

### The Impact of CRR: Evidence and Analysis

The hypothesis that CRR should have had no impact on monetary control and federal funds rate volatility under borrowed reserve targeting is, in fact, supported by evidence drawn from the 1984 implementation experience.<sup>10</sup> In terms of absolute average percent change, there was no significant difference in the weekly variability of either the M1 growth rate or the federal funds rate between pre-CRR and post-CRR sample periods.

On the other hand, there was a significant reduction in funds rate variability observed following the 1982 shift in operating procedures, confirming that the switch to a borrowed reserve operating procedure had an important impact on reserve market dynamics.

It has been suggested that the failure of CRR to dampen money and interest rate variability might be attributed either to the change in operating procedures or to the failure of CRR to alter

the reserve management practices of banks.<sup>11</sup> But these two explanations are actually the same. In managing their reserves, banks do not react to the volume of reserves available, nor can they even be fully aware of that availability except through some market signal, the most important of which is provided by the federal funds rate.

To the extent that the federal funds rate is stabilized by the Federal Reserve's operating procedures, the banking system will not be induced to make timely reserve adjustments in response to deviations of money from target. The advantage of a nonborrowed reserve control operating procedure under CRR is that it can allow automatic offsetting movements in interest rates in response to short-run deviations of monetary growth from target, thus providing banks with the necessary signal to make timely adjustments.

However, under the current borrowed reserves operating procedure, the Federal Reserve manipulates the supply of nonborrowed reserves to accommodate unexpected demand changes so that the level of borrowing is maintained. Consequently, automatic funds rate movements in response to money shocks

do not materialize, and the reaction of the federal funds rate to monetary deviations is largely dependent on discretionary adjustment of the borrowing target by the FOMC.

### Conclusion: The Outlook

CRR is important not because it *has* improved the Federal Reserve's short-term monetary control, but because it makes possible a wider range of operating procedure choices in the future that may improve that control. Whether the potential of CRR is ever fully realized depends upon whether the Federal Reserve returns to a reserve-oriented operating procedure.

A return to nonborrowed reserve operating procedures would include a role for CRR in speeding up the automatic funds rate response to monetary shocks as compared with the experience of 1979-82. Moreover, CRR would be an important element of a total reserve operating procedure. As long as policy is conducted as it is now, however, the advantages of CRR will be unrealized.

10. The findings cited in this section are presented in Daniel Thornton, "An Early Look at the Volatility of Money and Interest Rates Under CRR," *Review*, Federal Reserve Bank of St. Louis (October 1984), pp. 26-32.

11. See "Lagged and Contemporaneous Reserve Accounting: An Alternative View"; and "An Early Look at the Volatility..."

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# ECONOMIC COMMENTARY

## CRR and Monetary Control

by Michael R. Pakko

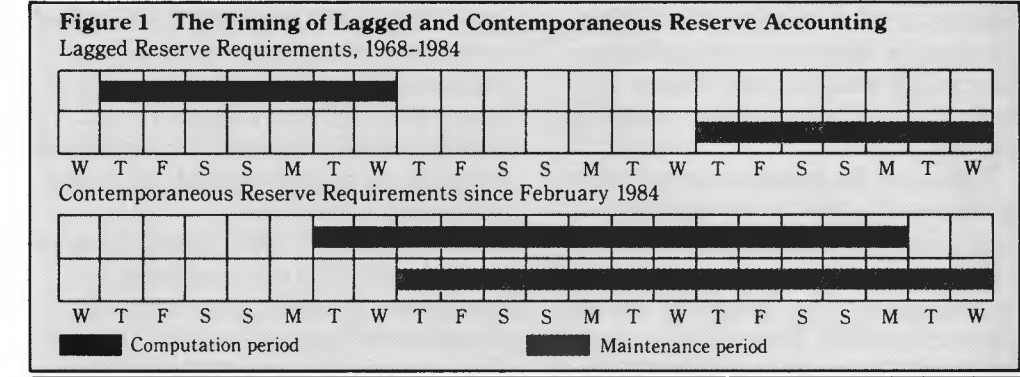
All depository institutions are required by law to hold reserves in proportion to certain deposit liabilities, to be kept either as cash in their vaults, or on deposit with Federal Reserve Banks. Because these required reserves comprise the bulk of all reserves held by the banking system, the demand for reserves in the federal funds market is closely linked to the volume of deposits.

The reserve needs of an individual bank rise or fall daily, reflecting deposit and loan activity, and as the institution manages its reserve position by buying or selling reserves in the federal funds market. The Federal Reserve System has effective control of the total supply of reserves through its open-market operations and can manipulate reserve market conditions to affect bank deposits and portfolio adjustment decisions.

Therefore, reserve requirements play an important role in the money supply process. They influence the reserve demand that interacts with the Federal Reserve's open market supply operations to affect the course of deposit expansion and money stock growth.

In February 1984, the Federal Reserve implemented a regulatory change affecting the timing of reserve requirements. Since 1968, the average level of reserves to be held during a one-week 'maintenance period' had been based on a bank's average level of deposits during a one-week 'computation period' two weeks earlier.

This arrangement, known as lagged reserve requirements (LRR), was replaced in February 1984 by a form of contemporaneous reserve requirements (CRR), in which both the computation and maintenance periods were lengthened to two weeks, and the lag between them was reduced to two days (see figure 1).<sup>1</sup>



Criticism of the LRR system surfaced soon after it was implemented in 1968, but became more intense after the Federal Reserve adopted a reserve-oriented monetary control strategy in October 1979. The early criticism of LRR focused on the observed increase in federal funds market variability after 1968. But after the 1979 change in operating procedures, the focus of criticism involved the problems that LRR creates under a reserve control operating procedure.

realized since the implementation of CRR because of changes made in the Federal Reserve's operating procedures in late 1982.

This *Economic Commentary* reviews the history of the LRR-CRR controversy and discusses the relative importance of reserve timing under various operating procedures. The purpose of this discussion is to explain why the expectations of CRR proponents have not yet been realized and to suggest how the Federal Reserve might make better use of the advantages offered by the new CRR arrangement.<sup>2</sup>

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The views expressed herein are those of the author and not necessarily those of the Federal Reserve Bank of Cleveland or of the Board of Governors of the Federal Reserve System.

1. For a complete and concise description of the details of the new CRR arrangement, see Alton R. Gilbert and Michael E. Trebing, "The New System of Contemporaneous Reserve Requirements," *Review*, Federal Reserve Bank of St. Louis (December 1982), pp. 3-7.

2. An important premise of this *Economic Commentary* is that improved short-term monetary control is, in fact, desirable. There is some disagreement among economists about the importance of short-term control, but it is beyond the scope of this essay to discuss the issues involved in this broader topic.

### Early Criticism of LRR: Reserve Market Instability

When the Federal Reserve adopted LRR in 1968, the intent was to provide banks with better information about their required reserves. This, in turn, was expected to reduce end-of-week reserve adjustment pressures and related federal funds rate variability.<sup>3</sup> However, subsequent studies found that end-of-week adjustment pressures *increased* after the implementation of LRR.<sup>4</sup>

In analyzing this effect, economists generally agreed that the increase in intra-weekly instability resulted from the untethering of required reserves from deposit flows. Under CRR, a change in a bank's deposit liabilities resulted in automatic and equal changes in its actual reserve assets, and a partial offsetting change in its required reserves. But under LRR, the change in deposits and actual reserves did not give rise to an offsetting change in required reserves until two weeks later. Thus, the reserve adjustment necessary in the current week became larger, and reserve adjustment became necessary two weeks later.

This need for greater reserve adjustment, combined with the tendency of banks to delay adjustments until near the end of the reserve accounting period, caused greater fluctuations in demand than under CRR. These fluctuations required either more end-of-week federal funds rate variability or more active manipulation of reserve supplies by the Federal Reserve to smooth interest rate movements toward the end of a week. In fact, after the implementation of LRR in 1968, increases in end-of-week variability were found to exist both for the federal funds rate and for the volume of Federal Reserve defensive open-market operations.<sup>5</sup>

But despite the increased intra-weekly reserve market instability, LRR caused no serious problems for the implementation of monetary policy at the time. Throughout most of the 1970s, the Federal Reserve System used an operating procedure that involved selecting a narrow range for the federal funds rate that was expected to be consistent with targeted money stock growth. The System then supplied and absorbed reserves to keep the rate within that band. Under this procedure the Federal Reserve accommodated short-term fluctuations in reserve demand, so it did not matter if those fluctuations originated from deposit growth changes in the current week or from two weeks earlier.

### The October 1979 Operating Procedures: New Considerations

By the end of the 1970s, it was widely recognized that the federal funds rate operating procedure was not well-suited to short-term monetary control. Non-transitory deviations of money from target were difficult to identify, and once they were recognized, it was difficult to decide on an appropriate funds rate movement in response.

In October 1979, the Federal Reserve announced that it was replacing the funds rate operating procedure with a nonborrowed reserve control strategy. The intermediate target of monetary policy — the growth rate of monetary aggregates — was unchanged; the new procedure was intended to make monetary targeting more precise by providing a mechanism in which the federal funds rate would adjust automatically to reflect, and eventually to counteract, unexpected changes in money growth.

The new procedures called for supplying reserves to maintain a growth path for nonborrowed reserves, allowing above-path demand for reserves to be met only through discount-window borrowing. Because banks are generally reluctant to borrow from the Federal Reserve, increases in reserve demand are linked with federal funds rate increases as banks bid more vigorously in the funds market rather than borrow. Thus, the nonborrowed operating procedures provided a mechanism by which money growth excesses were automatically met by federal funds rate movements in the appropriate direction.

Although the new procedures provided a degree of automaticity in the Federal Reserve's reaction to monetary growth deviations, the existence of LRR delayed the funds rate response, causing deviations of money from target to be accommodated until reserve demand caught up.<sup>6</sup> To the extent that the deviation was nontransitory, the delay allowed it to accumulate over time so that the federal funds rate response necessary to bring the quantity of money demanded back on target was greater than it might be with a quicker response. Therefore, it was argued that the variability of money supply growth, and possibly the volatility of interest rates as well, would be lower with CRR than with LRR under a nonborrowed reserve operating procedure.<sup>7</sup>

Other critics of LRR suggested that a total reserve operating procedure might be more effective for monetary control than the nonborrowed reserve technique, and that the adoption of CRR was a necessary prerequisite to the implementation of such an approach.<sup>8</sup>

Proponents of a total reserve (or total monetary base) operating procedure argued that the nonborrowed reserve procedure suffered from two important

flaws. First, because increases in reserve demand were accommodated through discount-window borrowing, the banking system was able to extend above-path deposit expansion and meet reserve requirements through borrowing.

In addition, the relationship between changes in discount-window borrowing and federal funds rate movements is far from exact. Thus, total reserve advocates have argued that the role of borrowed reserves under the non-borrowed reserve operating procedure introduced an element of instability and unpredictability to the Federal Reserve's policy responses. By eliminating the discount window as a temporary source of reserve supplies, they contended, the banking system would be forced to make short-term portfolio adjustments that would tend to affect deposit growth and to bring required reserve demand in line with reserve supply.

But a total reserve operating procedure could not be implemented under LRR without causing excessively volatile conditions in reserve and money markets. Under LRR, the immediate response of required reserves to deposit changes is absent, because required reserves are predetermined in any given week. If the discount window were eliminated and banks needing reserves sought to bid them away from banks with excess reserves, any change in excess demand or excess supply in the reserve market would generate wide swings in the federal funds rate. The more contemporaneous reserve requirements are, the more smoothly federal funds rate adjustments are likely to be under a total reserve operating procedure.

### The Adoption of CRR and the 1982 Operating Procedures

In October 1982, the Federal Reserve System's Board of Governors voted

to implement a form of CRR, noting the monetary control advantages that it offered:

It is expected that contemporaneous reserve requirements will improve the implementation of monetary policy to a degree by strengthening the linkage between reserves held by depository institutions and the money supply. (Federal Reserve Press Release, October 5, 1982, p. 1)

While noting that the relationship between money and reserves would still be subject to a degree of uncertainty, the Board's statement was an encouraging indication that reserve-oriented operating procedures were to be improved by the change.

But in the same month that the Board announced the details of the switch to CRR, the Federal Open Market Committee (FOMC) announced that it would no longer place as much emphasis on the behavior of the narrow monetary aggregate M1 as it had in the past. Financial deregulation had resulted in the proliferation of new types of deposit accounts, and as the public began to take advantage of these accounts, the monetary aggregates (M1 in particular) became subject to large deviations from their typical growth patterns.

Reducing emphasis on M1 implied that the potential impact of CRR was of less value. The CRR plan adopted by the Board was particularly suited to improve control over M1 rather than over the broader aggregates, because only reserves on demand deposits and other checkable deposits were moved to a contemporaneous basis. Other reserve requirements were left to be met on a lagged basis.

More importantly, the impact of CRR was mitigated by a change in operating procedures in late 1982. Shortly after weight given to M1 was reduced, it

became apparent that all of the aggregates would behave uncharacteristically for a time, so that monetary policy would have to be conducted in a more judgmental manner than it had since 1979. Therefore, the FOMC revised the 1979 operating procedures to allow a "flexible" nonborrowed reserve path. This strategy essentially amounted to setting an objective for borrowed reserves in order to achieve a "degree of reserve restraint" rather than aiming toward specific behavior of nonborrowed or total reserves.<sup>9</sup>

By maintaining a target for borrowed reserves, the FOMC is following a policy that tends to smooth interest rate movements. Because of administrative regulation of discount-window borrowing, and many banks' general reluctance to borrow from the Federal Reserve, there is a connection between the volume of borrowing and the spread between the federal funds and discount rates. A larger spread between those rates is required to induce the banks to borrow at the discount window rather than pay the higher price in the federal funds market.

While this relationship is not exact, the Federal Reserve's maintenance of a borrowing target does tend to confine federal funds rate movements, so that the borrowed reserve operating procedure is somewhat reminiscent of the pre-1979 federal funds rate regime. Because this procedure provides no automatic mechanism to respond to unexpected monetary deviations, the timing of reserve demand responses to monetary growth variations is no longer a practical consideration; money demand fluctuations are being accommodated with total reserves adjusting to demand in the short-run.

3. The "week" referred to here is the reserve maintenance week ending on Wednesday. See Board of Governors of the Federal Reserve System, *55th Annual Report, 1968* (1969).

4. See, for example, Albert Burger, "Lagged Reserve Requirements: Their Effects on Federal Reserve Operations, Money Market Stability, Member Banks, and the Money Supply Process" (unpublished paper of the Federal Reserve Bank of St. Louis, 1971); and Warren L. Coats, Jr., "The September 1968 Changes in 'Regulation D' and Their Implications for Money Supply Control," Ph.D. Dissertation, University of Chicago (June 1972).

5. See, for example, "Lagged Reserve Requirements: Their Effects..."; Warren L. Coats, Jr., "Lagged Reserve Accounting and the Money Supply Mechanism," *Journal of Money, Credit and Banking* (May 1976), pp. 167-80; and Edgar L. Feige and Robert McGee, "Money Supply Control and Lagged Reserve Accounting," *Journal of Money, Credit and Banking* (November 1977), pp. 536-51.

6. Because of the way the Federal Reserve averaged its nonborrowed reserve paths over the period between FOMC meetings, the delay was reduced from two weeks to one. See Fred J. Levin and Paul Meek, "Implementing the New Operating Procedures: The View from the Trading Desk," *New Monetary Control Procedures: Volume I*, Board of Governors of the Federal Reserve System, February 1981.

7. See Daniel L. Thornton, "Simple Analytics of the Money Supply Process and Monetary Control," *Review*, Federal Reserve Bank of St. Louis (October 1982), pp. 22-39.

8. See Marvin Goodfriend, "The Promises and Pitfalls of Contemporaneous Reserve Requirements for the Implementation of Monetary Control," *Economic Review*, Federal Reserve Bank of Richmond (May/June 1984), pp. 3-12.

9. A description of the borrowed reserve operating procedures, as well as an analysis of their significance, is contained in Henry C. Wallich, "Recent Techniques in Monetary Policy" (remarks to the Midwest Finance Association, April 5, 1984).