



BOARD OF GOVERNORS
OF THE
FEDERAL RESERVE SYSTEM
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March 11, 1975

CONFIDENTIAL (FR)
CLASS II-FOMC

To: Federal Open Market Committee


From: Arthur L. Broida *ALB*

Attached is a memorandum from Governor Holland transmitting a revised version of the first stage report of the Subcommittee on the Directive.

We plan to list this report on the agenda for discussion at the meeting of the Committee to be held on March 18, 1975, on an "if time is available" basis.

Attachment

TO: Federal Open Market Committee DATE: March 10, 1975
FROM: Robert C. Holland, Chairman,
Subcommittee on the Directive



Attached is a revised version of the first stage report of the Subcommittee on the Directive that was originally distributed on December 21, 1974. The revision reflects the recalculation of statistical tests of relationships between various reserve measures and monetary aggregates that were necessitated by corrections of the original reserve series that had been used. The recalculations are compared with the original results in the brief staff memo (from Mr. Pierce) that is also attached.

The new results do not fundamentally change the recommendations of the Subcommittee, but they do alter the emphasis in some degree. Nonborrowed reserves continue to be recommended as the principal reserve operating target of the FOMC, but somewhat more emphasis is placed on following, on a current basis, the figures on total reserves.

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REVISED

To: Federal Open Market
Committee

Date: March 7, 1975

From: Subcommittee on the
Directive

Subject: Improvements in the
Directive: Stage I

Introduction and Summary of Conclusions

At its July 1973 meeting, the Federal Open Market Committee established the Subcommittee on the Directive to undertake a thorough reconsideration of the Committee's procedures for formulating and implementing domestic policy directives. To carry out its charge, the Subcommittee divided its work into three stages and launched an extensive System-wide research program for each stage. This report sets forth the Subcommittee's conclusions and recommendations reached in the first stage of its inquiry.

The objective of the first stage has been limited to evaluating alternative reserve measures that might serve, in place of RPD, as short-term operating targets in an aggregate-oriented approach to policy. Stage II of the Subcommittee's work will appraise the merits of these operating targets against other possible short-run targets, such as the Federal funds rate or other indicators of money market conditions. Combinations of operating targets also will be considered. In addition, Stage II will evaluate whether pursuit of intermediate targets, such as the monetary aggregates or interest rates, is helpful in formulating monetary policy, and if so, which intermediate target (s) are "best." In the third and final stage, the Subcommittee will attempt to identify possible regulatory and institutional changes that

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might produce a more effective execution of monetary policy in the reasonably foreseeable future.

This report is limited to the conclusions and recommendations reached in Stage I of the Subcommittee's work. It is hoped that Stage II will be completed by early next year. Assuming that the FOMC is agreeable, the Subcommittee plans to arrange for nonconfidential portions of its work on Stages I and II to be reviewed and discussed by some leading academic economists. The final stage will be extended over a longer period.

The Subcommittee recommends:

1) The FOMC should move toward replacing RPD with nonborrowed reserves (NBR), a reserve target that is more controllable to the Desk. This step can and should be undertaken without placing exclusive reliance on a reserve measure as an operating target and while recognizing that none of the various reserve measures promise precise control over the monetary aggregates in the short run.

2) The NBR target should be defined for the interval between FOMC meetings (as illustrated in the appendix to this report) rather than for the moving two-month horizon used for RPD. The target should be accompanied by estimates of the total reserves that are expected to be consistent with it.

3) Insofar as the FOMC directs the Manager to utilize this reserve target, the Manager normally should not attempt to "look through" NBR to the monetary aggregates, but rather

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should attempt to maintain his operating reserve target within a specified range of tolerance. However, staff materials and, in some degree, the record of FOMC actions should include the principal assumptions that underlie the projected multiplier relationships between NBR and the monetary aggregates. These assumptions would include, among other things, projected member bank borrowing (with, when significant, distinctions by type of borrowing--e.g., regular adjustment, seasonal, and emergency).

4) There should be provision for the Manager to consult with the Chairman to determine whether the NBR target should be changed in the interval between meetings should this target prove to be in conflict with other operating constraints, such as the Federal funds rate. Furthermore, the behavior of total reserves may indicate that a sustained and unexpected shift in member bank demand for borrowings is occurring and, as a result, the NBR path may need to be adjusted in a compensating direction.

5) Until such time as the FOMC acts finally on the proposals set forth herein, NBR should be added as a "shadow" target to be included in the materials prepared for the FOMC. This procedure will assist the FOMC in evaluating the desirability of adopting the alternative operating target in place of RPD and it will smooth the transition to NBR should that be the Committee's final decision.

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Procedures for Evaluating Instruments

The Subcommittee on the Directive believes that the RPD experiment begun in February 1972 has made an important contribution to improving the FOMC's operating procedures. The experiment has helped the FOMC focus on the relationships between its reserve-supplying actions and the behavior of the monetary aggregates, and has helped point up the difficulties in achieving control over the monetary aggregates when Federal funds rate movements are constrained. The experiment has also aided the Committee in clarifying the broader issues involved in the choice of appropriate operating and intermediate targets.

However, several problems have been encountered in pursuing the RPD experiment. First, RPD has proven to be very difficult for the Desk to control. Second, the multiplier relationships between RPD and the monetary aggregates are difficult to predict at times. Thus, the RPD concept has not always been a reliable guide for the FOMC in forming its decisions concerning either longer-term or inter-meeting monetary policy, nor in judging, after the fact, how well the Manager has complied with FOMC instructions. Finally, the RPD concept has proven deficient in terms of enhancing public understanding of monetary policy. As a result, the FOMC now places little or no emphasis on RPD and the measure has become virtually irrelevant to the Manager in his operations.

The Subcommittee took as its first order of business the search for a more reliable substitute for RPD as the FOMC's aggregate-oriented

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short-term operating target. The following candidates were considered: total member bank reserves, nonborrowed member bank reserves, RPD less reserves required to support large certificates of deposits, and three variants of the monetary base.^{1/} The following criteria were employed to evaluate each of these measures as a possible operating target.

1. Controllability. An operating target should be one that the Manager can control with reasonable precision over a weekly time period. This implies that the target must respond quickly and predictably to open market operations. Information about the target should be available to the Manager on a timely basis so that he can determine whether the operating target is on track and react quickly with open market operations should it deviate from path.

2. Predictability. The relationships between the operating target and the monetary aggregates should be reasonably stable and predictable.

3. Interest rate implications. The operating target should be evaluated in relation to its potential for introducing serious money market disturbances.

4. Public understanding. The operating target should enhance-- or at least not obscure--public understanding of monetary policy. The

^{1/} The monetary base measures the net monetary liabilities of the Federal Reserve and the Treasury to the private sector of the economy and consists of member bank reserves plus currency outside member banks. It is the base that underlies the stock of money balances held by the nonbank public. The variants of the base that were used include the source base, the non-borrowed source base and the monetary base. The source base consists of total reserves of member banks, vault cash held by nonmember banks, and currency held by the public. The nonborrowed source base is simply the source base less member bank borrowing. The monetary base is the source base adjusted to reflect changes in reserve requirements and changes in the size, type and distribution of deposits in the banking system. In this report, the more familiar terms of nonborrowed reserves plus currency and total reserves plus currency will be used for the nonborrowed source base and the source base respectively.

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behavior of the operating target should not be conducive to the formation of erroneous inferences concerning the intent of monetary policy by outside observers.

In making these evaluations, the Subcommittee had the benefit of a number of analytical papers prepared for it by members of the staffs of the Board and several Reserve Banks. Specific studies are cited whenever their findings are particularly relevant. A list of all the papers is provided at the end of this report and copies of these papers will be supplied by the Subcommittee on request.

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Evaluation of Alternative Operating Instruments

1. Controllability.^{2/} Total member bank reserves, total reserves plus currency, RPD, and RPD less reserves required to support large certificates of deposit all suffer from the deficiency that they are difficult, and at times impossible, to control in the short run. Borrowed reserves are a component of all these measures. Other things equal, attempts to change any of these measures will be frustrated in the short run by an offsetting response of bank borrowing.^{3/}

An example should make the point: assume that total reserves are used as the operating target and that they are growing more rapidly than the FOMC desires. Under these conditions, the Manager would reduce the availability of nonborrowed reserves in an attempt to reduce the growth of total reserves. Because required reserves are fixed in the short run, the banking system's first response to the reduced availability of nonborrowed reserves necessarily would be to borrow more at the discount window.^{4/} Thus, total reserves would be little affected in the first instance by Desk actions, but the mix between borrowed and nonborrowed reserves would change. The reduced availability of nonborrowed reserves,

^{2/} A detailed discussion of the controllability question is provided in "Alternative Operating Targets for Monetary Policy," by Rudolph Thunberg and in "On Controlling Monetary Aggregates via Base or Member Bank Reserve Concepts," by Dennis Starleaf.

^{3/} In this context, the term "borrowing" will denote adjustment borrowing by member banks.

^{4/} Lagged reserve accounting prevents the banking system from adjusting its required reserves in any statement week. Even if there were contemporaneous reserve accounting, the banking system would have only a small impact on its required reserves in any week.

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and increased debt to the Federal Reserve, would trigger bank portfolio adjustments, however, which would raise interest rates and set in motion a reduction in the growth of deposits and hence in required reserves. But this reaction takes time. Over weekly (or at times even monthly) intervals, the Manager would not be able to hit the target specified by the FOMC.

Thus, over short time intervals--which is the appropriate horizon for an operating target--the Desk would often be unable to carry out a directive specified in terms of an operating target that includes bank borrowing. In fact, with lagged reserve accounting, it sometimes would be impossible to reduce reserves sufficiently to hit the target.

In terms of the control criterion, the preferred alternatives as the operating target are either nonborrowed reserves or nonborrowed reserves plus currency (nonborrowed source base). Except for as-of adjustments, both measures are known with reasonable accuracy with a one-day lag. Weekly control is subject to errors in projecting other factors affecting reserves (principally float) and the availability of collateral for adding reserves. Relative to other candidates, both nonborrowed reserves and nonborrowed reserves plus currency could be controlled quite closely, even on a week-by-week basis.

The total of nonborrowed reserves and currency would be slightly easier to control than nonborrowed reserves alone. With a nonborrowed reserves plus currency target, it usually would not be

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necessary for the Desk to react to errors in currency projections. If currency unexpectedly rose or fell, nonborrowed reserves would move in the opposite direction so that the total would tend to remain unchanged. However, if the Desk were following a nonborrowed reserve target, an unexpected movement in currency would cause nonborrowed reserves to deviate from the desired path. The Manager would learn about this deviation in currency with a one-day lag, and would act to offset it in order to stay on the desired nonborrowed reserve path.^{5/}

The problems of short-term control by the Desk associated with each of the alternative reserve or monetary base measures except nonborrowed reserves and nonborrowed reserves plus currency led the Subcommittee to consider only these latter two as serious alternatives to RPD as an operating target.

2. Interest rate implications. A nonborrowed reserve operating instrument appears preferable in terms of likely effects on interest rates. If nonborrowed reserves were the operating target, shifts in currency would be offset by open market operations and interest rates would not respond to currency movements. If the target were nonborrowed reserves plus currency, however, currency shifts would not elicit an offsetting Desk response because nonborrowed reserves would move in the opposite direction from currency. Thus, these changes in the availability of nonborrowed reserves would produce sharper interest rate fluctuations than would be the case under a nonborrowed reserves target. Available empirical evidence suggests that the superiority of

^{5/} The concept of currency used in this context includes all currency outside the Treasury and Federal Reserve banks. The currency component of the money stock includes currency in the hands of the nonbank public, i.e., currency as defined above less currency in the vaults of all commercial banks.

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nonborrowed reserves over nonborrowed reserves plus currency in terms of interest rate fluctuations is usually apt to be small in practice.^{6/} Infrequently, however, unexpected currency movements appear to be large enough to produce a considerable impact on the Federal funds rate if the Desk were instructed to achieve a target consisting of nonborrowed reserves plus currency.

Pursuit of any reserve or monetary base operating target that includes member bank borrowing would produce sharper interest rate fluctuations than those measures that exclude borrowing. The larger money market reactions would arise because the tendency for borrowing to offset changes in nonborrowed reserves would be resisted by the Desk. Assume that the Desk were following a target that includes bank borrowing, say total reserves. If total reserves growth were stronger than desired, the Desk would respond by reducing the growth in nonborrowed reserves thereby tending to increase the Federal funds rate. Banks would respond to this reduced reserve availability and the increased Federal funds rate in the first instance by increasing their borrowing from the Fed, so that total reserves would tend to return to their earlier value. The Desk would react again by reducing nonborrowed reserves. While the Desk would probably be unsuccessful in achieving its total reserve target in the short run, the attempt could produce large week-to-week movements in interest rates.

^{6/} See "Reserve Aggregate Target Experiment," August 12, 1974 memorandum to the Subcommittee by James L. Pierce.

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3. Public understanding. It is reasonable to expect that current values of broader measures such as total reserves or total reserves plus currency (source base) on average will move more closely with current values of the monetary aggregates than will nonborrowed reserves or nonborrowed reserves plus currency. In this sense, the broader measures would be preferable in enhancing public understanding of monetary policy. There are times, however, when the short-term movements in these broader measures will not accurately reflect the thrust of policy. For example, if a decision is made to reduce the growth in the aggregates, the growth of nonborrowed reserves will slow, but total reserves will continue to rise for a while because of an increase in borrowing in the short run. Only later, after banks are impelled to reduce deposit growth in order to repay their indebtedness to the Federal Reserve, will total reserves show a slower growth. In those cases, nonborrowed reserve movements would more accurately reflect the thrust of current policy.

However, the fact that occasionally banks have to be pushed much further into or out of debt to the Federal Reserve in order to impel a timely change in their deposit-creating behavior creates a problem of public perception. At times, the Desk would have to be told to strive for a change in a nonborrowed reserve target which in percentage terms would be much greater than the percentage change desired in overall deposits. To the unsophisticated reader of the FOMC policy record, such percentage changes in nonborrowed reserve

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targets would exaggerate the intended extent of monetary policy changes. This effect could presumably be forestalled to some degree by stating FOMC targets for nonborrowed reserves in terms of dollar levels or dollar changes rather than annualized percentage rates of change.

The more global measures such as total reserves or total reserves plus currency (the source base) will tend on average to move more closely with the monetary aggregates. Because the source base includes currency--a relatively large and stable component of M_1 and M_2 --it should show percentage changes most closely paralleling the monetary aggregates. It is important to recall that while these global measures usually create fewer interpretation problems for the public, they create the greatest control problems for the Desk. Table I shows the growth in the various candidates for the operating target along with the growth in the monetary aggregates. The greater similarity between the percentage changes in deposit aggregates and those in the measures that include currency can be discerned readily from the table.^{7/}

On the other hand, there may be some difficulty in persuading the public that the use of an operating target that includes both currency and reserve balances can improve control over the broader deposit aggregates. The a priori logic of such a relationship is somewhat disconcerting, since currency in the hands of the non-bank public does not support deposit growth. Indeed, since currency in effect carries a 100 per cent reserve requirement, and demand deposits less than a 20 per cent reserve requirement, shifts in the public's

^{7/} The source base would have caused interpretation problems in the second half of 1974 because of the rapid rise of currency relative to demand deposits in the second half of the year.

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money holdings from demand deposits to currency should absorb reserves and greatly restrict deposit growth. That the relationship between offsetting movements in currency and reserve balances turns out usually not to contract deposits (due to such factors as changes in deposit composition) is an empirical fact in the real world, but it may not be easy to explain to the public.

4. Predictability. It was expected that the broader reserve or monetary base measures, such as total reserves, total reserves plus currency or RPD would be more closely related to the monetary aggregates than would the more narrowly defined nonborrowed reserve measures. That is, it was expected that the multiplier relationship between the more inclusive operating targets and the aggregates would be more predictable. The staff's empirical results support this expectation; the broader, more difficult to control reserve measures, such as RPD and total reserves, give better predictions of the monetary aggregates than do the narrower, more controllable measures, such as nonborrowed reserves and nonborrowed RPD.^{8/}

The empirical evidence was examined in several different ways.^{9/}
The most successful effort in terms of predicting M_1 and M_2 was one in

^{8/} A detailed discussion of the analysis is provided in the revised version of "Reserve Measures as Operating Variables of Monetary Policy: an Empirical Analysis" by Daniel Laufenberg and in "Money Stock Control: an Aggregate Approach," by Albert Burger.

^{9/} The staff's empirical work was directed primarily toward establishing a ranking of the various potential operating targets in terms of their ability to predict the monetary aggregates. With additional work, the staff, could, no doubt, increase the precision with which any one operating target predicts movements in the monetary aggregates. This further research would be conducted if the FOMC selected one of the potential candidates as its operating target.

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which both current and lagged changes in the operating target were related directly to changes in M_1 and M_2 by regression analysis.^{10/}

As shown in Tables II and III, there is remarkably little difference, within the sample period, among the error performances of the regressions for any of the operating target measures.^{11/} However, the error statistics indicate that for predicting M_1 and M_2 even one month into the future, sizable errors were made by using any of the measures.

Tables IV and V show the errors in predicting M_1 and M_2 made by the regression equations for the twelve months outside the sample period. These results probably give the best measure of the reliability of the relationships because they are roughly the equivalent of forecasts. Outside the sample period there are distinct differences among the various operating targets in their ability to predict M_1 and M_2 . RPD and total reserves gave the closest predictions of the monetary aggregates during 1974. Total reserves plus currency (the source base) performed relatively poorly during the period because of the large shifts into currency that occurred in 1974. None of operating targets that exclude member bank borrowing performed as well as total reserves on RPD. However, nonborrowed RPD and nonborrowed reserves did provide fairly reliable predictions of M_1 and M_2 .

The results for 1974 indicate that there is a trade off between

^{10/}In these regressions all reserve measures were adjusted for changes in legal reserve requirements. The monetary base measures were not adjusted for changes in required reserves associated with changes in deposit mix.

^{11/}Only the errors for the last year of the 1969-73 sample are shown. The performance of the regressions over the entire period was quite similar to that of 1973.

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the controllability of the operating target on the one hand and the stability of its relationship to the monetary aggregates on the other. The controllability criterion favors nonborrowed reserves and nonborrowed reserves plus currency. The predictability criterion favors RPD or total reserves. The use of nonborrowed reserves appears to offer a reasonable balance between the two conflicting criteria. Nonborrowed reserves are highly controllable by the Desk and the relationship of NBR to the monetary aggregates is fairly close--although variations in member bank borrowing do weaken the relationship.

The results in both the estimation period--1969 to 1973--and the forecast period for 1974 indicate that the FOMC should clearly distinguish between (a) nonborrowed reserves as an operating target for the Desk, and (b) a broader reserve measure such as total reserves which, because of its closer relationship to the monetary aggregates, can be used to judge whether the goals with respect to the monetary aggregates are being achieved. Because of this distinction, it is important that the projected behavior of member bank borrowing during the inter-meeting period be made explicit so that the behavior of actual relative to projected total reserves can be monitored. The appendix table illustrates the borrowing projections for three bluebook alternatives.

It is important to note, however, that monthly multiplier errors for nonborrowed reserves tend to be offset from month to month, so control of the monetary aggregates should be fairly close over a calendar quarter.^{12/} The errors for nonborrowed reserves over various time horizons are shown in

^{12/}This offsetting behavior of successive errors also holds true for other reserve and monetary base measures. For additional supporting evidence, see Albert Burger, "Money Stock Control: An Aggregate Approach."

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Table VI. This evidence suggests that if the growth in the aggregates is stronger than expected in a particular month, given the growth in non-borrowed reserves, it is likely that the growth in the aggregates will be weaker than expected in subsequent months. This finding implies it is preferable for the Desk to stay on the established reserve path since short-run deviations in the monetary aggregates from their expected values tend to be self-correcting.

In evaluating these results, it is important to keep several factors in mind. First, the size of the errors highlights the fact that adoption of any single reserve measure as an operating target probably would not result in a marked improvement in the accuracy of control over the aggregates in the short run. The errors obtained by using the regression technique are fairly close to those that have been experienced recently in bluebook projections. But, it is possible that the errors indicated in the statistical results could be decreased by adjusting the estimates to reflect judgmental factors in much the same way as is done currently in preparing the bluebook. However, it is important to realize that control over the monetary aggregates will be worsened whenever the range of tolerance for the Federal funds rate is too narrow to allow the appropriate movements in the operating target. The Subcommittee has not yet carried out studies far enough to determine whether or not it should recommend adjustments in the operating constraints on the Federal funds rate. This determination will come in phase II of the Subcommittee's work.

Finally, it should be noted that there are technical reasons for suspecting that the statistical results may understate the errors in controlling the aggregates through a reserve operating target.^{13/}

^{13/} For a more detailed discussion, see "Interim Staff Report to the Subcommittee on the Directive," June 12, 1974 memorandum by James L. Pierce and John H. Kalchbrenner.

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These results were obtained from data generated during a period in which a reserve measure was not used exclusively as the operating target. The actual short-run implementation of monetary policy was conducted in terms of operations on both RPD and the Federal funds rate, and the intermediate targets themselves were given weight when the multipliers appeared to be in error.

Under these circumstances, whenever the funds rate approached the limits of its allowable range, the Manager would provide or withdraw a sufficient volume of reserves to maintain the funds rate within the range. This process permitted the monetary aggregates to expand or contract along with increases or decreases in the demand for money. Thus, in part, reserves were reacting to the growth in the aggregates rather than the aggregates responding to reserves. The results indicate the closeness of the relationships in the data, but do not prove the direction of causation. On these grounds, actual use of these measures as operating targets could yield greater errors for the monetary aggregates than the empirical evidence indicates.

Summary of Evaluation Results

The evaluation of each of the alternative operating targets suggests the following conclusions:

1. Controllability: nonborrowed reserves plus currency or nonborrowed reserves are the preferred targets.
2. Interest rate variability: an intermediate target that excludes member bank borrowing is to be preferred. Nonborrowed reserves is the best on this score, but apparently only marginally so.

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3. Public understanding: a broad measure such as total reserves or the monetary base is preferable.
4. Predictability: the lowest errors in predicting M_1 and M_2 were achieved using RPD or total reserves; nonborrowed reserves performed quite well. However, all of the statistical results should be received with considerable caution.

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Recommendations

The Subcommittee recommends that the FOMC move toward replacing RPD with nonborrowed reserves (NBR) as its short-term quantitative operating target. The nonborrowed reserves measure was preferable on two of the four evaluation criteria--controllability and interest rate variability. Nonborrowed reserves did not perform as well as RPD or total reserves in terms of predicting the monetary aggregates but it did a creditable job, particularly as the prediction errors tended to be offsetting. Because of the great importance that the Subcommittee attaches to specifying a target for the Manager that he can control between FOMC meetings without producing large disturbances in the money market, we are willing to recommend NBR as the operating target even though this measure does not produce the smallest monthly prediction errors for the monetary aggregates.

Total reserves and RPD, which performed highest on the predictability criterion, suffer from the flaw that they are virtually impossible to control month by month because of the offsetting reaction of member bank borrowing in response to open market operations. Moreover, RPD, and to a lesser degree nonborrowed RPD, is particularly difficult to control by the Desk because the future mix of deposits is highly uncertain.

To more nearly satisfy the criterion of public understanding, where NBR does not score highly, the Subcommittee recommends that staff materials, and in some degree the record of FOMC actions, include a statement of the principal assumptions and projections concerning borrowing, excess reserves and deposit mix that underlie the multiplier relationship

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between NBR and the monetary aggregates. The availability of this information would generally increase public understanding of current monetary policy, and reduce the likelihood of misinterpretation when NBR moves in a direction counter to the thrust of monetary policy.

The Subcommittee believes that a change from RPD to NBR is a natural, understandable progression. Furthermore, adoption of NBR as the operating target does not preclude the addition of currency to the target at a later date (i.e., a switch from nonborrowed reserves to the nonborrowed source base) should experience indicate that this further evolution is desirable.

The Subcommittee also recommends that the path for the NBR target only be defined for the interval between FOMC meetings. The current procedure involves the specification of moving two-month paths for both the intermediate targets M_1 and M_2 , and the operating target RPD. This makes it difficult for the FOMC to appraise how well its objectives are being achieved monthly by blurring the distinction between errors in hitting the target and policy-directed changes in the target itself from month to month. Adoption of the interval between meetings as the target period would allow this distinction to be observed. Because the Manager could hit a NBR target with reasonable accuracy, there is no reason to use the moving two-month horizon for the operating target. The NBR target should be described as the dollar change from the previous intra-meeting period in the level of the target to be attained on average over

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the next four or five week interval. In order to allow for interferences from a variety of factors, it is suggested that the instructions include a tolerable range of error of \pm \$50 million.^{14/}

As shown in Table VI, evidence compiled by the staff suggests that over time errors in the relationship between nonborrowed reserves and the monetary aggregates tend to be offsetting. Thus, it does not appear that it would be productive to "look through" nonborrowed reserves to the aggregates. For this reason, the Subcommittee recommends that the Manager be instructed not to make adjustments for apparent multiplier errors in the interval between meetings but rather to adhere to the assigned nonborrowed reserve path provided that the funds rate remains within its range of tolerance.

However, the Manager should be instructed to consult with the Chairman if it becomes apparent that the NBR target cannot be achieved within the established Federal Funds rate constraint. In addition, when sizable, sustained and apparently explainable deviations in the assumed multiplier relationships between NBR and the monetary aggregates develop between meetings, there should be provision for the Manager to consult with the Chairman concerning possible adjustment of the target. For example, when there is a sustained shift in bank attitudes toward adjustment borrowing, it would become necessary to modify the nonborrowed reserve path. Such a shift would be reflected in the behavior of total

^{14/} This figure, it should be noted, represents a tolerance range around a 4 or 5 week average. Errors in projections of reserve factors may be larger than \$50 million in any given week, but these errors will tend to be offsetting over a longer period. At the current level of nonborrowed reserves, a tolerance of \pm \$50 million represents an annual rate of change in a range of a little over 3 per cent. For a more extended discussion of these projection errors, see "Preliminary Investigations into Nonborrowed Reserve Projection Errors," November 26, 1974 memorandum by Sheila Tschinkel.

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reserves. Since total reserves bear a tighter relationship to the monetary aggregates than do nonborrowed reserves, a sustained movement in total reserves relative to expectations should be taken as an indication that some adjustment may be required in the NBR path.

A large volume of emergency borrowing would also require adjustment in the NBR path. In this case, the adjustments in the multiplier and hence in NBR would depend upon reactions by the emergency bank and other banks to the situation that develops, with the extent of portfolio adjustments and shifts in banks' demands for free reserves governing the size of adjustment needed in NBR. In general, the adjustment of the NBR path does not lend itself to a predetermined formula but rather would have to be determined in light of prevailing circumstances.

The possibility of adopting an interest rate target or money market condition as either the sole or supplementary operating target has not been excluded by the Subcommittee. The results of these alternatives relative to the reserve measures will be evaluated in stage II of the Subcommittee's investigation.

Until such time as the FOMC acts finally on the substantive recommendations contained herein, the Subcommittee recommends NBR be added as a "shadow" target to be included in the materials prepared for FOMC use on a continuing basis. It is felt that the process of tracking the proposed alternative target will assist the FOMC in evaluating the desirability of adopting NBR in place of RPD; further, it will smooth the transition from one instrument to the other if that should be the Committee's final decision. An example of the manner in which these materials would be presented is included as an appendix to this report.

APPENDIX

Paragraph on Nonborrowed Reserve Target
(as it might have appeared in Blue
Book for November 19 meeting)

The expected levels and changes in nonborrowed reserves (NBR) are shown in the table below for the three policy alternatives, along with other related measures. Under alternative B--which assumes that money market conditions are about unchanged from those recently prevailing--NBR is indicated to increase about \$470 million, seasonally adjusted and bank borrowing is expected to remain about \$215 million below the average of the past four weeks. A more substantial increase in NBR is targeted under alternative A. Under alternative A, in view of the expected slightly further easing in the Federal funds rate, and assuming no change in the discount rate, member bank borrowing is expected to drop over the next four weeks to \$875 million on average. This drop in borrowing would offset about half of the expansion in nonborrowed reserves under alternative A, and total reserves are expected to show moderate growth over the period on average. The monetary base, which includes currency in circulation as well as total reserves, would be expected to show a larger increase, reflecting the steady expansion of currency.

Average Nonborrowed Reserves and Related Measures
(\$ million)

	<u>4 weeks ending November 20</u>	<u>4 weeks ending December 18</u>		
		<u>ALT. A</u>	<u>ALT. B</u> (Levels)	<u>ALT. C</u>
1. Nonborrowed reserves	35,635	36,290	36,105	35,935
2. Member bank borrowings	1,215	875	1,000	1,125
3. Total reserves (1+2)	36,850	37,165	37,105	37,060
4. Currency outside banks <u>1/</u>	69,330	69,765	69,765	69,765
5. Monetary base (3+4)	6,180	106,930	106,870	106,825
		<u>ALT. A</u>	<u>ALT. B</u> (Changes)	<u>ALT. C</u>
1. Nonborrowed reserves		655	470	300
2. Member bank borrowing		-340	-215	-90
3. Total reserves (1+2)		315	255	210
4. Currency outside banks <u>1/</u>		435	435	435
5. Monetary base (3+4)		750	690	645

1/ Currency outside member banks includes currency held in the vaults of nonmember banks.

Papers Prepared for Improvements in the Directive: Stage I

Burger, Albert, "Money Stock Control: An Aggregate Approach,"
Federal Reserve Bank of St. Louis.

Laufenberg, Daniel, "Reserve Measures as Operating Variables of
Monetary Policy: An Empirical Analysis," Board staff.
Revised version forthcoming.

_____, "Report: Nonborrowed Reserves Adjusted," Board
staff.

Pierce, James L., "Reserve Aggregate Target Experiment," Board staff.

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Table Ia

Actual One-Month Percentage Change
at Annual Rates

	<u>M₁</u>	<u>M₂</u>	<u>Total Reserves</u>	<u>Non-borrowed Reserves</u>	<u>Source Base</u>	<u>Non-borrowed Source Base</u>	<u>RPD</u>	<u>RPD Less Reserves Against Large CDs</u>	<u>Non-borrowed RPD</u>	<u>Nonborrowed RPD Less Reserves Against Large CDs</u>
<u>1973</u>										
Jan.	5.2	9.4	27.3	23.9	11.3	10.0	14.7	12.4	10.5	7.8
Feb.	4.7	7.0	-18.7	-36.2	2.9	-2.5	-0.7	-6.1	19.1	-26.4
Mar.	0.5	5.4	10.3	1.6	11.5	8.8	8.1	-18.7	-1.4	-13.7
Apr.	6.5	7.8	12.5	17.8	8.5	10.0	10.5	16.3	16.1	5.5
May	13.4	12.0	6.0	1.2	4.6	3.1	8.1	4.2	3.1	-1.8
June	13.7	11.7	1.1	0.8	7.1	7.2	16.8	13.7	17.5	14.3
July	3.6	5.2	27.0	24.6	7.3	6.2	16.6	24.4	13.4	21.4
Aug.	-0.5	7.0	-4.3	-12.5	0.3	-2.3	11.4	16.2	3.5	7.6
Sept.	-1.4	4.5	9.4	21.8	5.2	9.1	14.0	3.6	27.7	18.2
Oct.	4.1	9.5	11.3	25.9	9.6	14.3	1.8	5.7	16.4	23.1
Nov.	12.6	12.0	-3.6	-0.8	10.3	11.4	-3.6	5.9	-0.3	9.9
Dec.	9.4	10.6	28.0	32.5	9.5	10.8	8.9	14.3	12.9	19.2
<u>1974</u>										
Jan.	-2.7	6.9	32.6	42.6	8.9	11.9	5.9	-1.1	15.4	9.6
Feb.	9.7	11.1	-23.6	-29.2	6.6	5.0	2.9	-4.0	2.3	-10.2
Mar.	9.2	9.7	-4.7	-9.2	5.9	4.1	8.2	6.7	3.9	1.7
Apr.	6.1	8.0	31.1	17.2	13.5	9.6	19.1	10.5	4.0	-7.3
May	4.3	4.5	21.2	-7.7	6.5	-3.2	21.5	1.8	-9.5	-35.3
June	10.4	11.2	7.1	-7.1	6.7	2.0	15.7	3.4	1.2	-14.9
July	2.1	5.2	21.7	13.1	4.2	0.8	8.6	3.1	-1.7	-9.9
Aug.	0.9	5.0	-4.3	-5.9	3.4	3.0	10.8	4.1	10.6	3.0
Sept.	1.7	3.2	7.1	9.7	8.2	9.2	7.8	2.7	10.6	5.5
Oct.	4.7	8.5	-1.8	49.6	8.4	25.2	-1.3	3.2	53.3	70.4
Nov.	6.8	9.7	-1.6	17.6	16.1	22.6	-3.0	6.9	17.2	31.5
Dec.	2.1	2.5	16.0	34.3	11.8	17.6	6.4	9.3	25.4	31.7
<u>1975</u>										
Jan.	-8.9	3.1	8.7	19.7	-7.7	-4.2	0	-11.7	11.5	1.4

TABLE 1D

Actual Two-Month Percentage Change
at Annual Rates

	M ₁	M ₂	Total Reserves	Non- borrowed Reserves	Source Base	Non- borrowed Source Base	RPD RPD	RPD Less Reserves Adjust Large CDs	Non- borrowed RPD	Nonborrowed RPD Less Reserves Against Large CDs
<u>1973</u>										
Jan.	9.7	11.0	22.2	12.2	10.2	6.8	13.2	10.2	2.3	-1.2
Feb.	5.0	8.2	4.3	-6.2	7.1	3.7	7.0	3.2	14.8	-9.3
Mar.	2.6	6.2	4.2	-17.3	7.2	3.2	3.7	-12.4	8.9	-20.0
Apr.	3.5	6.6	11.4	9.7	10.0	9.5	9.3	-1.2	7.4	4.1
May	10.0	9.9	9.3	9.5	6.6	6.6	9.3	10.3	9.6	1.9
June	13.6	11.9	3.6	1.0	5.9	5.1	12.5	9.0	10.3	6.3
July	8.7	8.5	14.1	12.7	7.2	6.7	16.7	19.1	15.5	17.9
Aug.	1.6	6.1	11.4	6.1	3.8	2.0	14.0	20.3	8.5	14.5
Sept.	-1.0	5.8	2.6	4.7	2.7	3.4	12.7	9.9	15.6	12.9
Oct.	1.4	7.0	10.4	23.9	7.4	11.8	7.9	4.7	22.1	20.7
Nov.	8.4	10.8	3.9	12.6	10.0	12.9	-0.9	5.8	8.1	16.5
Dec.	11.0	11.3	12.2	15.9	9.9	11.1	2.7	10.1	6.3	14.6
<u>1974</u>										
Jan.	3.4	8.8	30.3	37.6	9.2	11.4	7.5	6.6	14.2	14.4
Feb.	3.5	9.0	4.5	6.7	7.7	8.5	4.4	-2.6	8.9	-0.3
Mar.	9.5	10.4	14.2	-19.2	6.2	4.5	5.6	1.4	3.1	-4.3
Apr.	7.7	8.9	13.2	4.0	9.7	6.8	13.7	8.6	4.0	-2.8
May	5.2	6.3	26.2	4.8	10.1	3.2	20.3	6.2	-2.8	-21.3
June	7.4	7.9	14.2	-7.4	6.6	-0.6	18.6	2.6	-4.2	-25.1
July	6.3	8.2	14.4	3.0	5.4	1.4	12.2	3.2	-0.2	-12.4
Aug.	1.5	5.1	8.7	3.6	3.8	1.9	9.7	3.6	4.5	-3.5
Sept.	1.3	4.1	1.4	1.9	5.8	6.1	9.3	3.4	10.6	4.3
Oct.	3.2	5.9	2.7	29.7	8.3	17.3	3.3	3.0	32.0	38.0
Nov.	5.8	9.1	-1.7	33.6	12.3	24.1	-2.2	5.1	35.3	51.0
Dec.	4.5	6.1	7.2	26.0	14.1	20.3	1.7	8.1	21.3	31.6
<u>1975</u>										
Jan.	-3.4	2.8	12.4	27.0	2.0	6.7	3.2	-1.2	18.5	16.6

Table II

First Differences Regression Procedure
(billions of dollars)
Errors in Estimating M_1
Within Final Year of Sample Period

Date	Composite				Nonborrowed			
	Total Reserves	Source Base	RPD	RPD less CDs	Nonborrowed Reserves	Nonborrowed Source Base	Nonborrowed RPD	Nonborrowed RPD less CD
1973								
Jan.	-0.382	-0.675	-0.502	-0.457	0.058	-0.321	0.032	0.072
Feb.	-0.710	-0.573	-0.564	-0.648	-0.319	-0.090	-0.468	-0.469
Mar.	-1.011	-1.206	-0.760	-0.560	-0.662	-0.645	-0.485	-0.385
Apr.	1.025	0.372	0.717	1.015	1.135	0.456	0.790	0.996
May	0.716	0.549	0.814	1.005	0.746	0.235	0.782	0.917
June	1.560	0.895	1.295	1.548	1.594	0.968	1.442	1.598
July	0.031	-0.319	-0.319	-0.133	-0.011	-0.370	-0.205	-0.080
Aug.	-1.193	-1.048	-1.173	-0.851	-1.292	-1.171	-1.080	-0.859
Sept.	-0.580	-0.572	-0.621	-0.421	-0.765	-0.854	-0.559	-0.414
Oct.	0.181	0.045	0.195	0.537	0.121	-0.321	-0.136	0.100
Nov.	1.988	1.947	2.357	2.295	1.550	1.410	1.995	1.991
Dec.	1.330	0.847	1.424	1.163	1.211	0.788	1.397	1.192
MAE	.892	.754	.895	.886	.789	.636	.781	.756

Table III

First Differences Regression Procedure
 (billions of dollars)
 Errors in Estimating M_2
 Within Final Year of Sample² Period

Date	Composite				Nonborrowed			
	Total Reserves	Source Base	RPD	RPD less CDs	Nonborrowed Reserves	Nonborrowed Source Base	Nonborrowed RPD	Nonborrowed RPD less CDs
1973								
Jan.	-0.501	-0.835	-0.848	-0.184	1.337	0.341	0.850	1.166
Feb.	-0.406	-0.280	-0.624	-0.588	0.965	1.061	0.360	0.081
Mar.	-0.887	-0.908	-0.429	0.174	0.379	0.239	0.405	0.539
Apr.	1.305	0.007	1.636	2.271	1.780	0.430	2.009	2.259
May	1.217	0.473	1.320	2.188	1.163	-0.039	1.365	1.980
June	1.111	-0.342	0.175	1.191	1.190	-0.333	0.553	1.250
July	-1.126	-1.250	-1.485	-0.593	-1.112	-1.325	-1.221	-0.426
Aug.	-0.462	-0.039	-0.695	0.498	-0.415	-0.046	-0.391	0.460
Sept.	-0.094	0.255	-0.473	0.582	-0.683	-0.562	-0.602	0.482
Oct.	1.129	1.115	1.411	2.505	0.683	0.281	0.899	1.664
Nov.	2.641	2.218	3.089	3.325	1.125	0.955	1.899	2.417
Dec.	2.428	0.959	2.532	1.944	1.893	0.669	2.084	1.798
MAE	1.109	.723	1.226	1.337	1.060	.523	1.052	1.210

Table IV
 First Differences Regression Procedure
 (billions of dollars)
 Errors In Estimating M_1
 Outside Sample Period¹

Date	Composite				Nonborrowed			
	Total Reserves	Source Base	RPD	RPD less CDs	Nonborrowed Reserves	Nonborrowed Source Base	Nonborrowed RPD	Nonborrowed RPD less CDs
1974								
Jan.	-1.696	-2.416	-2.003	-2.451	-1.983	-2.865	-2.152	-2.450
Feb.	-0.197	-0.269	-0.027	-0.118	-0.580	-0.755	-0.270	-0.337
Mar.	0.520	0.162	0.648	0.785	0.508	0.306	0.762	0.835
Apr.	0.513	-0.988	-0.140	0.273	0.988	-0.009	0.515	0.747
May	-2.046	-2.894	-2.247	-1.512	-1.333	-1.941	-1.266	-0.786
June	0.574	0.190	0.916	1.624	1.661	-1.260	1.732	2.259
July	-0.525	-0.727	-0.133	0.125	0.396	0.090	0.201	0.439
Aug.	-1.251	-1.320	-0.984	-0.695	-0.859	-0.976	-0.856	-0.667
Sept.	-0.163	-0.541	-0.120	-0.283	-0.102	-0.473	-0.017	-0.088
Oct.	-0.465	-1.341	-0.341	-0.898	-0.678	-0.294	-1.192	-1.474
Nov.	0.210	-0.550	0.664	0.023	-0.781	-1.956	-0.596	-1.090
Dec.	-0.176	-1.857	-0.087	-0.425	-1.594	-3.287	-0.683	-0.952
MAE	.695	1.104	.692	.768	.956	1.351	.854	1.010

Table V

First Differences Regression Procedure
(billions of dollars)
Errors in Estimating M_2
Outside Sample Period²

Date	Composite				Nonborrowed			
	Total Reserves	Source Base	RPD	RPD less CDs	Nonborrowed Reserves	Nonborrowed Source Base	Nonborrowed RPD	Nonborrowed RPD less CDs
1974								
Jan.	-0.208	-1.320	0.271	-1.176	-1.105	-2.374	-0.506	-1.079
Feb.	1.310	0.701	1.448	0.980	0.172	-0.208	0.713	0.606
Mar.	1.421	-0.043	0.779	1.038	1.212	0.095	0.769	0.981
Apr.	0.210	-2.610	-0.383	0.651	2.320	-0.335	1.377	1.556
May	-4.833	-6.048	-4.320	-2.196	-1.369	-3.202	-1.420	-0.610
June	-1.181	-1.284	-0.233	2.448	2.906	1.661	2.865	4.053
July	-2.242	-1.732	-1.125	0.689	0.850	0.395	0.946	1.700
Aug.	-1.693	-1.778	-1.371	-0.071	-0.413	-0.771	-0.356	0.183
Sept.	-0.894	-1.779	-0.963	-0.898	-0.713	-1.676	-0.759	-0.563
Oct.	0.191	-2.209	0.084	-0.858	-1.546	-4.397	-1.426	-1.504
Nov.	1.166	-1.442	1.277	-0.423	-3.268	-5.142	-2.262	-2.636
Dec.	-1.359	-5.579	-1.142	-2.792	-5.961	-9.319	-4.517	-4.437
MAE	1.392	2.210	1.116	1.185	1.820	2.465	1.494	1.659

Table VI

Average Errors in Predicting Change in M_1 Using Nonborrowed Reserves
 Regression Equation: Outside Sample Period

1974	Single Month	2-month Average	3-month Average	4-month Average	5-month Average	6-month Average	7-month Average
January	-1.983						
February	-0.580	-1.282					
March	0.508	-0.036	-0.685				
April	0.988	0.748	0.305	-0.267			
May	-1.333	-0.172	0.054	-0.104	-0.480		
June	1.661	0.164	0.439	0.456	0.249	-0.123	
July	0.396	1.028	0.241	0.428	0.444	0.273	-0.049
August	-0.859	-0.232	0.399	-0.034	0.171	0.227	0.112
September	-0.102	-0.480	-0.188	0.274	-0.047	0.125	0.180
October	-0.678	-0.390	-0.546	-0.311	0.084	-0.152	0.010
November	-0.781	-0.730	0.520	-0.605	-0.405	-0.060	-0.242
December	-1.594	-1.188	-1.018	-0.789	-0.803	-0.603	-0.280

1974	8-month Average	9-month Average	10-month Average	11-month Average	12-month Average
August	-0.150				
September	0.085	-0.145			
October	0.073	0.000	-0.198		
November	-0.088	-0.022	-0.078	-0.251	
December	-0.411	-0.256	-0.179	-0.216	-0.363

BOARD OF GOVERNORS
OF THE
FEDERAL RESERVE SYSTEM

Office Correspondence

Date March 7, 1975

To Subcommittee on the Directive

Subject: Revisions in the empirical

From James L. Pierce

results for "Improvements in the

Directive Stage I"

It has recently developed that errors were made in the construction of the reserve series specially constructed for the purpose of the empirical research for the first stage report of the Subcommittee on the Directive. These errors do not bring into question the reserve series presented to the FOMC in the bluebook and other sources.

The errors in these special series have been corrected and the empirical work redone. The new results indicated that non-borrowed reserves is not as dominant as we previously thought.

In order to provide the necessary basis for reviewing the entire first stage report, all of the regressions were re-estimated using data supplied by the Banking Section or taken directly from published sources. The period of study was extended to cover all of 1974. First, it was necessary to determine whether or not the first difference regression

approach was superior to the naive multiplier or the moving average multiplier approaches using the most recent correct data. Re-estimation of the relationships between money, narrowly and broadly defined, and each of the alternative reserve measures used in the report indicated that the first difference approach is the superior method as before.

Second, using the new first difference regression approach results, it was necessary to see if there was a change in the rankings of reserve measures by the degree to which they "explained" money using the revised and corrected data.

The mean absolute errors in predicting changes in M1 are shown below for the results in the current Subcommittee report and the revised results. The complete revised results are included as Table 1.1 in the appendix.

Mean Absolute Errors in
Predicting Change in M1
(Last Year of the Sample Period-1973)

	Total Reserves	Source Base	RPD	RPD less CD	Nonborrowed Reserves	Nonborrowed Source Base	Nonborrowed RPD	Nonborrowed RPD less CD
Original	.912	.759	.927	.930	.793	.660	.811	.784
Revised	.892	.754	.895	.886	.789	.636	.781	.756

From these results, it is apparent that the original expectation that broader reserve measures would be more closely related to money than narrower measures is not confirmed in either set of results. Within the sample period, the lowest errors for 1973 were achieved using the nonborrowed source base and the source base. RPD and Total Reserves rank toward the bottom, with nonborrowed reserves ranking in the middle.

However, there were substantial changes in the rankings of the mean absolute errors associated with the alternative reserve measures outside the sample period. In the current report, the data outside the sample ended in August, 1974, while the entire year is included in the revised analysis. This information is shown below, and the complete results are included as Table 1.2 in the appendix.

Mean Absolute Errors in
Predicting Changes in M1
(Outside of the Sample Period)

	Total Reserves	Source Base	RPD	RPD less CDs	Nonborrowed Reserves	Nonborrowed Source Base	Nonborrowed RPD	Nonborrowed RPD less Cds
Original	.903	1.033	.937	.964	.827	.858	.864	.871
Revised	.695	1.104	.692	.768	.956	1.351	.854	1.010

In the original report the results outside the sample period favored the four nonborrowed measures. Nonborrowed reserves and the non-borrowed source base had the lowest errors. In the revised results, the broader measures dominate with the exception of the source base. RPD and total reserves have the lowest errors, and the two base measures rank at the bottom. Nonborrowed reserves, formerly with the smallest error, now ranks fifth. Furthermore, the difference between the smallest and the

largest error is more pronounced in the revised results.

While not quite as large, there were similar changes between the original and the revised results in terms of the accuracy of predicting M2. The mean absolute errors for the last year of the sample period (1973) are shown below and the complete results are in Table 2.1 in the appendix.

Mean Absolute Errors in
Predicting Changes in M2
(Last Year of the Sample Period-1973)

	Total Reserves	Source Base	RPD	RPD less CDs	Nonborrowed Reserves	Nonborrowed Source	Nonborrowed Base	Nonborrowed RPD	Nonborrowed RPD less CDs
Original	1.135	.928	1.226	1.225	.951	.600	1.016		1.100
Revised	1.109	.723	1.226	1.337	1.060	.523	1.052		1.210

A comparison of the results for predicting M2 within the sample period indicates that there were only minor changes in ranking of the various reserve measures between the original and revised estimates. In the original estimates, the two monetary base measures yielded the best prediction results. This pattern is sustained in the revised estimates, and the errors are reduced substantially. As in the original results, RPD measures ranked lowest.

The comparable figures for M2 prediction outside the sample period are shown below, and in complete form as Table 2.2 of the appendix. As in the case of M1, the revised results include all of 1974 while the original data were through August only.

Mean Absolute Errors in
Predicting Changes in M2
(Outside of the Sample Period)

	Total Reserves	Source Base	RPD	RPD less CDs	Nonborrowed Reserves	Nonborrowed Source Base	Nonborrowed RPD	Nonborrowed RPD less CDs
Original	1.796	1.495	2.001	1.485	1.326	1.078	1.277	1.319
Revised	1.392	2.210	1.116	1.185	1.820	2.465	1.494	1.659

Outside the sample period, the two base measures ranked lowest in the revised estimates, two of the RPD measures had the smallest errors, and the rank of total reserves changed from 7 to 3. The dispersion of the errors increased across the eight measures for the revised estimates and a longer period outside the sample. In the original estimates, the nonborrowed source base ranked first and RPD last. In the revised estimates this order is reversed.

Summary

For the prediction of M1, within the sample period, the nonborrowed source base had the lowest mean absolute error in the revised (and original) estimates. Outside the sample period, the revised estimates indicate that RPD (followed closely by total reserves) had the lowest errors.

For the prediction of M2, the revised estimates indicate that the nonborrowed source base had the lowest error within the sample period (as in the original results). But, in the period outside the sample, the lowest error was again achieved using RPD.

As in the original analysis, the first difference regression approach proved superior to either the naive multiplier or the moving average multiplier approach.

In the existing Subcommittee report, it is noted that the lowest errors in predicting M1 were achieved using nonborrowed reserves and the lowest errors for predicting M2 were achieved using the nonborrowed source base. The revised results indicate that the preferred variable for predicting M1 is RPD (or total reserves), and the preferred variable for predicting M2 is also RPD. In the existing report, the results indicated that the most easily controlled reserve measures were also the best predictors of M1 and M2. In the revised results, the more easily controlled reserve measures rank fairly low in predictability, and the reserve measures that are more difficult to control rank highest. The choice of the preferred reserve variable as an operating target thereby becomes more difficult.