The Federal Reserve's Impact On Several Reserve Aggregates

By Jack L. Rutner

A number of economists posit that "reserve aggregates,"' such as the monetary base, are crucial to the determination of the money supply.[2] A previous article in this Review, which examined the relationship between one reserve aggregate—the monetary bas—and two money supply measures, did indeed find that the base played an important role in the determination of the money supply.' Findings such as these have led some-economists to argue that the Federal Reserve can control the money supply by controlling reserve aggregates. These arguments typically assume that the Federal Reserve can easily control reserve aggregates, and, while they recognize that the Federal Reserve does not have direct control over reserve aggregates, they nonetheless assume that open market operations can be used to effectively control the behavior of these variables. Empirical verification of this assumption, however, has received only scant attention in the professional literature, although the technical or analytical relationship has received thorough treatment.'

This article examines the relationship between Federal Reserve open market operations and reserve aggregates such as the monetary base. The first section briefly treats the analytical relationships, while the next section contains the results of an empirical analysis of these relationships. The article concludes with a discussion of the study's implication for the Federal Reserve's ability to control reserve aggregates.

[1] The items which constitute the reserve aggregates are in the modem world liabilities of the central bank and/or the Treasury. Historically, gold and silver were used as reserves in addition to central bank and Treasurv liabilities.

[2] See, for instance, Fred J. Levin, "Examination of the Money Stock Control Approach of Burger, Kalish, and Babb," and Michael J. Hamburger, "Indications of Monetary Policy: The Arguments and the Evidence," both in *Monetary Aggregates and Monetary Policy* (Federal Reserve Bank of New York, 1974).

[3] Jack L. Rutner, "A Time Series Analysis of the Control of Money," Federal Reserve Bank of Kansas City *Monthly Review,* January 1975.

[4] The effect of open market operations on reserves was examined by John H. Wood, "A Model of Federal Reserve Behavior," *Staff Economic Studies,* No. 17, Board of Governors of the Federal Reserve System, mimeographed (no date); and by Vittorio Bonomo and Charles Schotta, "Federal Open Market Operations and Variations in the Reserve Base," *Journal of Finance,* Vol. 25, No. 3 (June 1970).

The omission of free reserves from the items examined in this article was based on free reserves having been extensively explored in the Wood and in the Bonomo and Schotta studies.

DETERMINANTS OF RESERVE AGGREGATES

The Monetary Base

The monetary base consists mainly of those liabilities of the Federal Reserve that are either a part of the nation's money supply or that may be used as bank reserves to support deposits that are a part of the money supply. Specifically, the base consists of two components: member bank deposits at the Federal Reserve and currency and coin— mainly Federal Reserve notes — held by commercial banks and the nonbank public.[5]

Many factors affect the monetary base, with an important one being the Federal Reserve's open market operations in U.S. Government securities. Suppose, for example, that the Federal Reserve buys some securities from bond dealers and pays for them with checks drawn on the Federal Reserve. Suppose further that the bond dealers deposit the checks in their bank accounts and the banks forward the checks to the Federal Reserve to be added to their reserve accounts.[6] The open market operation would then result in an increase in member bank reserves and therefore an increase in the monetary base. The example, however, ignores the impact of other factors which may also affect the base and either offset or augment the impact of open market operations. Movements in the base therefore may not necessarily correspond on a one-to-one basis with movements in open market operations.

Factors other than open market operations that affect the base may themselves be affected — perhaps indirectly — by open market operations, so that some of the impact of operations on the base may be automatically offset. An example of this type of factor is member bank borrowing from Federal Reserve Banks. The purchase of Government securities by the Federal Reserve and the corresponding rise in reserves may produce a decline in interest rates. The decline in interest rates and the increase in bank reserves may cause banks to reduce their borrowing from the Federal Reserve, which in turn would tend to reduce bank reserves and the monetary base. This reduction in the base, then, would offset some or all of the initial increase in the base produced by the open market operation.

Other factors, however, may interact coincidentally with open market operations: Thus, for example, an increase in Federal Reserve float due to inclement weather or other reasons may result in the increase in the base in the absence of open market operations. The Federal Reserve, however, may employ open market operations to offset the impact of other factors that are expected to affect bank reserves and the base. Suppose, for example, that the Federal Reserve wishes to maintain bank reserves at a constant level but anticipates that changes in float or in some other factor could potentially reduce reserves. The Federal Reserve, in this case, would purchase securities in order to offset the impact of the other factors, but the open market operations would not result in a rise in bank reserves or the base.

Factors that affect the monetary base other than open market operations may be conveniently grouped together and referred to as "other factors." Using this terminology, it may be said that changes in the base are determined by two variables--open market operations and other factors. The relationship between the monetary base, open market operations, and other factors may be further clarified by reference to the balance sheet of the Federal Reserve System (Table 1). This balance sheet shows that the base consists mainly of certain of the liabilities of the Federal Reserve

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[5] **The monetary base includes currency and coin issued by the U.S. Treasury, which is not a liability of the Federal Reserve.**

[6] **In actual practice, no checks would be written. Both the dealers' and the banks' accounts would be credited directly.**

Table 1
THE FEDERAL RESERVE BALANCE SHEET
(In billions of dollars)
August 11,1976

ASSETS		LIABILITIES	
U.S. Treasury securities	93.1	Liabilities included in	
All other assets:	20.5	monetary base:	104.6
Member bank borrowing	.6	Member bank deposits	24.7
Float	3.4	F.R. notes outstanding	79.9
Gold and SDR's	12.3		
Other assets	4.2	All other liabilities:	9.0
		U.S. Treasury deposits	4.7
		Other deposits	1.2
		Other liabilities	
		and capital	3.1
Total	113.6	Total	113.6

NOTE: In addition to the Federal Reserve liabilities included in the monetary, base, the base includes U.S. Treasury currency outstanding, that is, currency and coin issued by the U.S. Treasury. As of August 11, 1976, Treasury currency was $10.7 billion, so that the monetary base was $115.3 billion ($104.6 billion of Federal Reserve liabilities included in the base plus the $10.7 billion in Treasury currency). Note that the sum of the factors affecting the base add up to the base. Thus, the base equals U.S. Treasury securities held by the Federal Reserve, $93.1 billion, plus other factors affecting the base, $22.2 billion. The other factors are all other assets from the balance sheet, $20.5 billion, less all other liabilities, $9.0 billion, plus Treasury currency, $10.7 billion.

The specific components of other factors are: gold and SDR's plus member bank borrowings plus float plus other assets, including bank premises, plus U.S. Treasury currency outstanding less U.S. Treasury deposits less other deposits, including foreign deposits, less other liabilities and capital.

System, that is, deposits of member banks and Federal Reserve notes held by commercial banks and the nonbank public. Since the Federal Reserve's assets must equal its liabilities—the balance sheet must balance—a change in any of the Federal Reserve's asset items or in any of the liability items other than items included in the base could potentially result in a change in the base. Thus, these asset and liability items are the determinants of the base. Following the previous discussion, these factors may be placed into two groups. One group consists of changes in the Federal

Reserve's portfolio of U.S. Government securities — pen market operations—while the second group consists of the other factors referred to earlier. In summary, the following relationship may be stated . between the monetary base, open market operations, and other factors.'

[7] The actual definitions of the reserve aggregates and the Treasury portfolio employed here diier somewhat from the general description of the text. The Treasury portfolio as found in official publications is valued at par. (See the Federal Reserve Bank of New York's publication, *Glossary:*

Changes in the monetary base
   = open market operations
   + other factors affecting the base.

Other Reserve Aggregates

Reserve aggregates treated in this article, in addition 'to the monetary base, are the unborrowed monetary base, member bank reserves, and unborrowed member bank

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Weekly Federal Reserve Statements, New York (September **1972),** p. 8, item 7 and **7a•).** The desired variable, however, is the cash purchase (and sale) value of the portfolio because it reflects more accurately actual changes in reserves due to open market operations. The premiums and discounts are embedded in other assets and liabilities and capital accounts, which, according to the **terms** used here, are part of other factors. Allowing these premiums and discounts to remain in other factors could overstate the effect other factors have on the reserve aggregate. Unfortunately, these premiums and discounts are not readily available so an adjustment was made to approximate them by adding to the portfolio the items other assets less premises less foreign currency less other liabilities and capital plus capital and surplus less Franklin National borrowings (beginning in October 1974 when it was moved from borrowings to other assets — note that the other factors employed here include Franklin National borrowings). The reason the item "other capital accounts," the difference between capital and capital paid in plus surplus, was not used directly stems from its not being available on a weekly average basis. Capital paid plus surplus, however, even though also not available on a weekly average basis, changes only infrequently. Thus, subtracting these items from other liabilities and capital on a weekly average basis leaves other liabilities and other capital accounts approximately on a weekly average basis. The source for other assets and liabilities and capital was from *Federal Reserve Bulletins* from the table on Member Bank Reserves, while the remaining were from the table on Consolidated Statement of Condition of all Federal Reserve Banks.

Aside from these changes, the monetary base was changed in two ways. The first involved adding "other deposits" at the Federal Reserve to it because some of these deposits are held by nonmember banks and certainly must contribute to their reserves. Secondly, but for reasons not directly applicable to this paper, the monetary base (as well as member bank reserves) was adjusted for reserve requirement changes. To maintain comparability, the same adjustment was performed on the Treasury portfolio. Inasmuch as examination here is on a log linear basis, the effects of this adjustment on the relationships being examined should be small.

reserves. The unborrowed monetary base is the monetary base less member bank borrowings from the Federal Reserve. This aggregate was developed because some economists argue that changes in member bank borrowings prevent the Federal Reserve from controlling the total monetary base. Changes in borrowing, according to this argument, tend to **offset** the impact on the total base of open market operations. Since changes in borrowings do not affect the unborrowed base, it is argued that the Federal Reserve can control the unborrowed base better than the total base.

The relationship between the unborrowed monetary base, open market operations, and other factors is equivalent to that for the total monetary base, except that member bank borrowings are not included in the other factors that affect the unborrowed base.

Member bank reserves is an important reserve aggregate because reserves provide the support for deposits which are an important component of the nation's money supply. The relationship between member bank reserves, open market operations, and other factors is similar to that for the monetary base, except that other factors affecting member bank reserves include currency and coin held by nonmember banks and the nonbank public. Such currency and coin is included because changes in it affect member bank reserves but do not affect the monetary base. Unborrowed member bank reserves was developed as a reserve aggregate for the same reason that the unborrowed monetary base was developed. Member bank borrowings are not included in the other factors that affect unborrowed reserves, but, as is the case with the total member bank reserves, currency 'held by the public and by nonmember banks is included.

EMPIRICAL EXAMINATION

As discussed in the previous section, open **market** operations and "other factors" jointly determine the behavior of each reserve

aggregate. This section examines the relative importance of the two determinants by first estimating the correlation between each reserve aggregate and its determinants as well as the correlation between the determinants. Then, these correlations—which are examined for weekly, monthly, and quarterly observations for the period from **January** 1959 through December 1974--are used to draw conclusions about the extent to whidh open market operations or other **factors** determine reserve aggregates.[8]

Two types of correlations are examined—simple and partial. In both types, the correlation coefficient, which may vary in value from -1.0 to $+1.0$, measures the degree of association between two variables. A high positive value indicates that movements are highly and positively associated, while a high negative value means that movements are highly and negatively associated. Simple correlations show the degree of association

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[8] The intent of examining the three correlations associated with each reserve aggregate for time periods of differing durations is to attempt to infer which, if either, of the reserve aggregate's two components are determining it. Other factors on a weekly basis, for example, may be highly associated with reserve aggregates, but on a quarterly basis may not be related at all. This could suggest that over the longer run open market operations are offsetting the effect of other factors on reserves, although other evidence needs to be present for this interpretation to be valid.

The data employed for assessing the weekly interaction of each of the four reserve aggregates with their components are not seasonally adjusted figures beginning in the **first** week of January **1959** and ending in the last week of December 1974. The weekly data were then grouped into 208 4-week averages, **termed** monthly here, and 64 13-week or quarterly averages. This article's monthly figures differ from officially published figures because the official figures are actually for a period longer than 4 weeks. The quarterly figures differ as well because the official quarterly figures are averages of official monthly data. The choice of computing quarterly averages from the weekly figures rather than employing official figures was determined by the necessity of making certain adjustments to open market operations, which could more accurately be accomplished with the original weekly data. This adjustment was also the determining factor in employing 4-week averages. (For adjustments, see footnote 7.)

between any two variables without taking account of the possible association of either of the two variables with any other variables. Partial correlations, which are derived from regression analysis, show the degree of association of two variables after taking account of association with other variables. Two sets of partial correlations were derived. One set--called Type I—takes account of the impact of past movements in both the dependent and the independent variables in each regression. The other set—Type 11—takes account only of past movements in the dependent variable.'

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[9] The regressions are of the form:

$$Y = f \text{ (past Y, current X, past X, error term)} \quad \text{(Type I)}$$
$$Y = f \text{ (past Y, current X, error term)} \quad \text{(Type II)}$$

The dependent variable in one set of regressions was the change in the natural logarithm of the reserve aggregate, while the independent variable was either the change in the natural logarithm of open market operations or the change in the natural logarithm of other factors, as measured by the ratio of the reserve aggregate to open market operations. The choice of using the change in these logarithms rather than changes in levels was determined by the ability of logarithms to remove some heteroscedasticity of the regression residuals. A second set of regressions for the interaction between open market operations and other factors estimated the partial correlation between the two, first using one and then the other as dependent variables. The reason for reversing dependent and independent variables in the second set of regressions was a consequence of other inconclusive evidence concerning the direction of causality between these two variables. Estimating the partial correlations both ways, which as it turned out makes virtually no difference to the conclusions, does not presuppose any a *priori* assumptions about causality. The independent variables are not reversed when the reserve aggregate is the dependent variable because the reserve aggregate is the determined and not the determining factor.

The lags for the regressions were the following: 57 weekly, 13 monthly, and 5 quarterly.

The Box-Pierce Chi-square test on the residuals when lagged dependent variables are present was used. See G.E.P. Box and David A. Pierce, "Distribution of Residual Auto-correlation in Auto-regressive Integrated Moving Average Time Series Models," Journal of the American Statistical Association, Vol. 65, December 1970, p. 1509.

In all .but one of, the regressions, significant autocorrelation was present in the residuals. Thus, it was necessary to filter the original variables in the several regressions so as to make the residuals as nearly white noise as practicably possible. Two techniques were used in

The Monetary Base and Unborrowed Monetary Base

The correlation results summarized in Table 2 show that during the 1959-74 period the monetary base was more highly correlated with open market operations than with other factors, especially for monthly and quarterly movements. The simple correlation, for example, between the base and open market operations for weekly movements in the variables was **.51,** while the correlation between the base and other factors was only .25. The simple correlation between quarterly movements in the base and open market operations increased to .66, while the correlation between the base and other factors declined to **.11,** with the latter too small to be statistically significant. The two types of partial correlations derived from regression analysis have a pattern similar to the simple correlations.[10]

The correlation results also indicate that movements in open market operations and other factors were fairly highly and negatively correlated during the 1959-74 period, suggesting that simultaneous but opposite movements in the base's two determinants offset some of the potential impact of each determinant. The extent of these offsetting movements generally tended to increase as the length of the time period increased.

Several conclusions may be drawn from these correlation results. One is that open market operations during the 1959-74 period offset the impact of other factors on the monetary base, although by itself the high negative correlation between open market operations and other factors shows only that one offset the other.[11] It is the finding that the correlation between the base and open market operations increased while the correlation between the base and other factors declined as the length of the time period increased that suggests that it was open market operations which offset other factors, rather than the other way around.

A second conclusion suggested by the correlation results is that open market operations during the 1959-74 period were the dominant factor determining movements in the base and not merely offsetting movements in other factors. This conclusion is supported by the finding that the correlation between the base and open market operations was fairly high—considerably higher than that between the base and other factors—and that this correlation did not decline as the length of the time span increased. If open market operations had merely offset movements in other factors, either open market operations would have been highly and negatively correlated with other factors but not with the base, or the correlation

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determining the filter. One was from a regression of the residuals on themselves, while the second was to treat the residuals as moving averages and follow the technique described in T. W. Anderson, *The Statistical Analysis of Time Series* (New York: John Wiley and Sons, Inc., 1971), pp. 223-35.

[10] The partial correlations, however, differ from the simple correlation in that the partial correlations indicate that on a weekly basis open market operations and other factors, while still having a very high negative correlation, are about equally correlated with the base. This, suggests that, although both components of the base are offsetting one another, they both play about an equal role in weekly determination of the base, It also suggests that the simple correlations are affected by some third set of variables to which the base and open market operations are responding. When this response is held constant, especially in the Type I regression, open market operations are less highly associated with the base while other factors are more highly related.

[11] The finding that the association between the monetary base and its other factors is declining must mean that something is offsetting other factors so that they have no effect on the base. Since the base is composed of only two determinants and since its association with open market operations was not declining, indicating that these operations are not being offset, it must be open market operations which are offsetting other factors. The high negative correlation between open market operations and other factors which is either stable, as in the simple correlations, or increasingly negative, as in the partial correlations, indicates that other factors and open market operations are indeed offsetting one another rather than, say, other factors having self-canceling movements over time so that it has no effect on the base.

Table 2
CORRELATION OF OPEN MARKET OPERATIONS, RESERVE AGGREGATES, AND OTHER FACTORS

Correlation of	Simple Correlations			Partial Correlations*					
				Type I — Account Taken of Past Movements in Both Dependent and Independent Variables			Type II — Account Taken of Past Movements in Dependent Variable		
	Weekly	Monthly	Quarterly	Weekly	Monthly	Quarterly	Weekly	Monthly	Quarterly
Monetary Base									
Monetary base with:									
OMO†	.51	.62	.66	.40	.42	.49	.34	.40	.52
Other factors	.25	.19	.11§	.40	-.08§	-.04§	.23	.10	.15§
OMO with other factors‡	-.71	-.65	-.68						
A.				-.78	-.89	-.92	-.50	-.86	-.83
B.				-.78	-.90	-.90	-.73	-.88	-.94
Unborrowed Monetary Base									
Unborrowed base with:									
OMO	.33	.61	.67	.22	.46	.68	.17	.41	.59
Other factors	.46	.26	.11§	.58	.17	-.11§	.60	.23	-.06
OMO with other factors‡	-.68	-.61	-.67						
A.				-.66	-.84	-.90	-.57	-.79	-.81
B.				-.67	-.84	-.88	-.61	-.74	-.85
Member Bank Reserves									
Member bank reserves with:									
OMO	.38	.54	.47	.42	.50	.59	.29	.50	.36
Other factors	.74	.73	.49	.72	.49	.63	.72	.62	.68
OMO with other factors‡	-.34	-.18	-.54						
A.				-.32	-.57	-.53	-.25	-.53	-.50
B.				-.32	-.55	-.49	-.04	-.53	-.48
Unborrowed Member Bank Reserves									
Unborrowed reserves with:									
OMO	.13	.50	.40	.16	.48	.54	.12	.43	.44
Other factors	.89	.81	.67	.92	.78	.77	.92	.79	.77
OMO with other factors‡	-.34§	-.11§	-.42						
A.				-.24	-.28	-.37	-.20	-.18	-.29§
B.				-.24	-.28	-.33	-.20	-.13§	-.35

* See footnote 9 for discussion of regressions from which the partial correlations were derived. Also, see footnote 7 for description of data used in regressions.

† OMO refers to open-market operations.

‡ In the case of the partial correlations between open market operations and other factors, the value of the correlation coefficient was estimated in two ways. The first correlation given in the table, and denoted by A, was derived under the assumption that other factors determine open market operations. The second, denoted by B, assumes that open market operations determine other factors. As the table shows, the results were quite similar. See footnote 9 for a more complete discussion of this matter.

§ Indicates correlation is not significantly different than zero in a statistical sense (5 per cent level).

between open market operations and the base would have declined as the time span of the observations lengthened. It should be added that, since only a part of the movements in open market operations could directly affect movements in the base (because the rest of the movement in open market operations was offsetting the other factors), the base was not perfectly correlated with open market operations even for the longer time spans.

The correlation results for the unborrowed monetary base are generally similar to results for the total monetary base. The unborrowed base was more highly correlated with open market operations than with other factors that affect the unborrowed base. Also, the unborrowed base became more highly correlated with open market operations and less highly correlated with its other factors as the length of the time span increased. Another result was that open market operations and other factors affecting the unborrowed base were highly and negatively correlated.

The only important difference between the unborrowed base and the total base is that for the weekly time span the unborrowed base was more highly correlated with its other factors than with open market operations. This suggests that for weekly periods the impact of other factors was offset by open market operations to a greater extent for the total base than for the unborrowed base.

Member Bank Reserves and Unborrowed Reserves

The correlation results for member bank reserves and for unborrowed member bank reserves differ considerably from the results for the base and the unborrowed base. Both total and unborrowed member bank reserves were less highly correlated with open market operations than with other factors. This is true for the simple correlations as well as for both sets of partial correlations. Also, unlike the results for the base concepts, there was no

systematic tendency for member bank reserves to become more highly correlated with open market operations and less highly correlated with other factors as the length of the time span increased.[12] This was especially true for the partial correlation results. Thus, for example, the Type II partial correlation between member bank reserves and open market operations was higher for the monthly than for the quarterly time span (.50 compared to .36, see Table 2), while the correlation between reserves and other factors was lower for the monthly than for the quarterly time span (.68 compared to .62).

These correlation results for member bank reserves and unborrowed member bank reserves suggest that during the 1959-74 period factors other than open market operations were considerably more important in determining these aggregates than was the case for the monetary base and the unborrowed base. The results also suggest that open market operations did not tend to offset the impact of other factors on reserves and unborrowed reserves as much as was the case for the base and the unborrowed base.[13]

Summary of Empirical Examination

In summary, two broad conclusions may be drawn from the empirical examination. One is that open market operations during the 1959-74 period appear to have been considerably more important than other factors in determining the monetary base and the unborrowed base, but for member bank reserves and unborrowed reserves, the correlation results do not provide any evidence that open market operations were a more important determinant than other factors. It

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[12] The partial correlations also indicate that open market operations were more highly correlated with member bank reserves and unborrowed reserves than with the monetary base and the unborrowed base. It may be that, for the base concepts, a relatively large portion of the variation in open market operations offset variations in other factors, leaving a relatively small portion of the variation in open market operations to affect the base concepts.

appears that for the base concepts, open market operations offset much of the impact of other factors on these reserve aggregates as well as having had a direct impact on these aggregates.

A second conclusion is that, in general, open market operations were as important in determining the unborrowed base as in determining the total base, and the same conclusion holds when comparing the impact of open market operations on unborrowed and total member bank reserves. An exception is that, over weekly time spans, other factors appear to have been more important than open market operations in determining the unborrowed base than in determining the base.

IMPLICATIONS FOR CONTROLLING RESERVE AGGREGATES

The results of this analysis may be interpreted to suggest that the Federal Reserve can use open market operations to control the monetary-base and. the-unborrowed base. The evidence presented in this article does not indicate whether or not the Federal Reserve can control the two base concepts better than member bank reserves and unborrowed reserves. During the period studied—1959-74-- the Federal Reserve did not necessarily attempt to control reserve aggregates. Thus, even though the findings indicate that factors other than open market operations affected the reserve concepts more than the base concepts, it may, nevertheless, be true that the **Federal** Reserve could if it so desired offset the effect of these other factors with open market operations. Thus, while the article could be used to infer which reserve aggregates the Federal Reserve can control—and these appear to be the monetary base and, for monthly and quarterly time periods, the unborrowed base—no conclusion can be drawn as to which aggregates the Federal Reserve cannot control.[14]

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[13] One interesting question that emerges from this study concerns unborrowed reserves. This reserve aggregate is closest to one variable on w ch the Federal Reserve actually focuses, which is free reserves. **Unborrowed** reserves differ from free reserves by the item required reserves. Yet, unborrowed reserves is more highly associated with other factors than any other reserve aggregate irrespective of the time period, and similarly it has the lowest negative association existing between other factors and open market operations. These results would seem to contradict the **Wood** study and the Bonomo and Schotta study cited earlier because they suggest that the impact of the other factors on unborrowed reserves is offset. A possible explanation is that the manager in the period covered by the data has changed his modw *operandi* and so focuses on other targets which have the net effect of resulting in the other factors of the broader reserve aggregates being offset. Clearly, however, this conundrum needs further examination.

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[14] The criterion used here for controllability is the ability of the Federal Reserve to offset most or all of the impact of factors other than open market operations on reserve aggregates. Under certain circumstances, other measures of controllability may be important as, for example, the standard error of estimate from a linear regression with a reserve aggregate as a dependent variable and open market operations as an independent variable. Because the Federal **Reserve** uses open market operations as a control variable to both offset the effect of other factors and to affect reserves directly, the standard error criterion is not applicable, except possibly in a regression from a larger model which takes into account the offsetting effects of open market operations on other factors.