.

Under the operating procedure in effect from October 1979 to October 1982, the Fed tried to control money by targeting nonborrowed reserves. Given that the level of required reserves was predetermined under the lagged reserve requirements in effect until February 1984, setting the level of nonborrowed reserves also largely determined the amount of reserves banks had to borrow from the Federal Reserve. Given that individual

banks view the federal funds market as a close substitute for borrowing from the Federal Reserve, this meant that the federal funds rate tended toward a level equal to the marginal cost of borrowing from the Federal Reserve, i.e., the nominal discount rate plus the nonpecuniary costs associated with Federal Reserve administration of the discount window. Because the latter cost would tend to rise with the amount and persistence of borrowing, the federal funds rate rises as banks are forced to borrow more from the Federal Reserve.<sup>7</sup>

Thus, the nonborrowed reserve operating procedure was not one in which the monetary authority set total reserves and allowed the federal funds rate to be determined by interaction between the level of reserves and the level of required reserves determined by current deposits. Rather, it was one where the monetary authority determined the federal funds rate, albeit indirectly, by deciding the quantity of reserves it would force the banking system to borrow at the discount window.<sup>8</sup> Therefore, the maximum benefits of universal reserve requirements for monetary control would not be realized under a nonborrowed reserve targeting procedure.

However, such requirements could enhance monetary control even under that operating procedure. If the monetary authority strictly adhered to a predetermined pattern of nonborrowed reserves, given a set discount rate and an unchanged administration of the discount window, then the adoption of universal reserve requirements should improve monetary control. Universal reserve requirements should strengthen the linkage between changes in required reserves and changes in the target monetary aggregate. This would provide a degree of automaticity that is lacking in a strict federal funds setting procedure. This automaticity arises from the fact that any unexpected change in the level of the target aggregate forces required reserves and, with the same level of nonborrowed reserves, bank borrowing to move in the same direction as the movements in the monetary target. Thus, an increase in the money stock causes borrowing at the discount window to increase, while a fall causes borrowing at the discount window to decrease. This has the beneficial effect of automatically raising the federal funds rate when the money stock grows more rapidly than expected and automatically lowering it when the money

stock grows less rapidly than expected. *By strengthening the link between the target monetary aggregate and the level of required reserves, universal reserve requirements help improve the automatic response in the federal funds rate.*

It should be noted, however, that, if the monetary authority does not stick with a predetermined growth in nonborrowed reserves or if it undertakes changes in the discount rate or the administration of the discount window, then the monetary authority more directly determines the federal funds rate and the benefits of universal reserve requirements decrease, and may even disappear.<sup>9</sup>

Finally, the policy utilized from October 1982 to the present has been one which targets borrowed reserves. Changes in the demand for reserves that would affect the level of borrowing are neutralized by the monetary authority through offsetting operations in nonborrowed reserves. By stabilizing the level of borrowing, this procedure tends to stabilize the federal funds rate. To the extent that this policy stabilizes the federal funds rate, any device that tightens the linkage between required reserves and the target monetary aggregate such as universal reserve requirements, would be irrelevant for improving monetary control.<sup>10</sup>

### **Operating procedure and the stability of the money multiplier**

The previous section asked the question: What other factors are important in determining whether a tightened third link between required reserves and the monetary aggregate target would improve monetary control? This section asks a closely related and much more frequently posed question. When is it appropriate to look at the stability of the relationship between reserves and the target monetary aggregate (the combined second and third link, or, equivalently, the "money multiplier") as an indicator of how accurately money *potentially could be controlled*?<sup>11</sup>

The imposition of universal reserve requirements is directed toward the immediate goal of stabilizing the relationship between reservable deposits included in the target aggregate and the level of required reserves. Stabilization of this relationship, in turn, is designed to stabilize the ratio of the target monetary aggregate to total reserves, i.e., the money multiplier. Other things being equal,

the more stable is the money multiplier, the greater the potential improvement in monetary control under the proper type of operating procedure. In practice, the more stable is the money multiplier, the more accurate would be monetary control under any operating procedure where unanticipated changes in the money stock are allowed to affect the federal funds rate. In no case would a more stable relationship between the target monetary aggregate and reserves lead to poorer monetary control. At worst, under a strict interest rate targeting procedure, the increased stability between the target aggregate and reserves would have no effect on monetary control.

One must, however, be cautious in drawing monetary control implications from the stability of the relationship between reserves and the target monetary aggregate (i.e., the combined second and third link of the schematic chain, or the money multiplier). *A closer link is a necessary, but not sufficient, condition for improved monetary control.* As noted earlier, an interest rate targeting procedure will lead to a tighter link between reserves and the target monetary aggregate, but the causation runs from changes in the target aggregate to changes in the level of reserves. The stability of the relationship under an interest rate target gives an overly optimistic impression of the results that could be achieved under a reserves targeting procedure. In drawing implications from the multiplier for monetary control it is necessary to know the operating procedure employed.

For example, a borrowed reserves targeting procedure (as the present Fed policy is often described)<sup>12</sup> in which the monetary authority hits a predetermined level of borrowed reserves could also produce stability in certain relationships that might be misinterpreted. A borrowed reserves targeting procedure is similar to an interest rate targeting procedure because in stabilizing the level of borrowings from the discount window the monetary authority tends to stabilize the marginal cost of reserves, which is represented by the federal funds rate. Like a direct interest rate targeting policy, this policy stabilizes the linkage between reserves and the target monetary aggregate. But again, the causation runs from the aggregate to reserves.

If there is a movement in the monetary aggregate being targeted, there would tend to be a reaction in which borrowed reserves would move in the same direction as the monetary



aggregate. This would initially tend to dampen the movement in the aggregate by moving the federal funds rate in the appropriate direction. However, under a borrowed reserves targeting procedure, the monetary authority changes the level of nonborrowed reserves so as to prevent a change in borrowed reserves. In this way the policy moves total reserves (and nonborrowed reserves) to match changes in the monetary aggregate. Thus, the relationship between the target aggregate and both total reserves and nonborrowed reserves will be stabilized. However, it is misleading to consider the evidence from this borrowed reserve targeting procedure as indicative of how stable the relationship would be if the monetary authority targeted nonborrowed or total reserves. Such a conclusion could lead one to be too optimistic with regard to monetary control.

### Conclusion

Universal reserve requirements were adopted with the intent of improving monetary control. They were designed to do this by tightening the linkage between the target monetary aggregate and required reserves and thereby stabilizing the money multiplier.

Any actual improvement in monetary control stemming from the adoption of universal reserve requirements depends critically on the operating procedure used by the monetary authority. Universal reserve requirements would be most beneficial under an operating procedure that targeted total reserves. On the other hand, universal reserve requirements would make no difference under a strict interest rate targeting policy. It can be argued that the operating procedures utilized by the Fed have never corresponded to those under which the maximum benefits of universal reserve requirements might be realized. However, to the degree that universal reserve requirements strengthen the linkage between the target aggregate and required reserves, they cannot be deleterious to monetary control.

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<sup>1</sup> Actually, the problem of non-universal reserve requirements occurs anytime that reserve requirements on an additional dollar of the same type of deposit differ between different depository institutions, and not just when there are no reserve requirements at some banks.

<sup>2</sup> Essentially, what is required is that deposits bear relative marginal reserve requirements proportional to the weight with which they enter the target monetary aggregate.

<sup>3</sup> This argument was made in the 1970s in a number of Fed publications. See Edward G. Boehne, "Falling Fed Membership and Eroding Monetary Control: What Can Be Done?" *Business Review*, Federal Reserve Bank of Philadelphia, (June 1974), pp. 3-15; Ira Kaminow, "The Case Against Uniform Reserves: A Loss of Perspective," *Business Review*, Federal Reserve Bank of Philadelphia, (June 1974), pp. 16-21; Robert E. Knight, "An Analysis of the Case for Uniform Reserve Requirements," *Monthly Review*, Federal Reserve Bank of Kansas City (May 1974); and Dorothy M. Nichols, "Toward More Uniform Reserve Requirements," *Business Conditions*, Federal Reserve Bank of Chicago, (March 1974), pp. 3-12.

<sup>4</sup> There was debate, prior to the adoption of universal reserve requirements, about whether the changes would help stabilize the money multiplier. See Kenneth J. Kopecky, "Nonmember Banks and Empirical Measures of the Variability of Reserves and Money: A Theoretical Appraisal," *Journal of Finance*, 33 (March, 1978), pp. 311-318 and "Nonmember Banks and Monetary Control: Reply," *Journal of Finance*, 35 (June, 1980), pp. 807; also Dennis R. Starleaf, "Nonmember Banks and Monetary Control," *Journal of Finance*, 30 (September 1975), pp. 955-975 and "A Comment on Nonmember Banks and Empirical Measures of the Variability of Reserves and Money: A Theoretical Appraisal," *Journal of Finance*, 35 (June 1980), pp. 801-805.

<sup>5</sup> Actually it depends not just on the current federal funds rate, but on the expectations of future funds rates engendered, at least in part, by the current federal funds rate.

<sup>6</sup> It should be emphasized that numerous socio-political and institutional factors enter into the Fed's decision to utilize a particular operating procedure. It may be that precise monetary control over short time frames has not been viewed as the most pertinent goal.

<sup>7</sup> See Paul L. Kasriel and Randall C. Merris, "Reserve Targeting and Discount Policy," *Economic Perspectives*, Federal Reserve Bank of Chicago, 6 (Fall 1982) pp. 15-25.

<sup>8</sup> See Robert Laurent, "Lagged Reserve Accounting and the Fed's New Operating Procedure," *Economic Perspectives*, Federal Reserve Bank of Chicago, 6 (Midyear 1982) pp. 32-43.

<sup>9</sup> For analyses of the theoretical impact of universal reserve requirements under different operating procedures, See Kenneth J. Kopecky, Darrel W. Parke, and Richard D. Porter. "A Framework for

Analyzing Money Stock Control under the Monetary Control Act," *Journal of Economics and Business*, 35 (June 1983), pp. 139-157; also Kenneth J. Kopecky, "The Monetary Impact of Universal Reserve Requirements Under Alternative Operating Targets," *Economic Letters*, (1984), pp. 103-108; and Case M. Sprenkle and Bryan E. Stanhouse, "A Theoretical Framework for Evaluating the Impact of Universal Reserve Requirements," *Journal of Finance*, 36 (September 1981), pp. 825-840. It is not clear that the Fed, during the "new operating procedure" period (October 1979 - October 1982), strictly adhered to a predetermined nonborrowed reserve path. Besides changing the discount rate, the Fed also appeared to reduce the provision of nonborrowed reserves when money growth was running below target. This last reaction appears designed to prevent the federal funds rate from

plunging, as would occur under lagged reserves and a strict nonborrowed reserves operating procedure, when money growth is running below target.

<sup>10</sup> This connection was advanced some years ago even within the Federal Reserve System. See Edward E. Veazey, "Reserve Requirements: Structure an Impediment to Monetary Control?" *Business Review*, Federal Reserve Bank of Dallas, (December 1976), pp. 9-18.

<sup>11</sup> For an example of the "money multiplier" approach, see James M. Johannes and Robert H. Rasche, "Predicting the Money Multiplier," *Journal of Monetary Economics*, 5 (July 1979), pp. 301-325.

<sup>12</sup> See Henry Wallich, "Recent Techniques of Monetary Policy," *Journal of the Midwest Finance Association*, 13 (1984), pp. 1-10.