FEDERAL RESERVE SYSTEM

Office Correspondence

To Members of the Board and Reserve Bank Presidents

From S. H. Axilrod

Date April 17, 1980

Subject: Various Reserve Proposals

As requested at the last FOMC meeting, an analysis--prepared by Messrs. Lindsey and Simpson of the Board's staff--of several proposals for changing the reserve requirement or reserve accounting structure is attached. Also attached as Appendix A is the evaluation of lagged reserve accounting previously distributed and discussed at the time of an earlier FOMC meeting.

Board members and Presidents may wish to make preliminary comments on the coverage and other aspects of the study at the time of the April 22 FOMC meeting, pending a more extended discussion at the time of a later FOMC meeting. In the interim, the study will be discussed in detail with System economists.

BOARD OF GOVERNORS
OF THE
FEDERAL RESERVE SYSTEM

Office Correspondence

Date April 16, 1980

To Members of the Board and Reserve Bank Presidents

From David E. Lindsey, Chief, and Thomas D. Simpson, Senior Economist, Banking Section, Division of Research and Statistics*

Subject: An Analysis of Reserve Requirement Proposals

I. Introduction and Summary

In light of the Federal Reserve's adoption of a reserve aggregate operating target last October and the recent enactment of the Depository Institutions and Monetary Control Act broadening coverage of federal reserve requirements, this paper reassesses a number of proposals for altering reserve accounting that have been offered in recent years.

The proposals examined fall into two general categories: those aimed at relieving bank reserve management and money market pressures, which often occur under current regulations (especially on Wednesdays), and those designed to tighten the short run relationship between reserves provided by the Federal Reserve and the stock of money. In the former category are proposals to enlarge current carryover provisions, including a proposal to subject all carryover to a penalty--but with no restrictions on amount and duration--and a proposal to replace the present system of common settlement on Wednesdays with one of staggered reserve settlement periods. In the latter category are proposals to alter the present system of lagged reserve accounting (LRA), including a proposal to reverse the lag in reserve accounting by relating a bank's reserve requirements in

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* This memorandum draws heavily on earlier analysis of these proposals by Daniel Laufenberg, Paul Boltz, Warren Trepeta, Kenneth Kopecky and the authors, all of the Board staff. In addition, helpful comments on an earlier draft were provided by various members of the Board staff, William Poole, Consultant, Federal Reserve Bank of Boston, and Robert Laurent, Economist, Federal Reserve Bank of Chicago.

the current week (based on its deposits in the current week) to reserve balances maintained in the previous week. Another proposal calls for a 100 percent marginal reserve requirement on changes in deposits over a two week period. In addition, the option to return to contemporaneous reserve accounting (CRA) has been reviewed very recently by the Board and Reserve Bank Presidents.

The analysis below demonstrates that a tradeoff generally exists between the objectives of, on the one hand, easing reserve management and lessening volatility in money market conditions, and, on the other, controlling the monetary aggregates more precisely in the short run of up to three months. Proposals that would relieve short-term pressures in the money market would, at the same time, tend to weaken the System's short-run control over the monetary aggregates. Those that would improve control over the aggregates would generally appear to produce as a by-product larger week-to-week fluctuations in the federal funds rate and other short-term rates of interest.

Both precision of short-run monetary control and prevention of sharp volatility in market rates of interest are generally considered to be legitimate objectives of the Federal Reserve. As a practical matter, neither can be attained completely without sacrificing the other goal.

Avoidance of sharp week-to-week variability of the federal funds rate that arises from reserve adjustment pressures may be desirable because such fluctuations can affect other money market interest rates and occasionally longer-term rates as well. With large fluctuations in market conditions, the orderly and efficient flow of funds through financial markets can be disturbed. Moreover, given the highly levered capital positions of brokers and dealers in these markets, unexpected rate movements can threaten their solvency.

On the other hand, even though real economic activity and inflation are widely believed to respond to movements in the monetary aggregates only over intermediate-term periods of three to six months, the possiblity of reasonably precise monetary control in the short-run is of value for several reasons. A tight short-run control mechanism means that unexpected disturbances could have less impact on monetary growth, implying a reduction in the likelihood that shocks late in the year will prevent the System from attaining its announced annual targets. Moreover, if the control mechanism allows departures from targeted growth to accumulate over several months earlier in the year, more abrupt adjustments in reserves and short-term rates are needed later in order to hit the annual targets. Finally, the closer monetary growth is throughout the year to the announced targets, the more credible to the public is the Federal Reserve's resolve and ability to hit its longer-term targets, implying that decisions by members of the public are more likely to be consistent with the System's intentions.

The following summary of the various proposal's implications for these two objectives precedes a more lengthy and detailed analysis of their characteristics.

Proposals to Ease Bank Reserve Management Pressures and to Smooth Fluctuations in the Federal Funds Rate.

Liberalized carryover provisions. Existing carryover regulations permit banks to make up a given settlement week's reserve surplus or deficit--of up to 2 percent of required reserves--with a reserve deficit or surplus, respectively, in the next week. Thus, a reserve surplus or deficit

can be carried over only one week. One proposal is to expand the 2 percent limit to 4 percent and to extend the carryover privilege for an extra week.

Such a change, by expanding banks' options for reserve position adjustments, would further ease their task of reserve management and likely damp fluctuations in the federal funds rate on Wednesdays. However, a liberalization of carryover would also permit banks to postpone basic balance sheet adjustments to policy-induced changes in reserves, thereby adding to uncertainty about the multiplier linking deposits to reserves. Moreover, in the face of changes in the transactions demand for money, enlarged carryover would tend to delay normal market responses that reduce the impact of such demand changes on monetary growth. Consequently, liberalized carryover would further lessen the precision of short-run monetary control.

Unlimited carryover subject to a penalty. Another proposal would permit unlimited carryover, in both amount and duration, but would impose a penalty in the form of higher reserve requirements in the next week for reserve surpluses or deficits carried over. For example, a bank with a reserve deficit in one week would be required to make up 110 percent of that deficiency in the next week; similarly, a bank with a surplus in one week would be allowed to use only 90 percent of that surplus in satisfying reserve requirements in the next week. Under this rule, the cost of carryover would average 10 percent of the federal funds rate, since a bank, facing the same funds rate in both weeks, would effectively pay 10 percent more if it waited until next week to make up a deficiency through borrowing in the funds market than if it had borrowed this week. Similarly, a bank could earn 10 percent more this week if it lent surplus reserves in the funds market than if it carried over the surplus, postponing the sale--of a smaller amount--until next week.

This proposal has some drawbacks. While banks would have considerable incentive to meet their reserve requirements exactly, such behavior could cause heightened fluctuations in the funds rate compared to the present system. Even a small shortage of aggregate reserves below required reserves would, with a 10 percent penalty, tend to drive up the funds rate in the current week, at the outer limit to 10 percent higher than the level expected by banks next week, while even a small surplus would similarly tend to drive it lower. Although a lower penalty rate could moderate such funds rate volatility, it would give rise to heightened use of carryover, accompanied by the greater slippages between aggregate reserves and deposits discussed above in connection with liberalized carryover rules.

Staggered reserve acounting. Another option for relieving bank reserve management pressures, especially late in the reserve settlement week, is to stagger the end of the settlement week for different groups of banks. For example, one-fifth of all banks could settle on Wednesday, another one-fifth on Thursday, and so on for each business day.

In the face of soon-to-be-reversed changes in aggregate reserve availability arising from fluctutions in uncontrolled market factors such as float, this system would, it is argued, facilitate the transfer of reserve surpluses or deficiencies among banks across currently separate weeks through federal funds transactions. Smoother movement in the federal funds rate around Wednesday would tend to result, reducing the need for defensive open market operations by the Trading Desk. However, with a nonborrowed reserves operating target, staggered reserve accounting could significantly impair the precision of monetary control by diminishing the predictability of the response

of the monetary aggregates to a policy-induced change in reserves. It affords banks the opportunity to transfer among themselves reserve imbalances across currently separate statement weeks, and thus can lead to the avoidance of systemwide balancing of reserve positions every week. A policy-induced change in reserves could even lead to persistent fluctuations in the monetary aggregates over time, as settling banks buy or sell assets, predominately from depositors of nonsettling banks, thereby effectively transferring their accumulated reserve imbalances to nonsettling banks. In any case, the general pattern of the response of the monetary aggregates to changes in reserves would tend to be less predictable than under a common reserve settlement period because of more uncertainty about the particular mode of adjustment chosen by banks.

Proposals to Tighten the Linkage Between Reserves and the Money Stock

Reversing the lag between required reserves and total reserves. One proposal aimed at improving monetary control is to reverse the lag in reserve accounting. Required reserves based on the current week's deposits would be satisfied with reserve balances held at the Federal Reserve in the previous week. The purpose of this proposal is to ensure that it is deposits and required reserves that adjust in the current week to a predetermined level of reserves, rather than total reserves that adjust to a predetermined level of required reserves, based on deposits two weeks earlier, which is the case under the present system of lagged reserve accounting.

This proposal in one of its forms contains, in addition, several other revisions to present regulations designed to facilitate its operation, including the subtraction of the current week's changes in reserve balances at the Federal Reserve that arise in the process of check clearance from a bank's

required reserves in the same week.[1/] However, given the complexity of the proposed system, it would be a difficult one to comprehend for those involved with it--bankers and central bankers alike. The proposal has several other problematic characteristics. The entire adjustment of deposits to a change in systemwide reserves occurs in the week following the reserve change, implying that banks could be forced into asset adjustments of unprecedented size and that substantial fluctuations in interest rates would occur. Hence, large changes in deposits would arise in the next week in response to movements in uncontrolled market factors affecting reserves in the current week, and they would be accompanied by heightened interest rate volatility. In addition, the discount window would lose its present role as a safety valve available to both individual institutions and the banking system for relieving disturbances to excess reserve positions in the current week arising either from changes in required reserves in the current week or from changes in reserve balances occurring too late in the previous week for banks or the Desk to offset. Furthermore, the Desk would have minimal ability to damp the resulting sizable week-to-week fluctuations in short-term interest rates through its open market operations, which would affect excess reserves with a week lag.

1/ Thus, if a bank in a week gains deposits and an equivalent amount of reserve balances, it would not be construed as having added to its required reserves and therefore would not "illegally" have required reserves in excess of last week's reserve balances. Unless the bank lent the bulk of this reserve inflow in the federal funds market in the same week, however, it would need to make a sizable upward adjustment to its required reserves in the next week in order to match the higher level of reserves in the current week and to avoid a substantial excess reserve position.

The supplemental 100 percent reserve requirement on two week changes in deposits. This proposal would add to present required reserves based on deposits two weeks earlier a supplemental reserve requirement equaling the difference between reservable deposits in the current week and those two weeks before.[1/] Banks would maintain reserves in the current week to satisfy this reserve requirement. The purpose of the proposal is to approximate the close short run monetary control associated with 100 percent reserve requirements without the impracticalities associated with that more radical scheme.

Under this proposal, an increase in demand deposits relative to two weeks ago associated with a jump in the transactions demand for money would produce an identical change in required reserves, placing substantial immediate pressures both on banks to undertake offsetting adjustments and on money market interest rates. The Desk could have difficulty tempering such rate pressures through open market operations because the impacts on systemwide excess reserve positions would be negligible if the open market transactions are with the nonbank public; both deposits and required reserves would change by an amount equal to the reserve injection, leaving excess reserves at banks unchanged in that week. By the same token, however, unintended changes in aggregate reserves and deposits arising from movements of uncontrolled factors would have little impact on market rates. Another consequence of this feature is that the effect of a given policy-induced change in reserves on deposit creation or destruction would be spread out over a longer time, requiring sizable open market operations in order for the Desk to attain its objectives for the monetary aggregates in the short-run.

1/ It does not appear that this system would be legal under the recently enacted monetary control legislation.

Contemporaneous Reserve Accounting. Under this system, required reserves would be based on reservable deposits in the current week, rather than two weeks earlier as at present. This system has been the most intensively studied of all, in part because it was actually in existence for over 50 years prior to 1968. The most recent Board staff analysis of synchronous reserve accounting in comparison to the present lagged system is attached to this document as Appendix A. This analysis provided the basis for discussion of the Governors and Reserve Bank Presidents on February 4 of this year.

II. Proposals to Ease Reserve Adjustment Pressures

Pressures in the federal funds market often emerge on the final day of the reserve settlement week--Wednesday--as many banks scramble to adjust to last minute disturbances affecting their reserve positions. These adjustments are facilitated by carryover provisions that allow banks to carry over from one week to the next, but no longer, a reserve surplus or deficit amounting to as much as 2 percent of their required reserves. The use of carryover serves to temper Wednesday fluctuations in money market rates, although variability in the federal funds rate remains substantial on that day, in part owing to the limits on carryover. Some have proposed to moderate Wednesday pressures further by liberalizing carryover regulations or by designating that a different one-fifth of all institutions settle on each business day of the week, including Wednesday.[1/] Not only would volatility in the federal funds rate itself be moderated on Wednesday, but disturbances to other markets might also be avoided and, it is maintained, the Federal Reserve would be freer to initiate policy actions on Wednesdays, instead of being occupied with defensive measures. In addition, proponents envisage less variation in the funds rate week-to-week.

Before analyzing proposals for enlarged carryover and staggered reserve periods, it is useful to review the week-to-week and Tuesday-to-Wednesday fluctuations in the federal funds rate and the contribution of Wednesday

1/ The likelihood that such proposals would smooth movements in the funds rate is indicated by the experience prior to September 1968 when country banks settled reserve positions only every other week, on even weeks, while other banks settled on both even and odd weeks. At that time, it was possible for country banks in effect to carry over an unlimited amount of a reserve surplus or deficit from odd to even weeks. Thus, on odd weeks country banks could buy reserves from or sell them to other banks with reserve surpluses or deficits and make up the surplus or deficit the next even week. Country banks were compensated by the difference between the rates at which they traded reserves in the first as compared to the second week. As a consequence, the Tuesday-to-Wednesday change in the funds rate on average was three times as large on even weeks as on odd weeks, as shown in Table 1 (page 12).

movements to the weekly average funds rate. Table 1 shows that the average absolute week-to-week change in the funds rate (adjusted for trend) was around 10 basis points through the first nine months of 1979, about the same as over the preceding five years. However, this measure jumped to about 65 basis points over the next five months following the adoption of the reserves operating target. Over the same two periods, the average absolute Tuesday-to-Wednesday change (adjusted for trend) jumped from about 25 basis points, which was typical over the preceding five years, to over 80 basis points since last October.

The federal funds rate frequently varies within a very wide range on Wednesdays--indeed, the intra-day range of the federal funds rate has averaged about 850 basis points on Wednesdays since last October in contrast to only about 230 basis points on other days. However, these movements affect the weekly average funds rate by much less and probably are not viewed by market participants as a signal of future market developments. As shown in Table 2, the mean absolute impact of Wednesdays on the weekly average of the federal funds rate has been only about 15 basis points since last October's adoption of a reserve aggregates operating procedure. One reason the contribution of Wednesday is generally limited to this amount is that only a very small volume of federal funds transactions occur at outlying rates; indeed, most trading on Wednesdays occurs in the first half of the day when more normal rates prevail. In addition, defensive open market operations absorb or supply reserves on Wednesday, thereby reducing the amount of transactions at abnormal rates.

Table 1

Average Absolute Change in the Federal Funds Rate
Adjusted for Trend[1]
(Basis points)

	Tuesday-to-Wednesday[2]		Week-to-Week[3]
	Even Weeks[4]	Odd Weeks[5]	All Weeks
Before Lagged Reserve Accounting			
1963	31	12	8
1964	43	14	9
1965	59	10	10
1966	48	18	26
1967	46	14	22
1968/1-8	33	24	14
1963-1968/1-8 weighted average[6]	44	15	15

After Lagged Reserve Accounting	All weeks	All weeks
1968/10-12	67	15
1969	87	36
1970	48	25
1971	34	19
1972	28	12
1973	65	24
1968/10-1973/12 weighted average[7]	53	23
1974	44	25
1975	37	18
1976	19	08
1977	20	7
1978	20	11
1979/1-1979/9	26	10
1974-1979/9 weighted average[8]	28	13
1979/10-1980/2[9]	83	66

Footnotes to Table 1

1/ Federal funds rate change statistics are measured by average absolute deviation of changes from the average change over the relevant period. That is, the statistics are calculated according to the following formula: mean $|\Delta RFF - \overline{\Delta RFF}|$, where $\overline{\Delta RFF}$ represents the mean change of the Federal funds rate over each relevant period. This statistic corrects for trend in the Federal funds rate over the period.

2/ Changes from Tuesday-to-Wednesday are those on the last day of the settlement period.

3/ Changes from week-to-week are based on averages of daily figures during settlement weeks.

4/ All member banks, including country banks, settled on even weeks.

5/ Only city and reserve city banks settled on odd weeks; country banks did not.

6/ The average statistics are calculated by weighting each statistic by the number of months covered. That is, these statistics are calculated according to the following formula:

$$\frac{1}{68}\left[\sum_{i=o}^{4} 12(x_{1963+i}) + 8(x_{1968/1-8})\right].$$

7/ These average statistics are calculated weighting each statistic by the number of months covered. That is, these statistics are calculated according to the following formula:

$$\frac{1}{63}\left[\sum_{i=o}^{4} 12(x_{1969+i}) + 3(x_{1968/10-12})\right].$$

8/ Calculated similarly as in footnotes 6 and 7.

9/ On October 6, the Federal Reserve adopted an operating strategy emphasizing reserve aggregates.

Table 2

Impact of Wednesday Effective Federal Funds Rate [1/]
on Weekly Average Effective Federal Funds Rate
(Basis points)

	Average impact	Average absolute impact
1970	-7.3	8.8
1971	-1.1	5.1
1972	-.5	4.9
1973	-5.1	11.9
1974	-3.9	7.8
1975	-3.6	7.6
1976	-.6	3.1
1977	-.4	2.8
1978	-.1	3.3
1979	-4.4	6.4
1979/1-1979/9	-2.1	4.0
1979/10-1980/2	-10.2	14.7

1/ Impact calculated as yearly average difference and yearly average absolute difference between the seven-day average of trade weighted federal funds rates and a six-day average of trade weighted federal funds rates excluding Wednesday.

Liberalizing Present Carryover Limits[1/]

Carryover expands the options that individual institutions have available to satisfy their reserve requirements, especially at the end of the reserve maintenance week.[2/] An example will help to illustrate the possible use of carryover for an individual bank. Suppose this bank experiences a $100,000 outflow of reserve balances on Wednesday, causing a reserve deficiency of this amount which, say, equals 2 percent of its required reserves. Provided this institution did not have a reserve deficiency in the previous week, it can avoid turning to the federal funds market or to the discount window by carrying this deficiency over into next week. In the next week, however, this institution must maintain a reserve surplus of at least $100,000 in order to offset the previous week's deficiency.[3/] If this institution maintained a surplus reserve position in excess of $100,000 in the second week, it could carry up to $100,000 of the excess forward into the third week. However, by utilizing carryover to postpone adjustments to reserve position disturbances in the first week, the institution runs the risk of having to make an even larger adjustment in the second week if the disturbance is not fully offset by a reserve inflow. In the example above, if the institution does not receive an inflow of reserves in the second week, it must make balance sheet adjustments, such as borrowing in the funds market

1/ This issue is discussed at length in Paul W. Boltz, "Carryover of Reserves--A Reconsideration," May 1979.

2/ In addition to carryover, institutions can adjust their borrowing from the discount window to match reserve requirements, liquidate assets in return for reserve balances, and acquire reserve balances through liability management, especially by borrowing federal funds. Only carryover and borrowing from the discount window, however, can be used as adjustments to satisfy reserve requirements of all institutions as a group, since asset sales and federal funds transactions only redistribute reserve balances among institutions.

3/ If the previous week's deficiency were not fully offset in the current week, the institution would be subject to a penalty on its remaining deficiency of the discount rate plus 2 percent. The institution, however, is legally required to maintain a proper level of reserves and therefore does not have the option of deliberately incurring the penalty.

or at the discount window, to obtain $200,000 of reserve balances--half of which would be needed to offset the previous week's carryover and the other half to bring the current week's reserve balances up to the required level.

In addition to reducing the need for last minute reserve adjustment measures, carryover permits institutions to transfer reserve deficiencies and surpluses from one week to the next based on their expectations of market rates of interest. For example, when an institution expects the federal funds rate to increase from the current week to the next, it has an incentive to build up surplus reserves in the current week--even if it has to borrow federal funds--so that it can lend its carried over balances in the next week at the expected higher federal funds rate. On the other hand, if the institution expects the federal funds rate to be lower next week, it has an incentive to incur a reserve deficiency this week, even by lending federal funds, and then to offset this deficiency in the next week by borrowing federal funds at the expected lower rate. Such speculative activity also tends to smooth week-to-week movements in the funds rate. Under a reserves operating target the impact of such activity on the funds rate may be more noticeable than under a funds rate target, when the Desk may be able deliberately to attain a particular funds rate objective irrespective of bank activity. However, in the latter case, the amount of reserves supplied would vary from week to week partly in response to banks' efforts to speculate on funds rate movements through carryover.

To see how carryover affects bank reserve management in the aggregate, federal funds market activity, and monetary control, it is useful to examine four common occurrences: temporary deposit and reserve shifts among

banks with aggregate reserves unchanged; temporary changes in the stock of reserves resulting from movements in uncontrolled factors, such as float; a policy-induced change in reserve availability; and a change in the public's demand for transactions balances. In the first case, reserve inflows into banks experiencing deposit increases match outflows from banks losing deposits. In the absence of carryover, both groups of banks might turn to the federal funds market to borrow or lend reserves or they might employ other methods of adjustment. But with the carryover privilege, both groups can either delay adjustments altogether or reduce the scale of these adjustments in the week in which deposit and reserve shifts occur; the larger is the carryover limit, the smaller is the potential need to use other means to adjust reserve positions in the first week. If those institutions that receive reserves and those that lose reserves use carryover to the same extent, there is virtually no impact on the federal funds rate in that week. In addition, when both use carryover to the same extent, aggregate net carryover is unaffected, since positive (surplus) carryover on the part of those banks with reserve inflows just offsets negative (deficit) carryover on the part of those experiencing outflows. With net carryover unchanged, the relationship between the aggregate supply of reserves, on the one hand, and the stock of money, on the other, would be undisturbed. However, if both groups of institutions do not employ carryover to the same extent, then the federal funds rate and the money stock will tend to be affected. Moreover, even if the deposit flow is exactly reversed in the second week, banks still have to make reserve adjustments equal to their use of carryover in the first week.

Carryover can also ease the adjustment of individual banks, and the banking system as a whole, to temporary changes in aggregate reserve availability resulting from movements in uncontrolled factors, such as float, while

cushioning the effects on the stock of money. In the absence of carryover, were banks to have deficient reserve positions during a statement week because, for example, float declined, there would be a tendency for pressures to build up in the federal funds market and for the federal funds rate to rise, requiring that deficient banks either lower their earning assets or turn to the discount window or that the Desk intervene to furnish banks with additional reserves. With carryover, however, pressures on the federal funds rate and the discount window would tend to be relieved as banks carried some or all of their deficiencies into the next statement week. In the second week should this and/or other uncontrolled factors increase reserves by twice the decline in the first week--so that average reserve balances are unchanged over the two week period--then the utilization of carryover would permit these institutions to avoid other reserve adjustments altogether. Even if the increase in reserves in the second week is insufficient to leave average reserve positions unchanged, carryover can facilitate a smoother adjustment to disturbances caused by fluctuations in uncontrolled factors. Of course, if there is no change in reserves in the second week to help offset the decline in the first, then the utilization of carryover in the first week necessitates more substantial adjustments in the second. From the perspective of monetary control, carryover serves as a substitute for defensive open market operations and borrowing from the discount window in cushioning the initial effects of such temporary disturbances on the monetary aggregates. Clearly, liberal carryover privileges can contribute more in this regard than restrictive carryover provisions.

In the third case of deliberate policy actions, however, enlarged carryover would tend to weaken the precision of monetary control by adding to uncertainty about the effects of policy-induced changes in reserve availability on the monetary aggregates, particularly if the change were not immediately

recognized as permanent by market participants. Carryover gives banks more flexibility in selecting balance sheet adjustments in response to changes in the supply of reserves--including those that defer deposit changes--thereby adding to uncertainty about the short-run relationship between the supply of reserves and the stock of money.[1/] Moreover, by permitting banks to delay balance sheet adjustments, the lag between changes in reserve availability and changes in the stock of money tends to be lengthened. The more liberal are carryover provisions, the greater is the potential for slippage between the provision of reserves and the stock of money. By contrast, with the earlier federal funds rate operating target, this slippage does not significantly lessen the precision with which a money stock objective can be achieved because the ability of the Desk to hit a federal funds rate operating target is little impaired and because the stock of money is demand determined at the level of interest rates corresponding to the Desk's funds rate target. At times, though, more vigorous action may be required by the Desk to defend its funds rate target.

Finally, carryover can impair monetary control under a reserves targeting procedure when there are changes in money demand. With contemporaneous reserve accounting, an unanticipated jump in deposits associated with an increase in money demand--perhaps reflecting a strengthening of

1/ To the extent that banks use carryover as a substitute for borrowing from the discount window, however, carryover would tend to contribute less to slippage in the relationship between nonborrowed reserves and the monetary aggregates. For example, a policy-induced reduction in nonborrowed reserves could be offset in the short run by the use of deficit carryover just as it could be by a temporary increase in borrowings from the window. Nevertheless, increases in discount window borrowings have an increasing implicit cost, as they make future administrative pressure from discount officers more likely. Thus, a systemwide increase in borrowings tends to occur only as a response to an increase in the cost of federal funds which in turn indirectly acts to restrain monetary expansion. The tightening of the funds market that accompanies a comparable use of deficit carryover, not subject to administrative pressure, is likely to be less intense.

economic activity--would lead to an increase in required reserves in the same week. Upward pressure on the federal funds rate would immediately tend to emerge as banks attempt to obtain more reserves in the federal funds market. Sympathetic pressure on other market rates would shortly follow as banks turn to the sale of assets or the issuance of other managed liabilities. Any such transactions with the nonbank public, together with the increase in interest rates, would tend to choke off some of the expansion in deposits. However, carryover enables banks to postpone their basic balance sheet adjustments to the change in deposits until the next week--in somewhat the same way as does lagged reserve accounting--and thus adds to delays in partially corrective interest rates responses. In combination with lagged reserve accounting, carryover may lengthen further the already delayed response of interest rates to a change in money demand. Specifically, with LRA an increase in money demand in a given week results in an increase in reserve demands and interest rates two weeks later. By permitting banks to defer their adjustment still another week, carryover provisions can further add to the delay in partially offsetting interest rate responses, unless the Desk adjusts its targeted reserve path in light of information on the earlier movements in the aggregates.[1/]

As shown in Table 3, net carryover in 1979--a fairly typical year--averaged around $95 million and fell within a range of from minus $50 million to plus $250 million. Gross surplus carryover averaged $220 million and

1/ In principle, with LRA banks could attempt to build up surpluses in the week following a surge in deposits in order to carry them into the next week when the jump in required reserves is expected to create a deficiency. This anticipatory behavior would actually speed up the interest rate response to an increase in money demand. However, it is likely that the bulk of carryover is used in reaction to changes in reserve positions in the current week rather than in anticipation of such changes in the next week.

Table 3

Frequency Distribution of Carryover and Excess Reserves
(Weekly, 1979)

Range (millions of dollars)	Net Carryover 1/	Gross Surplus Carryover 1/	Gross Deficit Carryover 1/	Excess Reserves 1/
-150 to -100	0	0	0	1
-100 to -50	0	0	0	0
-50 to 0	4	0	0	3
0 to 50	13	0	0	4
50 to 100	11	0	9	5
100 to 150	12	3	32	9
150 to 200	6	19	11	7
200 to 250	6	17	0	2
250 to 300	0	9	0	5
300 to 350	0	4	0	2
350 to 400	0	0	0	6
400 to 450	0	0	0	2
450 to 500	0	0	0	2
500 to 550	0	0	0	1
550 to 600	0	0	0	2
600 to 650	0	0	0	1
Memo:				
Average weekly amount (millions of dollars)	96	220	124	219

1/ Number of weeks.

gross deficit carryover averaged around $125 million. Since neither a surplus nor a deficit position can be carried forward for two consecutive weeks, the desire of individual institutions to minimize reserve holdings, while avoiding penalties, tends to result in surpluses in one week offsetting deficits in the next and deficits in one week offsetting surpluses in the next.[1/]

Large institutions are considerably more active users of carryover than smaller institutions. As shown in Table 4, banks with deposits in excess of $5 billion use nearly all of their eligible carryover while very small institutions use only a fraction of reserve surpluses or deficiencies carried over from the previous week. In addition, smaller members frequently hold sizable excess reserves week after week and generally have more difficulty staying within the 2 percent limit than larger institutions, as indicated by Table 5. Several reasons explain why they tend to have more difficulty keeping both surplus and deficit carryover within the 2 percent limit. Given their relatively low level of required reserves, their allowable carryover is fairly small in dollar amounts; therefore, they hold large excess reserves as a precaution against moderate-sized withdrawals which, without precautionary balances, could easily give rise to reserve deficits in excess of allowable carryover. In addition, smaller member banks have generally lacked the expertise to manage reserve positions closely, unlike large banks.

1/ Some econometric evidence suggests that a change in aggregate net carryover in one week is reflected in a similar but opposite change in aggregate excess reserves in the following week. For example, a $50 million increase in net carryover in one week would tend to lead to roughly a $50 million decline in excess reserves in the next week, everything else the same. However, changes in carryover can account for only a small proportion of overall variability in excess reserves.

Table 4

Percent of Carryover Used,[1/]
by Size of Member Banks

Size of bank (total deposits, in dollars)	Percent of carryover used[2/]
Under 5 million	31
5 - 10 million	39
10 - 50 million	57
50 - 100 million	75
100 - 500 million	82
500 million - 1 billion	87
1 - 5 billion	87
Over 5 billion	95
All	86

1/ Averages of weekly data for seven week period ending March 19, 1980.

2/ Used carryover equals the amount of excess reserves in the current week of opposite sign to the amount of carryover established in the previous week. For example, if a bank's excess reserves were plus $50 in the current week and carryover established in the previous week were minus $100, used carryover would be $50 or 50 percent of eligible carryover.

Table 5

Reserve Management by Member Banks During 1978
(Weekly average, dollar amounts in thousands of dollars)

	All Member Banks	Member Banks by Deposit Size							
		Up to $25 million	$25 to $50 million	$50 to $100 million	$100 to $500 million	$.5 to $1.0 billion	$1.0 to $5.0 billion	$5.0 to $10 billion	Over $10 billion
OTAL NUMBER OF MEMBER BANKS	5,478	2,672	1,301	749	569	92	78	8	9
ember Banks with Surplus Reserves									
Number	3,349	1,756	776	419	304	46	38	4	5
Total amount of surplus reserves($)	388,350	66,906	33,726	33,142	61,752	37,495	74,399	25,345	55,585
Surplus as a percentage of required reserves	1.96	6.22	2.62	2.26	1.87	1.92	1.69	1.40	1.23
Number of banks with surplus reserves exceeding 2% of required	1,320	929	218	85	66	12	9	7	6
Total amount of excess * surplus($)	160,430	52,543	20,535	19,142	24,640	12,688	21,249	3,756	5,876
Average excess * surplus per bank($)	122	57	94	225	372	1,075	2,310	5,366	9,793
Excess *surplus as a percentage of required reserves	3.65	9.92	5.46	6.20	3.15	2.46	2.24	1.24	.94
ember Banks with Reserve Deficiencies									
Number	823	382	216	124	83	10	8	8	8
Total amount of deficiencies($)	37,493	4,464	3,775	3,850	7,257	4,019	9,330	1,669	3,128
Deficiencies as a percentage of required reserves	.9	1.90	1.09	.91	.87	1.02	1.17	.43	.43
Number of banks with deficiencies exceeding 2% of required reserves	79	52	13	7	5	.8	1	**	**
Total amount of excess * deficiencies ($)	12,454	2,716	1,759	1,461	1,927	1,078	3,301	200	12
Average excess * deficiency per bank($)	158	53	133	215	385	1,348	3,301	--	--
Excess * deficiencies as a percentage of required reserves	4.31	12.13	9.07	6.61	3.70	3.16	3.00	1.20	.10

Excess surplus or deficiency refers to amounts greater than 2 per cent of required reserves. The average excess surplus or deficiency per bank is calculated only for banks with such surpluses or deficiencies.

Less than 0.10.

Source: Paul W. Boltz, "Carryover of Reserves--A Reconsideration," May 1979.

Moreover, many smaller institutions often have been unable to assemble sufficient amounts of funds to place a minimum lot in the federal funds market, typically $50,000, and thus by retaining them as excess reserves they have foregone interest on these balances.

Enlarging carryover limits from their present 2 percent likely would further smooth adjustment to temporary deposit shifts among banks and changes in uncontrolled factors affecting reserves. However, it would also tend to weaken short run monetary control by increasing uncertainty about week-to-week changes in carryover and excess reserves. The increase in the variability of net carryover, though, would probably tend to be proportionally smaller than the increase in carryover limits, given the historical pattern of both reserve shifts within the banking system and banks' adjustments to such shifts. For example, one proposal was that carryover be increased from 2 percent to 4 percent.[1/] While potential gross carryover would double under this proposal from $860 million to $1,720 million--4 percent of required reserves under the present coverage of federal reserve requirements--the staff at the Federal Reserve Bank of New York has estimated that average net carryover would rise by only about $25 million and the range of typical variation would be enlarged by only about $100 million.[2/]

In addition to, or even instead of enlarging their carryover, banks might be permitted to carry a reserve deficiency or surplus over a two week period instead of the present one week. Stretching out the carryover period has many of the same implications as enlarging carryover. A longer carryover

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1/ See Federal Reserve Bank of New York, "Suggested Changes in Reserve Carryover Privileges," July 12, 1971, transmitted to the Board of Governors with a covering letter from Alfred Hayes, July 29, 1971.

2/ Federal Reserve Bank of New York, ibid.

period affords more flexibility in adjusting to short-term disturbances, such as deposit shifts among banks and uncontrolled factors affecting reserve availability. However, it tends to loosen the near-term relationship between reserves and the money stock.

Alternatively, carryover could be enlarged in a way that mainly benefits smaller banks by permitting carryover of up to 5 percent on the first $1 million of required reserves and the present 2 percent on amounts thereafter.[1/] Many smaller banks would be able to lower their holdings of excess reserves and to participate more actively in the federal funds market. This modification in carryover provisions, too, would tend to weaken monetary control but not by as much as an across the board doubling of carryover. In any event, it should be noted that under the 1980 monetary control legislation many smaller institutions will be able to satisfy their relatively lower required reserves with holdings of vault cash--assuming cash continues to be an eligible reserve asset and that the supplemental reserve requirement is not imposed--and in some cases will voluntarily hold substantial excess reserves in this form on a continuing basis. Hence, the value of enlarged carryover for these institutions would be negligible; however, larger institutions, with the bulk of deposits, would be in a position to take advantage of enlarged carryover provisions.

The Poole Proposal for Unlimited Carryover with Penalties

William Poole, Professor at Brown University and consultant to the Federal Reserve Bank of Boston, has recommended making three fundamental

1/ See Paul Boltz, op. cit., for a discussion of this proposal.

changes in carryover regulations.[1/] First, banks would be permitted unlimited carryover of positive or negative excess reserves. Second, any carryover could be extended for as long as the bank desired; that is, a surplus or deficit could be carried indefinitely into subsequent periods. Third, a penalty would be imposed on all carryover; the penalty would take the form of adding to next week's required reserves adjusted for carryover a fixed proportion of the deficit or surplus carried over into that week. For example, in each settlement week required reserves could be increased by, say, 110 percent of the deficit or decreased by 90 percent of the surplus carried over from the previous week--a 10 percent weekly penalty.

One unusual aspect of Poole's proposal is the penalty that banks must pay for the privilege of carrying deficient or excess reserves. With a 10 percent penalty, the cost of carryover would average 10 percent of the federal funds rate. For example, suppose the bank experiences a deficiency of $1 in the current settlement period and that its alternatives are twofold: either the bank can borrow $1 of federal funds in the current week to satisfy its reserve requirement immediately or the bank, if it expects the federal funds rate to fall next week, can carry the $1 deficit over and borrow federal funds in the next week to meet its requirement. In the first case, the cost of borrowing is $1 times the current week's federal funds rate. When the bank carries over, the penalty adds 10 percent to its deficiency and thus it must borrow $1.10. The cost of this option, because of the 10 percent penalty, will be $1.10 times next week's federal funds rate. With an unchanged funds rate, the net cost of one week's carryover is thus 10 percent of the federal funds rate.

1/ See William Poole, "The Making of Monetary Policy: Description and Analysis," New England Economic Review, March/April 1975.

Under this penalty, banks with balanced reserve positions that expected the federal funds rate to be 10 percent next week would buy federal funds this week if the current rate were below 9 percent and sell at a current rate above 11 percent. Deficit banks with the same expectation would buy federal funds this week if the rate were below 11 percent and sell at a rate above 11 percent. Banks with a surplus reserve position would sell at a rate higher than 9 percent and buy at a lower rate. Thus, trades would tend to occur within this 9 to 11 percent range, if all banks expected a 10 percent funds rate next week. As the penalty percentage declines, then the interest rate band within which trades occur declines.

Poole's proposal is designed to counter the objection to a reserves operating procedure that interest rates would fluctuate "widely, even wildly." Poole prefers a "built-in market mechanism to smooth the federal funds rate rather than relying on the Open Market Desk to do the smoothing." Automatic market forces would be "less likely to smooth interest rates when they ought not be smoothed." He argues that federal funds rate variability due to disturbances originating in the banking system--changes in float, shifts in deposits among banks with different required reserve ratios, etc.--would be smoothed without the aid of the Desk, whereas other disturbances--e.g., heavy credit demand associated with an investment boom--would not be cushioned, except by reserve injections by the Desk or by borrowing from the discount window.

It is not clear, however, that the proposal would, in fact, result in less funds rate volatility in response to short-run disturbances such as fluctuations in uncontrolled factors affecting reserves, since there would be two effects working at cross purposes. The elimination of carryover limits--both for quantity and duration--would expand the scope for carryover

and tend to smooth rates. However, the penalty feature, by itself, would tend to exacerbate rate movements. Without the penalty feature, it would presumably pay a deficit bank that expected the funds rate next week to be 10 percent to carryover its deficit into the next week if the funds rate this week rose a little above 10 percent, since the bank would rather borrow at the lower expected rate next week. With the 10 percent penalty, however, this bank would attempt to buy the funds this week so long as this week's funds rate remained below 11 percent.

This behavior suggests that a small decrease in float that reduces systemwide reserves and might otherwise lead to only a modest increase in the federal funds rate would tend to drive the funds rate this week to its upper limit (11 percent in the above example if all banks expect the funds rate to be 10 percent next week) because of the penalty. Similarly, a slight expansion in reserves would tend to push the funds rate down to its lower limit (9 percent in the above example) with the penalty. Consequently, if all banks expected a federal funds rate of 10 percent next week, there would be a tendency for the funds rate to alternate between 9 and 11 percent, depending upon whether reserve supply were slightly above or slightly below required reserves.[1/] Moreover, variability might be compounded if such exaggerated penalty-related fluctuations in the federal funds rate this week influenced expectations of next week's funds rate. If, for example, an exaggerated decline in the funds rate this week caused banks to reduce their expectation of the funds rate next week, the bottom limit to the decline in the rate this week would be still lower. Of course, in practice expectations of next week's funds rate are not unanimous, which implies that the funds rate

1/ By contrast, in the cases where disturbances affecting the stock of reserves would otherwise cause the federal funds rate to move outside the upper and lower limits described above, with unlimited carryover and a penalty the funds rate would tend to be bounded by the upper and lower limit.

would not alternate between a specific upper and lower limit. Neverthless, with different expectations, the funds rate would still be more variable within that range than in the absence of the penalty, and it could move outside that range if large changes in aggregate reserves occur.

To ameliorate such problems of rate instability, the penalty could be reduced. However, any such reduction would further loosen the link between reserves and deposits, weakening monetary control, since, with a lower penalty, the incentive for banks to meet their reserve requirements exactly is reduced. Also, the smaller the penalty the smaller would be the short run impact of deliberate policy actions or changes in money demand on market interest rates and accompanying bank balance sheet adjustments that could move the money stock toward its target. In any case, the exact timing of funds rate movements and money stock adjustments could be difficult to predict, since they would be quite sensitive to market expectations and utilization of carryover.

Staggered Reserve Periods[1/]

Given the unpredictability of reserve flows within the banking system and the apparent propensity of money managers to postpone reserve adjustment until late in the settlement period, the requirement that all member banks settle on Wednesdays heightens federal funds market pressures on that day. An alternative system was originally proposed in the mid-1960s by Milton Friedman and recently has been suggested by Congressman Henry Reuss.[2/] They propose

1/ This proposal is discussed at greater length in Warren Trepeta and David Lindsey, "The Reuss Proposal to Stagger Reserve Accounting Periods," April 1979.

2/ Milton Freidman, "Effect of Staggered Reserve Periods," memorandum to Albert Koch, Federal Reserve Board, January 19, 1965, reprinted in Report of the Ad Hoc Subcommittee on Reserve Proposals, Robert P. Black, Chairman, and others, May 13, 1966. Congressman Henry Reuss, letter to Chairman Miller June 7, 1978 and letter to Chairman Volcker, April 3, 1980.

that member banks instead be divided into 5 groups, with each group settling on a different business day of the week. A 7 day reserve computation period could still be retained. Under this system, if, say, an aggregate reserve deficiency existed on Wednesday, then banks settling on later days would not have to bid immediately for federal funds; moreover, these banks would be free to lend funds to banks settling on Wednesday. Banks could respond in a similar fashion to aggregate reserve imbalances on days other than Wednesday. As a result, it is maintained, there would be less volatility in the Federal funds rate on any day of the week than typically has occurred on Wednesday. Moreover, this could be achieved with less activity by the Desk, as borrowing and lending between banks settling on a given day and those settling on other days would tend to substitute for reserve injections or withdrawals by the Desk and perhaps also for adjustments in borrowing from the discount window.

It is apparent that staggered reserve periods would tend to moderate day-to-day variability in the federal funds rate resulting from temporary fluctuations in float and other noncontrolled factors affecting reserve availability. For example, consider a decline in float and a consequent reduction in reserves on Wednesday that is followed by an increase in float and reserves on Thursday, such that, on average over the two days, reserves are unchanged. Under current reserve accounting procedures, all banks would be settling on Wednesday, and this decline in float on Wednesday would produce strong upward pressure on the federal funds rate, since the average institution would have a reserve deficiency and would bid for federal funds to meet reserve requirements. If the Desk had instructions to temper any of this pressure, it would have to inject reserves; then on Thursday, when float increased, the Desk would have to withdraw reserves to relieve downward pressure on the funds rate. With staggered reserve periods, however, banks

settling after Wednesday would be in a position to lend their reserve balances on Wednesday and later to offset their resulting deficiencies with reserves provided by the assumed rise in float on Thursday. In short, staggered accounting, by facilitating transfers of reserve deficiencies or surpluses among banks across currently separate statement weeks, would permit a greater volume of interbank lending that could temper movements in the federal funds rate without action by the Desk.

However, by the same token, staggered reserve periods could add to delays in the effects on financial markets of policy-induced changes in reserve availability, since federal funds transactions among banks would provide the opportunity to defer, perhaps for several weeks, more basic balance sheet adjustments to, say, a decline in the supply of reserves. Through such interbank transactions a diminished stock of reserve balances could be transferred back and forth between banks settling on the current day and those settling on later days, leading to an accumulation of current reserve deficiencies by the banking system from one week to the next--given attainment of an aggregate reserve target--and an ever mushrooming volume of interbank activity. Presumably, this process would be restrained by the upward pressure on the funds rate that would begin to emerge over time as considerations of risk and future availability and cost of borrowed federal funds began to discourage lending by banks. Increases in the funds rate, in turn, would then encourage banks to make other more basic adjustments, such as asset sales.

However, even though deposits decline as a result of asset sales, a further slippage can occur in the relationship between the initial change in reserves and the associated change in the money stock. Asset sales by settling banks to depositors of nonsettling banks act much like federal funds borrowing by settling banks from nonsettling banks to transfer the reserve deficits accumulated by the settling banks on earlier days to nonsettling banks.[1/] Thus, it is possible for the banking system to accumulate sizable reserve deficits by the time aggregate deposits fall to the level desired by the Federal Reserve and one sustainable in the long run given aggregate reserve availability. If deficient settling banks continue to sell earning assets to draw reserves from other banks, the money stock would temporarily decline below the targeted level. Even with CRA, it is possible for the money stock to fall well below the target before self-correcting forces emerge, and subsequently to oscillate above and below its targeted level, as banks continue to transfer the burden of adjustment to accumulated reserve imbalances from one to another across weeks. If so, interest rates would tend to fluctuate to equate the demand for money with the fluctuating supply. To the extent that banks relied on the discount window or holdings of excess reserves to aid their adjustment to reserve imbalances, such oscillation becomes less likely. But in any event, the actual paths of deposits and interest rates in the short run following a policy-induced change in reserves would depend more heavily than under a common reserve settlement system upon banks' chosen methods of

1/ Unlike the case of common settlement periods, in which every bank must settle on the same day, with staggered accounting, as noted above, accumulated systemwide reserve deficits can be transferred among banks across several currently separate statement weeks.

adjustment. The multiplier connecting deposits to reserves would hence likely be less stable and predictable in the short run.[1/]

Staggered reserve periods accompanied by a reserves target could lead to delays and uncertainties in market responses to changes in money demand. Should deposits surge--in response, say, to a jump in economic activity--required reserves would grow. With contemporaneous reserve accounting and common settlement periods, current interest rate movements would tend to induce banks to make a variety of balance sheet adjustments, some of which reduce deposits. However, with staggered reserve periods such adjustments could be postponed if those institutions settling on a given day borrow reserve balances from those settling on later days. Further adjustments would be more difficult to predict because of the complicated dynamic characteristics of the staggered system arising from the potential build-up of reserve imbalances over time.

Moreover, a staggered system would make it more difficult for the Desk to determine the appropriate volume of defensive open market operations. The Desk would need disaggregated data on reserve requirements and past reserve holdings of five groups of banks--each at a different point in its statement week--in order to assess the current reserve position of banks as a whole. In addition, since each day would be the first day of an accounting period for one group of banks, the Desk's forecasts of uncontrolled factors affecting reserves would always have to take account of developments six days ahead--instead of, as now, a diminishing number as the week progresses. The staggered system would therefore appear to complicate the Desk's

1/ For a technical discussion of these issues see Warren Trepeta, "The Response of the Money Stock to a Permanent Change in Nonborrowed Reserves Under a Staggered Reserve Accounting System," Analytical Appendix to Trepeta and Lindsey, op. cit.

task of keeping the funds rate within specified limits in the context of a reserves target. The Desk's ability to hit a targeted federal funds rate under the earlier operating procedure would likely be impaired as well by staggered accounting, at least while experience with the system was being gained.

Regardless of the operating procedures used by the Federal Reserve, staggered reserve periods would tend to be disadvantageous to some institutions, especially those settling on Mondays. Specifically, a Monday settlement would make it particularly difficult to adjust to unexpected changes in reserve positions on Fridays, which would count for three days. For example, a bank that experiences an unexpected reserve outflow late on Friday also loses reserve balances for Saturday and Sunday; if this bank settled on Monday it would have only Monday to make a large reserve adjustment in order to avoid a reserve deficiency for the week.[1/] With the present system of common reserve periods ending on Wednesday, such a bank normally has three business days to adjust its reserve position. Treatment of banks could be equalized by rotating settlement days among banks. For example, the System could periodically reassign banks to new settlement days. This approach would have the disadvantage of further complicating bank strategies for reserve management and it would complicate matters considerably for the Federal Reserve.

1/ Problems of this sort for institutions settling on Monday would be compounded on those weeks for which Monday is a holiday. Outflows of reserve balances on Friday would not only count for four days but might also require major reserve adjustments on Friday.

III. Proposals to Tighten the Relation Between Reserves and the Monetary Aggregates

The following two proposals--the Laurent reverse lag and the Poole supplemental reserve requirement on two week changes in deposits--are designed to provide more precise short-run monetary control than would be achieved even under contemporaneous reserve accounting. Under either scheme, a surge in demand deposits, perhaps associated with a jump in transactions demand, would ensure significant movements in short-term market rates and accompanying sizable balance sheet adjustments by banks in the same week. The Trading Desk would have reduced flexibility, even compared to a pure CRA system, in moderating the immediate impact of such developments on the federal funds rate. Moreover, under the plan proposed by Laurent, the role of the discount window as a safety value for relieving such pressures would be greatly diminished. Variability of interest rates arising from uncontrolled factors affecting reserves would be moderated by Poole's proposal but exacerbated by Laurent's.

The Laurent Reserve Lag Accounting Proposal

Robert Laurent, an economist at the Federal Reserve Bank of Chicago, recently has proposed a reversal of the present time lag between the computation of required reserves and reserves.[1/] Banks would enter the settlement week with a predetermined level of total reserves rather than, as now, predetermined required reserves. In a given settlement period, total reserves would be determined by the bank's account at the Federal Reserve last week, while required reserves would be based on the bank's deposit liabilities in the current week. Therefore, systemwide deposits and required reserves would have to change in the current week to eliminate any disparity between the

1/ Robert D. Laurent, "Reserve Requirements: Are They Lagged in the Wrong Direction?" Journal of Money, Credit and Banking (August 1979).

predetermined level of reserves and the level of required reserves. For example, if aggregate required reserves initially exceeded the given systemwide level of total reserves in any week, banks would be forced to sell liquid assets or issue certain managed liabilities until enough demand deposits were extinguised in that week to lower required reserves to the given level of total reserves.

Such an adjustment contrasts with the present system of lagged reserve accounting, where instead the volume of total reserves must increase in a given week to eliminate any shortfall of reserves--that, under present regulations, cannot be carried over into the next week--below the fixed level of required reserves. In the final analysis, this increase in total reserves must arise from discount window borrowings or open market operations by the Desk. The situation with contemporaneous reserve accounting is an intermediate one where adjustments in both required reserves and in total reserves in the same week can act to eliminate any systemwide reserve deficit.

A related comparison involves the speed of adjustment of deposits to an initial policy-induced change in nonborrowed reserves. Under CRA or LRA, the long run equilibrium change in deposits--and other bank balance sheet items--is also a multiple of the initial change in reserves. But during the process of deposit creation or destruction, individual banks are forced to engage in transactions involving their own liquid assets or managed liabilities of an amount at a maximum only as large as their own reserve surplus or deficiency. Since these transactions are in practice largely with depositors of other banks, they affect deposits and required reserves at these other banks and thus the remaining burden of adjustment is passed along to other banks.

Since the process of deposit creation or destruction involves actions by a large number of banks, it probably cannot be completed in a single week without disruptive effects on financial markets. If only because of unexpected deposit and reserve flows late in the statement week, some banks in the short run would end up holding excess reserves, or resorting to carryover or borrowing from the discount window.

Under the reverse lag scheme, however, the entire aggregate adjustment of deposits to a policy-induced change in reserve assets this week is of necessity collapsed into a single week, the week following the change. For this to take place, the proposal contains a second novel feature by which net reserve clearings in a given week are subtracted from demand deposits in computing required reserves that week. Reserve clearings are defined as those changes in a bank's reserve account at the Federal Reserve that arise via check clearings or wire transfers from changes in deposits anywhere in the banking system. Changes in reserves resulting from federal funds transactions, discount window borrowings, or direct bank transactions with the Desk are not counted in reserve clearings.

This feature implies that if a bank suffered an outflow of demand deposits of $100 in a week while its associated net reserve clearings were a negative $100, then required reserves would be unaffected, as the decline in demand deposits is offset by subtracting the amount at negative clearings to obtain the amount of deposits subject to reserve requirements.[1/] Deducting

1/ Thus, shifts of deposits among commercial banks during the week would leave required reserves unchanged at each bank in that week and, of course, excess reserves are unchanged since total reserves are determined by last week's holdings of reserve balances. Cash items in process of collection and demand deposits due from other banks would continue to be subtracted from gross demand deposits in calculating required reserves. Thus, clearings through correspondent banks also, as now, leave required and excess reserves unchanged.

net clearings from required reserves also means that an individual bank can alter its own required reserves in the same week, even if its asset transactions are with depositors of other banks. For example, if a bank is subject to a reserve requirement on demand deposits of 10 percent and finds that its required reserves exceed its total reserves by $10, then it must sell $100 worth of assets. If the purchaser of the assets draws a check on the same adjusting bank, then the bank's demand deposits will fall by $100, required reserves will decline by $10, and the bank will have succeeded in matching its required reserves with total reserves. If the purchaser of the asset draws the check on another bank, then when the check clears, the net clearings of the adjusting bank at the Federal Reserve will be plus $100. Since in computing required reserves this amount is subtracted from an unchanged amount of deposits, the adjusting bank again would have succeeded in lowering its required reserves by the needed $10. The bank of the purchaser, by contrast, would experience a demand deposit outflow of $100 matched by a negative net clearing, and thus would have no change in its required reserves in that week.[1/]

1/ This example is also representative of a systemwide adjustment to a reserve deficiency of $10 in which demand deposits in the system fall by the requisite $100 to bring deposits in line with the amount of reserve assets supplied by the Federal Reserve in the preceding week. All the adjustments at individual banks are the same as those needed by the entire banking system in that week, so that a reserve deficient bank cannot throw the burden of reserve adjustment onto other banks in the same week. Individual banks alter their own required reserves through balance sheet adjustments that, as a multiple of their initial reserve imbalances, return not only their own excess reserves but also those systemwide to near zero each week.

However, such adjustments in the current week do not leave banks with reserve positions that are sustainable for more than one week. To avoid even larger asset transactions in the opposite direction in the next week, banks would have to rely on purchases or sales of federal funds in the current week. In the prior example, the adjusting bank that had to sell $100 worth of assets in the current week to eliminate a $10 reserve deficiency at the same time acquires $100 in balances at the Federal Reserve that will count as reserves in the next week. Unless this bank lent $90 in federal funds in the current week, it would enter the next week with $90 in excess reserves, requiring that it buy $900 in assets to balance its reserve position.[1/] Similarly, the asset purchaser's bank would need to borrow $90 in federal funds in the current week to avoid having to make asset sales of $900 next week.

Thus, banks would have to rely heavily on federal funds transactions in the current week in attempting to meet their anticipated need for reserves in the next week. For example, a bank would need to acquire reserves a week in advance in order to cover the increase in required reserves associated with an expected increase in loans in the next week. (Required reserves go up when the bank makes the loan either because the bank's demand deposits rise or because reserve clearings are negative if the funds are spent.)[2/]

1/ By contrast, to avoid incurring excess reserves under the present LRA system, the bank could, among other things, lend $100 of federal funds or buy $100 of earning assets in the current week.

2/ In the week of the loan takedown, the bank would have to finance the remainder of the loan by additional purchases of federal funds. Alternatively, the bank could in the week of the loan takedown finance the loan by asset sales or issuance or RPs, which would result in a decline in its own demand deposits or, in the case of asset sales or RPs to depositors of other banks, positive net clearings, either of which would offset the negative net clearings resulting from expenditure of loan proceeds, and thus prevent a rise in required reserves and obviate the need to acquire reserves a week in advance.

If the bank had not positioned itself with additional reserves in the week prior to the loan takedown, it would be forced into sales of liquid assets or issuance of certain managed liabilities in an amount equal to the increase in loans at the same time the loans were booked.

However, banks could not rely on federal funds transactions to avoid all disturbances. Individual banks would face adjustment difficulties resulting from unpredictable reserve inflows or outflows late in the previous week that could not be offset through federal funds transactions; in this case, substantial purchases and sales of assets would be required in the subsequent week if reserve surpluses or deficiencies were to be avoided.

Laurent's article also leaves the impression that required reserves in any week would be known ahead of time. For certain transactions this would be the case as a result of the third and fourth features of the proposal. The third is to make changes in deposits other than demand deposits reservable only in the current week at the required reserve ratio on demand deposits. The purpose of this feature is to insulate the required reserves of a bank in the same week from shifts between types of deposits subject to different reserve requirements.[1/] The

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1/ Week-to-week control over aggregate transactions balances, however, would be closer without this complication. For example, a shift from demand deposits to large time deposits, subject to a lower reserve requirement, would reduce M-1 by the full amount of the shift with this feature of Laurent's plan, as required reserves in the week would be unaffected, inducing no secondary demand deposit creation. By contrast, without this feature, required reserves would initially decline, causing adjustments, such as asset purchases, that would partly offset the initial decrease in demand deposits. Short-run monetary control would also be improved if other liabilities, such as RPs or Eurodollar borrowing, were exempted from this supplemental reserve requirement. Laurent does not discuss their treatment explicity, either with respect to this reserve requirement on weekly changes or to clearings against them. It is assumed in this discussion that, on monetary control grounds, weekly changes in these liabilities are exempted from reserve requirements, but that reserve clearings against them are counted as reserve clearings to be deducted from reserve requirements. This treatment would permit banks to supplement asset management with management of these selected liabilities.

fourth is to subtract vault cash from demand deposits in computing required reserves rather than to permit vault cash to be eligible as a reserve asset. Its purpose is to prevent shifts between currency and demand deposits from affecting required reserves in the same week. However, there are other transactions that, if unanticipated a week in advance, would cause unexpected variation in required reserves in the current week. Examples are unexpected loan takedowns or decreases in RP demands, both of which would either raise the bank's demand deposits or decrease its net reserve clearings, causing a reserve deficit. Consequently, given the possibility of such unanticipated changes in required reserves in the current week, banks again would not be able to insulate themselves fully by federal funds transactions in the previous week from potentially large adjustments of assets or certain managed liabilities.[1/] Putting the point more abstractly, shifts in the aggregate transactions demand for deposits associated with changes in demands for bank loans or RPs would confront a fixed, perfectly interest-inelastic money supply schedule and require substantial aggregate balance sheet alterations in the same week.

The likelihood of large week-to-week adjustments of bank assets and certain managed liabilities could also mean considerable week-to-week volatility of market interest rates, especially on the short-end. Under current operating procedures, the Desk maintains the federal funds rate

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1/ The ability of banks to engage in liability management to adjust to, say, a reserve deficiency in the current week is limited by the third feature of Laurent's scheme that imposes the required reserve ratio for demand deposits on changes in time deposits in the current week. This prevents the issuance of large time deposits from lowering required reserves that week with the positive net clearings that are generated. However, since other managed liabilities, such as RPs, are not accorded this reserve treatment, a bank could issue such liabilities rather than sell earning assets so as to lower required reserves that week via the associated positive reserve clearings.

within upper and lower limits specified by the FOMC through open market operations affecting the supply of nonborrowed reserves. Under Laurent's plan, however, the ability of the Desk to defend its funds rate limits would be severely constrained in the face of sizable variations in the transactions demand for deposits, since the Desk could not affect the excess reserves of banks in the current week. Reserves supplied or withdrawn by the Desk in the current week would, with the one week lag in reserve accounting, not affect the amount of reserves to be used in that week by banks to satisfy reserve requirements, and thus could not relieve adjustment pressures on banks in that week. Moreover, open market operations could not alter required reserves in the week since a transaction with a member of the public creating a deposit would generate an offsetting net clearing, whereas a transaction with a bank altering its deposits at the Federal Reserve would not be counted in reserve clearings. Even to the extent that Desk open market operations could influence the federal funds rate in the current week by affecting the supply of available federal funds, the scale of such operations would be severely limited by the multiple effects on deposits in the next week that any changes in total reserves outstanding this week would entail.

Similarly, the discount window cannot serve as a safety valve to relieve pressures on reserve positions emerging in the current week. Changes in discount window borrowings would only alter the reserves available to satisfy required reserves in the subsequent week. Laurent argues that "while not critical to the reverse lag, it would be

desirable to eliminate the discount window, since banks could easily avoid unexpected deficiencies." Unexpected deficiencies would seem more common than Laurent suggests, but, even so, under his proposal discount window borrowings in the same week offer no relief.

Moreover, because of the very tight link between reserves and deposits under the Laurent plan, uncontrolled market factors affecting reserve supply would have a much larger impact on market interest rates and the monetary aggregates than under LRA or CRA.[1/] Any miss of the targeted reserve path in one week would be translated into a miss in the monetary aggregates from their targeted path in the subsequent week of some multiple of this amount, with the Desk unable in the subequent week to offset the effects of movements of uncontrolled factors in the previous week. Under LRA or CRA the balance sheet adjustments of the public and banks to changes in the supply of nonborrowed reserves are spread over several weeks, as banks can for a time rely on changes in borrowings from the discount window to cushion the initial impact. With the response distributed over time, the Desk is able to offset the effects of inadvertant changes in nonborrowed reserves before market rates or the money stock are fully affected. In contrast, with Laurent's scheme the response of banks to changes in reserve availability in one week is collapsed into the following week, and especially if the discount window were closed--preventing changes in borrowings from partly offsetting changes in market factors in the previous week--uncontrolled

1/ Such market factors include Federal Reserve float, Treasury deposits, together with, in this context, "as of" adjustments to available reserves.

factors would affect money market conditions and the aggregates substantially.

A final implication of the proposal worthy of note is that not permitting vault cash to serve as reserves would severely disadvantage smaller institutions, particularly under the new monetary control legislation. Unless the supplemental reserve requirement in the bill were implemented, most smaller institutions will be able to satisfy reserve requirements with the cash needed in any event for operations, but under Laurent's proposal they would be forced in addition to open reserve accounts at the Federal Reserve, either directly or indirectly through another institution on a pass-through basis.

In sum, the reverse lag proposal clearly tightens the link between reserves and the monetary aggregates one week later, and thus--aside from problems of uncontrolled factors affecting reserves--deserves high marks on monetary control grounds. However, it severely restricts the flexibility of Desk operations to constrain fluctuations in market interest rates and, by minimizing the safety valve role of discount borrowings for unexpected pressures, might be associated with short-run bank balance sheet adjustments of unprecedented size and very volatile conditions in money markets. In addition, the very complicated nature of the plan would tend to add to the difficulties of reserve management--especially for smaller institutions--and might lead to misunderstandings on the part of market participants.

The Poole supplemental required reserve proposal. This plan, proposed by William Poole, also is designed to facilitate closer week-

to-week control over the monetary aggregates--than available with CRA--by inducing larger immediate adjustments by banks to offset undesired shifts in money demand.[1/] The plan adds to the present required reserves (based on deposits two weeks earlier) a 100 percent reserve requirement on the difference between its reservable liabilities in the current week and the amount two weeks earlier. That is, a bank's holdings of reserve assets in the current week must be at least equal to the sum of its present required reserves and the change in its deposits over the last two weeks.[2/] If deposits were unchanged over the last two weeks, a bank's required reserves would equal required reserves under the present structure. If deposits declined, required reserves would fall below the basic level related to deposits two weeks earlier.[3/]

Under this proposal, a surge in loan demand and the resulting deposit creation would raise required reserves by a like amount in the initial two weeks.[4/] Consequently, the demand for reserves would rise markedly, and, in the face of a constant supply of nonborrowed reserves,

1/ William Poole, "A Proposal for Reforming Bank Reserve Requirements in the United States," Journal of Money, Credit, and Banking (May 1976).

2/ The adoption of this proposal under the Depository Institutions Deregulation and Monetary Control Act of 1980 would appear to be illegal.

3/ Poole also proposed eliminating the present 2-week lag in vault cash accounting and exempting government deposits from required reserves. Control over the narrower monetary aggregates could be further improved if, under new legislation, nonpersonal time deposits were exempted from the 100 percent reserve requirement.

4/ Thus, no secondary deposit expansion at banks receiving the funds after the borrowers spend the loan proceeds can occur, unlike the case of LRA or CRA. The banks initially making the loans would be equally deficient under any of these regimes.

money market rates would rise automatically to moderate the higher loan and deposit demand, although to the extent that banks turn to the discount window, some of the increase in deposits can be accommodated. This interest rate response exceeds that of CRA and particularly that of LRA. The rise in the funds rate would lead to portfolio adjustments of banks and the public that would begin to offset the initial increase in deposits, in addition to presumably inducing more borrowing from the discount window.

However, if this higher funds rate exceeded the upper limit specified by the FOMC, the Desk could have some difficulty in lowering it through open market operations. If the Desk purchases government securities from the nonbank public and creates deposits for the sellers, required reserves rise by the same amount as reserve injections. Only purchases directly from banks or, equivalently, borrowing from the window would provide new reserves to the banking system without raising required reserves by the same amount. Thus, the fall in interest rates associated with open market purchases is more likely to be limited to their direct impact on the demand for securities than under CRA or LRA. At present, the Desk does not discriminate between bank and nonbank dealers in its open market operations. The Desk would likely continue to follow this practice under Poole's proposal so as to avoid protests by nonbank dealers. But under his plan, the effects of a given open market operation would depend considerably more than under LRA or CRA upon the mix of bank and nonbank participants, and consequently the same day impact--particularly on excess reserves and short-term interest rates--would be less predictable.

The proposal stretches out in time the deposit multiplier process generated by deliberate policy actions, involving given changes in reserves.

When an open market purchase increases reserves and deposits equally, excess reserves would not be affected for two weeks; that is, required reserves go up immediately by the amount of additional reserves and deposits. But two weeks later, if deposits had stayed constant at the higher level, required reserves on the increase in deposits would fall from 100 percent to only a fraction of the deposit change, creating excess reserves and only then permitting a further deposit expansion in the subsequent two weeks of a like amount (which would absorb the newly-created excess reserves). Thus, the Poole proposal would damp the initial impact of the open market purchase on deposits, and postpone a second round of deposit expansion for two weeks. The third round then would be postponed for two more weeks, and so on, until the standard multiplier process is finally completed. The long run impact is identical to that under CRA or LRA.

It should be noted that this characteristic of the proposal implies much more substantial changes in reserves during periods of sizable seasonal movements in deposits. Because reserve requirements are applied to not seasonally adjusted data, the surge in not seasonally adjusted demand deposits around Christmas, for example, would have to be accompanied by a much larger not seasonally adjusted increase in reserves than would be the case under LRA or CRA. Moreover, two weeks following a surge in deposits, required reserves revert to their base level determined by deposits two weeks earlier, necessitating a decline in reserves. The uncertain impact of open market operations on deposits and excess reserves would lessen the precision of the associated defensive operations.

Uncontrollable changes in the supply of reserves, resulting from changes in float or Treasury deposits at the Federal Reserve, initially

tend to cause equal changes in bank deposits. Under the Laurent reverse lag, a multiple deposit change is forced upon the banking system in the subsequent week. Under present LRA, an equal change in deposits and reserves alters excess reserves in the current week by the same amount, and secondary deposit adjustment might begin in the same week. Under contemporaneous reserve accounting and a fractional reserve requirement, the change in excess reserves is a fraction of the change in deposits and reserves, stimulating further deposit creation or destruction to a lesser degree. Poole's proposal would neutralize the entire change in available reserves by an equal change in required reserves, implying no change in excess reserves and no further deposit creation or destruction until two weeks later. Money markets would be little affected during the process.

In sum, Poole's plan would help to stablize the money stock in the face of shifts in deposit demand, but at the expense of sizable rate movements, which the Desk could have difficulty moderating through open market operations. Moreover, the process of money creation in response to a deliberate injection of reserves is delayed in the plan, because the two-week impact of an open market operation is only a dollar-for-dollar change in demand deposits. By the same token, though, day-to-day variations in uncontrolled factors affecting reserves which initially change deposits in the same direction initially induce no secondary deposit movements and create only minimal disruption in money markets.

APPENDIX A

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.

BOARD OF GOVERNORS
OF THE
FEDERAL RESERVE SYSTEM

Office Correspondence

Date January 21, 1980

To Board of Governors

Subject: Possible Changes in Present Lagged Reserve Accounting System.

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

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

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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

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1/ On the other hand, under CRA 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 reprograming 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 reprograming 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

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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

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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 practicability 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.