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It should also be said early on that reserve targeting is not a simple, risk-free procedure that can quickly solve monetary policy problems. It does not resolve basic questions about the target rate of money supply growth that is in fact appropriate to particular economic conditions. Moreover, once the Committee is satisfied about its basic path for the aggregates, there are still potential slippages between reserves and the aggregates that require flexibility in operations-- a flexibility that we have attempted to allow for in the basic description of the reserve technique that is given in subsequent sections of this memorandum. Finally, we do not believe the Committee can entirely ignore emerging credit and security market conditions, or at times exchange market conditions, in rigid pursuit of short-run reserve targets.

Behavior of monetary aggregates in relation to targets

As may be seen in the second column of the table below, growth in the money supply aggregates over the first three quarters of this year remained within the longer-run ranges set by the FOMC. However, in the past two quarters, as shown in the third and fourth columns, rates of growth have been accelerating and have been above the longer-run ranges, well above most recently. Thus the aggregates are within the ranges because of the very slow increases in the first quarter, and in the case of M-1 a decline at that time. Bank credit growth has been steadily above its longer-run range since the beginning of the year.

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	Target Range	Actual annual rates of increase			
		QIV '78 to QIII '79	Quarterly		
			QIII	QII	QI
M-1	3 to 6 ^{1/2}	5.0	9.5	7.6	-2.1
M-2	5 to 8	7.5	11.9	8.6	1.8
M-3	6 to 9	7.8	10.3	7.9	4.7
Bank Credit	7½ to 10½	12.6	11.6	11.2	13.6

For the money supply aggregates as a group to be within their ranges by the time the year is over, a considerable slowing from their recent pace is required. The table below shows rates of growth for the fourth quarter (both on a quarterly average and monthly basis) that are consistent with two alternative rates of growth for the year. The left-hand panel shows fourth quarter growth rates consistent with a yearly increase at the midpoints of the longer-run targets. The right-hand panel shows fourth quarter growth rates consistent with a yearly increase in the upper half of the longer-run ranges.

	Growth for Year at Midpoint of Target Range	Fourth quarter growth		Growth for Year in Upper Half of Target Range	Fourth quarter growth	
		Qtrly Avg.	Sept. to Dec.		Qtrly Avg.	Sept. to Dec.
M-1	4.5	2.8	1.3	5.3	5.9	4.6
M-2	6.5	3.2	1.5	8.0	8.8	7.5
M-3	7.5	6.3	5.3	8.0	8.2	7.3

^{1/} Represents the 1½ to 4½ percent range specified by the FOMC adjusted for the staff's current estimate that ATS effects will restrain M-1 growth by about 1½ percentage points over the year rather than the 3 percentage points originally estimated last February.

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The sharply decelerated growth rates in the fourth quarter--shown in the left panel of the table--needed if the midpoints of the longer-run targets are to be hit by the end of the year would appear to require a very sharp rise in interest rates and/or a considerably a weaker economy than is currently being projected. Fourth quarter rates of growth in the right panel were implicit in the alternative B bluebook path presented to the Committee at the mid-September meeting. These growth rates would, when the year is over, put M-2 at the upper end of its longer-run range and M-1 and M-3 in the upper halves of their ranges.^{1/} The staff expected that such growth rates might be attained with little, or no, further upward pressure on money market rates--assuming that growth in nominal GNP is at least as weak as a 7½ percent annual rate in the fourth quarter and that some of the cash built up in recent months is shifted into other financial assets. Of course, that result is by no means assured, and recent experience has been for both money growth and interest rates to run above staff projections.

In view of the uncertainties in interest rate forecasts, in estimates of nominal GNP, and in assessing the behavior of money demand, we believe that the Committee might have greater assurance of achieving monetary growth rates over the next few months consistent with its longer-run targets if the Desk moved to an open market operating technique that placed more emphasis on factors directly influencing the supply of money. Thus, the procedure we will describe in the next section is based on supplying an amount of monetary base and bank reserves designed to be consistent with the Committee's choice of aggregates.

^{1/} It appears unlikely that bank credit could in practice grow slowly enough in the fourth quarter to fall within its range for the year. To reach the upper limit, quarterly average growth in the fourth quarter would have to be a little less than 4 percent.

For purposes of describing the reserve operating procedure, we have taken a reserve path consistent with limiting growth in the aggregates to rates close to those in the right hand panel of the table on page 3. On the assumption that there is equal likelihood of exceeding or falling short of money supply objectives--because of slippages to be discussed below--the illustrated reserve path does contain some risk that some aggregates would exceed target, particularly M-2 which is targeted at the top of its longer-run range in any event. The Committee could minimize such risks, if it wished, by choosing, say, a path between those in the two panels of the table.

Monetary base and reserve operating procedures

The first column of the table below shows the deceleration in growth of the monetary base and total reserves between now and year-end presently estimated as needed to restrain growth in money to the dimensions indicated in the right panel of the preceding table.^{1/} Rates of increase for preceding months are also shown in adjacent columns.

	<u>Sept. to Dec.</u>	<u>June to Sept.</u>	<u>March to June</u>	<u>Dec. to March</u>
Total monetary base	8.0	12.5	4.7	4.2
Total reserves	7.0	11.1	-3.9	-4.4

As noted above, such a reserve path between now and year-end is designed to lead to growth in money supply aggregates over the year within

^{1/} On a quarterly average basis though, fourth quarter growth in these reserve aggregates would probably be higher than in the third quarter in view of the very high levels reached by the end of the third quarter. The base and total reserves would increase 10 and 9 percent, respectively, on a quarterly average basis in the fourth quarter, as compared with growth rates of 9.7 and 6.2 percent, respectively, in the third.

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the FOMC's targeted range, but well into the upper half of those ranges. However, because of various slippages, any reserve path the Committee establishes can, of course, lead to growth in the monetary aggregates different from expectations.

There are two chief sources of slippage. First, there is always the chance that variability in the multiplier relationship between reserves and money could lead to more (or less) money growth than expected--though, if the path is adhered to, an excess growth in one variable such as M-2, or bank credit, might be offset by slow growth in another variable, such as M-1. Second, slippage could occur because more (or less) total reserves are supplied relative to path either because of enlarged (or reduced) member bank borrowing or because of sizable (or small) reserve provision of nonborrowed reserves by the Desk caused by, say, a Federal funds rate constraint or large unexpected movements in reserve factors.

Because of these risks, it would be expected that the basic reserve or monetary base path would be reassessed at each meeting of the FOMC along with the constraints placed on Desk operations in relation to that path.

To guide Desk operations in the intermeeting period, the Desk would be provided with estimates for the base and total reserves over that period consistent with the FOMC's longer-run path. In current circumstances, one such path for the monetary base would be the 8 percent annual rate of increase (seasonally adjusted) noted earlier for the period from September to December. However, the Trading Desk operates on, and controls directly, only the nonborrowed components of these aggregates. Thus, the Desk would be operating through nonborrowed reserves, and an initial path for such reserves would be provided as a starting point. As

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the intermeeting period proceeded, though, the family of reserve measures--total base, total reserves, and nonborrowed reserves--would provide the Desk with flexibility to allow for such factors as exogenous shifts in the demand for borrowing, changes in currency flows and other elements affecting multiplier relationships, or sharp expansion or contraction in demands for money and credit.

The reserve estimates for the intermeeting operating period would allow for normal seasonal movements in deposits, would reflect the trend rate of growth implicit in the Committee's reserve target, and, to the extent that there was a clear reason to do so, allow for weekly or monthly deposit variations around the trend. With such allowances, a seasonally unadjusted level of the total monetary base would be constructed for the intermeeting period, as well as measures of total reserve (the difference representing estimated currency holdings outside member banks) and nonborrowed reserves.

A method for setting the level of nonborrowed reserves would be to take the average level of borrowing in recent weeks and subtract them from total reserves. Or the Committee could take a different level of borrowing--either higher or lower--depending in part on whether it wishes to tilt money market conditions toward tightness or ease in the period ahead. Whether money market interest rates would tend to rise, or rise more than they otherwise would, then depends on whether the demand for the total monetary base or total reserves were strong relative to the FOMC's path. If strong, the funds rate and the level of member banks borrowing would tend to rise as the Desk adhered to the initial path level nonborrowed reserves. Conversely, if demands were weak, the funds rate, and the level of member bank borrowing, would tend to decline.

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If the pressures on banks associated with the rise in borrowing were not sufficient to begin reducing the demand for the total base or total reserves over the operating period toward the desired level, the Desk might at that point make an allowance for the enlarged amount of borrowed reserves and take action to lower nonborrowed reserves below the initial path level, provided there was room to do so within any Federal funds rate constraint that the Committee might wish to impose. Symmetrical reasoning would suggest flexibility for raising nonborrowed reserves above the initial path if the total base and total reserves were significantly weaker than the Committee wished--again to the extent permitted by a Federal funds rate constraint.

The Committee would clearly have the option of "biasing" the result toward money market tightness or ease through its decision on the growth path of the monetary base or total reserves. For example, if the Committee chose to reduce the growth in reserves more substantially, or more quickly, than is implied by the 8 percent September to December total base growth path, the initial nonborrowed reserve path for an inter-meeting period derived by subtracting the recent level of borrowing would be lowered. But as the Desk adhered to this path, a rise in the level of borrowing and in money market rates would almost immediately occur, assuming the Committee's total reserve path was slower than market demand for reserves at pre-existing interest rates.

There would be other, more technical reasons for adjustments in the initial nonborrowed path between Committee meetings. A change in the discount rate would alter the relationship between that rate and market

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rates and thereby change the demand for borrowing for any given level of total reserves. Or an expansion of member borrowing under emergency loan procedures would clearly necessitate offsetting adjustments in nonborrowed reserves. Finally, changes in deposit mix or currency from expectations might require adjustments in reserve targets between meetings based on an understanding of the Committee's views about behavior of key monetary aggregates.^{1/} In any event, the multiplier relationship between money, bank credit, and reserves would generally be reassessed at the time of each meeting.

Federal funds rate constraint

With the focus on reserve supply, the behavior of money market interest rates will depend on the strength of demand for money and reserves relative to the amounts being supplied. If demands are strong the Federal funds rate will rise and if weak the rate will fall.

Emphasis on a reserve target would not, of course, prevent the FOMC from imposing intermeeting constraints on the variability of money market conditions and of the Federal funds rate in particular. We would, in fact, suggest such a constraint, largely to guard against excessive

^{1/} For instance, the multiplier relationship in the fourth quarter between reserve measures in the table on page 5 and the money supply assumes: growth in currency held outside member banks at a rate somewhat below its third quarter pace; a deposit mix consistent with recent patterns, including continued growth of large CD's at a moderate rate; and average excess reserve holdings by banks for that period of year. Given those estimates, an unexpected, sharp decline in outstanding CD's would release reserves that could be used for excessive money supply expansion unless the Desk were able to absorb these reserves; doing so could well require a lowering of the nonborrowed reserve target. On the other hand, a sharp rise in CD's could absorb reserves and retard money expansion. Whether the Committee would wish to have the Desk provide more non-borrowed under the latter circumstances would depend on the extent to which it wished to use the reserve base as a means of constraining bank credit growth.

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short-run changes whose consequences cannot be foreseen at this time (before we have had any experience with such a reserve operating technique).

However, there would be no purpose in moving to a reserve target operating procedure if the intermeeting Federal funds rate constraint were narrow, or if the rate were not free to fluctuate over a fairly wide range on a day-to-day or week-to-week basis. We would suggest that the range of variation be at least 3 or 5 percentage points, with even wider variation possible within a day (as occurs now on certain days, such as the last day of statement weeks). Of course, the Desk would always operate within the constraint of avoiding disorderly market conditions.

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Operations under a reserve-targeting approach

The Desk's objective under the approach envisaged here would be to operate on a "family" of monetary base and reserve targets. In the sense of an immediate objective of day-to-day Desk action the focus would be on nonborrowed reserves, but over the course of an intermeeting period there would also be an effort to reach, or move toward, the paths for total monetary base and total reserves, making needed interim adjustments in the short-run nonborrowed reserve objective.

The starting point for open market operations would be the average level of reserve aggregates to be attained over the intermeeting period, together with estimates of weekly path levels for these aggregates consistent with the intermeeting average (all seasonally unadjusted). As described earlier, the path levels for NBR are derived by starting with the total monetary base path consistent with desired performance of the aggregates, subtracting currency outstanding, and then subtracting an assumed level of borrowings.

The table below shows such estimates. It uses the recent level of borrowing in deriving the NBR path, but the Committee could, of course, choose a different initial borrowing assumption should it wish. A high borrowing level would tend to tighten money market conditions relative to current conditions, and a lower level would tend to ease them. The choice would depend, in part, on whether the Committee wished to tilt the thrust of operations more toward tightness or toward ease of money market conditions over the operating period.

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	Average Level for Intermeeting Period	Week <u>1</u>	Week <u>2</u>	Week <u>3</u>	Week <u>4</u>
Desired Total Reserve Path	40.25	40.1	40.2	40.3	40.4
Assumed Member Bank Borrowing	1.2	1.2	1.2	1.2	1.2
Initial NBR Path	39.05	38.9	39.0	39.1	39.2

In carrying out its operations, the Desk of course would also have projections of NBR for each week of the intermeeting period based on expected behavior of market factors affecting the supply of NBR, such as float, Treasury balances, currency, etc. In addition, to aid the Desk in gauging the timing of its reserve operations, it would be provided with weekly projections of the likely demand for total reserves at current interest rates. Suppose these demands are running high because money demand (and hence banks' demand for required reserves) is running strong. Such projections are shown below in comparison with the desired path.

	Average Level for Intermeeting Period	Week <u>1</u>	Week <u>2</u>	Week <u>3</u>	Week <u>4</u>
Demand for Total Reserves	40.55	40.2	40.5	40.7	40.8
Desired Total Reserve Path	40.25	40.1	40.2	40.3	40.4
Amount Demanded Above Path	.3	.1	.3	.4	.4

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With more demand for total reserves than the Committee wishes to see supplied member bank borrowing will have to rise. In this example, if the Desk reached the four-week average nonborrowed level of 39.05 shown in the top table on p. 11, borrowing would rise by \$300 million to an average level of \$1.5 billion over the period and the funds rate would rise by, say, 50-75 basis points. Such a tightening of the money market may not be sufficient, however, to make significant progress in bringing total reserves toward its desired path. The Desk may, therefore, take action to reduce NBR below path so long as it was possible within any Federal funds rate constraint adopted by the Committee.

Assuming the Desk did in fact reduce NBR below the path under the circumstances, the results after the four-week period was over might be as in the table below (actual results are underlined):

	<u>Average Level for Intermeeting Period</u>	<u>Week 1</u>	<u>Week 2</u>	<u>Week 3</u>	<u>Week 4</u>
Initial demand for total reserves	40.55	40.2	40.5	40.7	40.8
Desired total reserves path	40.25	40.1	40.2	40.3	40.4
<u>Actual total</u>	<u>40.43</u>	<u>40.2</u>	<u>40.5</u>	<u>40.6</u>	<u>40.4</u>
Initial NBR Path	39.05	38.9	39.0	39.1	39.2
<u>Actual NBR</u>	<u>38.85</u>	<u>38.4</u>	<u>38.6</u>	<u>39.1</u>	<u>39.3</u>
Memo:					
Actual Member Bank Borrowing	<u>1.58</u>	<u>1.8</u>	<u>1.9</u>	<u>1.5</u>	<u>1.1</u>

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Without attempting to trace specific Desk operations over the course of the period, the actual total reserves came in \$180 million on average above the desired path, while nonborrowed was \$200 million on average below its initial path. However, as the month progressed actual total reserves moved back toward the desired level, partly in response to pressure put on by the Desk as it moved NBR early in the period to a track that was below path and forced member banks to increase borrowings to obtain needed reserves. Borrowings rose to \$1.8 and \$1.9 billion in the first two weeks. By the end of the period borrowing had dropped back to \$1.1 billion as total reserves were moving back to path and as money growth seemed to be moderating.

The foregoing illustration neglects a number of other technical points that might arise in practice. Several of these points--such as the "slippage" due to variations in the multiplier relationship between reserves and money--were referred to earlier in this memorandum. Additional technical points that the Desk would have to keep in mind would relate to such matters as sudden bulges in excess reserves at the end of a statement week, which appear too late to be removed by Desk action and which cannot be carried over to another week. Since such excesses cannot support deposit growth, it should not be necessary to remove them in reaching target reserve levels. Another point to keep in mind is the possibility of situations like a

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computer breakdown, at the Fed or at a major money market bank, that causes a sudden reserve shortage that is temporarily accommodated at the discount window. Such borrowing, though, would have different significance from the borrowing that arises because the Desk is deliberately holding back on the provision of nonborrowed reserves. These would be among the reasons that the Desk would tend to take guidance from a "family" of paths for total monetary base, total reserves, and nonborrowed reserves--as well as following the Committee's Federal funds constraints--rather than seeking rigid adherence to a single nonborrowed or other reserve target.