

BOARD OF GOVERNORS
OF THE
FEDERAL RESERVE SYSTEM

Office Correspondence

Date January 21, 1980

To Board of Governors and
Reserve Bank Presidents
From Stephen H. Axilrod

Subject: Proposed Changes in Present
Lagged Reserve Accounting Procedure.

As per the Chairman's request at the previous FOMC meeting, attached is a staff memorandum analyzing the present lagged reserve accounting system and presenting possible alternatives to it. Conclusions with respect to the desirability of the alternatives relative to the present system are summarized beginning on p. 17. Earlier staff studies are also attached.

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Subject: Possible Changes in Present

From Reserve Requirement Policy Group
(Messrs. Axilrod, Lindsey, and
Ettin)

Lagged Reserve Accounting System.

I. Introduction

The new operating strategy that places more emphasis on controlling reserve aggregates and less on confining short-term movements in the Federal funds rate suggests the need for reconsideration of the two week lag between the required reserve computation week and the reserve maintenance week, which was introduced in September 1968.

This memorandum discusses three alternatives to the present lagged reserve accounting procedure (LRA). The alternatives are:

1. Returning to essentially contemporaneous accounting, with a one-day lag between the end of the required reserve computation week and the end of the associated reserve maintenance week (so that the reserve computation and maintenance periods have six common days).
2. Shortening the present two-week lag between the ends of the computation and maintenance weeks to one week. (Thus, the reserve computation and maintenance periods would, as now, not overlap at all).
3. Returning to contemporaneous accounting for large banks, with a one day lag, but continuing the two week lagged system for small banks.

The staff sees no need to alter the present vault cash accounting procedures, also introduced in September 1968, in which vault cash held two weeks previously is counted as reserves in the current maintenance week. Lagged vault cash accounting reduces the problem posed by uncertain cash flows for a bank's reserve management by preventing unexpected changes in current vault cash from affecting total reserves. It also provides the Desk with certain knowledge of this component of total reserves, and

therefore minimizes the impact on the monetary aggregates of unexpected shifts between the public's holdings of currency and deposits.^{1/}

Background. Prior to September 1968, reserve maintenance was essentially contemporaneous with the outstanding reservable deposits of member banks. That is, the reserve maintenance period over which member banks satisfied reserve requirements on a daily average basis was synchronous with the computation period for required reserves based on daily average deposits. In practice, the lag was one day because the calculation of daily reserves was based on close-of-business figures while the calculation of daily deposits for required reserve purposes was based on opening-of-business figures.^{2/} Two other features of this earlier accounting system also deserve mention. First, all member banks could make up reserve deficiencies of up to 2 percent of required reserves by carrying them into the next reserve maintenance period, but they had no carryover privilege for surplus reserves. Second, while the length of the reserve

^{1/} With lagged vault cash accounting, a switch in the composition of money supply between currency and demand deposits would have less potential effect on M-1 than without such accounting. For example, a decline in demand deposits, associated with a withdrawal of vault cash by the public would, unbeknownst to the Desk, lower member bank reserves if vault cash were counted as reserves on a contemporaneous basis. This decline would begin to induce a further, perhaps multiple, contraction of deposits as banks adjust, assuming contemporaneous required reserve accounting. However, with lagged vault cash accounting, bank adjustments would, at most, only tend to offset the initial deposit outflow; thereby the accounting procedure would avert a potential multiple contraction in money. To be sure, the present vault cash accounting procedure permits banks to exert a limited short-run influence over aggregate nonborrowed reserves by switching between vault cash and balances at the Federal Reserve. While in principle this feature could allow banks to offset the effects of temporary changes in aggregate reserves and to delay their adjustments to permanent changes in reserves, the empirical evidence suggests that banks have not used vault cash in this manner since September 1968. Thus, the staff recommends retention of the lagged vault cash accounting procedure.

^{2/} Similarly, vault cash that would be counted as reserves was based on opening-of-business holdings.

maintenance period was one week for reserve city banks, country banks maintained reserves over a two-week period.

The original 1966 study by a System Committee proposing lagged reserve accounting identified three major concerns:

(1) Very large revisions in required reserves and vault cash data often occurred after the computation and maintenance period when final data became available. These revisions made it difficult for the Desk to hit a particular level of net free reserves (excess reserves minus member bank borrowings).^{1/} Net free reserves were a key operating target for monetary policy at that time.

(2) Substantial pressures for reserve adjustments within the banking system occasionally developed near the close of a reserve maintenance period and produced sharp fluctuations in the availability and cost of federal funds and in the amount of member bank borrowing from the Federal Reserve. The study alleged that contemporaneous accounting intensified such pressures because required reserves could change unpredictably during the current week, making it difficult for member banks to avoid large reserve surpluses or deficiencies near the end of the maintenance week. In addition, the study recognized that banks' inability to carry over surplus reserves occasionally induced large sales of federal funds and intense downward pressure on the funds rate on Wednesday. Both factors, it was felt, contributed to the difficulty of member bank reserve management and, consequently, tended to destabilize money market conditions in general.

(3) A related concern that became important in Board deliberations of reserve accounting was that the difficulty banks faced in adjusting their reserve positions under the contemporaneous reserve accounting structure unduly strained member bank relations.

^{1/} Net free reserves also equal nonborrowed reserves minus required reserves.

As a result of these considerations, Regulation D was amended, effective September 12, 1968, so that

1. all member banks were put on a one-week reserve accounting period.
2. member banks could not only make up reserve deficiencies in the next reserve maintenance week, but also could carry forward excesses into the next maintenance week (in both cases up to 2 percent of required reserves and for one week only).
3. required reserves were to be met with a two-week lag. That is, for average end-of-day deposits during a given seven-day computation week, reserves were to be held during a seven-day maintenance week ending 14 days after the end of the computation week.
4. the reserve asset vault cash was also lagged two weeks. That is, vault cash held during the computation week was to be used to satisfy reserve requirements during the maintenance week two weeks later.

Thus, these modifications to Regulation D were adopted to further the following objectives:

1. to permit the Desk to maintain more closely a particular level of net free reserves, the principal operating target at the time.
2. to moderate fluctuations in money market conditions at the end of the maintenance week.
3. to facilitate efficient member bank reserve management and thereby reduce the burden of Federal Reserve membership.

II. Lagged reserve accounting and monetary control

Since the introduction of lagged reserve accounting, several reports on its effects have been prepared for the Board by a systemwide committee and by the Board staff. These studies, which are attached to this memorandum,^{1/} reached similar conclusions with regard to the implications of lagged reserve accounting for monetary control, and also for certain other issues, such as member bank relations and reserve management. These

^{1/} Staff Committee on Lagged Reserve Accounting, "First Report," August 10, 1973; Reserve Requirement Policy Group, "Lagged Reserve Accounting," April 13, 1976 (the 1973 report appears as Appendix A in this report); and Reserve Requirement Policy Group, "Impact of Lagged Reserve Accounting," August 30, 1977.

studies recognized that LRA was not an impediment to monetary control under a federal funds rate operating procedures. However, they all also concluded that LRA was a hindrance to monetary control through reserve targeting, although more so in the relatively short-run than in the long-run. LRA was viewed as an obstacle to control of total reserves and, even if it did not impede attainment of a predetermined nonborrowed reserves level-- other than via the constraint on the funds rate--it slowed the market response (by two weeks) to a change in money demand. Adoption of the new reserve operating procedure obviously makes it more germane to reconsider the desirability of LRA.

The introduction of LRA made it easier and less costly for banks to acquire current data on their required reserves in time to take action to alter their reserve positions, which appealed particularly to small banks and to those large banks with extensive branch systems. Member banks generally favored the new reserve accounting system even though LRA actually added to the size of member banks' reserve adjustments by heightening unexpected movements in their excess reserves for banks clearing through the Federal Reserve. Unexpected movements in reserves are typically accompanied by unanticipated changes in deposits, but with LRA changes in required reserves did not partly offset the impact of these reserve movements on excess reserves. As a result, additional adjustments in the form of federal funds transactions and member bank borrowing from the Federal Reserve were needed for banks to attain their desired reserve positions. Thus, as confirmed by empirical evidence, LRA actually added somewhat to the pressures for day-to-day fluctuations in the federal funds rate, thereby increasing the volume of System defensive open market operations needed to constrain day-to-day fluctuations in the funds rate to any given amount. However,

lagged accounting had no discernible impact on the precision of monetary control under a federal funds rate operating procedures, which relied mainly on influencing the public's money demand.

In contrast, under a reserves aggregate operating procedure the evidence examined in the System studies suggested that LRA would impair the precision of monetary control, especially over short periods such as a month or so. Contemporaneous reserve accounting (CRA) would be consistent with closer short-run monetary control in part because a surge in the public's money demand would raise required reserves and automatically would tend to tighten money market conditions in the same week as banks bid for reserves.^{1/} As the federal funds rate rose, banks and the public would begin to adjust their balance sheets in ways that would lead to a partially offsetting decline in the money stock. With LRA, on the other hand, the primary response of money market conditions to a change in the public's money demand occurs only with a lag of two weeks, delaying these balance sheet adjustments. Moreover, given this slower initial response in the federal funds rate to changes in money demand under LRA with a reserves aggregate operating target, the amplitude of fluctuations in short-term interest rates would need to be greater within a specified control period in order to keep average growth of the monetary aggregates at the given target rate. However, even with CRA, the short-run relationship between

^{1/} On the other hand, under LRA an unexpected movement in non-money supply type deposits, such as interbank deposits, would tend to affect money market conditions inappropriately for money supply control purposes in the current statement week. Under LRA, adjustments in the reserve path to such unexpected movements would be facilitated because the lag would permit changes in the reserve path by the time of the reserve maintenance week. Thus, in principle it might be desirable to lag reserve requirements on non-money liabilities and make requirements on money liabilities contemporaneous. However, the administrative complexities of such a System are vast and would appear to preclude its practical application.

reserves and money would still be rather loose given other characteristics of the present institutional environment. Moreover, over a longer control period, say a quarter or more, the differences between lagged and contemporaneous accounting for monetary control become less significant.

Total reserves are more difficult to control over short periods with LRA. Given that banks typically hold only minimal levels of excess reserves, banks' needs for total reserves are largely determined by the level of required reserves, but with LRA required reserves are predetermined in any week, since they are based on deposit levels two weeks previously. Thus, banks are unable to take any action that alters the current week's level of required reserves in response to Federal Reserve actions. By manipulating the supply of nonborrowed reserves and money market conditions in the current week, the Federal Reserve can influence only future levels of required reserves and, so long as banks are able to alter current discount window borrowings enough to offset the current week's changes in nonborrowed reserves, only future levels of total reserves. In contrast, under CRA, to the extent that adjustments of banks and the public to such System actions change deposits and required reserves in the same week, total reserves also will be affected. Of course, member banks would still be able to delay such adjustments to whatever extent by altering discount window borrowing in the current week. However, such changes in borrowing tend to be larger under LRA, because borrowing must adjust to offset fully movements in nonborrowed reserves if necessary to satisfy the predetermined need by banks for total reserves.^{1/}

^{1/} Of course, banks can alter their need for total reserves in the current week by availing themselves of the carryover privilege, but only within allowable limits.

LRA does have one technical advantage for Desk operations under a reserve aggregate target. Under LRA pressures on the funds rate would be better indicators of unexpected movements in noncontrolled factors affecting the supply of nonborrowed reserves, like float--which the Desk can act to offset through open market operations--because pressures on the funds rate would not reflect changes in deposits (and hence required reserves) in the current week. Thus, the Desk in deciding on the scale of its operations could use pressures on the funds market as a check on the probable accuracy of projections of noncontrolled factors affecting reserves. This technical advantage could increase the precision with which aggregate nonborrowed reserves are controlled. However, it is precisely the pressures on the funds rate from contemporaneous variations in required reserves--which is absent under LRA--that permit closer control by the Federal Reserve over total reserves and are a condition for more precision in the relation between either total or nonborrowed reserves and deposits than is obtained under LRA. Therefore, some additional desk uncertainty about the current week's level of nonborrowed reserves is intrinsic to attaining closer control over the monetary aggregates via an operating procedure emphasizing reserve aggregates.

In sum, most banks appear to believe that, with LRA, the benefits of known required reserves in a given week contribute more to the efficiency of their reserve management than their enlarged adjustments detract. On the other hand, a return to CRA, combined with an operating procedure emphasizing reserve aggregates, could lead to an improvement in monetary control, especially over the shorter-run.

III. Alternatives to the Two-Week Lag

This section discusses the implications of three alternatives for reducing the length of the lag in required reserve accounting and compares their advantages and disadvantages.

1. Returning to contemporaneous reserve accounting, but with a one-day lag between the end of the required reserve computation week, Wednesday, and the end of the reserves maintenance week, Thursday.

This alternative is similar to the structure prevailing prior to the amendment to Regulation D in September 1968. At that time reserves held in the maintenance week in essence had to satisfy required reserves against deposits outstanding at the end of six of the seven days in the same week. Even though the computation and maintenance weeks were synchronous, the lag was in practice one day, because banks used beginning-of-day deposits to calculate required reserves, while reserves were maintained on an end-of-day basis. However, under alternative 1, which would continue the end-of-day measure of deposits in use since September 1968, Thursday rather than Wednesday would become the last day of the reserve maintenance week.^{1/}

^{1/} If the Board were concerned because the computation and maintenance weeks did not end on the same day under alternative 1, it could restore the exact pre-September 1968 structure. The staff decided against presenting as an alternative a literal return to the earlier system of reserve accounting partly because readopting a beginning-of-day measure of deposits with a Wednesday end-of-computation-week would require a revision of weekly and monthly historical data for the monetary aggregates to put them on the new basis and a revision of historical weekly and monthly seasonal factors. In addition, it would involve major changes in member bank computer systems for reporting deposit data to the Federal Reserve, with the associated transitional reprogramming costs. In light of after-hours transactions, it would also give banks less time to calculate their required reserves before the end of the maintenance week than would alternative 1.

The staff also considered other variants of contemporaneous accounting but their practical disadvantages appeared to outweigh their advantages.^{1/}

Characteristics of Alternative 1. This alternative would restore the advantages that existed prior to September 1968 for short-run control over both the monetary aggregates and total reserves under a reserve aggregate operating target. In addition, some diminution in day-to-day interest rate variation may also result from a reinstatement of contemporaneous accounting. These advantages were outlined in the section of this memorandum that summarized previous staff reports to the Board.

^{1/} One variant of alternative 1 was to keep the end-of-day concept of deposits but to move the end of the computation week up to Monday or Tuesday and leave Wednesday as the end of the maintenance week. Besides the associated revisions of the historical weekly series for the monetary aggregates, the changes in reporting forms, data flows, and perhaps the publication schedule would involve higher reprogramming costs, particularly for member banks, but also for Federal Reserve Banks and the Board for a variety of data systems related to the monetary aggregates.

Another variant considered was to keep Wednesday as the end of the computation week but to move the end of the reserve maintenance week to Friday. This approach has the advantage of allowing banks one extra day to calculate their required reserves. However, a major disadvantage involves the fact that member banks' reserves on Friday also count for Saturday and Sunday in calculating weekly average reserves. If Thursday were the last day of the maintenance week, as is recommended, member banks and the Desk would have Monday through Thursday to offset errors in estimating reserves on Friday, which receive a weight of three days. But if Friday were the "last" day of the maintenance week, and if Saturday and Sunday were also included in that week, then neither banks nor the Desk would have an opportunity to offset the magnified Friday error. If Friday were the last day of the maintenance week, with Saturday and Sunday counted in the next week, then there would be five days to offset the Saturday and Sunday errors, but banks and the Desk would have to plan their last maintenance day strategy keeping in mind the direct effects on the next week, which would complicate their actions. In particular, discount window borrowing on Friday would then count in two statement weeks. Another disadvantage of this variant is that many member bank employees must work late on the last settlement day; switching this day to Friday would inconvenience these employees.

The main disadvantage of this alternative, also noted above, is that it would add most to the burden on respondents of monitoring current deposits in order to calculate current required reserves, since the reserve maintenance week would end only one day after the end of the computation week. Under the current two-week lag, Reserve Banks advise member banks of their required reserves prior to their maintenance week, thereby providing banks nearly perfect knowledge of required reserves. With this alternative, however, Reserve Banks could only do so after the applicable maintenance week had passed. In addition, Reserve Banks' advice on the level of allowable carryover into the maintenance week would be delayed from early in the week to late in the week at best. Thus, member banks would have to rely on their own calculations of required reserves and allowable carryover in managing their reserve positions. However, even under the present structure, the preponderance of banks make their own calculations of required reserves and carryover and rely on the Federal Reserve only for verification.

Some banks might have good estimates of required reserves on the next day even with their present procedures.^{1/} Others, particularly small

^{1/} However, over a recent eight-week period, 60 percent of large member banks were unable to send deposits data for the Markstat D report to their Reserve Bank within the scheduled time frame of close-of-business on the following day or, at the latest, by early on the second morning after the as-of-date. It is not clear that the money desks at many of these banks, however, do not have fairly accurate daily estimates within 24 hours, although Reserve bank staff have reported a lack of hard data. In any event, with contemporaneous accounting, banks would have an incentive to develop timely estimates of current deposits; at present their incentives to do so are not strong, as they incur no penalty for late reporting and do not need the data for timely required reserve calculations.

banks and large banks with extensive branch networks, would no doubt have to improve their computer systems and/or hire additional staff, possibly at considerable expense. Even then, many may have difficulty getting good estimates of required reserves for the computation week ending Wednesday by late the next day, Thursday. For this reason, banks may at times miss their desired reserve positions by more than they do at present.^{1/} In addition, normal quality edit checks involving questions of respondents by Reserve Banks will result, as now, in revisions to estimated deposit levels. But under CRA, in contrast to LRA, they will also result in revisions in reported required reserves for the maintenance week already past.

Such misestimates and revisions will likely increase bank requests for waivers of penalties on their deficiencies and for the substitution of surpluses in later weeks. Depending on the strictness of Federal Reserve policy on requested waivers, banks may have to increase their holdings of excess reserves as a cushion against the then more likely reserve deficiencies.^{2/}

^{1/} Recall, however, that unexpected movements in total reserves on all days but the last day of the maintenance week automatically tend to be accompanied by partly offsetting movements in required reserves in the same week under this variant of CRA, reducing the average amount of unpredictable variation in excess reserves relative to what it would be under LRA.

^{2/} The adoption of alternative 1 would involve transitional System costs for reprogramming the TEDS and FR-422 Flashwire systems for reserve balances and member bank borrowings data in order to drop from each weekly transmission present Thursday data and to add Thursday figures seven days later. In addition, the System would incur added costs for reprogramming the member bank reserve statements prepared by those Reserve Banks that provide weekly average statements as well as daily ones. Also, the publication schedule of the Federal Reserve statement of condition would have to be altered. A minor added complication is that a revision of both the historical weekly reserve aggregates series and their seasonal factors would be needed to make them consistent with the new concept.

Possible carryover adjustments. As another option that would aid banks in managing their reserve positions under alternative 1, the Board could consider liberalizing the existing 2 percent limit to reserve carryover, either for all member banks or for small banks, which is the group that typically experiences disproportionately frequent reserve surpluses and deficiencies in excess of 2 percent of required reserves. However, as with the timing of reserve accounting, there is a tradeoff between the ease of member bank reserve management and monetary control. A widening of the carryover limits would tend to loosen the short-run connection between reserve and monetary aggregates, to delay somewhat bank adjustments to changes in reserve availability, and to make total reserves a little more difficult to control on a week-to-week basis. On monetary control grounds, therefore, the staff would not recommend any further widening of the carryover limits.^{1/}

2. Reducing the lag between the last day of the required reserve computation week, Wednesday, and the last day of the reserve maintenance week, Wednesday, to one week from the present two weeks.

The higher costs banks would incur in calculating required reserves on a timely basis for reserve management purposes with alternative 1 suggest that the Board may wish to consider shortening the lag to only one week, since all banks would have time to calculate their required reserves within the reserve maintenance week.^{2/} While offering some advantages for monetary control via reserves relative to the present system, a one-week lag also shares some of the disadvantages associated with the contemporaneous and the two-week lagged accounting systems.

^{1/} If the Board wished to make such adjustments on other grounds, consideration could be given to changing the carryover limit to, say, 3 percent for all banks, or possibly restricting a larger carryover privilege to smaller member banks who seem to have the largest relative problem in managing their reserve positions.

^{2/} This proposal was analyzed in detail in Reserve Requirement Policy Group, "Lagged Reserve Accounting," April 13, 1976, pp. 11-18.

The advantage of somewhat closer monetary control than is now possible would arise because the federal funds rate would tend to react one week sooner to a change in the public's demands for deposits under the reserves operating procedures. In addition, the one-week lag complements the current one-week carryover option better than the current two-week lag and would therefore result in less amplitude in week-to-week variability in the federal funds rate. As an example of this effect, consider an outflow of deposits and reserves that causes banks to carry over a current-week reserve deficiency that must be covered by a surplus in the next week. Under a one-week lagged reserve accounting system, required reserves in the next week would be depressed by the earlier deposit outflow, thereby contributing to needed surplus reserves and reducing the need to borrow in the funds market or from the discount window to obtain the surplus. This stabilizing effect is absent with the current two-week lag.

The disadvantage of a one-week lag for monetary policy purposes, relative to a two-week lag, however, is that even though required reserves are predetermined in the computation week, the Desk would have only a very preliminary estimate of required reserves during most of the maintenance week; significantly more accurate figures would not be available until the last day of the week.^{1/} In addition to not knowing aggregate required reserves, the Desk would nevertheless be incapable of inducing an adjustment in required reserves and total reserves (when the demand for total reserves is

^{1/} Furthermore, only reserve city banks in most districts would reliably receive the Reserve Bank calculation of required reserves within the maintenance week. This calculation is based on the report of deposits due to the Reserve Bank either Monday for reserve city banks or Tuesday for other banks. Given processing and mail lags, country banks would not receive their required reserve figures from their Reserve Bank by close-of-business on Wednesday of their maintenance week. However, as noted above, all banks would have time to determine themselves their deposits and required reserves for the computation week prior to the end of the reserve maintenance week.

running above path) in the current week by manipulating nonborrowed reserves because the level of required reserves would be fixed by last week's deposits.

Thus, the fundamental connection between the current week's deposits and total reserves that characterizes contemporaneous accounting is severed with a one-week lag because the overlap of six out of seven days in the computation and maintenance weeks in alternative 1 no longer occurs. This disadvantage relative to contemporaneous accounting as embodied in alternative 1 appears to the staff to be a crucial reason for preferring the first alternative.

3. Returning to contemporaneous accounting for large banks, with a one-day lag, and retaining the present lagged system for small banks.

This alternative might be construed as the middle ground between alternatives 1 and 2, in that it tends to reduce some of the disadvantages of each. Since smaller banks are estimated to bear already a disproportionately large burden of membership relative to large banks, they could be exempted from a reversion to contemporaneous accounting. Under this alternative, Reserve Banks could continue to provide small banks with estimates of their required reserves prior to the maintenance week.^{1/} To be sure, this alternative would not alleviate the cost impact on larger banks, particularly those with large branch systems, of the more timely need for required reserve data. Moreover, as will be noted later in this section, it introduces the possibility of greater multiplier errors and of inappropriate changes in money market conditions as compared with the present System or alternatives 1 and 2.

^{1/} The importance of this membership benefit may well be minor compared with the basic costs of membership to these banks--chiefly the cost of holding reserves well in excess of value received in terms of clearing services.

Making the deposits of the largest banks, which exhibit the most week-to-week variability, reservable contemporaneously would, other things unchanged, facilitate the achievement of monetary control. As an example of a possible breakdown, the about 70 reserve city banks, defined since 1972 as institutions with net demand deposits of more than \$400 million, could make up the group subject to contemporaneous accounting.^{1/} In October of 1979, reserve city banks held about 40 percent of demand deposits adjusted at all member banks.^{2/} Over the previous year, the average absolute weekly change in demand deposits adjusted was \$2.2 billion at reserve city banks compared to \$1.5 billion at all other member banks.^{3/} With this alternative, changes in deposits at reserve city banks would tend to have the desired immediate impact on money market conditions.

The effectiveness of the third alternative for monetary control purposes, however, is reduced because a shift of demand deposits adjusted between reserve city and other member banks that leaves M-1 unchanged would destabilize the effective contemporaneous multiplier connecting reserves to the money stock and would enhance the risk of inappropriate changes in money market conditions. This destabilizing result would occur even if there were uniform required reserve ratios at all banks and arises because deposits would be reservable in the same week at large banks but not at small banks. A shift of demand deposits into large member banks would raise their required reserves without simultaneously reducing current required

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- ^{1/} This criterion could also be applied to foreign-related institutions subject to reserve requirements under the International Banking Act. However, fewer than a dozen institutions would likely be subject to CRA.
- ^{2/} In October, 1979 reserve city banks had about 47 percent of net demand deposits and 43 percent of total time and savings deposits held at all member banks.
- ^{3/} The average absolute weekly change in net demand deposits was \$4.0 billion at reserve city banks, compared to \$1.5 billion at all other member banks.

reserves at small member banks. Given the supply of aggregate nonborrowed reserves, the net rise in aggregate required reserves would tend to tighten money market conditions, but inappropriately, since M-1 was initially unchanged in this example.

An inappropriate effect on money market conditions in response to deposit shifts between classes of member banks could occur with alternative 1 under the present reserve requirement structure but only in the muted form resulting from the graduation of reserve requirements by amount of demand deposits, and would not occur at all if reserve requirements were made uniform. Also, under a lagged reserve system for all banks, as alternative 2 or the present system, any inappropriate effect on money market conditions would be more muted than under alternative 3.

IV. Conclusions

The staff believes that contemporaneous reserve accounting is more consistent with present reserve targeting procedures than lagged reserve accounting. Thus, alternative 1 would be preferred to either present procedures or the two other alternatives presented in this memorandum, even though it complicates the timely calculation of required reserves by member banks.^{1/} Nonetheless, it should be noted that control of the monetary aggregates by a reserve handle would still be subject to considerable slippage even under CRA because of the availability of the discount window, federal funds rate constraints, lags in bank and public responses to changing market conditions, the existing complex reserve requirement structure, and the growing amount of deposits at nonmember institutions.

^{1/} It is assumed that any alternative adopted by the Board would be published for comment. If alternative 1 were finally adopted after comments were received, the staff would also recommend a delay of several months in implementation to allow time for member banks to prepare for the new procedures and for the Federal Reserve to alter data processing systems.

If the Board did not wish, for membership or other reasons, to adopt alternative 1 at this time, the staff would see little advantage to other possible adjustments in the present system. Rather, it may be preferable to leave the lagged reserve system unchanged until the Board believed conditions were more appropriate to a shift back to contemporaneous accounting, such as after new monetary improvement legislation is passed. While alternative 2 would to some degree speed up market response to changes in money demand, it would not establish any direct contemporaneous relationship within a reserve computation week between reserves and deposits, as would alternative 1, and would therefore not greatly enhance the practicality of week-to-week total reserve targets. Nor would it establish a reserve to deposit multiplier based at least in large part on the arithmetic of reserve ratios, since this week's deposits would still not necessarily be related to this week's level of reserves. Moreover, it would probably not mute the public dispute about lagged reserve accounting. With regard to alternative 3, it appears to entail some of the advantages of CRA, but at the cost of introducing additional multiplier and money market instabilities that inhere in a mixed contemporaneous and lagged system.

(2) A one-week lag would not give rise to significant bank relation problems, according to the survey. Such a lag would probably improve monetary control a little in the short-run, but not by as much as a contemporaneous reserve system. It would not reduce intra-weekly money market pressures, but would moderate somewhat the amplitude of interest rate movements required to attain a money growth target over a particular period of time.

(3) Insofar as the Federal Reserve wishes to utilize reserve measures in helping to achieve short-run control of the monetary aggregates, the staff would recommend moving to a contemporaneous reserve system. But member bank relations seem to be an impediment to such a move. The staff believes that, as a compromise, a one-week lag could be instituted, and that such a shortened lag structure would bring about a marginal improvement in monetary control. However, the staff would like to emphasize that if the day-to-day target for open market operations is in practice limited to a specific Federal funds rate (adjusted from week to week in response to incoming data on the money supply), there would be no net gain in monetary control from reducing or eliminating the two-week lag.

(4) If the Board adopts a one-week lag in reserve accounting, it would seem reasonable also to count vault cash for reserve purposes with a similar one-week lag (rather than the current two-week lag). The present one-week carryover provision for reserve surpluses and deficits should be maintained and the size of the carryover limit--now 2 per cent of required reserves--should also be retained since raising the limit would weaken short-run monetary control. It would be desirable to publish

the one-week lag and related proposals for comment by the public before they become effective. A draft Federal Register announcement is contained in Appendix D.

II. BACKGROUND AND DESCRIPTION OF PRESENT PROCEDURES

Prior to 1968, reserve accounting was essentially contemporaneous with the reservable deposits of member banks.^{1/} Two other features of the pre-1968 reserve system should also be mentioned. All member banks could make up reserve deficiencies by carrying them into the next reserve and deposit accounting period (up to 2 per cent of required reserves), but there was no carryover privilege for surplus reserves. In addition, while reserve city banks were on a one-week reserve accounting cycle, country banks accounted for reserves over a two-week period.

The original study by a System Committee in 1966 that proposed lagged reserve accounting was dominated by two major concerns: (1) the large sales in the Federal funds market of excess reserves (and resultant decline in the funds rate) on Wednesdays by those banks that knew they would be unable to carry over their surplus reserves and (2) the very large revisions in required reserves and vault cash data after the statement week when final data become available, which made it difficult for the Desk to hit a particular net free reserve figure (a key monetary target at that time). As the issue was further considered, however, member bank relations became a particularly important factor. Because of unexpected fluctuations in deposits and required reserves in the same statement week, it was alleged that member banks were unable to manage their reserve

^{1/} In practice the lag was 1-day since calculation of daily deposit for reserve purposes was based on opening-of-business figures. Similarly, vault cash that could be counted as reserves was based on opening-of-business holdings.

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positions without often ending up with either unduly large excesses or large borrowings. This, it was felt, added to the burden of membership.

As a result of these considerations, Regulation D was amended, effective September 12, 1968, so that

- all members were put on a one-week reserve accounting schedule.
- members could not only make up reserve deficiencies in the next statement week, but also could carry forward excesses into the next statement week (in both cases up to 2 per cent of required reserves).
- required reserves were to be met with a two-week lag. That is, for average deposits during a given 7-day statement week (the "deposit" week), reserves were to be maintained on average during a 7-day statement week (the "reserve maintenance" week) ending 14 days after the end of the deposit week.
- the reserve asset vault cash was also lagged two weeks. That is, vault cash held in the deposit week was usable as reserves during the reserve maintenance week.

By adding flexibility, these modifications were designed to ease the burden of membership. In addition, it was felt that the amendments to Regulation D would make it easier for the Desk to hit a net free reserve target-- then the principal operating target--and to reduce intra-weekly fluctuations in money market conditions.

III. SYSTEM REVIEW

The System Staff Committee which reviewed experience with lagged reserve accounting in 1973 found that "the lagged reserve accounting procedure makes no positive contribution to controlling monetary aggregates.

If reserve aggregates are used as a handle of policy, the contribution of lagged reserve accounting is, if anything, negative ...". In addition, the Committee's findings regarding purely economic considerations were that

lagged reserve accounting (a) significantly reduces the ability to hit a total reserve or RPD target in the interim between committee meetings, though to a lesser extent a nonborrowed reserve target; (b) is a less significant limitation on the System's ability to control reserves and monetary aggregates over the longer-run; (c) adds to the tendency for day-to-day money market variability; and (d) increases somewhat the range over which the Federal funds rate needs to fluctuate if monetary aggregates are to be controlled by use of a reserve handle.

The Committee, however, thought that a bank relations problem might arise if a contemporaneous system were reinstated because a majority of member banks still appeared to favor the lagged system. Thus, "if bank relation costs are great some members of the Committee would favor retention of the current system, assuming the permissible range of variation in the funds rate is not unduly circumscribed," so that aggregate targets could still be attained over a longer-term horizon.

In 1975, a survey of commercial bank Directors of Reserve Banks and branches was conducted in order to provide an indication of member bank attitudes toward reserve accounting. The report of that survey is attached as appendix B. Briefly, this survey indicated that

-- members, especially those with branches, believe they benefit from lagged reserve accounting by knowing in advance their required reserves. Only banks with great deposit stability or volatility did not think they benefited

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from lagged reserve accounting. Vault cash lags were less important than lags for reserve accounting.

- about two-thirds of respondents felt that there would be no significant diminution in benefits if the lag were reduced from two weeks to one week. Lags of less than one week were opposed by a majority of respondents.
- over half of the respondents felt that a return to contemporaneous reserve accounting would increase costs, mainly from additional staffing; a one-week lag would entail only a modest increase in bank costs.
- two-thirds of respondents felt that a return to contemporaneous reserve accounting would adversely affect attitudes toward membership; less than a fifth thought a one-week lag would do so.
- respondents felt that if contemporaneous reserve requirements were re-instituted, or lags were significantly shortened, the permissible carryover limits should be increased from its present 2 per cent of required reserves, or reserve requirements lowered, or other adjustments be made to offset the increased bank costs.^{1/}

This survey suggests that a return to contemporaneous reserve accounting would adversely affect member bank relations, but that a reduction of the lag from two weeks to one week would not be a substantial negative factor.

^{1/} Those mentioned included: simplifying the reserve requirement structure so as to ease the calculation of required reserves, paying interest on reserves held, and lowering of the penalty rate on reserve deficiencies.

IV. ECONOMIC AND OPERATIONAL IMPLICATIONS OF A ONE-WEEK LAG IN RESERVE ACCOUNTING

Since the 1973 System Committee Report, the staff has continued to study lagged reserve accounting on both a theoretical and empirical level. Both lines of inquiry reinforce that Committee's conclusions that lagged reserve accounting tends to make it somewhat more difficult for the System to control the monetary aggregates in the short-run via reserve aggregates.

Empirical studies of the linkage between monetary and reserve aggregates indicate a closer--though still relatively loose--relationship before the institution of lagged reserve accounting than after. The left panel of Table 1 on p. 8 summarizes prediction errors of equations relating reserve measures and M_1 or M_2 in the 1961-1967 period before lagged accounting, while the right panel shows comparable statistics in the 1969-1974 period after introduction of the two-week lag. In both absolute and percentage terms, errors in the sample period were larger after the introduction of lagged accounting.

The increase in prediction errors was larger when these errors were not adjusted for systematic seasonality. We believe that these

Table 1

Standard Errors of Estimate^{1/} of Regressions of
 Monetary Aggregates on Current Reserve Aggregates,
 Commercial Paper Rate and Discount Rate^{2/}

Reserve Aggregate	Contemporaneous Accounting				Two Week Lagged Accounting			
	Sample Period 1961 07 - 1967 06				Sample Period 1969 01 - 1974 12			
	billions of \$		percent annualized		billions of \$		percent annualized	
	Pre-Seasonal Adjustment	Post-Seasonal Adjustment	Pre-Seasonal Adjustment	Post-Seasonal Adjustment	Pre-Seasonal Adjustment	Post-Seasonal Adjustment	Pre-Seasonal Adjustment	Post-Seasonal Adjustment
M1								
Nonborrowed Reserves	1.413	.905	10.51	6.73	3.187	1.548	16.00	7.76
Total Reserves	1.439	.924	10.70	6.86	3.356	1.430	16.85	7.18
M2								
Nonborrowed Reserves	1.406	1.039	6.20	4.58	3.316	2.047	8.27	5.10
Total Reserves	1.472	1.059	7.49	4.67	3.430	1.903	8.54	4.74

^{1/} The absolute value of the monthly prediction error is expected to be lower than the standard error of estimate two-thirds of the time.

^{2/} The equations were fit using seasonally unadjusted data. The standard errors under the pre-seasonal adjustment columns are from the original equations. The standard errors under the post-seasonal adjustment columns were obtained after seasonally adjusting the errors of the original equations in a second step.

Table 2

Standard Errors of Estimate of Regressions of
 Monetary Aggregates on Current and Lead Reserve
 Aggregates, Money Market Rates and Discount Rate^{1/}

Two Week Lagged Accounting
 Sample Period
 1969 01 - 1974 12

Reserve Aggregate	billions of \$		percent annualized	
	Pre-Seasonal Adjustment	Post-Seasonal Adjustment	Pre-Seasonal Adjustment	Post-Seasonal Adjustment
M_1				
Nonborrowed Reserves	2.183	1.514	10.96	7.60
Total Reserves	2.154	1.387	10.81	6.96
M_2				
Nonborrowed Reserves	2.313	1.802	5.76	4.49
Total Reserves	2.199	1.621	5.48	4.03

^{1/} The absolute value of the monthly prediction error is expected to be lower than the standard error of estimate two-thirds of the time.

^{2/} The equations were fit using seasonally unadjusted data. The standard errors under the pre-seasonal adjustment columns are from the original equations. The standard errors under the post-seasonal adjustment columns were obtained after seasonally adjusting the errors of the original equations in a second step.

unadjusted figures are more relevant in evaluating the impact on monetary control of the shift to lagged reserve accounting.^{1/} There is some corollary evidence for this belief. The equation used to relate money supply to reserves in the 1969-1974 period can be adjusted to in effect eliminate the impact of lagged reserve accounting (by including as an additional explanatory variable next month's reserves). As shown in Table 2 on p. 9, the effect of this is to reduce the magnitude of the percentage errors for M_1 prior to seasonal correction to rates more comparable with those estimated in the 1961-1967 period before lagged reserve accounting. This may be seen by comparing the percentage results shown in Table 2 with the percentage results in the first panel of Table 1.

Thus, it appears as if there has been a deterioration in the relationship between money and reserves because of lagged accounting.^{2/}

1/ In the more recent period, as a result of lagged reserve accounting, the supply relationship between current reserves and money became more unstable and less identifiable statistically. The errors in the relationship consequently are more likely to reflect factors affecting both the demand for and supply of money. Observed seasonal movements in money are predominantly demand-related. The seasonal adjustment procedure would, under the circumstances, pick up a combination of demand and supply related seasonals, but would be more heavily weighted on the demand side, and inappropriately so when attempting to estimate a supply function. This would be less the case prior to lagged accounting, when the supply of reserves is, in the nature of the case, more closely linked to deposits and any seasonality in the errors, therefore, is less likely to be demand-related. A comparison of the pattern of each equation's seasonal adjustments with the Board's seasonal factors for money confirmed this view; after lagged accounting the seasonality in the prediction errors more closely resembled the presumably demand-related seasonal factors for the money stock.

2/ We have not shown results using the monetary base because the inclusion of currency in both the dependent variable (money) and the independent variable (the base) tends to obscure the impact of the shifting relationship between reserves and deposits.

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The introduction of graduated reserve requirements and a more complicated reserve structure in the 1970's may also have weakened the short-run reserve-money relation, but our evidence so far suggests that lagged reserve accounting had a stronger negative impact.

While these results are consistent with the view that short-run control of the aggregates through reserves could be improved somewhat with a return to contemporaneous accounting, they do not tell us how much, if any, of an improvement would be affected by introduction of a one-week lag. There is no reason to believe, however, that some improvement would not occur. As a first approximation, the improvement might be represented by half the difference between the percentage errors shown in the first and second panels of Table 1. However, if monetary control through reserves is viewed over a longer span than one month--say three to six months--the distortion from lagged reserve accounting is less and the degree of improvement stemming from a shift to a one-week lag would there be reduced.

The closer short-run relationship between money and reserves as the lag is shortened occurs because, when the demand for deposits changes, banks are more promptly forced to bid for the reserves they are required to hold behind deposits, thereby affecting money market conditions sooner rather than later. Under contemporaneous reserve accounting, a change in deposits in a given week alters the level of required reserves in that week. Given nonborrowed reserves, the change in required reserves provides an automatic alteration in money market conditions and bank portfolio behavior, which helps to set in motion forces that will work to offset the initiating change in deposits and required reserves. For example, if deposits

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rise more than expected in a regime of contemporaneous reserve accounting, the increased demand for required reserves automatically increases bank demands on the funds markets which raises money market rates and immediately sets in train forces that will reduce money demand. Also, on the supply side, banks will soon begin to undertake portfolio adjustments, such as asset sales, that will directly reduce aggregate demand deposits. In contrast, under lagged reserve accounting there is no change in bank demands for reserves and no automatic pressure on money market rates for two weeks, thus delaying this automatic offset. Moreover, because of the delay, interest rates would have to rise to higher levels over time to achieve a given increase in deposits over a particular period, in view of the lags between money demand and interest rates.

In addition, there will be more interest rate fluctuations and/or more defensive open market operations in a regime of lagged reserve accounting. With required reserves fixed by the level of deposits two weeks earlier, the entire burden of adjustment to changes in nonborrowed reserves falls on excess reserves or borrowings, and changes in banks' willingness to hold free reserves normally entail variations in interest rates. Thus, if currency flows are draining more reserves than expected, for example, the Desk will have to intervene more actively to prevent, or limit, a rise in interest rates since the drop in deposits associated with the currency outflow would not also reduce required reserves in the current statement week. Under contemporaneous reserve accounting, however, changes in interest rates produced by unexpected changes in noncontrolled factors affecting reserves would be moderated since partially offsetting changes in required reserves would occur as a result of associated changes

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in deposits; this would lessen the burden of adjustment that must take place in excess reserves and borrowings and hence would reduce interest rate variations.

Advantage of reducing the lag to one week. The impact on monetary control of shortening the reserve accounting lag to one week depends on the operating procedure employed by the Federal Reserve.

If a reserve aggregate is used as the primary policy instrument, the main advantage for monetary control of a one-week relative to a two-week accounting lag is that an unexpected but sustained surge in money demand will induce an automatic tightening of money market conditions one week earlier. Required reserves on demand deposits will respond to the higher demand deposits in the following week. Bank attempts to acquire additional reserve, if nonborrowed reserves were unchanged, would bid up money market rates, which would partly counteract the higher deposit demand one week sooner with a one-week lag.

Reducing the lag would also enhance monetary control in some degree even if a nonborrowed reserves operating target is combined with a side constraint in the form of a specified Federal funds rate range. The funds rate would be likely to move within the range somewhat earlier. Moreover, whenever it appeared that the Desk could not attain the non-borrowed reserves target without violating the range for the Federal funds rate, the Manager could so notify the FOMC; this would trigger a decision as to whether a change in the nonborrowed reserves target and/or the Federal funds rate side constraint were appropriate. Reducing the lag in reserve accounting would permit the FOMC to react one week sooner.

Reacting a week sooner would be important particularly at times when unexpected deviations in demand deposit growth in one week are

followed by unexpected deviations in the next week in the same direction, i.e., when there is a tendency for money growth to weaken or strengthen cumulatively. Such a cumulative tendency has not been unusual in the past. A more rapid recognition of, and adjustment to, such disturbances in the expected relationship between money demand, nonborrowed reserves, and the Federal funds rate would improve monetary control.

A shortening of the lag to one week would have only a marginal influence on monetary control if money is controlled via money demand with a Federal funds rate instrument, as is now the case. The FOMC votes on a Federal funds rate band for the subsequent month. As the month progresses, the Desk monitors movements in the money stock. In response to observed deviations in money growth from the tolerance ranges, the Desk gradually adjusts the Federal funds rate within this band by supplying whatever reserves are necessary. Occasionally, significant changes in money growth trigger an FOMC-approved revision of the band. Except to the extent that, with a shortened lag, money market pressures are taken to represent movements in required reserves reflecting as yet unreported deposit changes and are therefore not completely offset by

Desk action, shortening the lag in reserve accounting to one week would have little, if any, significance for monetary control under present operating procedures.^{1/}

Disadvantages of reducing the lag to one week. With the current reserve accounting system, the Desk knows required reserves with a high degree of certainty for the statement week in which it is operating. Virtually final deposit data on which to base required reserves are available in sufficient time. However, with current reporting schedules and a one-week lagged reserve accounting scheme, the System would have only a preliminary estimate of required reserves during most of the statement week in which it is operating; more accurate figures would not be available until about the last day of the statement week. Member banks, of course, would presumably know their own required reserves earlier in that week so they are not disadvantaged. It would take a

^{1/} Even with the current operating procedures, however, a one-week lag would complement the present one-week carryover provision and result in reduced defensive open market operations designed to forestall volatility in the funds rate. An open market operation involving the nonbank public or an unexpected (and hence not offset) change in non-controllable factors affecting reserves will change both deposits and the level of reserves in the current week. But under the present two-week lagged reserve accounting procedure, the change in deposits will not affect required reserves for two weeks; the impact on total reserves, therefore, will be reflected in excess reserves, and in the reserve surplus or deficiency carried over into next week. Suppose, for example, that reserves are absorbed by an unexpected decline in Federal Reserve float, which would also reduce reservable deposits. The loss of total reserves will contribute to a carry forward of reserve deficiencies into the next week, causing the funds rate to tend to rise in the week as banks attempt to cover that deficiency next week. Required reserves will decline, however, two weeks following the change in deposits and Federal Reserve float, tending to reduce the funds rate in that later week. Under a one-week lag, these conflicting pressures on the funds rate occur in the same week, thereby moderating inter-weekly pressures on the funds rate and consequently requiring smaller defensive open market operations. The same offset would occur under present reserve accounting if the carry forward provision applied with a two-week lag.

rather large investment in more rapid reporting by a larger sample of banks, as well as more rapid processing of all member bank deposit reports, to make this information available to the Fed on a more timely schedule.

Using data from September through February, estimates were made of Board staff's projection errors of required reserves and vault cash as of the first and second days of a statement week assuming a one-week lag. As can be seen in the last two columns of Table 3 these combined errors as of Thursday (the first day of the "reserve maintenance" week under a one-week lag) average \$226 million, with a quite wide range. They drop to only \$190 million by Friday, with a slightly reduced range. But the error on required reserves alone is considerably less--\$113 million--by the second day of the statement week.

These estimated errors should be considered as a maximum estimate since one-week lagged reserve accounting would induce improved efforts to forecast required reserves by System staff. But it is unlikely that projection errors could be reduced significantly without the earlier reporting and more rapid processing of deposit data noted above.

Thus, with a one-week lag, the Desk would not know exactly the system-wide level of required reserves at the beginning of the reserve maintenance week. Consequently, the Desk could not apportion the sources of money market pressure among changes in required reserves, as opposed to noncontrolled factors affecting the supply of reserves, as accurately as is now the case. For example, the Desk might not be able to disentangle how much unexpected upward pressure on the funds rate this week is attributable to a greater than estimated surge in demand deposits last week and hence required reserves this week, or how much is related to a fall in noncontrolled factors affecting nonborrowed reserves, such as float.

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Table 3
 SUMMARY MEASURE OF ERRORS
 in
 PROJECTION OF RESERVES
 Sept. 1975-Feb. 1976
 (Millions of dollars)

	<u>Required Reserves</u>		Vault Cash (Actual Less Projection)	<u>Combined Vault Cash and Required Reserves Error</u>	
	<u>Actual Less Thursday Est.</u>	<u>Actual Less Friday Est.</u>		<u>Thursday Est.</u>	<u>Friday Est.</u>
Mean absolute error	197	113	124	226	190
Mean	60.6	22.2	6.6	67.2	28.8
Standard deviation	243	166	182	287	243
Range: High	545	589	288	583	522
Low	-600	-322	-340	-753	-623

As Meek and Lucas have pointed out,^{1/} if the FOMC instructed the Desk to hit a nonborrowed reserve target, the additional uncertainty about the source of fluctuation in the funds rate caused by shortening the reserve-accounting lag would make it moderately harder to do so. Under either a one- or two-week lag, the Desk is faced with uncertainty regarding the level of noncontrolled factors--such as float--affecting the actual daily supply of nonborrowed reserves. With a one-week accounting lag, the Desk would, in addition, be uncertain as to the level of required reserves, and hence it would be less certain as to whether or not pressures on the Federal funds rate were emanating from changes in bank demands for required reserves or deviations in the supply of nonborrowed reserves from the

^{1/} See Appendix C, a paper on one-week lagged reserve accounting prepared by the New York Federal Reserve Bank.

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desired target. Therefore, the Federal funds rate would not provide as clear-cut a signal as it would with a two-week lag as to whether the Desk should or should not provide reserves to hit a nonborrowed target.

It should be noted, however, that this uncertainty as to the source of a Federal funds rate movement is intrinsic to attaining closer control over the aggregates through reserves. With a shortened reserve accounting lag, monetary control via reserves would be improved because, as noted earlier, money market conditions would respond sooner to changes in deposits and required reserves. If the funds rate were rising in any particular week, the Desk would have to assess whether this reflected a misestimation of float, represented a change in required reserves, or even a change in banks' demands for free reserves. Past experience would be a guide. Still, the Desk would be unable to isolate any single source for the pressure on the funds rate; therefore, prudence would suggest that the funds rate be permitted to adjust somewhat, though not completely, in response to market forces. On balance, this procedure would result in better control of the aggregates than is possible under the current two-week lag. With a two-week lag, money market pressures in the current week would never reflect an unexpected and undesired strengthening (or weakening) in deposits, and thus the opportunity for permitting an offsetting movement in the funds rate would not arise. In sum, with required reserves lagged and therefore fixed, a reserve target might be hit with more certainty, but the relationship of the reserve target itself and monetary aggregates would be looser the longer the lag.

Appendix A

August 10, 1973

TO: Board of Governors

FROM: Stephen H. Axilrod *A*

Attached is the initial report of the Staff Committee on Lagged Reserve Accounting. This report focuses on the issue of whether lagged reserve accounting does or does not impede the Federal Reserve's ability to control the monetary aggregates through a reserve handle. The conclusions and recommendations are summarized in the first three pages of the report.

The report provides a basis for Board discussion and decision as to whether in principle it is prepared to revert to a contemporaneous reserve system. Should the Board decide in the affirmative on this fundamental issue, the details of a contemporaneous system -- including the role of carry-over provisions, the lag in vault cash, whether reserves should continue to be based on end-of-day deposits, etc. -- could be prepared for decision in a relatively short time span.

Because of time pressure, and since the bulk of its research had been devoted to the question of lagged reserves initially assigned to it, the Staff Committee was not able to include a systematic analysis of the carry-over provision in this report. The Committee did recognize (p. 16 of the report) that continuation of the carry-over provisions would help ease bank relations problems in instituting a contemporaneous system. I would suggest that the main issue with regard to carry-overs is whether they should be enlarged and that the Board may wish to have this specific issue considered irrespective of its decision on lagged reserves.

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**First Report of the Staff Committee on
Lagged Reserve Accounting**

This report of the Staff Committee on Lagged Reserve Accounting will focus on the central issue of whether lagged reserve accounting does or does not contribute to monetary policy's ability to control bank reserves and monetary aggregates. When lagged reserves were introduced member banks were also permitted to carry over into the next week reserve surpluses up to 2 percent of required reserves (they already had a similar carry-over privilege for reserve deficiencies), the old country bank reserve period was reduced from two weeks to one week, and vault cash used in the calculation of reserves was lagged by two weeks. The Committee believes that the two week lag of required reserves in relation to deposits can be discussed on its merits as it affects control of the monetary aggregates independently of these other measures, although the Committee recognizes that many of the country banks considered lagged reserves to be in the nature of a quid pro quo for shortening the reserve period.

Our finding is that the lagged reserve accounting procedure makes no positive contribution to controlling monetary aggregates. If reserve aggregates are used as a handle of policy, the contribution of lagged reserve accounting is, if anything, negative. The Committee as a whole is agreed on the direction of effect, but members differ on the probable magnitude.

As explained in the ensuing text the Committee has found that lagged reserve accounting:

(a) significantly reduces the ability to hit a total reserve or RPD target in the interim between Committee meetings, though to a lesser extent a nonborrowed reserve target;

(b) is a less significant¹ limitation on the System's ability to control reserves and monetary aggregates over the longer run;

(c) adds to the tendency for day-to-day money market variability; and

(d) increases somewhat the range over which the Federal funds rate needs to fluctuate if monetary aggregates are to be controlled by use of a reserve handle.

With regard to member bank attitudes toward lagged reserve accounting, the Committee conducted a survey of Reserve Bank personnel who are in close contact with member banks. In an effort to avoid raising unnecessary bank relations problems at this time, the Committee did not sample member bank opinion directly. The response of Reserve Bank personnel suggested that the majority of member banks seem favorably disposed to lagged accounting because they believe it facilitates reserve management.

¹ Messrs. Axilrod and Sternlight feel that lagged reserve accounting is probably of little significance as an impediment over a three month control period under current operating procedures.

This suggests that a bank relations problem might arise if the System were to return to a contemporaneous system.

In terms of the economic considerations, the Committee recommends abandonment of lagged reserve accounting and institution of a contemporaneous reserve accounting system. The members of the Committee are divided, however, on the degree of importance they attach to abandonment of lagged reserve accounting when considering monetary control over a longer term horizon. Thus, if bank relations costs are great some members of the Committee would favor retention of the current system, assuming the permissible range of variation in the funds rate is not unduly circumscribed. The Committee recognizes the potential for a bank relations problem, but also recognizes that many banks originally objected to a lagged reserve system, that bank opinion currently seems to be divided (and a number appear to be indifferent), and that a number of banks may not understand the potential disadvantage to them of the lagged system.

Analysis of the principal issues considered by the Committee is presented below. These issues include the relationship of lagged reserve accounting to reserve targets, to money market conditions, to Desk operations, to the demand for money, and to individual bank reserve management and bank relations.¹

¹ It should be pointed out that members of the Committee are not in complete agreement on analytic points, though differences are mainly matters of emphasis and degree.

Lagged reserve accounting and reserve targets

The two week lag in reserves means, technically, that the Desk's capacity to affect total reserves, or RPD, in the period between FOMC meetings is more limited than it would be under a contemporaneous system. Required reserves are essentially fixed in the two statement weeks after a FOMC meeting and in the statement week that includes the Tuesday meeting.

With required reserves fixed, all System open market operations can do in the two weeks just after an FOMC meeting is change nonborrowed reserves or, what is in effect the same thing, affect free reserves. RPD in those two weeks can be affected only to the extent that excess reserves are in the process changed.

Excess reserves are generally kept at near minimum levels by banks. In any given statement week, though, operations can force excess reserves on the banking system. It is much more difficult, however, to reduce RPD's because doing so would force reserve deficiencies on the banking system. Banks would offset such deficiencies by borrowing since by law they must attempt to meet their legal reserve requirements.

In any event, the Federal funds rate constraint will forestall an effort by the System to expand or contract excess reserves sharply relative to normal (though volatile) bank demands. As a result, the fixed required reserves will pretty much determine RPD in the first two week period following the Committee meeting.

The inflexibility of required reserves in the lagged system will under certain circumstances seriously limit the FOMC's

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ability to hit a shortrun RPD target through current open market operations. For example, if deposits in the two weeks preceding and surrounding the FOMC meeting turn out to have been much higher than originally estimated at the time of the FOMC meeting, and hence required reserves in the target period much higher, this may raise RPD above target. The Desk would have a very difficult time getting down to target in the period between Committee meetings because actions taken in the first two week period just after the FOMC meeting would influence required reserves and RPD only in the last two weeks of the usual four week operating period. This may not represent sufficient time to move the desired average for the month down to target.

Of course, Desk operations would be affecting deposits in the whole four week inter-meeting operating period. Even though required reserves cannot be affected by Fed operations in the first two weeks, deposits can as, for example, banks sell assets to the public or restrict loans. The extent of deposit liquidation that might occur early in a period will depend on the speed of bank and public response in light of changes in money market conditions and interest rates. Given moderate changes in money market conditions, a relatively limited deposit response is likely in the first few weeks after an FOMC meeting but with the response becoming larger as more time passes.

While the exact nature and time path of the lagged relationship between deposits and interest rates is not fully known and is probably highly variable in any event, the deposit

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response set in motion through the System's ability to control nonborrowed reserves and/or money market conditions in the short-run should technically permit attainment of an RPD target at least over a two or three month period, assuming that the Federal funds rate constraint were no substantial impediment. Given that assumption, over that period 2-week lagged reserve accounting would not appear to be a significant impediment.

While the preceding analysis indicates that lagged reserve accounting itself makes it more difficult to hit an RPD target in the very short run, as compared with contemporaneous reserve accounting, lagged reserve accounting would not be a similar technical impediment to a short-run nonborrowed reserve or non-borrowed RPD target. Conceivably, such a target might not be attained any more frequently than RPD because of the workings of the Federal funds rate constraint, but the odds on attainment would be greater.

Lagged reserves and money market conditions

Apparently one of the original purposes behind introduction of lagged reserve accounting was to moderate pressures for reserve adjustments within the banking system that tended to develop near the close of a reserve period. This was expected to occur because member banks would no longer be uncertain about their level of required reserves and therefore could manage their reserve positions better.

Our research indicates that money market conditions have, however, been more volatile toward the end of a statement week since the introduction of lagged reserves. There were greater day-to-day changes afterward toward the end of the statement week in member bank borrowings, the Federal funds rate, and the System's holdings of securities. For example, the average Monday-to-Tuesday change in the funds rate was 35 basis points in the two year period after the introduction of lagged reserve accounting in the latter part of 1968 and 18 basis points in the two year period before. The Tuesday-to-Wednesday change comparison is even more dramatic--29 basis points before and 83 basis points in the two years after. Analysis of two additional years of data does indicate a drop in the day-to-day change in the funds rate to around pre-lag dimensions, but this was accompanied by substantially larger changes in System holdings of U.S. Government securities as offsetting open market operations were required to moderate money market variability.

The tendency toward greater money market variability under lagged reserve accounting can be explained as follows. Suppose for example, a deposit and reserve drain from a bank reflects a move into currency or decline in float rather than a shift of deposits and reserves to another bank. In this case, there will be a very clear net increase in demand for Federal funds under a lagged as compared with a contemporaneous reserve system because the banking system has lost reserves but has not

also experienced a partly compensating fractional decline in required reserves. As a result, the funds rate will tend to rise more than otherwise. A part of the tendency to greater fluctuation will be moderated, of course, by increased Federal Reserve market intervention to keep the rate within a permissible band.

As well as leading to a greater tendency for money market conditions to fluctuate within a statement week, lagged reserve accounting also requires somewhat greater week-to-week movement of the funds rate to achieve a given money supply objective if that objective is sought through use of a reserve handle. For example, if M_1 turns out to be much stronger than desired in the initial week of an operating period, under a contemporaneous reserve system required reserves would rise and the money market would tend to tighten, assuming the Fed were following a nonborrowed reserve target or an RPD target. This tightening would set in motion forces leading to deposit destruction--to a small degree in the current week and more so in subsequent weeks.

Under a lagged system, the rise in required reserves would occur two weeks later, and money market tightening would not occur until that time. Bank adjustments leading to deposit destruction would also not occur until that time. But because two weeks have been lost, the Federal funds rate would have to

rise somewhat more than it would have under a contemporaneous system.¹

It is most difficult to obtain an estimate of the amount of additional week-to-week variation in the funds rate that is needed to control money supply through reserves under a lagged system. The smallness of the two week lag reduces the amount because the delay in response is relatively short. Any relatively long lag in the relation between money demand and interest rates also reduces the loss from a small delay in response caused by the lagged reserve structure. On the other hand, the amount of additional week-to-week variation would be larger to the extent it was desired to get back on path within a very short period following an overshoot in money growth.

We have attempted to obtain an estimate of the degree of greater week-to-week variation in the Federal funds rate that would appear to be required from simulations on an experimental weekly money market model. The results are at best merely suggestive. Weekly models are difficult to work with. Specification and estimation of them are in an early stage of development.

¹ On the other hand, it is possible that if the Desk were sufficiently alert to the stronger than desired M_1 as it occurred, it could immediately impose the more stringent conditions that would have developed automatically under the no-lag system. This assumes, of course, not only adequate deposit statistics but also more confidence in using decisions as to the funds rate rather than decisions about reserves as a means of controlling M_1 . This is discussed in more detail in the section on the demand for money.

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Moreover, so many complicated, large, and often random financial flows affect money markets weekly that the effect of lagged reserves is difficult to measure, or discern, within the large margins of error in the model.

Our best conservative judgment is that a 2 week lagged reserve system might require the Federal funds rate range associated with a reserve target to be 10--25 basis points wider than it otherwise would be under a contemporaneous system.¹

Lagged reserves and Desk operations

One of the by-products of lagged reserve accounting has been that the Trading Desk has had the use of a required reserve figure that is not subject to substantial later revision. Under the previous contemporaneous system, revisions in required reserves were one of the significant sources of error in day-to-day projections of factors affecting reserve availability. Accordingly, the Committee undertook to review evidence of the extent to which a return to a no-lag system might again subject the Desk to this type of projection error, and to consider the ability of the Desk to cope with additional uncertainty from this source.

¹ One Committee member--Mr. Sternlight--remains skeptical whether even this modest estimated increase in Federal funds rate variation is needed to achieve comparable control of M_1 under a lagged reserve system as compared with a no-lag system. He agrees that under a no-lag system, a bulge in M_1 produces an immediate rise in required reserves and upward pressure on the Federal funds rate, unless the Desk offsets that pressure. But he points out that under a lagged reserve system, the Desk may be able to observe the M_1 bulge and act quickly to restrict the supply of reserves, and bring about the desired money market pressure.

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Our conclusion is that while removal of the lag would indeed subject the Desk to additional projection error, the increase would not be unmanageable. Moreover, since to some extent the impact of the projection misses would be in a "constructive direction" (i.e. unexpectedly absorbing reserves when it is appropriate that reserves be absorbed in order to reach FOMC reserve and deposit growth objectives) some of the increased uncertainty would be beneficial in its effect.

As to the possible extent of projection errors, the average absolute difference between Thursday projections of required reserves to be applied in the reserve week starting two weeks later (which are based on deposits in the week just beginning), and the actual requirements that finally emerged for that week turned out during 1972 to average about \$165 million. Receipt of later information as the week progressed would no doubt reduce this error, but the extent of such reduction is hard to estimate since current reporting needs have not generated the urgency for such up-dated information that would exist under a no-lag system. A rough estimate is that by the morning of the final day of a given week, required reserves projections might be on average within about \$75 million of the mark.

Some of the miss in required reserves projections would serve to offset misses from other factors, so that over-all reserve projections accuracy would not suffer to the full extent indicated above. In 1972, the average miss on Thursday projections of net change in weekly reserve factors would have been boosted from

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about \$240 million to about \$300 million because of the inclusion of required reserves on a no-lag basis, while a rough guess of the increased miss in Wednesday projections of the current weekly changes in reserve factors because of unlagging required reserves would be a rise from about \$90 million to perhaps \$120 million (making some allowance for improved interim estimates of required reserves toward the end of the reserve week).

An increase in projection misses of this magnitude, while not particularly welcome, is not unmanageable. Moreover, a major potential advantage of the no-lag system is that easing or tightening of the money market caused by a miss in projecting required reserves would be in the proper direction from a policy standpoint. For example, if deposit growth was unexpectedly strong, the absorption of reserves through increased requirements would cause a tightening of money market conditions that might well be appropriate if the deposit surge was related to a genuine strengthening of the economy. On the other hand, the firming might be inappropriate from the longer run point of view if the deposit strength stemmed from transitory factors that might soon be reversed and had no bearing on the over-all state of the economy. In the latter case, of course, the money market tightening would be followed by an offsetting easing in later weeks.

Lagged reserve accounting and money demand.

If one were to take the view that we are reasonably certain about the characteristics of the money demand function--particularly the timing and intensity with which interest rates enter into that function--and that we could forecast the extent of transactions demand, then one could argue that money supply objectives could be attained by controlling, say, the Federal funds rate. Or one might simply take the position that in practice ad hoc adjustment of the Federal funds rate to incoming money supply figures (assuming they were accurate) would be as effective as working on reserves. Control through the funds rate without reference to reserve targets would be in contrast to controlling money by assuming that we have better knowledge of how money relates to the supply of reserves.

It is difficult to argue that lagged reserve accounting has much relation to the public's demand for money. Thus, it should be pointed out that lagged reserve accounting is no impediment to an effort to control money through adjustments in the Federal funds rate, without reference to reserve targets. Lagged reserve accounting would still lead to a tendency for more day-to-day fluctuation in the funds rate than otherwise. But additional week-to-week variation would not be necessary to the extent that the Desk had accurate enough deposit figures to respond early to incoming data.

It is not the province of this Committee to take a position on the key question of whether to handle for monetary policy in terms

of controlling the money supply should be the Federal funds rate or some reserve aggregate. The FOMC appears to be giving weight to both.

The Committee does take the view, however, that existence of lagged reserves should not be used as an argument in favor of a Federal funds rate target. Lagged reserve accounting introduces a little more Federal funds rate variability than does contemporaneous reserves accounting if the FOMC chooses a reserve target, and lagged accounting is clearly an unnecessary impediment to achievement of very short-run reserve targets, though not so clearly an impediment to achievement of longer-run targets. On the other hand, although lagged accounting does not impede attainment of a Federal funds rate target, that target itself may or may not bear as close a relationship to a money supply objective as does a reserve target. Whether use of a Federal funds rate or some reserve aggregate provides the best basis in practice for achieving a given money supply objective needs to be determined on its own merits.

Bank relations.

An extensive bank relations effort was put in by the Federal Reserve at the introduction of lagged reserve accounting in 1968. Reserve Banks, for example, began providing member banks with forms in advance of a given statement week showing what required reserves would be in that week and the amount of reserve balances that needed to be maintained that week at the Fed (assuming normal vault cash holdings of the bank).

The knowledge of what reserve balances will be required in a forthcoming statement week seems to simplify reserve management for a large number of banks. The advantage of fixed required reserves appears to them to offset the disadvantage to banks from the fact that their deposit flows would be as uncertain as ever, so that the reserve balances available to meet the required reserves would also be uncertain.

Banks with large swings in deposits, such as those in state capitals, appear to be least enamored of lagged reserve accounting. The large number of relatively small banks, and banks with large branch systems appear most favorable toward the lag.

Because of the delicacy of the matter, and for fear of worsening bank relations if no constructive purpose was being served, the Committee has not contacted member banks, or asked Reserve Banks to make a special effort to contact member banks to ask about their experience and present position. Rather, the Committee has surveyed Reserve Bank personnel who are normally in continuous contact with member banks, such as accounting, discount, examination, and statistical reports officials.

The reports from Reserve Bank personnel indicate that member banks on the whole preferred lagged reserve to concurrent accounting. Ease and accuracy of reserve position management appears to be the one overriding consideration affecting bank attitudes. There were apparently some banks who felt that they could live with contemporaneous reserves if the Federal Reserve felt it necessary to revert, but this would of course

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involve costs of retraining at member banks. It would also involve costs of training and of new forms at Reserve Banks.

If the Federal Reserve Board were to determine that it was leaning toward abandonment of lagged reserve accounting on monetary policy grounds, a more direct survey of member banks to obtain a clearer picture of their attitudes could be undertaken. The Committee would like to point out, however, that any bank unhappiness with institution of a contemporaneous reserve system would likely be moderated by continuation of the carry-over provision (which is specifically designed to permit easier adjustment to unexpected deposit and reserve flows), by any educational campaign that explains the monetary policy needed for the contemporaneous system and the relationship of lagged reserves to a volatile Federal fund market, and by knowledge that the costs to banks of instituting a contemporaneous system are mainly the one-time costs of change since continuing costs would not appear to be significant for the banking system as a whole (after weighing the pluses and minuses for different types of banks).

Stephen H. Axilrod, Chairman

Albert Burger

Dorothy Nichols

William Poole

P. D. Ring

Kent Sims

Peter Sternlight

August 10, 1973

3/5/76

Appendix B

REPORT OF A SURVEY OF BANKER DIRECTORS OF FEDERAL
RESERVE BANKS ON LAGGED RESERVE ACCOUNTING

As part of the Board's process of reconsidering the present system of lagged reserve accounting, a survey of bank directors of Reserve Banks and branches was discreetly conducted to provide an indication of member bank attitudes toward reserve accounting. A total of 109 bank directors responded to the survey. The distribution of respondents across Reserve Bank districts by size of bank (determined by total deposits as of June 30, 1975) is presented in Table 1. Only 11 of the respondents are located in New England; 40 are located in the Mideast and Midwest, and the remaining 58 are located in the South and West.

The survey results are summarized below. It should be noted that not all respondents provided an answer to every question in the survey; thus, the total number of responses to a specific question often falls short of 109. In addition, Tables 2 through 13 present survey results for each Federal Reserve district. It was not possible to determine the distribution of urban and rural banks from the information reported by the Reserve Banks.

Question 1. Do you believe that the two-week lag in accounting for required reserves has benefited your bank? If so, in what ways? If not, why not?

Of the 109 bankers responding to Question 1, 85 replied in the affirmative.

Lagged reserve accounting has benefited member banks in several ways. The benefit most frequently reported is the ease and efficiency of reserve accounting. Many respondents stressed the greater accuracy afforded by lagged reserve accounting, as the lag helps to minimize errors and allows time for corrections. The lag is of particular value for banks

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with a large number of branches that experience posting problems which delay the computation of their combined position. A similar situation prevails among affiliate banks of bank holding companies that have a common reserve management system.

Some bankers reported that their banks enjoyed greater earnings with lagged reserve accounting than those afforded by contemporaneous accounting, particularly if the bank is experiencing increasing deposits. Banks with continued deposit growth acknowledged that the lag effectively reduces their reserve requirements.

In addition, the bankers felt that daily deposit fluctuations could be ignored with lagged reserve accounting, and were appreciative that the Reserve Banks computed required reserves for member banks. Many worried that a return to contemporaneous accounting would preclude this Reserve Bank service. Finally, significant benefits from the lag accrue to noncomputerized banks that are still hand-posting items.

Bankers who responded that the two-week lag has not benefited their banks did so for two reasons: 1) continued deposit stability, so that the lag presented no particular benefit, or 2) very volatile deposits, on an intra-monthly basis, which leads to a constant "mismatch" between deposits and the required reserve position.

The distribution of responses to Question 1 by size of bank is:

<u>Total Deposits (in \$ millions)</u>	<u>Benefit</u>	<u>No Benefit</u>
less than 10	2	
10-25	11	4
25-50	15	7
50-100	17	3
100-500	19	9
500-1,000	7	1
over 1,000	<u>14</u>	
TOTALS	85	<u>24</u>

Question 2. Would lagged reserve accounting be beneficial if the length of the lag were reduced to a) one week? b) two days? c) one day?

Of the 105 responses to Question 2a, 64 bankers replied that a one-week lag would be of benefit. The greatest proportion of negative answers were submitted in the very large and very small bank groups, but for differing reasons. The very large banks preferred no shortening of the lag, whereas the smallest banks appeared to favor either contemporaneous accounting or a very short lag.

Of the 104 responses to Question 2b, only 25 bankers responded that a two-day lag would be of benefit, and 79 responded in the negative.

Of the 105 responses to Question 2c, 84 bankers replied in the negative. Only 21 bankers reported that a one-day lag would be of benefit.

Some bankers indicated that computer problems could be anticipated with a lag of less than one week. Many more banks would of necessity either manually calculate reserves or estimate deposits with a lag shorter than one week.

The distribution of responses to Question 2 by size of bank is:

Total Deposits (in \$ millions)	<u>One-week lag</u>		<u>2-day lag</u>		<u>1-day lag</u>	
	<u>Benefit</u>	<u>No Benefit</u>	<u>Benefit</u>	<u>No Benefit</u>	<u>Benefit</u>	<u>No Benefit</u>
less than 10		2	2		2	
10-25	7	6	1	12	2	12
25-50	15	6	4	15	4	17
50-100	12	8	4	19	4	16
100-500	17	10	8	19	7	20
500-1,000	6	2	4	4	1	7
over 1,000	<u>7</u>	<u>7</u>	<u>2</u>	<u>10</u>	<u>1</u>	<u>12</u>
TOTALS	64	41	25	79	21	84

Question 3. Does the two-week lag in accounting for vault cash have the same importance to your bank as the lag in accounting for required reserves? For what reasons?

Of the 104 responses to Question 3, 70 bankers replied in the negative. All of the largest banks surveyed responded in the negative, as did the smallest banks. A slight majority of the banks with between \$10 and \$1,000 million in deposits indicated that the lag in accounting for vault cash was not as important as the lag in accounting for required reserves.

For those bankers that responded in the negative, lagged accounting of vault cash was felt to be of less importance primarily because vault cash levels are very stable. Moreover, vault cash generally represents a small portion of required reserves. Some of these bankers indicated that their vault cash fluctuations were not well-related to deposit variability, but were more related to the requirements of the type of depositors in the communities served by the bank. For example, significant reductions in vault cash levels could be attributed to the large, but infrequent, cash requirements of an institutional depositor, such as a university.

On the other hand, banks experiencing substantial variability in vault cash levels felt the lag in accounting for vault cash would be of equal benefit as the lag in reserve accounting. These banks stressed that vault cash fluctuations reflected deposit volatility, and pointed out that since vault cash is a direct offset to required reserves, the net effect on reserves of variation in vault cash is greater than the effect of the variation in the deposit base.

In addition, some bankers reported that the different accounting periods for required reserves and vault cash proved to be a source of confusion, and indicated a preference for the lag in accounting for vault cash simply on consistency grounds. A few bankers indicated the lag would provide valuable time to correct errors. And for the banks with several branches, the lag would help reduce problems of arriving at a consolidated figure since receipt of vault cash information typically coincides with receipt of other accounting information relevant to reserve requirements.

The distribution of responses to Question 3 by size of bank is:

<u>Total Deposits (in \$ millions)</u>	<u>2-week lag for vault cash</u>	
	<u>Yes</u>	<u>No</u>
less than 10		2
10-25	3	10
25-50	11	10
50-100	9	11
100-500	7	19
500-1,000	4	4
over 1,000		<u>14</u>
TOTALS	34	70

Question 4. Contemporaneous accounting of required reserves can be based on deposits as of the opening of business (in effect a one-day lag) or the close of business. Which would be preferable if it were deemed necessary to return to contemporaneous reserve accounting for monetary policy purposes?

There were only 89 direct responses to Question 4, of which 75 indicated a preference for the reserve accounting based on deposits as of the opening of business. Eight bankers preferred the close of business, and 6 bankers specified indifference.

The distribution of responses to Question 4 by size of bank is:

<u>Total Deposits (in \$ millions)</u>	<u>Open</u>	<u>Close</u>	<u>Indifferent</u>
less than 10	2		
10-25	5	2	3
25-50	11	2	2
50-100	14	2	
100-500	23	2	1
500-1,000	8		
over 1,000	<u>12</u>	<u> </u>	<u> </u>
TOTALS	75	8	6

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Question 5a). Apart from one-time costs of retraining personnel, would return to contemporaneous reserve accounting of required reserves significantly affect your bank's operations and costs? 5b). Would institution of a one-week lag significantly affect your bank's costs and operations?

Of the 100 responses to Question 5a, 58 bankers responded in the affirmative. As can be seen in the distribution of responses by size of bank given below, the great majority of banks with over \$100 million in deposits indicated that their costs and operations would be significantly affected by a return to contemporaneous reserve accounting. The situation is reversed among banks with less than \$50 million in deposits, and in the \$50-100 million deposit class, the responses were evenly divided.

All bankers surveyed by the New York and Chicago Reserve Banks replied in the affirmative, so did the overwhelming majority of respondents in the Atlanta and San Francisco Districts. In virtually all other Districts, either the responses were fairly evenly split or a small majority responded in the negative. The St. Louis District stands out as a single exception, for all Eighth District respondents replied in the negative.

For sources of impact on costs and operations, the respondents pointed principally to additional staffing requirements and the earnings loss on excess reserves due to the problem of estimating deposit and float data. Also mentioned were incremental computer costs and the increase in correspondent work load in order to supply information on a timely basis.

Although a majority of respondents felt that a return to contemporaneous accounting would significantly affect bank operations and costs, the great majority indicated that the institution of a one-week

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lag would have only a modest impact. Of the 100 responses to Question 5b, 87 replied in the negative.

The distribution of responses to Questions 5a and 5b is:

<u>Total Deposits (in \$ millions)</u>	<u>Significant cost and operations impact of contemporaneous accounting?</u>		<u>Significant cost and operations impact of a one- week lag?</u>	
	<u>YES</u>	<u>NO</u>	<u>YES</u>	<u>NO</u>
less than 10	1	1		2
10-25	4	8	1	12
25-50	8	11	3	17
50-100	10	10	3	18
100-500	19	7	5	20
500-1,000	5	3	1	7
over 1,000	<u>11</u>	<u>2</u>	<u>—</u>	<u>11</u>
TOTALS	58	42	13	87

Question 5c). Do you believe that attitudes of banks toward membership in the System would be adversely affected by a return to contemporaneous reserve accounting? by institution of a one-week lag?

Of the 94 responses on the effect of contemporaneous accounting on bank attitudes toward membership, 68 respondents replied in the affirmative. However, only 17 of the 92 responses on the effect of a one-week lag replied in the affirmative.

Generally, the bankers felt that the incremental costs of a reduction of the lag to one week were modest and thus, would have little effect on attitudes toward membership in the System. However, the significant impact of contemporaneous reserve accounting on bank operations and costs, coupled with the more liberal reserve requirements of some states (particularly the partial application of the U.S. Government securities portfolio against the reserve requirement) would, according to the great majority of respondents, adversely affect the attitudes of banks toward membership in the System.

It is interesting to note that generally, the larger the bank the greater the proportion of respondents that felt a one-week lag for reserve accounting had a less adverse effect on attitudes toward bank membership in the System.

The distribution of responses by size of bank to Question 5c is:

Total Deposits (in \$ millions)	Would there be an adverse effect on bank attitudes toward membership in the System			
	with contemporaneous reserve accounting?		with a one-week lag?	
	YES	NO	YES	NO
less than 10	2		2	
10-25	6	5	2	9
25-50	10	7	3	15
50-100	12	7	4	15
100-500	22	4	5	21
500-1,000	5	2	1	6
over 1,000	11	1		9
TOTALS	68	26	17	75

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Question 6a). Apart from one-time costs of retraining personnel, would return to contemporaneous accounting for value cash significantly affect your bank's operations and costs? 6b). Would institution of a one-week lag for vault cash accounting significantly affect your bank's costs and operations?

Of the 78 responses to Question 6a, 62 bankers replied in the negative. An even greater majority replied in the negative to Question 6b, as 72 of 79 responses replied that a one-week lag for vault cash accounting would not have significant impact on operations and costs.

Most of the bankers who cared to comment indicated a preference for accounting for vault cash simultaneous with deposit accounting. Many indicated very little difficulty with either contemporaneous accounting or a one-week lag as vault cash tended to be quite stable.

Since the Federal Reserve Bank of Atlanta did not ask Questions 6a and 6b, the number of responses is somewhat lower when compared to the other questions.

The distribution of responses to Question 6a and 6b by size of bank is:

<u>Total Deposits (in \$ millions)</u>	<u>Would there be a significant effect on bank operations and costs with</u>			
	<u>contemporaneous vault cash accounting?</u>		<u>a one-week lag?</u>	
	<u>YES</u>	<u>NO</u>	<u>YES</u>	<u>NO</u>
less than 10				2
10-25	1	11		10
25-50	5	12	3	14
50-100	1	14	1	14
100-500	6	9	2	13
500-1,000	3	4	1	6
over 1,000		12		13
TOTALS	16	62	7	72

Question 6c). Do you believe that attitudes of banks toward membership in the System would be adversely affected by a return to contemporaneous vault cash accounting? Institution of a one-week lag for vault cash accounting?

Twenty-nine of 89 respondents felt that bank attitudes toward membership in the System would be adversely affected by a return to contemporaneous accounting for vault cash, but only 6 of 91 respondents indicated there would be adverse effects with a one-week lag for vault cash accounting.

Interestingly, a majority of the respondents with between \$100 and \$1,000 million in deposits believed there would be adverse effects on attitudes toward System membership with contemporaneous vault cash accounting. All banks with over \$1,000 million in deposits replied in the negative to both parts of Question 6c.

The distribution of responses to Question 6c by size of bank is:

<u>Total Deposits (in \$ millions)</u>	<u>Attitudes toward membership in the System adversely affected by</u>			
	<u>contemporaneous vault cash accounting?</u>		<u>a one-week lag?</u>	
	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>
less than 10	2		1	1
10-25	1	12		13
25-50	5	11	2	15
50-100	4	14		17
100-500	12	9	2	20
500-1,000	5	2	1	6
over 1,000	—	<u>12</u>	—	<u>13</u>
Totals	29	60	6	85

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Question 7. If there were a return to contemporaneous reserve accounting, are there other changes in the reserve requirement structure that would offset the disadvantages, if any, to your bank? For example, at present reserve deficits or surpluses up to 2 per cent of required reserves can be carried forward to the next statement week. Would raising this percentage be of significant benefit to your bank? How much of an increase would make a significant difference--to 3 per cent, 4 per cent, or other?

A large proportion of respondents favored raising the carryover provision, with the 3% to 5% range reported most often. Several banks indicated the 10% to 15% range would not be unrealistic. Generally, the respondents indicated the shorter the lag, the greater the carryover provision would have to be to offset the incremental costs incurred.

Many bankers desired a simplification of the reserve requirement structure so as to ease the calculation of required reserves. Others suggested simply lowering required reserves would be a desirable offset. And several respondents requested consideration of U. S. Treasury securities or correspondent balances for meeting reserve requirements.

A few bankers suggested either lowering the penalty rate on reserve deficiencies or providing a short adjustment period without penalty with a limitation on the deficiency. Some others suggested the payment of interest on reserve balances would be a desirable offset. Many banks requested that Wire Service hours be extended if there were a return to contemporaneous accounting.

Respondents from banks with large branching systems and from multi-bank holding companies insisted that the reporting lag for branch data was, at a minimum, two days. They indicated it would be virtually impossible for them to comply with contemporaneous accounting if required, and some stated that with computerized accounts, they are currently experiencing a 2-day general ledger lag.

Appendix C

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CLASS II FOMC

OPEN MARKET OPERATIONS
UNDER ALTERNATIVE RESERVE ACCOUNTING SCHEMES

by

Paul Meek and Charles M. Lucas

The evaluation of alternative reserve accounting schemes depends on FOMC procedures for instructing the Desk, the Desk's ability to achieve the weekly nonborrowed reserve targets that follow from the Committee's instructions, and the effectiveness of Federal Reserve actions in modifying the behavior of the banking system and affecting the economy generally. The present paper focuses primarily on the implications that different reserve accounting schemes have for the Desk's ability to hit nonborrowed reserve targets established under alternative forms of FOMC instruction. The Committee has a strong interest in the limits within which the Desk can hit its targets, both to evaluate the Desk's performance and to judge the likely impact of any combination of FOMC instructions and accounting conventions on the effective transmission of the FOMC's policy intent to financial market participants.

The basic premise of the paper is that the System exerts its influence on bank behavior through control of the weekly level of nonborrowed reserves. As set forth in the appendix, the authors make a number of behavioral assumptions, as follows: Banks respond to changes in the aggregate gap between nonborrowed reserves and the reserves they are required to maintain. Changes in the gap result in movements in the Federal funds rate. Conditioned by experience, banks interpret sustained changes in the Federal funds rate to signify Federal Reserve efforts to slow down, or speed up, the expansion of the monetary and credit aggregates. Banks make decisions to adjust loan and

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investment holdings on the basis of intermediate-term expectations of interest rates and economic developments, and respond with a distributed lag to changes in these expectations. Nonbank holders of currency, and of demand, savings and time deposits of banks respond to changes in real economic conditions and interest rates rather than directly to movements in nonborrowed reserves or other reserve aggregates.

Review of the problem under these assumptions suggests that the critical substantive question relates to the Committee's reserve targeting procedure rather than to reserve accounting conventions. Given that banks react primarily to sustained changes in the Federal funds rate, the Desk's operational focus must be the relation between the level of nonborrowed reserves, on the one hand, and the level of required reserves, on the other, rather than on the levels of either separately. The particular reserve accounting scheme matters little; the crucial matter is the ability of the Desk to achieve a given nonborrowed reserves level in relation to required reserves. Since banks change expectations in response to sustained and clearly meaningful Federal funds rate movements, the efficiency of monetary control requires quick and relatively unequivocal communication of System intentions to market participants. This communication would probably be seriously impaired by institutional changes giving rise to heightened short-term variability of the Federal funds rate.

The study examines alternative reserve accounting procedures under three separate approaches to targeting nonborrowed reserves: (1) setting the weekly target to produce smooth changes in the Federal funds rate, (2) setting it to achieve a monthly nonborrowed reserve level, subject to a Federal funds rate constraint, and (3) setting weekly nonborrowed reserve targets without a Federal funds rate constraint.

The study finds that shortening the reserve accounting lag to one week in the first two cases will reduce somewhat the Desk's ability to

achieve weekly nonborrowed reserve objectives. This result is due mainly to the Desk's reduced knowledge of required reserves, which in turn would reduce marginally the precision with which the Desk could manage the gap between nonborrowed and required reserves. While this loss of precision would not be serious, the shift to a one-week lag would not change the Desk's trigger points for supplying or absorbing reserves. Since no change in the Desk's objectives would be visible to the financial markets, one would not expect any improvement in monetary control to result. There would seem to be little reason to proceed with a change that has bank relations costs and reduces the certainty of information to the Desk, but which produces no gain in monetary control.

The third case involves setting weekly nonborrowed reserves targets in advance, presumably on the basis of expected seasonal movements with an allowance for trend growth. Such a course calls for the Federal funds rate to vary as necessary in order to minimize deviations of weekly nonborrowed reserves from target. Under such a scheme, a shorter reserve accounting lag would probably complicate the Desk's job of hitting such targets for the following reason. Given current forecasting capabilities, actual deviations of reserves from expected levels would be large, generating sizable variations in the Federal funds rate if present weekly nonborrowed reserves targets are conscientiously pursued. Shortening the reserve accounting lag would simply augment this variability. Higher rate variability would reduce the ability of the Desk to obtain information on the effect of uncontrolled reserve factors on nonborrowed reserves from the behavior of the reserves market. Moreover, greater Federal funds rate variability would probably have adverse consequences for monetary control. This is because a "noisier" Federal funds rate would have less clear "signal" value to commercial banks, thereby delay-

ing adjustment of bank asset and liability management policies to shifting Federal Reserve policy.

I. The Present Procedure

The Committee's present procedure for establishing weekly nonborrowed reserve objectives for the Desk is specified in terms of the Federal funds rate. The Committee instructs the Desk to achieve nonborrowed reserves consistent with a specified Federal funds rate. It provides for varying the weekly objectives in response to incoming information on the aggregates. The Federal Reserve thereby provides clear and immediate signals through Desk operations to financial institutions whenever the FOMC seeks to speed up, or slow down, the growth of the money and credit aggregates. The use of instructions conditioned by aggregate behavior began in 1966 and has been progressively modified since 1970.

a. Two week lagged accounting

Operationally, the Trading Desk's problem, in achieving a desired nonborrowed reserve level, arises from the basic fact that projections of the uncontrolled factors affecting reserves are subject to a large margin of error. In 1975 the average absolute error in the projections made at the beginning of the statement week was \$318 million. Given this degree of uncertainty, the Desk has learned that it can do a significantly better job of hitting its nonborrowed reserve objective each week by evaluating the supply and demand forces at work in the reserves market--i.e., the Federal funds market.

To do this, the Desk makes an estimate of the total demand for reserves in that market during the statement week, and observes the Federal funds market for clues to the behavior of nonborrowed reserves. Under the two-week lag procedure, the Desk has in hand solid information on required reserves at the beginning of the "reserve maintenance" week. It has only

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to estimate the likely level of excess reserves to arrive at an estimate of total reserves for the week.^{1/} (A Federal funds rate objective must allow for likely variations in excess reserves.) Given its estimate of total reserves, the Desk estimates what level of nonborrowed reserves and what Federal funds rate are consistent with the FOMC's instructions. Then, if the degree of pressure in the reserves market differs from what is consistent with the statistical projections, the Desk concludes that nonborrowed reserves are either falling short of, or exceeding, the estimates and acts accordingly. Typically, the Desk will tend to supply reserves at a Federal funds rate somewhat above its weekly objective and tend to absorb reserves when the rate drops somewhat below.

The FOMC's instructions currently provide the Desk with clearly defined orders on how to move the Federal funds rate between meetings of the Committee in response to incoming information on M_1 and M_2 . In short, they establish zones of indifference for the two-month growth of each aggregate. So long as it appears between meetings that the two-month growth will fall within these zones, the Desk is instructed to maintain the Federal funds rate around the initial level prevailing after the FOMC meeting. However, once it appears that M_1 and M_2 will fall outside their respective zones, the Desk is instructed to allow the Federal funds rate to rise or fall accordingly. This instruction provides a Desk response that makes for a smooth movement of the Federal funds rate within the range established by the Committee. The shift in the Desk's entry points to supply and absorb

^{1/}The excess reserve estimate is a function primarily of historical patterns and the amount of excess reserves carried over from the previous week, but sharp changes in target rate levels are also taken into account.

reserves is quickly visible to financial market participants. In conjunction with the weekly data published on the aggregates, it gives clear signals that the Federal Reserve is trying to slow down, or speed up, the aggregates.

b. One week lagged accounting

The chief operational impact of a reduction in the accounting lag from two weeks to one week would be on the accuracy of the Desk's information on required reserves. At present, the initial week after the close of the "deposit week" is the "processing week"--the period required for the receipt and processing of member bank deposit data and calculating a national total for required reserves. The Desk has good information on required reserves at the beginning of the "reserve maintenance" week, which begins, in fact, 7 days after the close of the "deposit week." Individual member banks, too, begin the week with accurate knowledge of required reserves.

Under a one-week scheme most individual member banks would be able to calculate their own reserve requirements by some time on the Thursday after the close of the deposit week. And large branch banking systems would probably be able to do so within reasonable limits by Monday morning of the "reserve maintenance" week. In the aggregate, member banks would be only marginally worse off than at present in knowing their reserve requirements, although some additional expense might be involved in producing the information.

For the Federal Reserve, only modest gains in speeding up the processing cycle seem possible as long as one must allow for the normal delays in mail delivery. Data received on Friday and Saturday could be processed over the weekend at some additional expense, and transmitted to the Board for national aggregation on Monday. The Desk might then have reasonably solid data by Tuesday morning of the "reserve maintenance" week--only two days earlier than at present. Accordingly, the Desk would have to operate on the basis of projections of required reserves through Monday. Preliminary studies

suggest that the estimates of required reserves made on Friday of the statement week might err on average by \$50 to \$100 million from the data available the following Tuesday.

Under a reserve-targeting procedure linked to the Federal funds rate, the shift to a one-week lag would not seem likely to impair very much the Desk's ability to achieve its nonborrowed reserve objective. To be sure, it would reduce the accuracy of the Desk's initial estimates of total reserves for the current statement week. But the Federal funds market would still provide information on the discrepancy between actual nonborrowed reserves and the demand for total reserves by the member banks. The Desk would not be able to distinguish at the time between the errors arising from required reserves or from other factors, but this would not matter under a Federal funds targeting procedure. The Desk should be able to achieve nonborrowed reserves consistent with the desired Federal funds rate almost as well as under the two-week lag procedure.

It is possible that the Federal funds rate actually achieved under this procedure over the statement week might reflect to a slight degree the behavior of required reserves. Typically, the Federal funds rate achieved by the Desk under the present lag is marginally above the desired objective when nonborrowed reserves tend to fall short of desired levels because of shortfalls stemming from the uncontrolled factors. Conversely, the rate will tend to be slightly below if float and other factors inflate nonborrowed reserves unexpectedly. This effect might be of the order of 5 to 10 basis points. Thus, if the lag were to be shortened to one week, there might be a marginal effect on the rate that would reflect the Desk's uncertainty about the level of required reserves in the early part of the week. If deposits were consistently stronger than expected, for example, this would increase

ceteris paribus the banking system's demand for total reserves beyond the Desk's estimates and put upward pressure on the rate. The delay in the Desk's response might mean an average Federal funds rate that would be a few basis points above what would have prevailed under the two-week lag for required reserves.

It is doubtful whether such a marginal effect would, in fact, be visible to financial market participants. Currently, it is quite common for the Federal funds rate to range as much as 10 basis points or so on either side of the Desk's objective for the week without suggesting to financial market participants any change in the Desk's objective. All are well aware that variations in the uncontrolled factors affecting nonborrowed reserves are routinely great enough to cause such deviations. What is important to market participants is a change in the Desk's entry points to supply or absorb reserves. Since these would not be changed at all by moving to a one-week lag, one would not expect the shift to result in any significant change in the signals being given off by Desk operations.

Under a one-week lag, the FOMC's instructions in terms of the zones of indifference surrounding M_1 and M_2 would remain the determinant of the path of the Federal funds rate. In periods of strong deposit growth, the Desk would be consciously lifting its intervention points within the limits set by the Committee. And in periods of weak growth, it would be lowering those points. The Federal funds rate has often been allowed to move by as much as 1 percentage point between FOMC meetings under this procedure. The actual weekly averages of the Federal funds rate would vary around the desired average, depending in part upon the extent to which required reserves and all other factors exceeded, or fell short of, expectations. But there would be no significant change from the present in the market's perceptions of the Desk's objectives.

Since there is little or no gain from the change, there would seem little reason to incur the bank relations costs and loss of information to the Desk that would result.

II. Monthly Nonborrowed Reserve Targeting with Federal Funds Rate Constraints

The Subcommittee on the Directive has recommended that the FOMC make nonborrowed reserves its monthly operating target. Its January 13, 1976 report suggests that the Desk be instructed to use the full range of two percentage points to be allowed for variations in the Federal funds rate. Changes in the rate are to be effected on an orderly basis--for example, changes of about 1/4 of a percentage point per week in either direction. It is anticipated that with experience the maximum weekly change in the average funds rate should be gradually widened, particularly if and when the size and duration of deviations of NBR from its target path grow larger.

The proposed targeting procedure clearly involves an evolution from the current procedure toward one in which weekly changes in the Federal funds rate are larger, but cumulate in an appropriate direction. The procedure will continue to generate clear signals to banks and others of the FOMC's intent since the Federal funds rate will rise (or fall) as the margin between required reserves and the Committee nonborrowed monthly objective rises (or falls). To achieve the FOMC's objectives, the Desk will have to formulate a series of weekly nonborrowed reserve targets that are believed consistent with both the monthly objective and a smooth progression of the Federal funds rate. Operationally, the problem of pursuing each week's target would be essentially the same as under present procedures. The difference emerges in the cumulative path of nonborrowed reserves needed to hit a particular monthly objective to the extent the constraint permits. And the constraint can be relaxed in the inter-meeting interval if the FOMC chooses.

The Desk should be able to achieve its weekly nonborrowed reserve objectives under this targeting procedure about as well as under the current Federal funds rate procedure. To be sure, the weekly changes in the Federal funds rate are expected to be somewhat larger. But the Desk would still be able to depend upon the Federal funds market for information about the discrepancy between the actual and desired levels of nonborrowed reserves. Continuation of the two-week lag for required reserves would facilitate the operations of both the Desk and the banks.

Both could function almost as well if the lag were reduced to one week. But, as described in the first case, such a change would not significantly affect the transmission of the System's intent to the institutions whose behavior is to be affected. Accordingly, there seems little reason for incurring the bank relations costs or loss of certainty for the Desk that would be involved. The losses from a shift to contemporaneous reserve accounting would be larger, and have no greater benefit.

III. Weekly Nonborrowed Reserve Targeting Without a Federal Funds Rate Constraint

For the sake of completeness one should also examine a radically different procedure for instructing the Desk--one of specifying a weekly path for nonborrowed reserves. Such a path would presumably provide for seasonal variations in deposits plus an allowance for desired growth. The case for shortening the lag in reserve accounting depends upon the adoption of such a reserve targeting strategy, because in neither of the preceding cases does such a shortening affect significantly the Federal Reserve's impact on bank behavior. This approach assumes that a bulge in deposits--and required reserves--relative to the Desk's weekly nonborrowed reserve target will result in upward pressure on the Federal funds rate and prompt some banks to sell assets or cut back on loans within the statement week. Such actions under a contemporaneous

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reserve accounting system would be expected to reduce deposits and required reserves, partially reducing the gap between nonborrowed and required reserves within the week. The automaticity of this "feedback" process is expected to improve monetary control. Under either of the other reserve targeting procedures outlined above, contemporaneous accounting is irrelevant since the movement of reserves and the Federal funds rate is basically controlled by the targeting procedures.

A number of stringent conditions must be satisfied before one would expect the pre-specification of weekly nonborrowed reserve targets to improve the efficiency of monetary control. The weekly seasonals would have to be sufficiently reliable that one would have confidence in pre-specifying nonborrowed reserve levels that were uniquely consistent with the FOMC's long-term growth objectives. There are grounds for considerable doubts on this score since the absolute average week-to-week variation in demand deposits alone was \$2.2 billion in 1975. Even if one were satisfied that this could be done, there remains the operational question of how well the Desk could hit the specified targets.

With contemporaneous accounting, the Desk would need to begin each week with a projection of the expected change that week in required reserves if it hoped to be able to obtain information about the actual behavior of nonborrowed reserves from the Federal funds market. After allowance for weekly variations in excess reserves, the Manager would expect his target level of nonborrowed reserves to be associated with a specific rise (or fall) in the Federal funds rate, to the extent that the change in projected required reserves exceeded (or fell short of) the change allowed for in the weekly nonborrowed reserve target. He would have before him estimates of the impact of the uncontrolled factors on nonborrowed reserves. However, as he observed the Federal funds market, he would have no way of determining whether it was required reserves or nonborrowed reserves that were deviating from expected

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values. Since float and other market factors would be likely to produce larger errors than required reserves, the Desk would probably operate initially within the week on the assumption that the former were at work. Only as solid information on deposits and required reserves came in could he adjust his appraisal, and allow the overrun or shortfall in required reserves to impact the Federal funds rate.

One runs immediately into the problem that the Manager can only operate in a contemporaneous world on the basis of estimates of required reserves until the "reserve maintenance" week is nearly over by virtue of reporting and processing delays. Many individual member banks would be able to operate with reasonably good data on their requirements, but branch banking systems would have considerable difficulty.^{1/} The Manager's information on required reserves, however, would consist of estimates of varying quality throughout the week. He may seek toward the end of each statement week to allow the Federal funds rate to rise, or fall, sharply on the basis of incoming data on required reserves, but the ex post data would probably show sizeable errors in controlling nonborrowed reserves.

With weekly targets and contemporaneous accounting, one would expect a volatile market for bank reserves. If bank deposits continued to exhibit the same degree of variation from weekly seasonals as at present, one would expect the achievement of weekly nonborrowed targets to lead to considerably wider variations in the Federal funds rate.^{2/} The Manager

^{1/}One would expect excess reserves in the banking system to increase in a contemporaneous system, just as they declined after the introduction of lagged accounting in 1968.

^{2/}See Paul Meek "Nonborrowed Reserves or the Federal Funds Rate as Desk Targets--Is There a Difference," New England Economic Review, March/April 1975, pp. 37-43.

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would have much more difficulty in hitting the nonborrowed reserve target in a volatile Federal funds market. He would have to judge each week the impact of reserve changes on the Federal funds rate in order to read the Federal funds market for information on the behavior of nonborrowed reserves--a much more difficult task than under present procedures. Against this background the Manager at best would probably be able to come within \pm \$200 million of his objective two-thirds of the time, compared with perhaps \pm \$100 million at the present time.

The lag in the Manager's knowledge of required reserves under contemporaneous reserve accounting would also contribute to the volatility of the Federal funds rate. If he judged on Tuesday that required reserves were likely to be \$200 million higher than expected earlier, it would signify that the average Federal funds rate should be higher than he had previously thought to be consistent with his weekly nonborrowed reserve target. There would be a choice of seeking a rise in the rate on the last two days, or of missing the weekly target. (This additional source of uncertainty could, of course, be eliminated by retaining lagged reserve accounting.)

The real question is whether the weekly targeting of nonborrowed reserves in this fashion would contribute to more efficient control of the aggregates over the FOMC's longer horizons. The procedure would certainly make it more difficult for banks and other financial market participants to discern whether the central bank was trying to restrain or stimulate the aggregates. Only as the participants were able to sort out the underlying relation between nonborrowed and required reserves from the volatile behavior of the two and the Federal funds rate would they be able to make a reasonable judgement of the Federal Reserve's objectives. It seems dubious that a procedure that generates so much noise would, in fact, speed up the banking

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system's response to Federal Reserve action. In any case, the efficiency of the target setting procedure is the real issue. The shortening of the accounting lag is of secondary importance. Even so, the Desk's judgement would be that retention of the present lagged reserve accounting would help in the achievement of the weekly NBR objectives under case 3. It would facilitate the Manager's reading of the reserves market for clues to the behavior of nonborrowed reserves.

Appendix: The Effects of Federal Reserve Control Actions on the Monetary Aggregates

The preceding discussion assumed a particular pattern of responses by banks and nonbank economic units to Federal Reserve control actions. The purpose of this appendix is to write out in more detail the views on which these assumptions are based. The central issues are by no means new; and even though extensive recent debates have produced some degree of agreement on how linkage mechanisms actually work, much fundamental disagreement remains. The discussion which follows proceeds on the premise that the various theories of reserve lagging should be subject to reasonableness tests against what is known about how banks, the Federal Reserve, and nonbank asset holders in fact behave.

The key conclusion of the analysis that follows is that the reserve accounting scheme has no bearing on the controllability of the monetary aggregates. This is true basically because banks take actions which affect deposits on the basis of interest rate and economic expectations, not because of current period excesses or shortfalls of nonborrowed reserves. These expectations are formed over a period of time, and the Desk can influence them about as well under either contemporaneous or lagged reserve accounting.

It is by now commonplace to conceptualize problems of this nature in terms of the dichotomy between deposits and reserve markets. Supply and demand curves are thought to exist in both types of markets, each representing in a general way the behavior of a specific set of economic actors. In the markets for the various classes of bank liabilities, commercial bank offer curves (reflecting economic decisions to bid for deposits) are thought of as supply curves. Demand curves in these markets represent the aggregate behavior of nonbank holders of various types of bank liabilities. In the reserves market, the supply side consists primarily of Federal Reserve behavior, suitably conditioned by market influences not under its control. The demand side--required reserves--is thought to be simply a derived mechanical function of outcomes in the markets for commercial bank deposits.

One or two linkages between the deposits and reserves markets are fairly well understood. The first of these is the required reserves mechanism. Clearly, the demand side of the reserves market--required reserves--is strictly derived from the solutions of the various deposits markets. That is, the interaction of supply and demand in the various markets for bank liabilities determines required reserves; neither the supply or demand side, by itself, is sufficient to specify actual values of required reserves. It is also clear that this linkage amounts to a line of causality, and that the causality exists under any form of reserve accounting proposed thus far.

A second linkage involves Federal Reserve behavior. In a strategic context--month-to-month or quarter-to-quarter--the Federal Reserve reacts to deviations from desired values of macroeconomic target variables. The specific variables targeted shift over time, the relative weights placed on various targets shift, as does the nature of Federal Reserve response to a given deviation of a specific target. But in spite of these complications, empirical studies and common sense perception both indicate clearly that there exists a "response function" describing how in a particular period the System reacted to given stimuli.

Similarly, in a day-to-day context, the Desk responds to expected and unexpected variation in required reserves and other market factors influencing reserve supplies to keep free reserves and the Federal funds rate within desired ranges. Despite substantial shifts in institutions and the behavior of market participants, the basic daily procedures for implementing this short-run tactical approach have remained rather constant for at least two decades. Whether or not one considers the practice desirable, the Desk has acted so that the market now expects the large random fluctuations in reserve-affecting factors to be offset in such a manner that day-to-day and week-to-week movements in the Federal funds rate and free reserves will be for the most part gradual,

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orderly, and therefore meaningful. An implication of this expectation is that market participants treat sudden shifts in reserve availability initially as random movements beyond Desk control. They consider free reserves and rate movements to be indicative only if permitted to exist over a period of time long enough for them to be offset.

The preceding two paragraphs, describing well-known institutional and behavioral facts, together have one important implication: there exists a deeply imbedded set of practices which amount, on a conceptual level, to a linkage between the deposits and reserves market. The Federal Reserve actions to supply reserves can be said to be a function, in part, of developments in the deposits markets. In the short-run (day-to-day) that response is basically to offset movements in required reserves and market factors tending to displace free reserves and the Federal funds rate from desired levels. In the longer run, target values or response mechanisms are placed on the latter two variables in a manner thought to maximize the probability that actual outcomes of the demand and supply interactions in the deposit markets will coincide with desired levels. In turn these desired levels of the monetary aggregates are set so as to maximize the probability that the real economy will behave in desired fashion. Emphasis on the monetary aggregates as instrument variables has shifted over time, but the basic thrust of the above characterization applies to at least the period since the implementation of the so-called "credit proxy proviso clause" in 1966.

The linkage just described amounts to a unidirectional line of causality flowing from the interaction of supply and demand in the deposits markets to the supply side of the reserves market. Although the parameters of this function may change over time, the function is known to exist by market participants and most observers. Taken together with the required reserves linkage, it seems clear that, through separate mechanisms, both the supply and demand sides of

the reserves markets are clearly functions of the deposits markets and other phenomena.

By themselves, these two particular linkages imply nothing about the impact of reserve accounting schemes on the controllability of the monetary aggregates. These linkages provide causality flows in the wrong direction: they show the flow of causality from deposits markets to the reserves' market, and in no way indicate whether or in what way causality flows from the reserves market back to the deposits markets. While the material outlined above provides background important to understanding how the reserves market matters for deposit determination, linkages from reserves to deposits must be established separately. The latter problem, unfortunately, remains quite controversial. The question can be put quite simply: Does the supply of reserves, or the interaction of supply and demand in the reserves market, influence events in the deposits market? If so, how?

One such linkage is by now probably noncontroversial. Developments in the reserves market, which determine the Federal funds rate, influence prices of other financial assets through the arbitrage behavior of financial asset holders. In particular, movements of the Federal funds rate influence Treasury bill rates and rates on other short-term liquid claims. Movements in the constellation of short-term rates are generally considered as an influence on the behavior of non-bank asset holders and thereby to influence the demand for money and for interest bearing bank liabilities. Such influences are normally thought to operate with a distributed lag of some length, however, so that this linkage is neither very direct nor very immediate. It is likely that most people will agree that this linkage is not direct enough to be of importance in deciding

the relative merits of one-week versus two-week reserve lagging schemes. Indeed, the reserve accounting scheme is probably irrelevant to this linkage because the Federal Reserve can start pushing the Federal funds rate any direction it wants immediately on decision under either scheme.

Another linkage may also qualify as noncontroversial. This is the hypothesis that movements in short-term interest rates influence commercial bank liability offer curves--the supply side of the deposits markets. Here the influence is also thought to be expectational, and hence will also operate with a distributed lag. Banks form expectations of future interest rate movements and demands for loans, these factors influencing the posture they take with regard to solicitation of liabilities. Certainly with respect to CD's, Federal funds, Eurodollar borrowings, RP borrowings, commercial paper issued by holding companies, and perhaps others, banks bid more or less aggressively depending on interest rate expectations. Also, banks "bid" for demand and savings account balances through advertising and promotional campaigns, and alter the "price" of these liabilities by changing terms and services offered. However, given the probability that this particular mechanism operates with a substantial distributed lag, it probably does not bear on the question of reserve accounting schemes.

A third type of linkage is thought by some to exist, and forms a basis for proposing contemporaneous reserve accounting. This is the idea that banks change their liability offer curves, or manipulate assets within a one week period so as to affect liabilities, in response to movements in nonborrowed reserves. An argument goes as follows: The Desk acts to lower the supply of nonborrowed reserves relative to demand, creating a gap which must somehow be filled. Banks are likely to respond in a variety of ways: attempting to buy additional Federal funds or CD's being the most likely immediate responses. Because these responses must of necessity fail in the aggregate, interest rate pressures appear and

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some banks will respond by selling assets, while others will turn to the discount window or economize on excess reserves.

Under a contemporaneous reserve accounting system, same-week actions to reduce assets will also reduce deposits and required reserves, partially alleviating the gap between nonborrowed and required reserves. Under lagged reserve accounting, the selling of assets will not reduce required reserves until some time later. Thus if this linkage exists and operates as described, a basis can be developed to distinguish between reserve accounting schemes as regards their monetary control implications. That is, under contemporaneous accounting schemes, deposits would be affected by Federal Reserve nonborrowed reserves actions if at least some banks act to sell assets and thereby contract deposits and required reserves. Contrarywise, under lagged reserve accounting, it is argued, the contraction of required reserves will not occur immediately.

This particular linkage is more controversial, but an evaluation of it is of some importance since it stands as a central building block in most arguments dealing with reserve accounting schemes and nonborrowed reserves targeting. Before examining the hypothesis on a substantive level, it may be useful to note a problem with using the hypothesis to argue for contemporaneous reserve accounting. Assume for the moment that the linkage operates as described, the crucial point being that banks are expected to sell assets, thereby contracting deposits, in response to a shortfall of nonborrowed reserves. Indeed, if such asset sales occur, then an immediate and direct link exists between nonborrowed reserves and the monetary aggregates. Notice, however, that the reserve accounting scheme has no bearing on whether the link exists or not. An aggregate shortfall of nonborrowed reserves can be engineered by the Desk in the current period under any reserve accounting scheme, the only question remaining is whether the banks

react to this shortfall by selling assets in the current period. To be sure, the existence of a current period feedback from deposits to required reserves will depend on the nature of the reserve accounting system, but this is of importance only if nonborrowed reserves is a target and not if the deposit aggregates are targets.

Let us examine the hypothesis itself for a moment, stressing what is known about bank behavior. From what we know, it appears that banks, in the first instance, attempt to offset virtually all current period reserve shortfalls by appeal to the Federal funds market or the discount window. Going into a statement week, a money desk manager usually operates in a context defined by the portfolio decisions normally made by top management. Decisions with regard to issuance of CD's, purchases of Eurodollars, etc. are made in conjunction with decisions to purchase assets and establish strategies for various categories of loans. These decisions are made on the basis of expectations of intermediate and longer-term movements in interest rates, and probably more important, on expected economic developments in the bank's market area. With these strategic decisions made, the money desk manager is normally responsible for meeting the resultant reserve needs at minimum cost. From what we know, current period reserve shortfalls simply do not enter this picture at all. Should the bank find, in a week-to-week context, that the cost of meeting the reserve needs is higher or lower than expected, then overall financing and asset strategies are likely to be rethought. In this context it seems reasonably clear that for the individual bank the indicator of current period pressures in the reserves market is the rate and not the individual bank reserve shortfall.

In part, perhaps in large part, this situation is the product of Federal Reserve behavior over time. Banks have to come to expect that the Federal Reserve will

manage reserve supplies so as to achieve movements in free reserves and the Federal funds rate in an orderly fashion. Thus, if banks experience a current period reserve shortfall, they are likely to consider it a meaningless random occurrence. Only if the shortfall persisted and was accompanied by unresisted deviations in the Federal funds rate from recent ranges of variation would banks conclude that the supply of reserves had actually contracted. In a given week an individual bank may be forced to the discount window by a shortage of reserves in the aggregate, but the next week that bank may well decide to bid more aggressively for Federal funds, thereby forcing some other bank to the window. Clearly, the reserve deficiencies for the system can be shifted about among banks for some time before a message becomes clearly recognized that reserve provision strategies have been changed by the Federal Reserve. The net result, therefore, is that an action by the Federal Reserve on nonborrowed reserves is unlikely to affect current period commercial bank behavior directly, rather it will affect bank behavior with a lag, operating through the interest rate mechanism.

February 17, 1976

Appendix D

DRAFT FEDERAL REGISTER NOTICE

TITLE 12--BANKS AND BANKING

CHAPTER II--FEDERAL RESERVE SYSTEM

SUBCHAPTER A--BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM

[REG. D]

(Docket No. R-)

PART 204--RESERVES OF MEMBER BANKS

**Notice of Proposed Rulemaking Relating to
Calculation of Required Reserves**

The Board of Governors of the Federal Reserve System proposes to amend Regulation D (Reserves of Member Banks) in the following manner:

(1) The Board proposes to modify the procedure member banks must use to calculate required reserves. Currently, a member bank calculates its required reserves on the basis of the average daily net deposit balances held by the member bank two computation periods prior to the computation period during which the reserves must be maintained. Under the proposed amendment, a member bank would calculate its required reserves on the basis of the average daily net deposit balances held by the member bank one computation period prior to the computation period during which the reserves must be maintained.

(2) The Board proposes to change the period during which currency and coin held by a member bank may be used to satisfy required reserves. Currently, a member bank may use as reserve balances its average daily

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currency and coin held two computation periods prior to the computation period during which reserves must be maintained. Under the proposed amendment, a member bank may use as reserve balances its average daily currency and coin held one computation period prior to the computation period during which reserves must be maintained.

The following is an illustration of the operation of the proposed amendments: Assume that a member bank desires to calculate its required reserves for the 7-day computation period ending April 21, 1976. Based upon its average daily net deposit balances during the 7-day computation period ending April 14, 1976, the bank's reserve requirement is computed to be \$1 million. During the computation period ending April 14, 1976, the average daily currency and coin held by the member bank was \$100,000. Accordingly, for the 7-day computation period ending April 21, 1976, the member bank will be required to hold an average daily balance of \$900,000 with the Federal Reserve Bank of its District.

Changes in the reserve position of banks directly affect the flow of bank credit and money. In carrying out monetary policy, the Federal Reserve System relies upon its ability to increase or decrease the volume and cost of bank reserves. A shortened reserve accounting lag would result in a level of required reserves more closely associated with recent deposit levels and would make the banking system more responsive to the current availability of reserves. This should assist the Federal Reserve System in accomplishing its monetary policy objectives.

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To aid in the consideration of this matter by the Board, interested persons are invited to submit relevant data, views, comments or argument. Any such material should be submitted in writing to the Secretary, Board of Governors of the Federal Reserve System, Washington, D.C. 20551, to be received not later than _____, 1976. All material submitted should include the docket number R- _____. Such information will be made available for inspection and copying upon request except as provided in § 261.6(a) of the Board's Rules Regarding Availability of Information (12 CFR 261.6(a)).

This amendment is proposed under the authority of §§ 19(a) and (c) of the Federal Reserve Act (12 U.S.C. 461) to prescribe regulations as the Board may deem necessary to effectuate the purposes of that section. In consideration of the foregoing, the Board proposes to amend § 204.3(a)(2) of Regulation D (12 CFR 204.3(a)(2)) as follows:

§ 204.3--DEFICIENCIES IN RESERVES

* * * * *

(a) Computation of deficiencies

* * * * *

(2) In determining whether a member bank has maintained a reserve balance that is in excess of or less than its required reserve balance for any computation period:

(i) The required reserve balance of such bank shall be based upon the average daily net deposit balances held by the member bank at the close of business each day during the first

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computation period prior to the computation period for which the computation is made.

(ii) The reserve balance of such bank shall consist of the average daily balance with the Federal Reserve Bank of its District held by the member bank at the close of business of each day during the computation period for which the computation is made and the average daily currency and coin held by the member bank at the close of business each day during the first computation period prior to the computation period for which the computation is made.

* * * * *

By order of the Board of Governors,

Theodore E. Allison
Secretary of the Board