

Research Department  
Federal Reserve  
Bank of  
San Francisco

October 30, 1981

## Penalty Discount Rate: I

In October 1979, as part of its program for bringing down the rate of monetary growth, and hence inflation, the Federal Reserve adopted new procedures for controlling the stock of money. The new procedures control money from the supply side by manipulating the quantity of total bank reserves, rather than from the demand side through interest rates. Banks legally must hold reserves equal to fixed percentages of various types of deposits in the form of either deposits with the Fed or vault cash. (By "banks," we mean all depository institutions with transaction deposits, since such institutions must hold reserves with the Fed under the terms of the 1980 Monetary Control Act.) Therefore, by fixing the total quantity of reserves available to the banking system, the new operating procedures allow the Fed to control the total amount of bank deposits, and hence stock of money, that banks are able to create.

Two sources of reserves are available to banks. Nonborrowed reserves are owned outright by the banks and supplied by the Fed through purchases of securities. Borrowed reserves are supplied through loans from the Fed on a temporary basis. The Fed can closely control the amount of nonborrowed reserves by means of open market operations in securities. However, the Fed has only indirect control over the small but potentially volatile portion of total bank reserves which banks borrow from the Fed at the discount window. These borrowed reserves are created primarily at the discretion of the borrowing institutions. Consequently, some analysts suggest that the precision of monetary control would be strengthened under the new operating procedures if the Fed kept the cost of reserves at the window (the discount rate) above the cost of reserves in the private financial market (the Federal funds rate) so as to stabilize borrowed reserves at low levels. As discussed in our next *Weekly Letter*, the successful operation of a penalty discount rate would require a switch to

contemporaneous reserve accounting from the current system of lagged reserve accounting, which sets required reserves on the basis of deposits two weeks earlier. However, since the Federal Reserve Board of Governors recently announced that it is contemplating this change, it is interesting to assess how well a penalty discount rate might work if contemporaneous reserve accounting were introduced.

### Rationale

The Fed sets the basic discount rate (now 14 percent), as well as a surcharge (now 2 percent) for frequent borrowing by large institutions. Banks then decide on the total amount that they wish to borrow, subject to the Fed's rules on frequency and duration. While borrowed reserves constitute only 2 to 3 percent of total reserves on average, fluctuations in borrowings can contribute significantly to movements in total reserves at any particular time. Some analysts thus have proposed reforming discount-window operations so that borrowed reserves might be made more controllable and thus more predictable. With greater predictability, the Fed would be able to hit its targets for total bank reserves more easily by controlling the nonborrowed component.

At present the discount rate tends on average to fall below market rates of interest, although the Fed adjusts it up or down in response to movements in market rates. Moreover, the spread between these rates tends to be variable because of the discontinuous nature of the adjustments in the discount rate, which result in fluctuations in banks' incentive to borrow from the Fed. Banks' "reluctance to borrow" and the System's administrative procedures tend to hold borrowing in check, but the actual amount of borrowing varies positively with the difference between market rates and the discount rate (see chart).

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Tying the discount rate to market rates would eliminate fluctuations in the incentive to borrow, and thus would help make borrowings more predictable. Still, this would not eliminate all of the variability in borrowing. To keep such variability to an absolute minimum, the Fed would also have to set the discount rate at a penalty level, somewhat above market interest rates. Banks without alternative sources of funds for making adjustments in reserve positions could still do so at reasonable cost. But the amount of borrowing would be quite small and therefore considerably more predictable than it is now because banks would generally find it less costly to borrow in the private financial markets than at the window.

#### Sources of control errors

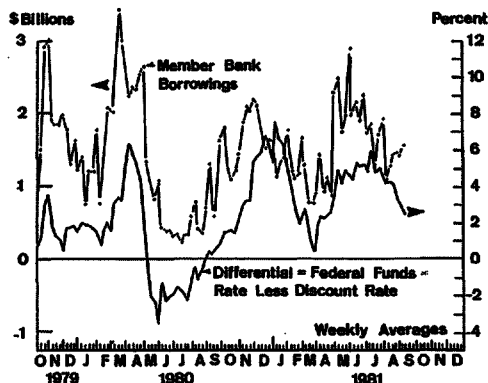
Whether a penalty discount rate would actually help to improve monetary control depends upon the size of the errors stemming from the variability in borrowed reserves, and also upon the system of reserve requirements in use. To analyze those factors, we first examine the major sources of error in monetary control during the initial year of the Fed's new operating procedure, and then consider the implications of alternative reserve-requirement systems.

A monetary aggregate may deviate from the mid-point of the annual target range for four different reasons. The first of these is an "intentional" deviation—a difference between the System's targeted *short-run* path for the monetary aggregate and the mid-point of its *annual* target range. Intentional deviations occur when the Federal Open Market Committee (FOMC) instructs the Trading Desk to supply bank reserves consistent with money paths that are closer to the upper or lower bound of the annual target range. For example, for a time in the spring of 1980 when M1-B was below its target range, the FOMC chose a short-run path close to the lower bound of the annual target range, to avoid an excessive interest-rate decline that could have weakened the dollar and adversely affected inflationary expectations.

Overall, in the first year of the new operating procedure, the absolute monthly deviation of M1-B from the mid-point of its annual target range averaged 1.40 percent. But M1-B deviated on average by only .78 percent from the FOMC's desired short-run path. So the Committee's "intentional" deviations were quite significant.

Three different types of operating errors also caused deviations from the FOMC's desired short-run growth path. For any given month, these included misses due to 1) errors in the projected "multiplier" relationship between the monetary aggregate and *total* bank reserves, 2) errors in hitting the targeted path for nonborrowed reserves, and 3) errors in projecting the total amount of discount-window borrowing. The first two types of error were both relatively small compared to the third in the first year of the new operating procedure. The average absolute monthly deviation was .47 percent for the M1-B multiplier (in relation to its predicted value), and was .43 percent for nonborrowed reserves (in relation to the targeted path for total reserves). In contrast, the average absolute deviation of borrowed reserves from projected levels (also as a percent of the total reserve path) was .94 percent—twice as large as either of the other two types of operating errors.

The size of the errors in projecting borrowing would seem to support the case for a penalty discount rate. However, if these errors partially tend to *offset* the other two types of errors, monetary control would not necessarily be worsened by borrowed reserve variability. A significant amount of offsetting actually occurred, since the sum of all three operating errors amounted to 1.84 percent—over twice the .78 percent average deviation of the M1-B from the FOMC's short-run path. The major reason was an inverse relation between errors in projecting borrowed reserves and errors in predicting the multiplier. Because of the tendency for offsetting errors, we cannot tell from the data alone whether or not the reduction in



borrowing errors obtainable through introducing a penalty discount rate would actually improve monetary control. Our next *Weekly Letter* will present some evidence on whether a penalty rate would be likely to reduce control errors on balance.

### Alternatives to penalty rate

Even if a penalty rate were not adopted, errors in monetary control arising from variability in borrowings could be reduced in other ways—first by making more forward-looking projections of the level of borrowing. In the first year under the new operating procedures, the Fed generally set projected borrowings each month at a level equal to the average amount of borrowing in the previous control period. This procedure generates reasonably accurate forecasts of borrowing when interest rates are stable. But the procedure tends to underestimate borrowing in periods of rising interest rates, and does the reverse in periods of falling interest rates.

Although the Fed sometimes revises borrowing projections within the control period, errors still have generally been associated with the direction of changes in interest rates. However, the Fed can predict interest rates to some extent, because their movements flow partly from the adjustments in total bank reserves required to keep the monetary aggregates on path. Therefore, a more forward-looking setting of the projected borrowing level at the beginning of a control period, as well as larger adjustments within it, might help to reduce borrowing errors.

Errors in projected borrowing also could be reduced by more frequent adjustments in the discount rate, to keep it more closely in line with market rates of interest. Borrowing levels could be made more predictable if there were smaller fluctuations in the incentive to borrow, through greater flexibility in the

discount rate. Of course, in the extreme this would be equivalent to tying the discount rate to current market rates. Unfortunately, however, there are limits to the feasible amount of short-run flexibility in the discount rate under the present system of lagged reserve accounting, where reserves are required against deposits outstanding two weeks earlier. Tying the discount rate to current market rates, either at a penalty level or otherwise, with lagged reserve accounting would tend to produce a short-run ratcheting in the level of interest rates, because the amount of reserves desired by banks is almost completely fixed within any two-week period. For example, a discount-rate increase produced by a rise in market rates would drive up the Federal-funds rate as banks tried to borrow reserves from each other instead of the Fed, and this would then produce a further increase in the discount rate, and so on.

In summary, we could obtain some reduction in monetary-control operating errors by using more forward-looking projections of borrowed reserves and by making more frequent adjustments of the discount rate. But with the present system of lagged reserve accounting, the apparently simple solution of tying the discount rate to current market rates (at either a penalty level or otherwise), would create very large instabilities in interest rates. Moreover, even under contemporaneous reserve accounting a tied or penalty rate might not actually reduce monetary-control errors by much, or at all, if borrowing errors tend mainly to offset opposite multiplier errors. In our next *Weekly Letter*, we will detail the changes in reserve requirements necessary for the successful operation of a penalty discount rate, as well as the likely resulting errors in monetary control.

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**BANKING DATA—TWELFTH FEDERAL RESERVE DISTRICT**  
 (Dollar amounts in millions)

Selected Assets and Liabilities	Amount Outstanding 10/14/81	Change from 10/7/81	Change from year ago	
			Dollar	Percent
<b>Large Commercial Banks</b>				
Loans (gross, adjusted) and investments*	153,123	- 584	10,997	7.7
Loans (gross, adjusted) — total#	132,238	- 487	12,114	10.1
Commercial and industrial	40,235	- 40	5,152	14.7
Real estate	54,789	134	5,920	12.1
Loans to individuals	23,164	28	- 722	- 3.0
Securities loans	1,510	- 277	380	33.6
U.S. Treasury securities*	5,572	- 110	- 1,029	- 15.6
Other securities*	15,313	13	84	- 0.5
Demand deposits — total#	42,076	48	- 6,328	- 13.1
Demand deposits — adjusted	29,702	508	- 5,510	- 15.6
Savings deposits — total	29,532	- 242	- 406	- 1.4
Time deposits — total#	86,078	- 123	21,178	32.6
Individuals, part. & corp.	78,212	- 75	21,984	39.1
(Large negotiable CD's)	33,865	- 339	9,635	39.8
<b>Weekly Averages of Daily Figures</b>	<b>Week ended 10/14/81</b>	<b>Week ended 10/7/81</b>	<b>Comparable year-ago period</b>	
<b>Member Bank Reserve Position</b>				
Excess Reserves (+)/Deficiency (-)	81	85		88
Borrowings	13	3		94
Net free reserves (+)/Net borrowed(-)	68	82		- 7

\* Excludes trading account securities.

# Includes items not shown separately.

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