

Review

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In This Issue . . .

It has become almost commonplace to argue that M1 doesn't matter anymore. First, there is widespread belief that recent financial innovations, such as super-NOW and money market deposit accounts, will distort M1 growth for some time and reduce its usefulness for monetary policy. Second, the greater variability in money growth over the past several years has induced some analysts to conclude that M1 growth can't be controlled. The first two articles in the *Review* provide evidence that these two perceptions are unfounded. The third article investigates whether bank holding company performance studies, as currently conducted, provide any useful information for policy decisions affecting bank holding companies.

The first article in this *Review*, by John A. Tatom, examines the effects of newly authorized money market deposit accounts and super-NOW accounts on monetary aggregate measures and monetary policy. In "Money Market Deposit Accounts, Super-NOWs and Monetary Policy," Tatom describes the conventional view that these new accounts have distorted M1 and its interpretation while leaving M2 and its policy usefulness virtually unaffected.

Disputing this conventional view, Tatom argues that the new accounts are not unprecedented. He points out that money market deposit accounts are comparable to money market mutual funds, and super-NOW accounts are similar to other checkable deposits. After investigating the impact of these past innovations, Tatom concludes that shifts to the new accounts are not likely to affect either the controllability of M1 or its relationship to measures of economic performance.

In contrast, while M2 is unaffected by shifts to super-NOWs, it is pushed up by shifts to money market deposit accounts, thus altering the relationship of M2 to such measures of economic activity as GNP. Thus, the usefulness of M1 for the conduct of monetary policy is unaffected by the new accounts. On the other hand, M2's usefulness has been reduced.

In the second article, "The Wayward Money Supply," R. W. Hafer and Scott E. Hein investigate the Federal Reserve's ability to control closely the stock of money. The authors examine this issue by simulating money growth for 1982 using two alternative control procedures. The first procedure, advocated by some analysts who are concerned by the growing number of financial innovations, is to provide a constant rate of adjusted monetary base growth each month. Under this procedure, money growth and base growth should be quite close if the money multiplier follows a steady pattern. During 1982, however, the multiplier fluctuated significantly. Thus, Hafer and Hein conclude, the adoption of a constant-base-growth strategy would not have materially reduced the variability of money growth in 1982.

The second procedure is to use forecasts of the money multiplier to determine the appropriate amount of monthly base growth over the year. Two forecasting procedures were investigated, one based on the "naive" guess that next month's multiplier is equal to the current month's, and another based on a more sophisti-

In This Issue . . .

cated statistical approach that models the time series of the multiplier. Using either method, the resulting money growth simulated for 1982 was much closer to the hypothetical policy target than that achieved by using the constant-base-growth strategy. Moreover, quarterly deviations of money growth were reduced substantially. Thus, a “post-mortem of 1982 money growth indicates that much of the volatility in money growth last year was attributable to money multiplier fluctuations, not erratic monetary base growth. Consequently, monetary policy aimed at smoothing the growth of M1 must anticipate and react to multiplier movements.”

In the third article in the *Review*, “Bank Holding Company Performance Studies and the Public Interest,” Donald M. Brown investigates whether performance studies actually are capable of identifying performance differences among banks and, hence, whether they are relevant to policy decisions about bank holding company acquisitions.

The Board of Governors of the Federal Reserve System must make difficult normative judgments about the desirability of bank holding company acquisitions. Several of the prospective benefits that the Board has associated with such acquisitions can be measured by bank financial ratios.

Brown reviews the results of previous studies that have investigated the effects of holding company ownership on these financial ratios and finds that there are significant weaknesses in their empirical results. Furthermore, the bank financial ratios used to measure performance are subject to serious distortions. Brown summarizes the methodological problems, most of which have been discussed previously in the literature, then explains how deposit interest rate ceilings and the nature of the banking firm and bank holding company organizations cause distortions in the financial ratios. He concludes that performance studies are not reliable guides to public policy toward bank holding company acquisitions.

Money Market Deposit Accounts, Super-NOWs and Monetary Policy

JOHN A. TATOM

NEW federal legislation allows depository institutions to offer money market deposit accounts (MMDAs) free of interest rate restrictions. The Garn-St. Germain Depository Institutions Act of 1982 instructs the Depository Institutions Deregulation Committee (DIDC) to authorize the new account not later than 60 days after its enactment (October 15, 1982), and requires that the account be "directly equivalent to and competitive with money market mutual funds." In addition, it specifies that the account have no minimum maturity and that it allow up to three preauthorized or automatic transfers and three transfers to third parties (checks) per month.¹

In addition to authorizing this account beginning December 14, 1982, the DIDC issued regulations allowing a super-NOW account to be offered after January 4, 1983; this account allows unlimited checking, or third-party transfers, yet offers an unrestricted interest rate. Both super-NOW and money market deposit accounts require initial and minimum average balances of at least \$2,500. The primary difference between them is that super-NOWs allow unlimited checking and are counted as transaction accounts for reserve requirement purposes, while money market deposit accounts have limited checking privileges and are not classified as transaction accounts.

As with prior innovations such as the development of the money market mutual fund (MMMF), the savings deposit with automatic transfer services (ATS), and the negotiable order of withdrawal account (NOW), the new deposits raise important questions about their effects on monetary aggregate measures. Serious concern has been expressed about the continued reliabil-

ity of monetary aggregates as economic indicators and their usefulness for monetary policy.² Some analysts have concluded that M1 will be subject to large and unpredictable changes that will adversely affect its relationships with spending and inflation, while M2 will remain unaffected. As a result, it has been suggested that the Federal Reserve should focus more attention on M2 in the conduct of monetary policy.³

The analysis presented here indicates that these concerns are exaggerated. New money market deposit accounts will distort M2, not M1. Super-NOW accounts are not likely to affect either aggregate. Since M1 and its interpretation are unlikely to be affected by shifts to money market deposit accounts or super-NOW accounts, it should remain as useful for the conduct of monetary policy as it has been in the past.

THE NEW ACCOUNTS AND THE MONETARY AGGREGATES

Table 1 presents the definitions of M1 and M2 and their components as of November 1982, the month

²An excellent review of the concerns raised by innovations is that by John M. Berry, "The Fed's Policy Levers Are Becoming Weaker," *Washington Post*, December 12, 1982. He indicates that some policymakers believe that recent and prospective innovations have rendered M1 "virtually meaningless in the short run," and that M2 is a more useful target, at least temporarily. See also Edward P. Foldssey, "New Bank Accounts May Force Fed to End Experiment in Monetarism," *Wall Street Journal*, December 28, 1982.

³A shift of emphasis in monetary policy that began in October 1982 was motivated by the same type of argument. Then it was anticipated that the redemptions of All-Savers Certificates, especially in October and November, would distort M1 but not M2. Interestingly, a year earlier, the concern with inflows to new All-Savers was that they would lead to a surge in M2. See Daniel L. Thornton, "The FOMC in 1981: Monetary Control in a Changing Financial Environment," this *Review* (April 1982), p. 20. The argument that M1 growth was distorted upward at the end of 1982 due to All-Savers redemptions is not examined below, since the pace of M1 growth in the last three months of 1982 was no larger than occurred from July to October 1982.

¹See U. S. Congress, *Garn-St. Germain Depository Institutions Act of 1982*, 97th Congress, 2d Session, September 8, 1982. In the implementation of the bill, the DIDC interpreted the latter to allow up to six transfers per month, including up to three checks per month.

Table 1
The Components of M1 and M2 as of November 1982
(billions of dollars)

M1		M2	
Currency	\$131.6	M1	\$ 474.6
Travelers checks	4.5	Overnight RPs ¹	41.3
Demand deposits	238.0	Overnight Eurodollars ²	6.6
Other checkable deposits ³	100.5	Money market mutual funds ⁴	185.8
		Savings deposits ⁵	362.2
		Small time deposits	922.4
	\$474.6		\$1,986.1

¹Repurchase agreements at all depository institutions, not seasonally adjusted.

²Such deposits at Caribbean branches of U.S. financial institutions, not seasonally adjusted.

³Includes super-NOW balances (as well as ATS savings, NOW and credit union share draft balances).

⁴Excludes money market mutual funds held by institutions. Only general purpose and broker dealer balances are included, not seasonally adjusted.

⁵Includes money market deposit account balances.

before the introduction of MMDAs.⁴ MMDA balances, which are not transaction balances, are included in M2, while super-NOW balances are included in M1, since they offer unlimited third-party transfers, just as do demand deposits, ATS balances, NOW deposits and credit union share draft accounts.

The "Source of Shifts" Approach and The Impact of The New Accounts

A popular means of assessing the effects of these new accounts on the monetary aggregates can be called the "source of shifts" analysis. In this approach, one looks at the items in table 1 and determines the source of the funds that are shifted into each of the new accounts. Of course, it is possible that funds added to one of the new accounts might have come from financial assets not listed in table 1 and this possibility is discussed later. To clarify the use of this particular approach, however, it is convenient to assume that funds shifted into the new accounts come solely from other accounts shown

in table 1. The net effect for each aggregate can be found by adding the balances in the new account and changes in the balances of the sources of the funds.

The new money market deposit account is included in M2. Consequently, shifts of funds from any other component in table 1 to money market deposit accounts will leave M2 unchanged; of course, shifts from M1 deposits to MMDAs will reduce M1. Thus, if total spending or GNP remains unchanged, shifts to money market deposit accounts from other components of M2 will not affect the velocity of M2 (the ratio of GNP to M2), but the velocity of M1 (the ratio of GNP to M1) will rise if the shifts to MMDAs are associated with a decline in M1.

In the case of super-NOW accounts, shifts of funds among M1 deposit components will leave both M1 and M2 totals unaffected. If funds included in M2 but not in M1 are shifted to super-NOW accounts, M1 will rise while M2 again is unaffected.

The conclusion of this approach is that M2 will be unaffected by the new accounts, but that M1 could fall or rise. As a result, M1 could be distorted and its movements rendered meaningless during the period of major shifts to these new accounts. This approach indicates that it will have limited use as an indicator of economic activity or a target for monetary policy. On the other hand, since M2 is unaffected, it is argued that its usefulness for policy is unchanged.

⁴On February 14, 1983, the Board of Governors of the Federal Reserve System announced revisions in the monetary aggregates. These revisions included two definitional changes for M2. First, tax-exempt money market mutual funds which previously had been excluded from the aggregates were included on the same basis as taxable MMMFs. Second, all IRA/Keough balances at depository institutions and MMMFs were removed from M2. The data used in this study do not incorporate these revisions, but the empirical results should not be affected by them.

Monetary Asset Portfolios and the Impact of the New Accounts

A broader approach is to examine the effects of these new accounts on desired holdings of stocks of monetary assets. In this approach, the actual purchases or sales of financial (or real) assets provide little information about the demand for or supply of M1. For example, when individuals add to their non-transaction balances (i.e., increase their savings), they generally do so initially by reducing their transaction balances; that is, they use currency or checkable deposits. In the "source of shifts" approach, this *initial* action would be interpreted as a reduction in the demand for transaction balances relative to other financial assets and, therefore, a reduction in M1, with no change in either M2 or economic activity.

In a more general analysis, this conclusion is not necessarily valid. Since countless individual transactions tend to be offset daily by other transactions by the same or other individuals, the vast majority of these transactions have little effect on financial markets or the nation's economic performance. Only if individuals change the share of their assets held as transaction balances (money) vis a vis savings, or their average money balances relative to income or spending, would there be a meaningful change in economic behavior. In the examination of the new accounts below, considerations from this broader "portfolio approach" generally reverse the "source of shifts" conclusions; the portfolio approach suggests that the new accounts will distort M2 while leaving M1 virtually unaffected.

PROJECTED IMPACT OF MONEY MARKET DEPOSIT ACCOUNTS

The money market deposit account was introduced to allow financial institutions to compete directly for deposits with money market mutual funds. The transaction services available with such accounts are limited, and are generally less than those currently available with money market mutual funds.

In addition to the sources listed in table 1, households and businesses could switch funds to MMDAs from other asset holdings, including such financial assets as U.S. savings bonds, Treasury bills or other securities. If this were to occur, M2 would rise.⁵ Such

⁵The same argument can be carried a step further but is not central to the discussion here. The monetary aggregate M3 includes, in addition to M2, large time deposits, term repurchase agreements and institutional money market mutual fund balances. Shifts from

reallocations in asset holdings are likely only if MMDAs offer a new asset-holding opportunity. Prior to MMDAs, however, asset holders could have held MMMF balances. MMDAs changed the financial environment by allowing a federally-insured, MMMF-like instrument to be held more conveniently at a local depository institution. If the additional convenience and/or insurance are important, M2 will be increased by shifts to MMDAs, while M1 will be unaffected.

The only type of shift to MMDAs that could impinge directly on M1 is a shift of deposits from M1. Such a shift is unlikely, however. MMDA balances do not provide the transaction services offered by M1 components and do not change the opportunities available before MMDAs, other than the insurance and convenience noted above.⁶ Asset holders could have chosen to hold less M1 and more MMMF balances had their higher yields been attractive compared with the lower yield and transaction services of the M1 components. The decision to hold M1 versus MMMF-type balances should be little affected by the availability of money market deposit accounts; their yield and convenience do not appear to offer a substantial improvement over previously available opportunities.

Indirect Effects Produced by Differential Reserve Requirements

One also must consider whether the shifts of funds to the new money market deposit accounts indirectly affect the monetary aggregates. Different monetary assets have different reserve requirements. Financial innovations that lead to shifts of funds into a new asset could affect the demand for reserves and, given a fixed supply of reserves, indirectly affect the monetary aggregates. Such indirect effects have an important influence on the monetary aggregates because they

the latter assets would raise directly M2 but leave M3 unaffected. Shifts from the broad spectrum of financial assets beyond M3, of course, would raise M2 and M3 directly.

⁶Some analysts may be concerned that MMDA accounts will attract some transaction balances that will continue to be used as transaction balances because of the limited transaction features of these accounts and their unlimited access in person, by messenger or by automatic teller machine. This concern appears to be unfounded; nearly the same opportunity exists but was not used with MMMFs. The same concern arose for MMMFs, which generally allow unlimited third party transactions, but often subject to a minimum size. Surveys of check usage of MMMF balances show that a relatively insignificant share of these balances are held in accounts with a turnover rate (ratio of the value of all debits, including checks, to average account balance) as high as that for NOW accounts. The latter, in turn, is less than for demand deposits. The turnover rate on all money market mutual fund shares is lower than for passbook savings deposits at all financial institutions.

influence whether the new accounts affect the various money multipliers.⁷

Personal money market deposit accounts are not subject to reserve requirements. Only nonpersonal money market deposit accounts are subject to reserve requirements, and these requirements are the same as those on nonpersonal time and savings balances. The deposit components of M1, the nonpersonal time and savings components of M2, and the personal time and savings components of M2 at member banks of the Federal Reserve System are subject to reserve requirements. To the extent that funds move from such balances to MMDA balances, required reserves are reduced. Given an unchanged stock of reserves, depository institutions would tend to develop excess reserves. To avoid the unnecessary non-interest-bearing reserves, banks can purchase assets, including new loans.

Although the effect on the demand for reserves would be largest for shifts to MMDAs from M1 deposit components, such shifts are unlikely to occur. Even if they should occur, the reduction in M1 would tend to be offset exactly by the indirect increase in M1 arising from the reserve demand effect. The net result is that M1 would be unaffected and M2 would be raised — just as if the shifts had come from financial assets not in M2. If MMDA funds should come from time and savings deposits, the indirect effects would serve to increase both M1 and M2.⁸

⁷See, for example, the discussion in John A. Tatom and Richard Lang, "Automatic Transfers and The Money Supply Process," this *Review* (February 1979), pp. 2–10; and John A. Tatom, "Recent Financial Innovations: Have They Distorted the Meaning of M1?" this *Review* (April 1982), pp. 23–35.

⁸In terms of a framework of the money supply process that uses this Bank's adjusted monetary base, M1 usually is affected by MMDA shifts only if there is a change in the adjusted monetary base. In the absence of such a base change, M2 would rise but M1 would be unaffected by the shift to MMDA balances. The primary exception is in the case of a change in the public's desired holdings of time and savings deposits at member banks relative to total checkable deposits. The multiplier is not very sensitive to such changes, however, and shifts of such funds to MMMF balances since 1978 have had no appreciable effects on the M1 multiplier over the past five years. The correlation between monthly changes in the ratio of time and savings deposits at member banks to the total checkable deposit component of M1 and changes in money market mutual fund balances (general purpose and broker dealer) is 0.003 for the period January 1978 to November 1982. The correlation coefficient using quarterly data is 0.19. These coefficients indicate that shifts to MMMFs have not affected the M1 multiplier through such a channel in any systematic way. Had such growth in MMMFs been registered in member bank time and savings deposits, however, the multiplier would have been lower and the adjusted monetary base correspondingly higher. This will be the case with MMDAs; shifts to MMDAs will have offsetting effects, raising the base and lowering the multiplier during the transition.

If, as expected, money market deposit balances come from MMMF balances or other non-reservable components of M2, neither M1 nor M2 will be affected. Finally, if money market deposit accounts arise from portfolio shifts from non-reservable assets not in M2, M2 will increase, while M1 will be unaffected.

Initial Impact of MMDAs

Money market deposit accounts have shown tremendous growth, due in part to the relatively high initial interest rates that depository institutions have offered on them. In the first four weeks, deposits in these accounts grew to \$160 billion, over 75 percent of the total assets of money market mutual funds. The latter lost about \$25 billion in share balances from December 8, 1982, to January 12, 1983. At commercial banks, savings deposits fell by \$11.7 billion over the same period.

A large part of the increase in MMDAs apparently came from shifts of funds from time deposits. At commercial banks, small and large time deposits fell by \$50.6 billion from early December to early January. Despite the massive flows of deposits to MMDAs, M1 was little changed. For the four weeks ending January 12, M1 averaged \$479.5 billion, compared with \$477.6 billion over the prior four weeks.⁹ Weekly information for such a short period is severely limited and cannot be regarded as more than suggestive evidence for the effects of MMDAs on the money supply process and on the interpretation of monetary aggregate movements, however.

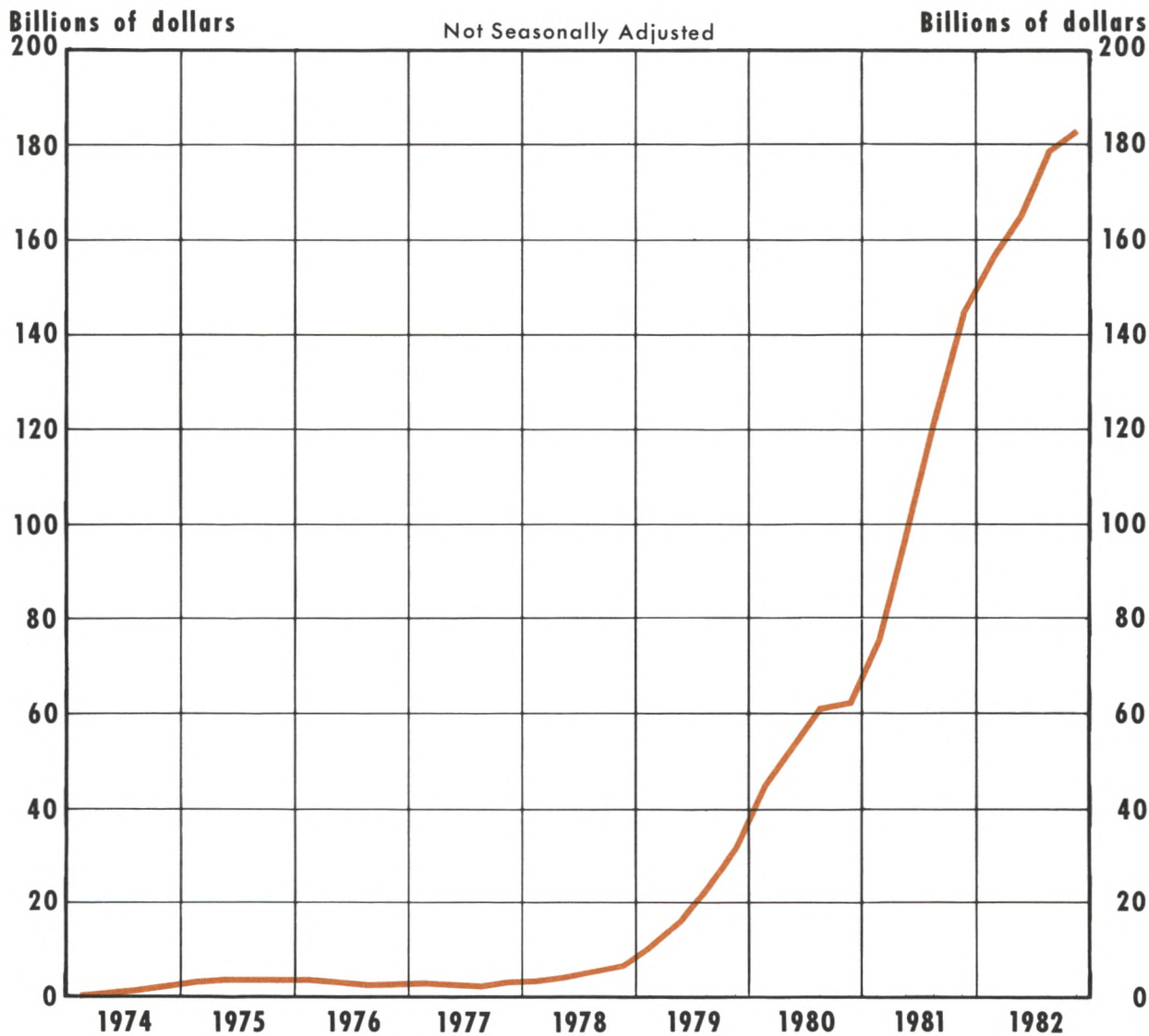
EVIDENCE FROM THE PAST: THE IMPACT OF MONEY MARKET MUTUAL FUNDS ON THE MONETARY AGGREGATES

To assess the various consequences of MMDA shifts, the effects of the advent of money market mutual funds can be examined. Chart 1 shows money market mutual fund balances (general purpose and broker dealer) since the first quarter of 1974. These balances remained relatively small until 1978.

⁹Since the latter period includes the first week in which super-NOWs began, the absence of an apparent M1 effect might be interpreted as a consequence of offsetting effects of MMDAs and super-NOWs on M1. However, when averages for the three weeks up to and following the week ending December 15, 1982 are used, M1 is virtually unchanged, while MMDAs expanded by \$119.8 billion.

Chart 1

Money Market Mutual Fund Balances (General Purpose and Broker Dealer)



MMMFM Effects on the Growth of the Monetary Aggregates

Since 1978, when MMMF balances began to expand sharply, monthly changes in money market mutual fund balances have been unrelated to monthly changes in M1 (using not seasonally adjusted data for both series); the correlation coefficient between these changes from January 1978 to November 1982 is 0.03,

which indicates no relationship whatsoever between them. Similarly, monthly changes in MMMF balances are unrelated to monthly changes in currency, demand deposits or other checkable deposits.¹⁰ The history of

¹⁰The same statistically insignificant relationships are obtained when quarterly changes from the first quarter of 1978 to the third quarter of 1982 are examined. For example, the correlation coefficient between quarterly changes in MMMFs and in M1 is -0.09.

MMMF growth from 1978 to the present indicates that M1 growth is unlikely to be affected by the growth of MMDA-type assets.

On the other hand, monthly changes in MMMF balances are correlated positively with monthly changes in M2; the correlation coefficient is 0.27, which indicates a statistically significant positive relationship at a 95 percent confidence level.¹¹ If all MMMF growth were at the expense of other components of M2, this correlation would be zero. Thus, the pattern of MMMF growth indicates that the M2 measure is increased significantly by the growth of MMDA-type assets.

MMMF Effects on the Component Mix of the Monetary Aggregates

If MMDA-type balances are an attractive alternative to holding deposit components of M1, then the mix of M1 components should be related to the growth of MMMFs. This could happen if people held relatively large idle checkable deposit balances that they wish to switch to meet the high minimum balances required by money market mutual funds and to obtain their relatively higher yields. Because money market deposit accounts have a higher minimum balance (\$2,500) than most money market mutual funds, such an effect could be important for MMDAs.

A measure of the desired mix of M1 components is the currency ratio, the holdings of currency relative to total checkable deposits. If the introduction of MMDAs causes a shift from checkable deposits, whether "idle" or not, it should show up in a higher currency ratio. In fact, the correlation coefficient between monthly changes in the currency ratio and monthly changes in MMMFs is negative, -0.21 , but *not* statistically significant at a 95 percent confidence level. For quarterly changes from the first quarter of 1978 to the third quarter of 1982, the coefficient is -0.03 , again negative but insignificant. Thus, the currency ratio has not been positively affected by the growth of money market mutual fund balances, confirming the previous conclusion that M1 has not been affected by growth in MMDA-type assets.

Chart 2 provides a partial indication of the likely sources of growth in the new money market deposit accounts. This chart looks at the nontransaction com-

ponents of M2, measured relative to the transaction balance measure of money, M1. The ratio of the non-M1 components of M2 to M1 is shown from I/1959 to III/1982, as well as the ratio computed without MMMF balances in the numerator. The broad non-transaction components measure generally rises over the whole period. After 1978, however, the instruments that exclude MMMFs decline sharply from their prior trend. This indicates that the total of non-transaction accounts in M2 has exhibited a faster trend growth than M1, while the growth in MMMF balances has taken place, in part, at the expense of the other previously existing non-transaction components of M2.¹²

MMMF Effects on Measures of Velocity

Whether MMDAs affect the meaning of the monetary aggregate measures is indicated by changes in these aggregates relative to total spending or GNP. An analysis of how the velocity of M1 (M2), the ratio of GNP to M1 (M2), has been affected by the growth of MMMF balances provides useful information regarding this question.

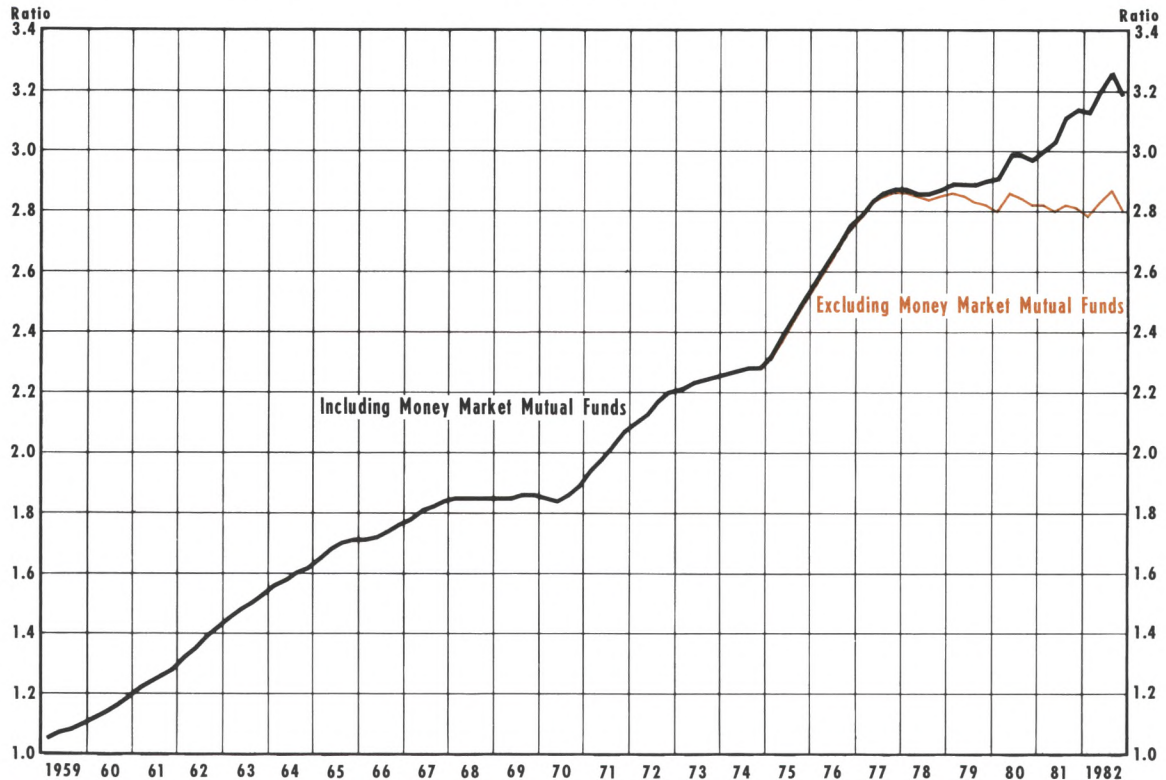
The correlation coefficient between quarterly changes in M1 velocity and quarterly changes in MMMF balances from the first quarter of 1978 to the third quarter of 1982, -0.15 , shows no statistically significant relationship between M1 velocity and MMMF balances. For the same period, the correlation coefficient for changes in M2 velocity is -0.46 , which indicates a statistically significant *negative* relationship between MMMF balances and M2 velocity.¹³ Since 1977, the velocity of M2 generally has been pushed down, or its growth rate reduced, by the surge in MMMFs. Thus, contrary to the "source of shifts" view, MMDA-type assets have distorted the relationship be-

¹²The correlation between monthly changes in MMMF balances and the other non-M1 components of M2 from January 1978 to November 1982 is -0.48 , using not seasonally adjusted data. This negative correlation is statistically significant at the 95 percent level. For quarterly data from I/1978 to III/1982, the same significant negative relationship is observed; the correlation coefficient is -0.57 .

¹³M2 velocity rose sharply from 1977 to 1980, and in late 1980 and early 1981, despite the rise in MMMFs. The unusually strong growth probably is associated with the sharp rise in interest rates during these periods. The velocity of M2 is strongly and positively correlated with interest rates. The correlation coefficient for changes in M2 velocity and quarterly changes in the 3-month Treasury bill rate is 0.35 from II/1959 to III/1982, while that for M1 velocity is 0.13. The former is statistically significant at a 95 percent confidence level, while the latter is not. A recent sharp decline in M2 velocity in 1982, in part, reflects the decline in interest rates.

¹¹For quarterly data from I/1978 to III/1982, this correlation is 0.43, which is only significant at a 93 percent confidence level. For seasonally adjusted M2 data, however, the coefficient is 0.478, statistically significant at a 95 percent confidence level.

Chart 2
Non-Transactions Components of M2 Relative to M1



tween M2 and spending, but not between M1 and spending.

Summary of Likely MMDA Effects

The simple correlation evidence from the explosion of money market mutual fund balances over the past five years does not support the hypothesis that M1 will be reduced because of shifts from M1 components to the new MMDA accounts. The evidence associated with the rapid growth of MMMF balances in the past five years indicates that the M1 measure will likely be unaffected by MMDA shifts, while M2 will rise. In addition, the evidence indicates that growth in MMDA-type balances, like MMMF balances, will reduce the velocity of M2, but is not likely to affect M1 velocity.

THE PROJECTED IMPACT OF SUPER-NOWS

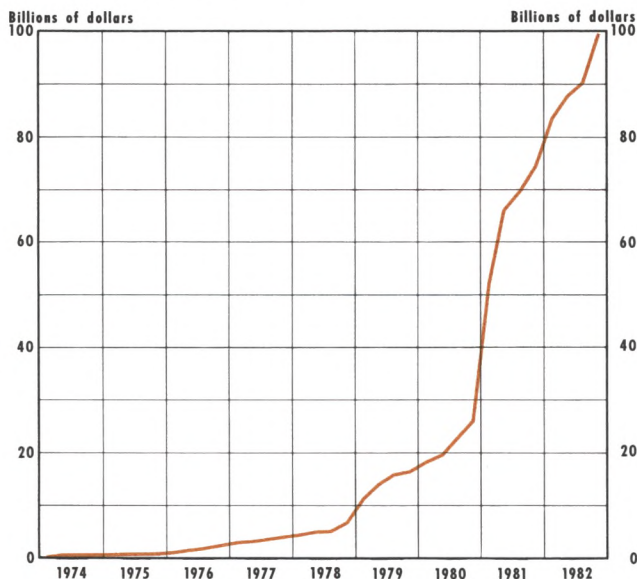
The introduction of super-NOW accounts similarly is not without precedent. Super-NOWs are higher-

yielding NOW accounts, subject to the same reserve requirements, but with a substantial initial and minimum average balance of \$2,500 and, in many cases, substantial fees.

NOW accounts, which were permitted nationwide beginning in January 1981, were included in other checkable deposits. Previously, other checkable deposits were principally ATS balances nationwide and NOW account balances in New England, New York and New Jersey. Chart 3 shows the pattern of growth of other checkable deposits from I/1974 to the present; they did not grow substantially until ATS accounts were permitted in IV/1978. In December 1980, 9.1 percent of total checkable deposits were held in other checkable deposits (i.e., checkable deposits other than demand deposits). During the first year of nationwide NOW accounts (through December 1981), other checkable deposits surged to 24.6 percent of total checkable deposits. By November 1982, other checkable deposits had risen further, to 29.7 percent of total checkable deposits.

The surge in NOW accounts was limited by restrictions prohibiting businesses from holding such

Chart 3
Other Checkable Deposits



accounts and by the lack of incentives for many depositors. Under existing regulations, the first restriction applies to super-NOW accounts, although the DIDC has asked for public comment on allowing businesses to hold the new super-NOW account. The second restriction, limited incentives, will be even more important with the super-NOW account than the NOW, because of the relatively high minimum balance requirement.

An individual considering holding a super-NOW account must weigh the higher yield on existing average balances currently held in a NOW account against the interest penalty borne on funds that would have to be shifted from higher yielding assets to meet the increased minimum balance requirements. Because super-NOW accounts, unlike MMDA or MMMF accounts, are subject to reserve requirements of about 12 percent, the interest rate paid on super-NOW accounts is likely to be lower than that on MMMFs or MMDAs by about 12 percent of current MMMF rates. In November 1982, this difference was about 1 percentage point; for a range of MMMF rates of 6 percent to 16 percent, this differential or penalty would vary from 72 to 192 basis points. These are clearly significant spreads for otherwise similar assets. Thus, only individuals already holding relatively large checkable deposits, for example, those holding more than \$2,500 on average, are likely to have an incentive to switch to a super-NOW account.

The primary concern over super-NOWs is not related to shifts from existing NOW accounts, however. Instead, as was the case when nationwide NOW accounts were introduced, the concern is that non-transaction balances will shift into the new accounts, distorting the M1 measure. By some estimates, only about 70 to 75 percent of new other checkable deposits in 1981 came from other transaction balances. Consequently, it was thought that as much as 25 to 30 percent of other checkable deposits represented a distortion of the aggregates, especially overstating the growth of the "true" transaction balance component of M1.

The problem with such estimates, as explained earlier, is that the *source* of the initial funds for a new account may be irrelevant. Previous studies of the effect of NOWs on the money supply process and on the relationship of M1 to economic performance have shown that shifts to NOW accounts did not distort measured M1, nor damage its usefulness as an indicator for total spending, inflation or monetary policy developments.¹⁴ There is no reason to believe that super-NOW accounts will have different effects from those previously observed with NOW accounts.

Additional Evidence on the Effects of NOW Accounts

Some additional evidence bearing on the likely impact of super-NOWs can be obtained by looking at the correlation between quarterly changes in other checkable deposits since the introduction of ATS accounts (IV/1978) and certain factors that influence the link between monetary policy actions and M1. The factors examined should be affected if desired portfolio holdings are altered by shifts to other checkable deposits such as super-NOWs.

One such factor is the currency ratio. The currency ratio should decline if the demand for total checkable deposits were increased relative to that for currency to meet minimum balance requirements or because the return on other checkable deposits had increased. The correlation coefficient for changes in other checkable deposits and changes in the currency ratio from IV/1978 to III/1982 is -0.27 using seasonally adjusted data, and 0.15 using not seasonally adjusted data;

¹⁴See Tatom, "Recent Financial Innovations: Have They Distorted the Meaning of M1?"; Scott E. Hein, "Short-Run Money Growth Volatility: Evidence of Misbehaving Money Demand?" this *Review* (June/July 1982), pp. 27-36; and Jerry Jordan, "Financial Innovation and Monetary Policy," in Federal Reserve Bank of St. Louis, *Financial Innovations: Their Impact on Monetary Policy and Financial Markets*, Proceedings of a Conference held at St. Louis, Missouri, October 1 and 2, 1982 (forthcoming).

neither is statistically significant. Correlation coefficients for quarterly changes in other checkable deposits and quarterly changes in the ratios of commercial bank (and all depository institutions) small (and total) time and savings deposits to total checkable deposits also fail to show any statistically significant negative relationships that might be expected due to shifts of nontransaction balances to measured transaction balances.¹⁵

Finally, if the growth of other checkable deposits represented such non-transaction balances, the velocity of M1 would be *negatively* and significantly correlated with the growth of other checkable deposits. The correlation coefficient for quarterly changes in M1 velocity and quarterly changes in other checkable deposits over this period is positive, 0.16, but statistically insignificant.¹⁶

IMPLICATIONS FOR MONETARY POLICY

The choice between monetary aggregate targets is influenced by both the controllability of the aggregate and the stability of its relationship to measures of economic performance, especially total spending or GNP. Typically, on both criteria, M1 is superior to other aggregates in statistical examinations of the historical record.¹⁷

Despite this evidence, there is widespread concern that recent financial innovations have affected the meaning or controllability of M1 and that, during periods of such "turbulence," M2 is a better policy target than M1.¹⁸ What is sometimes missed in discus-

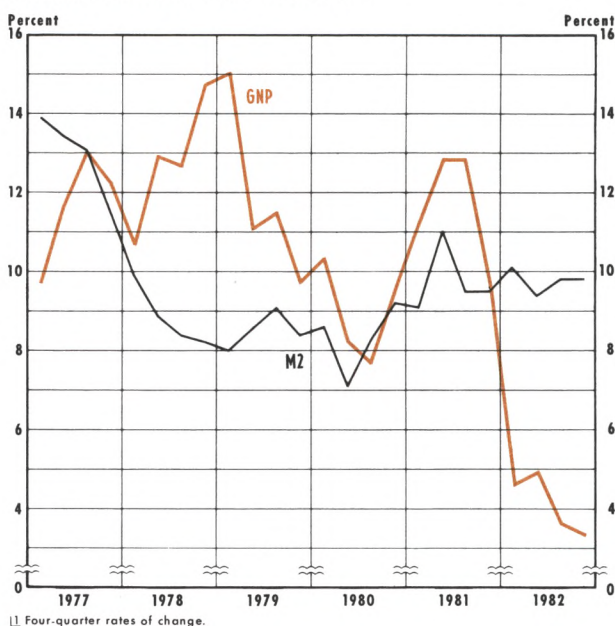
¹⁵The correlation coefficient for quarterly changes in the ratio of member bank total time and savings deposits to total checkable deposits, not seasonally adjusted, and quarterly changes in other checkable deposits, not seasonally adjusted, is 0.15, for the period since IV/1978; this also is not statistically significant. The M1 and M2 multipliers have been unaffected by changes in other checkable deposits.

¹⁶The growth of other checkable deposits such as super-NOW balances also is uncorrelated with M2 velocity movements. The correlation coefficient between quarterly changes in other checkable deposits and M2 velocity is 0.18 for the period from the fourth quarter of 1978 to the third quarter of 1982.

¹⁷See R. W. Hafer, "Much Ado About M2," this *Review* (October 1981), pp. 13–18; and Keith M. Carlson and Scott E. Hein, "Monetary Aggregates as Monetary Indicators," this *Review* (November 1980), pp. 12–21.

¹⁸Berry, "The Fed's Policy Levers," provides this conclusion but also notes, however, that the velocity of both M1 and M2 dropped in 1982, raising some doubt about the usefulness of either aggregate as a target for monetary policy. A decline in velocity, absolutely or relative to trend, is not unusual in a recession, however, since measured income declines relative to permanent income. See, for example, Milton Friedman, "The Quantity Theory of

Chart 4
Growth Rates of GNP and M2 ¹



sions of the relative merits of M2 and M1, however, is that the 1980 redefinitions of the aggregates changed the M2 measure substantially while changing M1 only moderately. The substantial difference between the old and current M2 measures arises from the inclusion of some financial assets that are competitive with time and savings deposits in the current definition of M2, especially money market mutual funds.¹⁹

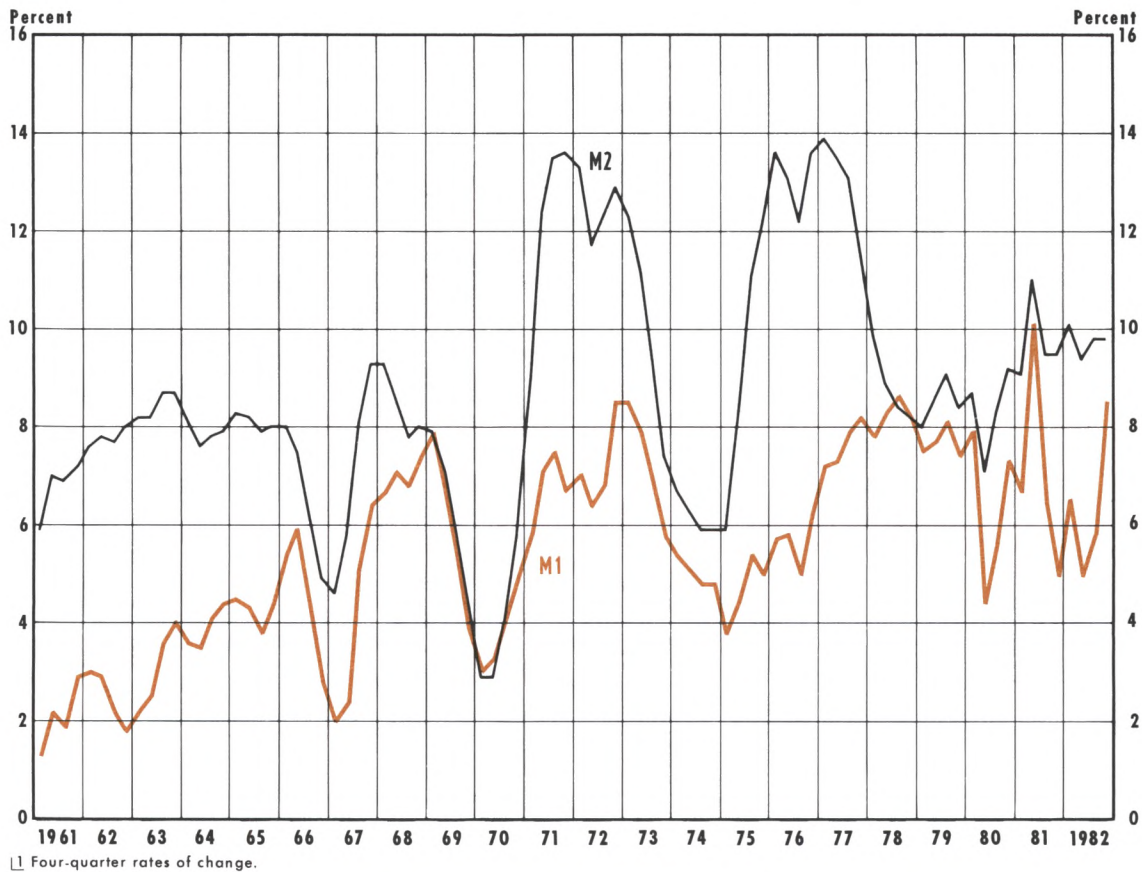
The Relationship Between the Monetary Aggregates and GNP

Movements in M2 have been dominated by movements in money market mutual fund balances for several years. As a result, the usefulness of M2 as an indicator of economic performance has been reduced substantially. Chart 4 shows the annual growth rates of M2 and GNP for four-quarter periods since the first quarter of 1977. Empirical assessment of the relationship of M2 and GNP growth affirm the relationship

Money — A Restatement," in Milton Friedman, ed., *Studies in The Quantity Theory of Money* (University of Chicago Press, 1956), especially pp. 18–19. The correlation coefficient for quarterly velocity changes and unemployment rate changes is -0.35 and -0.41 for M1 and M2, respectively, from III/1959 to III/1982. Both are strongly statistically significant and indicate the negative effect of recessions on velocity.

¹⁹See R. W. Hafer, "The New Monetary Aggregates," this *Review* (February 1980), pp. 25–32.

Chart 5
Growth Rates of M1 and M2 \perp



indicated in the chart. There is no correlation between the growth rates of M2 and GNP over the whole five-year period (the correlation coefficient is 0.04); over the past three years (I/1979 to III/1982), however, the correlation coefficient (-0.61) is significantly *negative* at a 95 percent confidence level.²⁰

²⁰Experiments with reduced-form regression equations bear out the breakdown as well. Hafer, "Much Ado About M2," presents equations using M1 or M2 growth that indicate the superiority of M1. When a sample period of II/1961 to IV/1977 is extended to III/1982, a standard Chow test indicates that the stability of the M2-GNP relationship breaks down. Experiments with the constrained GNP equation presented in the appendix to John A. Tatom, "Energy Prices and Short-Run Economic Performance," this *Review* (January 1981), pp. 3-17, substituting M2 for M1 yield the result that at a 99 percent confidence level, the equation with M1 is stable after 1977, but that with M2 is not. Simulations of the IV/1977 equation yield systematic and relatively large underestimates of GNP growth until I/1981, then systematic and large overestimates of GNP growth to III/1982. Of the 19 quarters simulated, six of the errors are greater than twice the standard error of the equation estimated and the root mean square error of the estimates is 5.10 percent, compared with an in-sample standard error of 2.80 percent.

In contrast, the growth rate of GNP is highly and significantly positively related to the growth rate of M1, both for the entire five-year period (the correlation coefficient is 0.67), and for the I/1979 to III/1982 subperiod (the correlation coefficient is 0.58).²¹

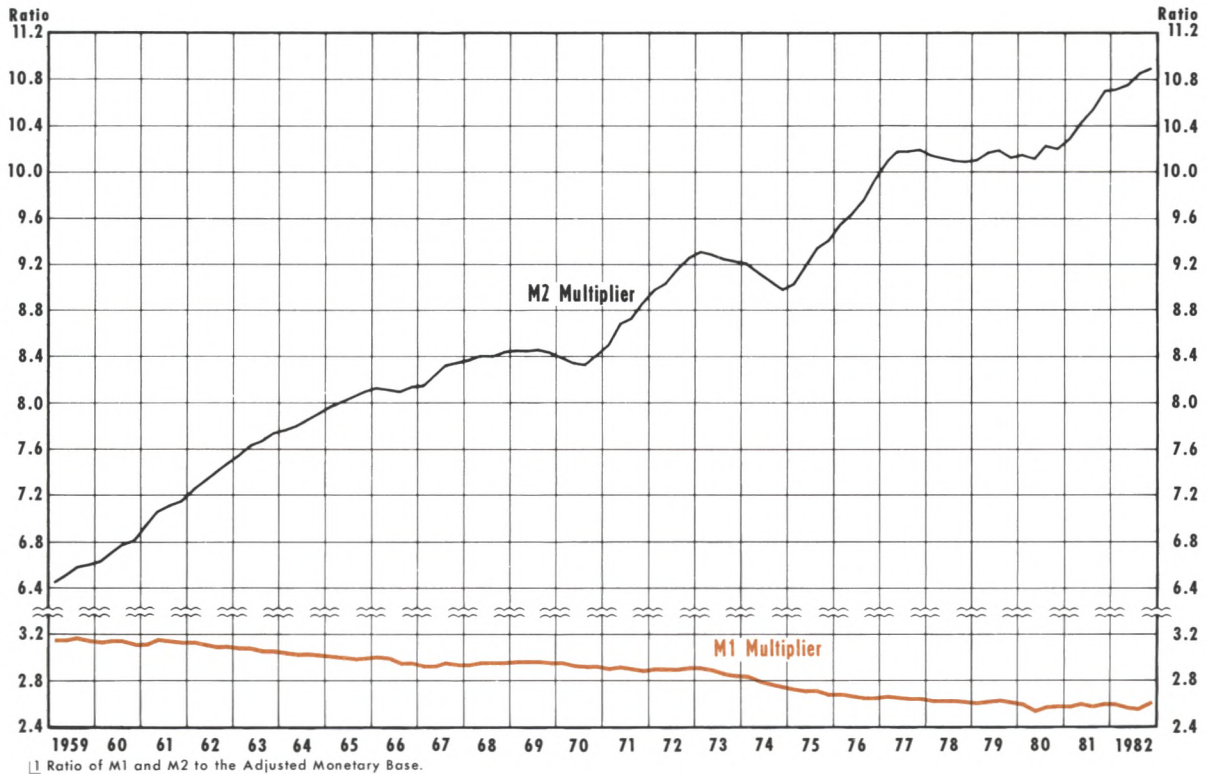
The Controllability of Monetary Aggregates

The problem with using M2 as an indicator of economic performance is reflected in the breakdown of the relationship between M1 and M2.²² Chart 5 shows

²¹For the conventional contrasting view, see Berry, "The Fed's Policy Levers." He notes that the relationship of M2 to GNP has been "quite stable and trendless with, say a 10 percent increase in M2, almost always associated with about a 10 percent increase in GNP."

²²The breakdown in the positive and strong relationship for the past several years is not unprecedented. There was no relationship during 1962-66 when M2 growth changed little, but M1 and GNP growth accelerated sharply; the correlation coefficient for M2 and GNP growth over this period is 0.24, not statistically significant at conventional levels.

Chart 6
M1 and M2 Multipliers ¹



the annual growth rate of M1 and M2 for four-quarter periods since 1960. Until 1977, the growth rates are highly positively correlated (the correlation coefficient is 0.65).²³ This relationship disappears after 1976; the correlation over the period I/1977 to III/1982 drops to 0.23, which indicates the absence of a statistically meaningful relationship.

This evidence provides some insight into the issue of the relative controllability of the monetary aggregates; this issue is crucial in the choice of a monetary policy target. The central bank directly controls only its own portfolio, so it can determine precisely only the monetary base. If the relationship between the base and monetary aggregates is unstable or even highly variable, the achievement of policy objectives is more difficult. In this case, the difficulty would be hitting the

target successfully. M2 is subject to substantially higher control errors than M1.²⁴ Over the past several years, this has been apparent in the disparate behavior of M1 and M2.

Further evidence on this issue is available from the analysis of the ratios of M1 and M2 to the adjusted monetary base, the M1 and M2 multipliers. These multipliers are shown in chart 6 from I/1959 to III/

²³Kenneth C. Froewiss, *Financial Market Perspective*, Goldman-Sachs Economics (December 1982), p. 3, shows that the growth in M1 plus the savings components of M2, has been inversely related to that of the remainder of M2 since mid-1978. He argues that this is evidence that M2 is no longer a reliable guide to monetary policy.

²⁴It should be noted, however, that in short-run control experiments, the error dispersion statistics for current-month aggregate projections have been found to be smaller for M2 than for M1 using both judgmental forecasts and the Rasche-Johannes multiplier forecasting method. See David Lindsey, *et al.*, "Monetary Control Experience Under The New Operating Procedures," in Board of Governors of the Federal Reserve System, Federal Reserve Staff Study, *New Monetary Control Procedures* (February 1981), pp. 1-102.

The conclusion in the text is based on quarterly estimates of the relationship between monetary growth rates and the growth rate of the adjusted monetary base, such as those in John A. Tatom, "Money Stock Control Under Alternative Definitions of Money," this *Review* (November 1979), pp. 3-9; or Hafer, "Much Ado About M2," where the standard error of aggregates is higher for M2 than for M1.

1982. The earlier analysis indicates that NOWs did not affect the components of the M1 or M2 multiplier, while the growth of MMDA-type assets affected only M2. A direct correlation analysis of the multipliers bears out these findings. The correlation coefficient between quarterly changes in the M2 multiplier and quarterly changes in MMMF balances since I/1978 is strongly and significantly positive (0.82); changes in the M1 multiplier, on the other hand, are unrelated to movements in MMMFs (the correlation coefficient for the same period is 0.12). Changes in other checkable deposits have had no significant effect on either the M1 or M2 multiplier over the same period; the correlation coefficient equals 0.23 and 0.38, respectively.²⁵

Summary

Based on the evidence above, it appears likely that the growth of money market deposit accounts will complicate efforts to control M2. The new accounts will tend to raise the M2 multiplier and reduce the M2 velocity, making M2 more difficult to control and to interpret for policy purposes.

The new accounts do not appear to pose a problem for M1. Its controllability and its relationship to spending are not likely to be affected by the changes according to the evidence from similar recent institutional changes.

CONCLUSION

Strong concern has been expressed that newly authorized financial instruments at depository institutions will substantially alter M1, thus reducing its usefulness as a target for conducting monetary policy. In particular, the current concern is that M1 will be either pushed upward by additions of idle or non-transaction balances to meet the higher minimum for super-NOW accounts, or pushed downward by shifts of idle or non-transaction balances from demand and NOW de-

posits to MMDAs. Since such shifting is primarily between assets within the M2 measure, it has been widely asserted that the shifts do not affect the measure of M2 and, by implication, will not distort its meaning or usefulness for the conduct of monetary policy.

A broader view of the money supply process reaches the opposite conclusions. The newly created money market deposit accounts are non-reservable deposits with limited transaction services and are quite similar, in practice as well as in legislative intent, to money market mutual funds. The principal differences are federal insurance and geographic convenience. Similarly, super-NOW accounts are virtually identical to NOW accounts, except that a \$2,500 minimum balance is required by law and the instrument is free of rate regulation.

Money market mutual fund-type assets, like money market deposit accounts, have no effect on M1 or its velocity. Increases in such assets do tend to raise M2, however, and to reduce its velocity. Super-NOWs are similar to other checkable deposits and are unlikely to affect M1 or M2 measures or their relationships to spending. In principle, the higher yields on super-NOWs compared with other transaction balances could lower currency demand relative to total transaction deposits, thereby increasing both the demand for M1 and its multiplier. The evidence from the introduction of ATS and, later, NOW accounts provides no support for this conjecture, however.

Finally, it does not appear that M2 is likely to be superior to M1 as a target for conducting monetary policy. The conventional view that the M2-GNP relationship is both statistically significant and stable has not been supported by the experience over the past several years.²⁶

²⁵The M2 multiplier is negatively related to movements in short-term interest rates. From I/1978 to III/1982, the correlation coefficient between changes in the M2 multiplier and those of the 4- to 6-month commercial paper rate is -0.47 . The M1 multiplier is not statistically correlated with changes in rates.

²⁶The argument here is *not* that monetary policy cannot be conducted successfully using an M2 targeting procedure. The evidence cited above only shows that MMDA accounts are likely to raise M2 growth relative to monetary policy measures like the adjusted monetary base, and relative to spending. Continuous monitoring of the effect of new accounts on M2, as well as successful monitoring of the effect of interest rate movements on the supply and demand for M2, in principle, could allow movements in the M2 target range that would be compatible with the attainment of policy objectives.

The Wayward Money Supply: A Post-Mortem of 1982

R. W. HAFER and SCOTT E. HEIN

SINCE the Federal Reserve changed its operating procedures in late 1979 to achieve greater control over monetary aggregate growth, money stock (M1) growth has been highly volatile.¹ This volatility continued through 1982: M1 grew at annual rates of 16.7 percent from November 1981 to January 1982, 3.0 percent from January to July 1982, and 13.1 percent from July to December 1982.

Increased volatility in money growth can produce adverse economic consequences under certain conditions. Both economic theory and evidence suggest that substantial short-run deviations in money growth from its longer-run trend affect the growth of spending and real economic activity.² For example, as chart 1 illus-

trates, large negative deviations of money growth from its trend have been associated with each period of economic decline since 1958.

The increased volatility in money growth has led many observers to question whether the Federal Reserve has the ability to control money growth adequately.³ Some analysts have suggested that the Fed must make certain technical changes, such as implementing contemporaneous reserve accounting, altering discount rate policy and restructuring reserve requirements, to better control the money stock.

This article examines whether more stable growth of the money stock could have been achieved in 1982 without any of the proposed technical changes. To this end, two simple money stock control procedures are used to simulate money growth in 1982. One procedure involves increasing the monetary base at a steady rate. The other involves changing base growth to offset expected money multiplier changes. The latter procedure is shown to achieve the hypothetical annual growth target with little volatility in quarterly money growth.

An earlier version of this paper was presented at a Business Economics and Public Policy Workshop at Indiana University. We would like to thank all the participants for helpful comments, especially Lawrence S. Davidson and Michele Fratianni.

¹For example, the standard deviation of quarterly M1 growth from IV/1979 to IV/1982 is 5.91. In contrast, the standard deviation for M1 growth from IV/1976 to III/1979 was 1.45.

Some may argue that this comparison is misleading, because the fluctuations in recent years likely will flatten out over time as evolving seasonal patterns are captured in the recalculation of seasonal factors. Others, however, have been highly skeptical of revisions in seasonal factors, arguing that such revisions artificially smooth away outliers. For example, William Poole and Charles Lieberman, "Improving Monetary Control," *Brookings Papers on Economic Activity* (2:1972), pp. 293-335, have stated that "one of the dangers of the X-11 model is that outliers are all too easily explained away by a superficial appeal to changing seasonals" (p. 332).

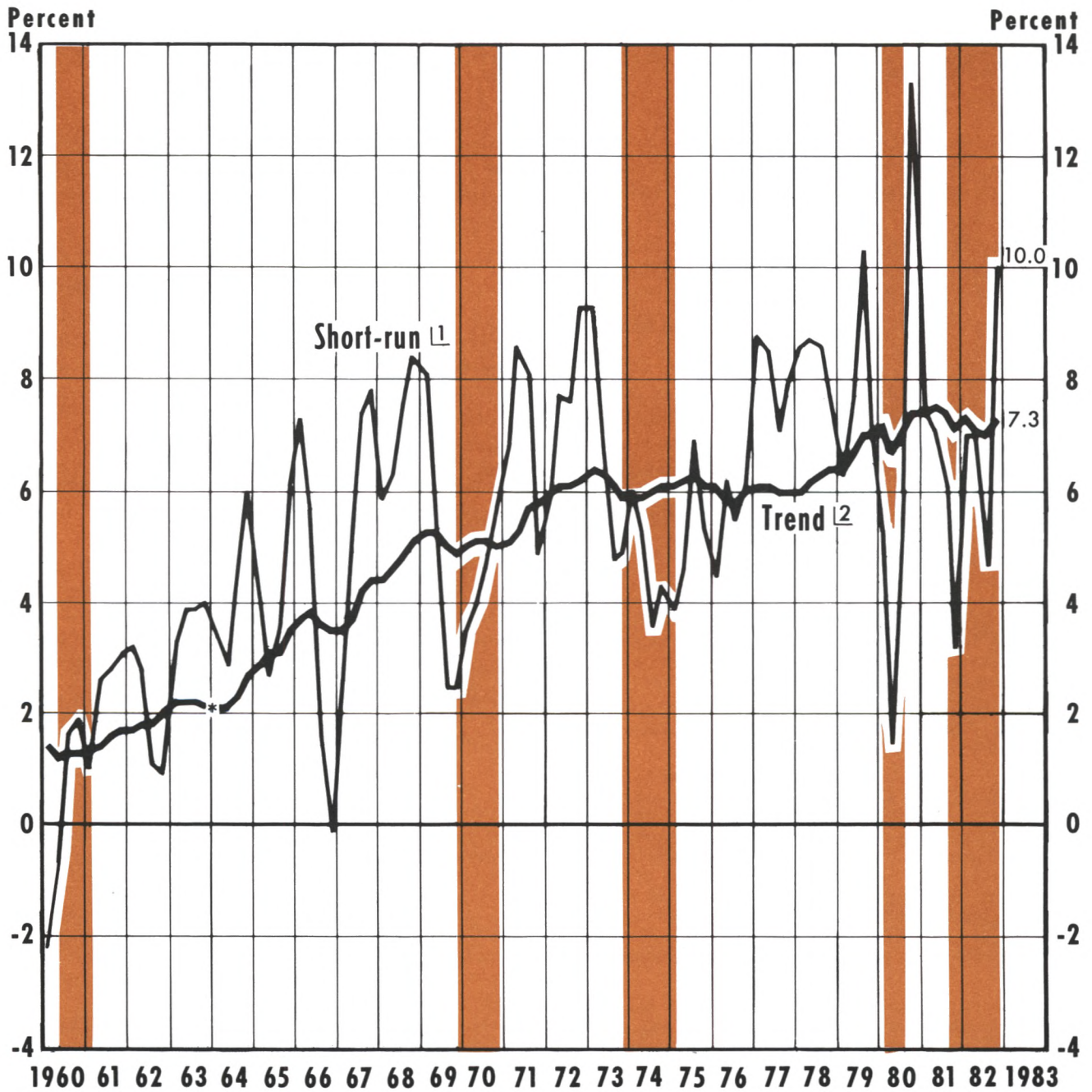
²This type of analysis was presented first by Clark Warburton, "Bank Reserves and Business Fluctuations," *Journal of the American Statistical Association* (December 1948), pp. 547-58, reprinted in Clark Warburton, *Depression, Inflation, and Monetary Policy: Selected Papers 1945-1953* (The Johns Hopkins Press, 1966), pp. 36-47. Analyses in this tradition also are presented in Milton Friedman and Anna J. Schwartz, "Money and Business Cycles," *Review of Economics and Statistics* (Supplement: February 1963), pp. 32-78; William Poole, "The Relationship of Monetary Decelerations to Business Cycle Peaks: Another Look at the Evidence," *Journal of Finance* (June 1975), pp. 697-712; and most recently Milton Friedman, "Misleading Unanimity," *Newsweek* (February 7, 1983), p. 56.

³For contrasting views on this issue, see Milton Friedman, "The Wayward Money Supply," *Newsweek* (December 27, 1982), p. 58; "The Pitfalls of Mechanical Monetarism," *The Morgan Guaranty Survey* (February 1981), pp. 8-13; and Milton Friedman, "Improving Monetary Policy," *Newsweek* (July 28, 1980), p. 60. More sophisticated analyses are presented in Board of Governors of the Federal Reserve System, *New Monetary Control Procedures*, Federal Reserve Staff Study, vols. 1 and 2 (Board of Governors, 1981).

One argument is that "large swings" in the demand for money are direct causes of observed variability in money growth. For example, see "Statement by Lyle Gramley, member, Board of Governors of the Federal Reserve System, before the Subcommittee on Domestic Monetary Policy of the House Committee on Banking, Finance and Urban Affairs, March 3, 1982," *Federal Reserve Bulletin* (March 1982), pp. 174-78. For an alternative analysis, see Scott E. Hein, "Short-Run Money Growth Volatility: Evidence of Misbehaving Money Demand?" this *Review* (June/July 1982), pp. 27-36; and Kenneth C. Froewiss, "Speaking Softly But Carrying a Big Stick," *Economic Research* (Goldman Sachs, December 1982).

Chart 1

Rates of Change of Money Stock (M1)



[1] Two-quarter rate of change.

[2] Twenty-quarter rate of change; data prior to 1st quarter 1964 are M1 on the old basis.

Shaded areas represent periods of business recessions. 1981-82 trough is tentative.

Table 1
M1 Growth Rates in 1982

	Monthly Growth Rate			Quarterly Growth Rate	
	Preliminary	Revised		Preliminary	Revised
12/81- 1/82	23.1%	21.5%			
1/82- 2/82	-3.4	0.5			
2/82- 3/82	2.7	1.6	IV/81-I/82	10.9%	11.0%
3/82- 4/82	11.5	1.9			
4/82- 5/82	-2.4	8.6			
5/82- 6/82	-0.3	2.7	I/82-II/82	3.3	3.3
6/82- 7/82	-0.3	2.7			
7/82- 8/82	10.9	10.8			
8/82- 9/82	14.9	13.6	II/82-III/82	3.5	6.3
9/82-10/82	22.6	15.5			
10/82-11/82	18.3	14.4	III/82-IV/82	17.1	13.9
11/82-12/82	9.2	11.4			
12/81-12/82	8.5	8.6	IV/81-IV/82	8.5	8.5

MONEY STOCK GROWTH IN 1982

Table 1 lists M1 growth for 1982 on a monthly and quarterly basis. The respective growth rates are calculated for both preliminary data and the recently revised data, which incorporate both benchmark revisions and revised estimates of seasonal factors. It is apparent that the recent revisions have smoothed substantially the fluctuations in both monthly and quarterly money growth. With the exception of March and April, the revised monthly growth rates all are closer to the average growth rate over the period. Thus, the standard deviation of the monthly growth rates is reduced substantially by the revisions: 6.84 vs. 9.59. Similarly, the standard deviation of the quarterly growth rates is 4.73 for the revised series and 6.62 for the preliminary series.

This suggests that at least part of the volatility in money growth last year is attributable to poor preliminary data. For example, the revised numbers indicate that the original estimates of strong money growth in April, October and November all were exaggerated. Similarly, the original estimates of negative money stock growth in February, May, June and July were incorrect; the revised data show that money growth was positive during these months.

The fact that revisions in money stock measures have reduced the volatility in money growth is comforting, *ex post*. For a policymaker making decisions in 1982, however, the extent of the revisions was unknown and

the volatility of observed money growth could have been considered excessive. Because this present analysis addresses the issue of reducing the volatility of money growth in an ongoing policy setting, we ignore the recent revisions in money stock numbers; policymakers would not have had this information in 1982 when decisions were being made.⁴

ACHIEVING GREATER MONEY GROWTH CONTROL IN 1982: TWO ALTERNATIVE PROCEDURES

Could the Fed have achieved a more stable pattern of money growth in 1982 than that evidenced by table

⁴This approach is supported by a recent Federal Reserve Board report dealing with the problem of seasonal adjustment. In that report, it is stated that "since the original projections [of seasonal factors] are what policymakers and other users of the data have to work with currently in making decisions, the revised data may give an erroneous impression, after the fact, of what the basis for the decision was." Board of Governors of the Federal Reserve System, *Seasonal Adjustment of the Monetary Aggregates: Report of the Committee of Experts on Seasonal Adjustment Techniques* (Federal Reserve Board, 1981), p. 35. Cited in David A. Pierce, "Seasonal Adjustment of the Monetary Aggregates: Summary of the Federal Reserve's Committee Report," *Journal of Business and Economic Statistics* (January 1983), pp. 37-42. Our treatment only adds realism to the simulations carried out. It does *not* affect any substantive conclusions about comparing alternative operating procedures: If revised data are used, the constant-base-growth strategy still results in quarterly money growth volatility in 1982 similar to that indicated by revised data, but much greater than that associated with the multiplier monitoring approach.

1? This question is examined by analyzing two alternative control procedures, each controlling M1 growth by altering the adjusted monetary base (hereafter referred to as base).⁵

The first procedure involves simply holding the growth of the base constant over the year.⁶ Because there generally is a direct relationship between changes in the growth rate of the base and the money stock, a constant rate of base growth will, on average, yield a predictable growth rate of money. This approach produces stable short-run M1 growth, however, only if the rate of change of the money multiplier — the connecting link between changes in the base and money — remains constant over time. Although this typically is the case over longer periods of time, it is not true over time spans as short as a month or a quarter. Thus, even though base and money growth are closely related over periods of a year or more, short-run money multiplier changes can cause short-run money growth to deviate substantially from any particular base growth. This is the primary weakness with this procedure.

The second control procedure alleviates the short-run discrepancies between base and M1 growth by anticipating changes in the multiplier and, then, offsetting them by appropriate changes in base growth. This

procedure involves using one-period-ahead multiplier forecasts to determine the extent to which the base should be expanded or contracted.⁷ Two methods of forecasting money multiplier developments are considered for this procedure.

The Constant-Base-Growth Procedure

Analysis of M1 growth and its volatility requires choosing some desired target level or range. In the analysis which follows, the top of the announced 1982 annual M1 target range — 5.5 percent growth — was selected as a hypothetical operating target.⁸ Table 2 enumerates the desired monthly level of M1 that would be consistent with achieving this growth target with no short-run variation in M1 growth (see column 1). Because the money stock is the product of the multiplier and the base, the growth rate of M1 ($\dot{M}1$) is approximately equal to the growth rate of the money multiplier (\dot{m}) plus the growth rate of the base ($\dot{A}MB$):

$$(1) \quad \dot{M}1 = \dot{m} + \dot{A}MB.$$

As equation 1 shows, it is necessary to predict \dot{m} in order to determine the appropriate $\dot{A}MB$ to provide. During the last 12 years (1970–81), the level of the money multiplier has been declining on average; \dot{m} has averaged -1.1 percent. Thus, over this period, base growth, on average, exceeded M1 growth by 1.1 percent. This was assumed to continue in 1982. To achieve the desired M1 growth of 5.5 percent under the base control procedure considered here, therefore, the money multiplier is “predicted” to decline at a 1.1 percent rate during 1982. Given the assumed rate of decline in the money multiplier, a constant 6.6 percent rate of increase in the base would be needed to yield the targeted 5.5 percent money growth. This required base path (in levels) is shown in column 3 of table 2.

The constant-base-growth strategy would have resulted in stable money growth *only if* the money multiplier declined in a steady fashion as presumed. During 1982, however, the money multiplier was highly volatile by historical standards (see column 2 of table 2). For example, based on original data, the difference between the maximum and minimum level of the mul-

⁵The base is controlled essentially by Fed actions. On the issue of the Fed's ability to control the base, see Anatol B. Balbach, “How Controllable is Money Growth?” this *Review* (April 1981), pp. 3–12.

That study found that “the Federal Reserve can control the monetary base *even on a weekly basis* if it so desires. There is, of course, no question that it can do so over longer periods of time.” In this light, no adjustment in achieving a monetary base objective is made. On measuring the base (on an adjusted basis), see R. Alton Gilbert, “Revision of the St. Louis Federal Reserve Adjusted Monetary Base,” this *Review* (December 1980), pp. 3–10; and John A. Tatom, “Issues in Measuring An Adjusted Monetary Base,” this *Review* (December 1980), pp. 11–29.

⁶This approach has been advocated in recent statements of the Shadow Open Market Committee. This is because “[C]urrent institutional changes have less effect on the growth of the base than on most other aggregates.” See “Policy Statement of the Shadow Open Market Committee, March 16, 1981,” *Annual Report*, Center for Research in Government Policy & Business (June 1981), pp. 31–35, especially pp. 33–34. This advocacy also is found in the September 14, 1981, “Policy Statement.” This argument presupposes that stable M1 growth may not be desirable with all of the current institutional changes. In contrast, the present article presupposes that stable M1 growth is desirable and seeks to determine the extent to which it may be achieved. Of course, the desirability of stable money growth depends on the stability of the demand for money, a matter not addressed in this article. For a study that also recommends base instead of money stock targeting, see Leonall C. Andersen and Denis S. Karnosky, “Some Considerations in the Use of Monetary Aggregates for the Implementation of Monetary Policy,” this *Review* (September 1977), pp. 2–7.

⁷A similar argument for using money multiplier forecasts as a basis for policy actions is presented in Balbach, “How Controllable is Money Growth?” and James M. Johannes and Robert H. Rasche, “Can the Reserves Approach to Monetary Control Really Work?” *Journal of Money, Credit and Banking* (August 1981), pp. 298–313.

⁸It should be noted that the Federal Open Market Committee temporarily ended its practice of adopting short-run targets for M1 in October 1982, because of difficulties in interpreting its behavior.

Table 2

**M1 Growth Under Constant 6.6 Percent Base Growth
(seasonally adjusted, original data)**

Period	Targeted M1 ¹	Actual multiplier	Simulated base ¹	Simulated M1 ¹	Simulated M1 growth rate	
					Monthly	Quarterly
	(1)	(2)	(3)	(4)	(5)	(6)
12/81		2.5951				
1/82	\$442.9	2.6142	\$170.8	\$446.5	16.4%	
2/82	444.9	2.5826	171.7	442.9	-9.3	7.8%
3/82	446.8	2.5809	172.6	445.5	7.3	
4/82	448.8	2.5837	173.6	448.5	8.4	
5/82	450.9	2.5566	174.5	446.1	-6.2	1.5
6/82	452.9	2.5374	175.4	445.1	-2.7	
7/82	454.9	2.5354	176.4	447.2	5.8	
8/82	456.9	2.5388	177.3	450.1	8.1	4.2
9/82	459.0	2.5598	178.2	456.2	17.5	
10/82	461.0	2.5893	179.2	464.0	22.6	
11/82	463.1	2.6142	180.2	471.1	19.7	17.0
12/82	465.1	2.6096	181.1	472.6	3.9	

Simulated M1 growth: December 1981 to December 1982, 7.2%
Actual M1 growth: December 1981 to December 1982, 8.6%

¹Billions of dollars.

multiplier in 1982 was 0.079. During the past decade this difference was exceeded by multiplier developments only during 1974.

Column 4 in table 2 shows the simulated money stock levels for 1982 holding base growth at a constant 6.6 percent throughout 1982, and assuming that the money multiplier would have behaved exactly as it did.⁹ Two important results emerge from this simulation. First, the patterns of both monthly and quarterly M1 growth produced by the constant-base-growth approach (columns 5 and 6) are similar to those that actually occurred. For example, the very strong money growth observed in January would have been lessened

only slightly by adopting a constant-base-growth strategy (23.1 percent vs. 16.4 percent). M1 growth from January through July 1982 would have been even weaker than actually occurred (1.2 percent vs. 0.3 percent), and the strong M1 growth from July to December 1982 would have been reduced only slightly (15.1 percent vs. 14.2 percent).

The similarity between actual and simulated M1 growth for 1982 is not an aberration; base growth was indeed fairly stable last year. The volatility in M1 growth last year was attributable, in large part, to money multiplier developments, not erratic base growth. Thus, those critical of the Fed for the volatile money growth last year should recognize that a constant-base-growth strategy would not have mitigated this problem.

The second important finding is that M1 growth from December 1981 to December 1982 would have exceeded the hypothetical target by 1.7 percentage points if the base had grown at a steady 6.6 percent over the year. The hypothetical growth rate target was 5.5 percent; M1 growth would have been about 7.2 percent under a policy of constant base growth. This "miss" of the annual M1 target occurred because the money multiplier essentially was unchanged between

⁹It might be argued that the actual money multiplier pattern would have been considerably different if the Federal Reserve actually had operated under such a control procedure. In this case, the resultant money growth would have been different from that reported here. This criticism is predicated on the belief that changes in base growth are associated with changes in the money multiplier. This belief is not well supported by recent data, however. For example, base growth was relatively stable in 1982, yet money multiplier growth was more volatile than any year since 1974. Moreover, for the period 1979 to 1982, the correlation between monthly base and multiplier growth is an insignificant 0.07. Thus, money multiplier movements do not appear to be related significantly to monetary base growth.

Table 3

**M1 Growth Using Last Month's Multiplier as a Forecast of This Month's Multiplier
(seasonally adjusted, original data)**

Period	Targeted M1 ¹	Actual multiplier	Simulated base ¹	Simulated M1 ¹	Simulated M1 growth rate	
					Monthly	Quarterly
	(1)	(2)	(3)	(4)	(5)	(6)
12/81		2.5951				
1/82	\$442.9	2.6142	\$170.7	\$446.2	15.3%	
2/82	444.9	2.5826	170.2	439.5	-16.6	7.0%
3/82	446.8	2.5809	173.0	446.5	20.9	
4/82	448.8	2.5837	173.9	449.3	7.8	
5/82	450.9	2.5566	174.5	446.2	-8.0	3.7
6/82	452.9	2.5374	177.1	449.5	9.2	
7/82	454.9	2.5354	179.3	454.5	14.2	
8/82	456.9	2.5388	180.2	457.5	8.2	9.2
9/82	459.0	2.5598	180.8	462.8	14.8	
10/82	461.0	2.5893	180.1	466.3	9.5	
11/82	463.1	2.6142	178.9	467.6	3.4	7.0
12/82	465.1	2.6096	177.9	464.3	-8.1	

Simulated M1 Growth: December 1981 to December 1982, 5.3%
Actual M1 Growth: December 1981 to December 1982, 8.6%

¹Billions of dollars.

December 1981 and December 1982, instead of declining at an assumed rate of 1.1 percent as it had on average over the preceding 10 years. Thus, both the pattern and average level of money growth last year were affected by unusual money multiplier developments, developments that would have had adverse impacts on a constant-base-growth rule.

MONITORING MONTHLY MULTIPLIER DEVELOPMENTS

The previous section demonstrates that short-run money multiplier movements must somehow be taken into account if more stable money growth is to be achieved. One way to accomplish this is to obtain one-month-ahead money multiplier forecasts and to adjust base growth to offset increases or decreases in the multiplier. Two ways of doing this are considered.

Naive Forecast: Monthly Monitoring of the Multiplier

The simplest procedure to forecast next month's money multiplier is to assume that it will equal the

current month's multiplier plus a random error (μ_t) which can be assumed to be zero on average:¹⁰

$$(2) \quad m_t = m_{t-1} + \mu_t.$$

Once the multiplier is forecast, the amount of base needed to achieve the desired level of M1 is then determined residually. For example, if the multiplier is forecast to be 2.60 next month and the target for M1 next month is \$450 billion, the policy directive would be to achieve a \$173.1 billion ($\$450/2.60$) base level next month. In this way, multiplier changes, to the extent that they are forecast, are offset by altering the base to maintain a desired path for M1. If the multiplier were projected to be only 2.50 next month, for example, then this procedure would require \$180 billion ($\$450/2.50$) in base to achieve the same M1 target of \$450 billion.

Table 3 summarizes the results for 1982 using this technique to achieve the same steady 5.5 percent growth rate of M1 as before. In comparison to the constant-base-growth strategy, monthly monitoring of

¹⁰See Balbach, "How Controllable is Money Growth?"

multiplier developments mitigates both problems of excessive volatility and missing the annual objective. The variability in quarterly M1 growth is reduced substantially under the multiplier monitoring procedure (compare columns 6 in tables 2 and 3). In particular, this procedure would *not* have produced the sharp midyear slowdown in money growth relative to trend. The simulated money growth from I/1982 to III/1982 under this procedure would have been 6.4 percent, substantially higher than the 2.8 percent growth simulated under the constant-base-growth strategy.

Moreover, it also would have produced more stable quarterly growth in M1 last year than that simulated with the constant-base-growth strategy: the standard deviation of the quarterly growth rates is 6.76 for the constant-base-growth strategy and 2.27 for the procedure using naive multiplier forecasts. This increased quarterly stability is achieved, however, at the expense of slightly more volatile monthly money growth. For example, the standard deviation of the simulated monthly M1 growth for the constant-base-growth approach was 10.21; the figure for the simulated M1 growth using the multiplier forecast approach was 11.27 percent.

The increase in the monthly volatility of M1 growth is a direct consequence of the procedure itself; the monthly monitoring procedure achieves stable quarterly money growth by reacting quickly to unexpected monthly disturbances in the money multiplier. Thus, when the multiplier declined sharply in May, this procedure produced a swift policy response in terms of sharply increased base growth in subsequent months. Consequently, the money stock would have been much closer to the hypothetical target level in August than was the case with the constant-base-growth strategy.

This simple procedure of controlling M1 growth also is much more successful than the constant-base-growth strategy in achieving the desired M1 growth target of 5.5 percent. M1 growth from December 1981 to December 1982 would have been 5.3 percent under this simple multiplier forecasting procedure, compared with a 7.2 percent growth rate under the constant-base-growth strategy.

If policy were directed toward achieving stable quarter-to-quarter M1 growth and strengthening the Fed's ability to hit an annual target, the simple technique of

monetary control described here would be superior to the constant-base-growth strategy.¹¹

More Sophisticated Multiplier Forecasts: Time Series Techniques

The forecasting technique described above — using last month's multiplier — is simple but ad hoc. There is no a priori reason to suspect that such a forecasting procedure would be especially reliable. Thus, more sophisticated time series forecasting models should be considered.¹²

Statistical evidence suggests that one can improve upon the preceding forecasting model, which merely uses last month's multiplier as a prediction for this month's multiplier.¹³ This improvement is derived by developing a time series model that explains changes in the multiplier (i.e., $m_t - m_{t-1}$) by using the information contained in the non-random component of the forecast errors from equation 2. More formally, the time series model chosen is represented by

$$(3) \quad m_t - m_{t-1} = \mu_t + b_1 \mu_{t-1}$$

¹¹This operating procedure previously has been shown to reduce quarterly money volatility and better achieve the long-run objective in 1980 (in Balbach, "How Controllable is Money Growth?"). Similar gains also would have been achieved in 1981. Based on first-revised data and aiming for a December 1980 to December 1981 growth rate of 7.0 percent, this procedure would have yielded 7.2 percent simulated growth, with the lowest quarterly growth rate being 4.5 percent and the highest quarterly growth rate being 8.2 percent. The actual growth for this period was 6.4 percent, with the quarterly growth rates ranging from 0.5 percent to 8.9 percent.

¹²The following analysis continues in the tradition of Eduard J. Bomhoff, "Predicting the Money Multiplier: A Case Study for the U.S. and the Netherlands," *Journal of Monetary Economics* (July 1977), pp. 325-45; James M. Johannes and Robert H. Rasche, "Predicting the Money Multiplier," *Journal of Monetary Economics* (July 1979), pp. 301-25; Johannes and Rasche, "Can the Reserves Approach to Monetary Control Really Work?" and Michele Fratianni and Mustapha Nabli, "Money Stock Control in the EEC Countries," *Weltwirtschaftliches Archiv* (Heft 3:1979), pp. 401-23.

¹³As a first step in such analysis, the autocorrelation of the first difference in the money multiplier ($m_t - m_{t-1}$) was examined for the period January 1959 to December 1981. For last month's multiplier to be an effective forecast of this month's multiplier, the change in the multiplier should not be autocorrelated. Any evidence of autocorrelation suggests that there is information in the past history of the multiplier that could be used to improve the forecast.

Examining the autocorrelation function of the multiplier's time series indicates that, for the sample period January 1959 to December 1981, the hypothesis that current changes in the multiplier are independent of past changes can be rejected at the 5 percent significance level.

Table 4

M1 Growth Using One-Month-Ahead Money Multiplier Forecast**Estimated Model: $m_t - m_{t-1} = -0.002 + \mu_t + 0.196 \mu_{t-1}$** **(seasonally adjusted, original data)**

Period	Targeted M1 ¹	Actual multiplier	Forecast multiplier	Simulated base ¹	Simulated M1 ¹	Simulated M1 growth rate	
						Monthly	Quarterly
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
12/81		2.5951					
1/82	\$442.9	2.6142	2.5914	\$170.9	\$446.8	17.3%	
2/82	444.9	2.5826	2.6078	170.6	440.6	-15.4	7.3%
3/82	446.8	2.5809	2.5855	172.8	446.0	16.0	
4/82	448.8	2.5837	2.5798	174.0	449.5	9.7	
5/82	450.9	2.5566	2.5809	174.7	446.6	-7.5	3.6
6/82	452.9	2.5374	2.5594	176.9	449.0	6.5	
7/82	454.9	2.5354	2.5397	179.1	454.1	14.7	
8/82	456.9	2.5388	2.5342	180.3	457.7	10.0	9.2
9/82	459.0	2.5598	2.5359	181.0	463.3	15.6	
10/82	461.0	2.5893	2.5531	180.6	467.6	11.6	
11/82	463.1	2.6142	2.5793	179.5	469.3	4.7	8.3
12/82	465.1	2.6096	2.6049	178.6	466.0	-8.2	

Simulated M1 Growth: December 1981 to December 1982, 5.7%
 Actual M1 Growth: December 1981 to December 1982, 8.6%

¹Billions of dollars.

where μ_t is the error from equation 2. An examination of the data revealed that the error in the multiplier process last month (μ_{t-1}) exerted a statistically significant effect on the change in the multiplier for this month. Moreover, the analysis indicated the existence of a slight negative trend in the data. Using this extra information and estimating the appropriate version of equation 3 for the period January 1959 to December 1981 yielded the following results:

$$(4) \quad m_t - m_{t-1} = -0.002 + \mu_t + 0.196 \mu_{t-1},$$

where again μ_t represents the random, unforeseen "innovation" to the multiplier process.¹⁴

While, for this sample, equation 4 is statistically a

¹⁴All data are seasonally adjusted. The estimated standard error of the model is 0.00118 and the Ljung-Box Q-statistic Q(12), distributed as a χ^2 with 10 degrees of freedom, is 11.53. Because the reported Q-statistic is even less than the 30 percent critical value ($\chi^2 = 11.80$), the hypothesis of independent residuals cannot be rejected, even at this high level.

For further details on this approach to forecasting economic time series, see C. W. J. Granger and Paul Newbold, *Forecasting Economic Time Series* (Academic Press, 1977).

more reliable model of the multiplier than the naive model used in the previous section, there is really little substantive difference between the two models. The naive model (equation 2) suggests that changes in the multiplier are random disturbances (μ_t), while the time series model (equation 4) only adds a negative trend term and the impact of last period's disturbance (μ_{t-1}). Thus, there may well be little difference in the forecasts.

The results found in table 4 suggest that this is indeed the case. The time-series model given by equation 4 was used to forecast the monthly values of the multiplier for 1982 by continuously updating the forecast to incorporate last month's money multiplier developments. The one-step-ahead money multiplier forecasts are listed in column 3. The table also shows the amount of base injection (column 4) required each month to achieve the hypothetical 5.5 percent M1 growth path if the multiplier behaved as the time series model predicted. In addition, the table lists the level and growth of M1 that would have resulted from the simulated base injections had the multiplier behaved as it actually did (columns 5, 6 and 7).

The simulated money growth developments using this procedure are similar to those using the naive forecast strategy (see table 3). For example, the average monthly M1 growth simulated in table 4 is 5.9 percent; the comparable figure using the naive model (table 3, column 5) is 6.2 percent. The quarterly simulations are also similar; in particular, the two successive quarters of very weak money growth simulated under the constant-base-growth strategy are avoided by either of these forecasting procedures.

Because the multiplier forecasts derived from the naive and sophisticated models are not that different, the lessons learned from the naive model results are supported by the evidence found in table 4 for the more sophisticated model.¹⁵ In particular, this multiplier forecasting procedure comes closer than the constant-base-growth strategy to achieving the hypothetical M1 growth target. In addition, quarterly volatility in money growth is reduced substantially using

¹⁵While the 1959–81 sample period results indicate some statistical gain over the naive model in explaining changes in the multiplier, the forecasting experience from 1982 shows that, as a practical matter, little would have been gained from employing the more sophisticated model. This is a limited sample on which to draw, however, and one should not conclude that the simple no-change model is equally sufficient in all time periods.

either multiplier forecasting technique.¹⁶ Thus, if quarterly money growth fluctuations affect real economic activity as suggested earlier, the multiplier forecasting approach to conducting monetary policy appears superior to the constant-base-growth strategy.

CONCLUSION

Monetary policy actions that utilize a constant-base-growth procedure generally will not achieve stable short-run money growth. A post-mortem of 1982 money growth indicates that much of the volatility in money growth last year was attributable to money multiplier fluctuations, not erratic monetary base growth. Consequently, monetary policy aimed at smoothing the growth of M1 must anticipate and react to multiplier movements. This article shows that either a naive approach to multiplier predictions or a more sophisticated time series model would have enabled policymakers to achieve smoother quarter-to-quarter changes in M1 by varying the growth of the adjusted base to offset changes in the multiplier.

¹⁶For an earlier analysis of this type that reaches similar conclusions, see Albert E. Burger, "The Relationship Between Monetary Base and Money: How Close?" this *Review* (October 1975), pp. 3–8.



Bank Holding Company Performance Studies and the Public Interest: Normative Uses for Positive Analysis?

DONALD M. BROWN

UNDER the Bank Holding Company Act of 1956, the Board of Governors of the Federal Reserve System must consider the convenience and needs of the community when ruling on applications by bank holding companies to acquire bank subsidiaries. In each case, the Board must decide, first, whether the benefits ascribed by the applicant would be realized and second, whether the proposed acquisition would further the public interest.

In its past decisions, the Board has focused on some specific potential effects of holding company acquisitions in assessing whether the acquisition would further the convenience and needs of the community. A number of these appear to be related to standard financial ratios computed from the financial statements of banks. The impact of bank holding companies on these financial ratios has been investigated and widely reported in a host of bank performance studies. Thus, although there is no evidence that the Board has used such studies in reaching its decisions, bank performance studies could provide useful information about holding company acquisitions.

The primary purpose of this article is to determine whether performance studies actually are capable of identifying performance differences among banks and, hence, whether they are relevant to policy decisions about bank holding company acquisitions. The first section briefly reviews the convenience and needs test as it relates to bank acquisitions and its implementation by the Board of Governors. The second section summarizes the results of previous performance studies. The third section investigates the conceptual difficulties with interpreting financial ratios as measures of bank performance. The final section draws conclusions about the implications of performance studies for both bank performance and public policy toward bank holding companies.

THE BOARD AND THE CONVENIENCE AND NEEDS TEST

Bank holding companies must apply to the Federal Reserve Board for permission to acquire a bank.¹ In analyzing the application, the Board must consider the effect on the convenience and needs of the community and must weigh this effect against anticompetitive effects stemming from an acquisition. According to the present judicial interpretation of the Bank Holding Company Act, the Board cannot apply competitive standards stricter than those in the anti-trust laws (see box).

The Federal Reserve Board's treatment of convenience and needs in bank holding company applications has been investigated through examination of published Board orders relating to its various decisions.²

¹Bank Holding Company Act of 1956, as amended, 12 U.S.C. 1841 *et seq.*

²Jules Backman, *The Bank Holding Company Act*, Bulletin No. 24-25 (New York University, C.J. Devine Institute of Finance, April-June 1963); and Michael A. Jessee and Steven A. Seelig, "An Analysis of the Public Benefits Test of the Bank Holding Company Act," Federal Reserve Bank of New York *Monthly Review* (June 1974), pp. 151-62. These articles were reviewed by Anthony W. Cynrak, "Convenience and Needs and Public Benefits in the Bank Holding Company Movement," in *The Bank Holding Company Movement to 1978: A Compendium* (Board of Governors of the Federal Reserve System, 1978), pp. 263-89. Jessee and Seelig later updated their study through June 1976; their findings, with respect to the Board's treatment of convenience and needs in bank acquisitions, essentially were unchanged from their original study. See Michael A. Jessee and Steven A. Seelig, *Bank Holding Companies and the Public Interest* (D. C. Heath and Company, 1977), chapter 5.

The Jessee and Seelig study is more relevant because its sample period, January 1971 to mid-1974, postdates amendments to the Bank Holding Company Act. The early 1970s was a period of rapid bank holding company expansion. During the 3½ years covered by the Jessee and Seelig study, the Board issued orders approving 434 holding company applications to acquire banks, while 47 denial orders were issued (including orders denying some non-bank acquisitions). Comparatively, only 37 orders were issued during Backman's sample period of 1956-62.

Legal Provisions and Interpretation of the Bank Holding Company Act

The circumstances under which a bank acquisition must be denied are set out in the following section of the Bank Holding Company Act, which is generally referred to simply as section 3(c):

The Board shall not approve —

- (1) any acquisition or merger or consolidation under this section which would result in a monopoly, or which would be in furtherance of any combination or conspiracy to monopolize or to attempt to monopolize the business of banking in any part of the United States, or
- (2) any other proposed acquisition or merger or consolidation under this section whose effect in any section of the country may be substantially to lessen competition, or to tend to create a monopoly, or which in any other manner would be in restraint of trade, unless it finds that the anticompetitive effects of the proposed transaction are clearly outweighed in the public interest by the probable effect of the transaction in meeting the convenience and needs of the community to be served.

In every case, the Board shall take into consideration the financial and managerial resources and future prospects of the company or companies and the banks concerned, and the convenience and needs of the community to be served.¹

In section 3(c)(2), the phrase “may be substantially to lessen competition, or to tend to create a monopoly” was taken verbatim from section 7 of the Clayton Act.² Its adoption was dictated by the Supreme Court’s decision in the Philadelphia National Bank case of 1963 in which the Court first applied the competitive standards of section 7 to block a bank combination.³

¹12 U.S.C. 1842(c).

²15 U.S.C. 18.

³*United States v. Philadelphia National Bank*, 374 U.S. 321 (1963).

The Clayton Act does not mention a countervailing role for convenience and needs. In the Philadelphia decision, the court asserted that “a merger the effect of which ‘may be substantially to lessen competition’ is not saved because, on some ultimate reckoning of social or economic debits and credits, it may be deemed beneficial.”⁴ Whether the amended Bank Holding Company Act has precedence over the anti-trust laws is a legal question. It has been moot so far, because the Board has never approved an acquisition when it found an anti-trust violation.

The Board maintains that the last sentence of section 3(c) subsumes actual or potential adverse competitive effects that do not amount to violations of the anti-trust laws.⁵ Though it found no anti-trust violation, the Board in 1979 denied on competitive grounds the application of County National Bancorporation to acquire T. G. Bancshares Company because “considerations relating to the convenience and needs of the community to be served are insufficient to outweigh the anticompetitive effects that would result from consummation of this proposal.”⁶ This decision later was overturned by the Eighth Circuit Court of Appeals.⁷ Thus, the present judicial interpretation is that convenience and needs effects are distinct from anti-competitive effects of bank acquisitions by bank holding companies.

⁴*Ibid.*, p. 371.

⁵12 C.F.R. 250.182.

⁶County National Bancorporation, “Order Denying Acquisition and Formation of Bank Holding Companies,” *Federal Reserve Bulletin* (September 1979), pp. 763–64.

⁷*County National Bancorporation v. Board of Governors of the Federal Reserve System*, 654 F.2d 1253 (8th Cir. 1981).

In these published orders, the Board addresses the benefits claimed by the applicant; it also may cite factors it finds inimical to the convenience and needs of the community.³ The benefits most often cited in orders approving bank acquisitions by holding companies are shown in exhibit A.⁴

³The orders are legal documents, written according to a formula and varying little in their wording. The effect of bank acquisitions on convenience and needs is described frequently as “consistent with approval.” The orders do not include an analysis of the quantitative effect of prospective benefits; consequently, the weight attached to a benefit in any application generally is not evident from the text of the order.

⁴Jessee and Seelig, *Bank Holding Companies*, table 5-1, pp. 52–53. The same table with only minor changes appears in Jessee and

What Conveniences? Whose Needs?

The Board of Governors has a difficult task in implementing the convenience and needs test. A chief difficulty is that the interests of all sectors of the community do not coincide. A policy of making only “risk-free” loans, for example, may benefit some depositors at the expense of prospective borrowers and the bank’s

Seelig, “Analysis of Public Benefits Test,” table 1, p. 153. The authors’ use of six categories of benefits is misleading, as section 3(c) of the Bank Holding Company Act requires that benefits fit into three categories: financial or managerial resources, future prospects or convenience and needs.

Exhibit A

Benefits Cited in Orders of Approval

Convenience and needs:

- Providing an alternative source of services to a market
- Increased lending capacity to support strong economic growth in an area
- Increased lending capacity to stimulate growth in economically depressed areas
- Expansion of specialized credit services

Increased competition:

- Increased competition through de novo entry
- Reduction of rates charged on loans or other services
- Strengthening the competitive position of a small firm through affiliation with a larger bank holding company
- Increasing competition by changing a limited service institution into a full-service firm
- Changing a conservative firm into a more aggressive competitor

Improved efficiency:

- Economies of scale
- Complementary skills

Improved financial resources:

- Acquiring a financially weak firm
- Improving the debt-to-equity ratio of the acquired firm
- Injecting a specific amount of equity capital into the acquired firm
- Providing "access to the greater financial resources" of the holding company
- Injecting a specific amount of equity capital into existing bank subsidiary

Improved managerial resources:

- Alleviating management succession problems
- Providing management depth
- Access to managerial resources of holding company

Other benefits:

- Lowering management fees for subsidiary banks

stockholders.⁵ A relevant social welfare function would be required to relate the anticipated effects of bank holding company acquisitions theoretically to "the public interest." Economists have not produced such a

⁵Some prospective borrowers would be denied credit and stockholders would earn a lower return on their investments. Depositors who are restricted to below-market interest rates (for example, a zero rate on non-personal demand deposits) probably could not gain, but might lose, if the bank made "risky" loans.

The interest of the bank's stockholders is of only secondary concern, because the Board's legislative mandate is to safeguard the convenience and needs of the community. Jessee and Seelig cite statements to this effect by members of the Board. See Jessee and Seelig, "Analysis of Public Benefits Test," p. 161.

function; consequently, the benefits cited by the Board, at best, are ad hoc approximations to the public interest. This is generally the best that can be done when normative assessments are required.

A separate issue that the Board must face is whether the effects that it has associated with convenience and needs will actually result if the acquisition is approved. For example, will an acquisition actually convert a staid bank into a more aggressive lender? Empirical investigations of this issue are available in a host of bank performance studies that have examined the effects of ownership on bank operating characteristics. Thus, in this instance, positive studies of bank operating characteristics might provide some useful background for the normative evaluations required of the Board.

RESULTS OF PERFORMANCE STUDIES

Performance studies have used different samples and empirical approaches. Not surprisingly, they often have attributed different effects to bank holding company ownership; they are remarkably consistent, however, in several important ways.

First, the studies have found virtually no difference in financial ratios between independent and bank holding company banks, prior to the acquisition of the latter by holding companies.

Second, holding company banks generally hold a higher proportion of their assets in loans and the obligations of states and municipalities, and a smaller proportion in cash and U.S. government securities, than comparable independent banks.

Third, bank holding companies generally have not had a sizable effect on the performance measures of their subsidiary banks. Holding company ownership typically has had a statistically significant effect on only a small proportion of the financial ratios included in the various performance studies. It has not been near the top of the list of factors that influence measures of bank performance.⁶ The single exception is the study re-

⁶Mayne and Jackson each computed beta coefficients, which are intended to measure the relative importance of the independent variables in a multiple regression. They both estimated several regression equations, so their results cannot be summarized conveniently. In most of their regressions, bank holding company ownership was of middling or lesser importance. See Lucille S. Mayne, "A Comparative Study of Bank Holding Company Affiliates and Independent Banks, 1969-1972," *Journal of Finance* (March 1977), pp. 147-58; and William Jackson, "Multibank Holding Companies and Bank Behavior" (Working Paper 75-1, Federal Reserve Bank of Richmond, July 1975).

porting that holding company banks are more highly leveraged than independent banks.⁷

In other respects, the findings have been less consistent. There is conflicting evidence on the effects of holding company ownership on (1) service charges on demand deposits and interest rates on time and savings deposits, (2) operating expenses, and (3) financial leverage (the ratio of total assets or debt to capital). Table I summarizes the results of performance studies.

ARE BANK PERFORMANCE STUDIES RELIABLE GUIDES FOR PUBLIC POLICY?

Bank performance is worth investigating, regardless of its implications for public policy toward bank holding company acquisitions. If the methodology is valid, bank performance studies can help economists understand how market characteristics affect bank operating results and why bank holding companies account for an increasing share of banking activity. But these studies also may indicate the likelihood that some of the benefits identified in previous Board orders will result from acquisitions of banks by bank holding companies.

Consider again exhibit A, the benefits cited in previous Board orders approving bank holding company acquisitions. Some of these benefits could be measured by financial ratios: The level of a specialized credit service could be represented by the ratio of a particular type of loan to the loan portfolio. Competition or the interest rate on loans could be represented by the ratio of interest revenue to the loan portfolio. Aggressiveness could be measured by the ratio of total loans to total assets. Economies of scale could be measured by the ratio of operating costs to total assets. The debt-to-equity ratio could be computed from a bank's financial reports. Other benefits are unrelated to financial ratios; management "depth" or problems of succession, for example, cannot be measured by any ratio.

The same financial ratios that could be used to measure certain prospective benefits of bank holding company acquisitions also appear in performance studies as measures of bank performance (see table 1).

Bank performance studies share a common methodology. They compare independent banks and bank

holding company subsidiaries on the basis of various financial ratios, computed from the consolidated reports of income and condition that all insured banks periodically file with their regulators. These reports have standard formats that vary only slightly for large banks and banks engaged in certain foreign enterprises.⁸ The same financial ratios, therefore, can be compared for all insured banks. The performance studies hypothesize that "good" or "bad" performance depends on the values of these financial ratios. Neither the relationship between performance and the financial ratios, nor the predicted effects of bank holding companies on the ratios, is derived theoretically. Like the measures of the public interest discussed previously, these ratios represent ad hoc measures of performance.

Are these ratios reliable guides to either bank performance or the public interest? It seems not.⁹ First, the empirical approaches employed in performance studies have various shortcomings. Second, these ratios are distorted by differences in accounting method, organizational structure and portfolio composition that cannot be captured by balance sheet and income statement data; moreover, they are not strictly comparable across independent banks and holding company banks.

Weaknesses of Empirical Approaches

Early performance studies used t-tests of differences in the means to evaluate the effects of holding com-

⁸The reports consolidate the financial results of a bank's main office, subsidiaries and branches (if any).

⁹Bank performance studies generally did not draw policy implications from their findings. Although early studies made explicit reference to the statutory convenience and needs test, their conclusions generally were limited to discussions of bank performance. Later studies did not refer to the convenience and needs test. Mayne went so far as to say that her results "do not relate to increased services or convenience . . ." See Mayne, "Comparative Study," p. 157. If she was referring to the Federal Reserve Board's interpretation of the public interest, then she was too circumspect. On the other hand, Jackson averred that holding company acquisitions of "well-managed" banks promise "few public benefits." See Jackson, "Multibank Holding Companies," p. 26.

Despite their unwillingness to make policy recommendations, the authors of performance studies apparently have an implicit standard for deciding whether bank holding companies are beneficial. For example, Rose and Scott described a higher ratio of other expenses to total assets among holding company banks as "alarming" and a lower ratio of farm real estate loans to total assets among holding company banks as a "deficiency." See Peter S. Rose and William L. Scott, "The Performance of Banks Acquired by Holding Companies," *Review of Business and Economic Research* (Spring 1979), pp. 29 and 31. All the performance studies refer to "bank performance." The term implies an objective or subjective standard for distinguishing superior from inferior performance.

⁷Mingo found that the difference increased with the level of market concentration. In the most highly concentrated banking market in his sample, the ratio of capital to total assets was 38 percent lower in holding company banks, other factors held constant. The lower ratio is equivalent to higher leverage. See John J. Mingo, "Managerial Motives, Market Structures and the Performance of Holding Company Banks," *Economic Inquiry* (September 1976), pp. 411-24.

Table 1
Empirical Results of Performance Studies

	Univariate Studies				Multivariate Studies						
	Lawrence	Talley	Ware	Hoffman	Johnson and Meinster ¹	Jackson	Mingo ²	Fraas	Mayne ³	Rose and Scott	Graddy and Kyle ⁴
Revenues and Expenses											
Operating Revenue/Total Assets	(+)		(+)	(+)		(+)	n.s.				
Net Income/Total Assets		n.s.	n.s.	n.s.				(-)	(+)		
Total Operating Expenses/Total Assets	(+)	n.s.	(+)	n.s.			n.s.		(-)		
Other Operating Expenses/Total Assets	(+)	(+)	⁵	(+)					(+)	(+)	
Salaries and Wages/Total Assets	n.s.	n.s.	n.s.	n.s.					(-)		n.s.
Prices											
Service Charges/Demand Deposits	(+)	n.s.	n.s.	n.s.				(+)	(+)		(+)
Deposit Interest/Time and Savings Deposits	n.s.	n.s.	n.s.	n.s.		(+)		(+)		(+)	n.s.
Interest on Loans/Total Loans	n.s.	n.s.	n.s.	n.s.		(+)			n.s.	(+)	n.s.
Portfolio Composition											
Loans/Total Assets	(+)	(+)	n.s.	(+)	(+)				n.s.	(+)	n.s.
Business Loans/Total Assets	n.s.	n.s.		n.s.			n.s.	n.s.	(-)	(+)	(+)
Real Estate Loans/Total Assets	n.s.	n.s.		n.s.			(-)	n.s.	(+)	(-)	n.s.
Installment Loans/Total Assets	(+)	(+)		n.s.			n.s.	n.s.	n.s.		n.s.
U.S. Government Securities/Total Assets	(-)	(-)	(-)	n.s.	(-)		n.s.			(-)	(-)
Cash/Total Assets	(-)	n.s.	n.s.	(-)	(-)					(-)	
State and Municipal Securities/Total Assets	(+)	(+)	n.s.	n.s.			(+)	n.s.	(+)		
Leverage (Total Assets or Debt/Capital)											
	n.s.	n.s.	(-)	n.s.	(+)		n.s.	(+)	(+)	(+)	(-)

n.s. Not statistically significant at the confidence level selected by the author(s).

(+) Indicates that the financial ratio was *higher* for holding company banks, ceteris paribus.

(-) Indicates that the financial ratio was *lower* for holding company banks, ceteris paribus.

¹The four financial ratios indicated as significant were the independent variables in a multiple-discriminant analysis that compared independent and holding company banks four years after the latter were acquired by holding companies.

²The reported results refer to the coefficient of the holding company dummy variable. In addition, an interaction variable between concentration and the dummy variable was positive and statistically significant in the equation for real estate loans/total assets and negative for business loans/total assets and capital/total assets.

³Mayne estimated equations for each of the four years 1969-72. The results are reported here as significant if the dummy variable she used entered an equation significantly in at least two of the four years.

⁴The reported results refer to the coefficient of the holding company dummy variable. In addition, six different interaction variables involving the dummy variable were statistically significant in at least one of the authors' 13 equations. In three equations, two of the interaction variables were statistically significant, and in five equations, one of the interaction variables was statistically significant.

⁵In the t-tests of differences in the means, holding company banks were found to have had a higher ratio of other operating expenses to total assets in the *second* year following acquisition by a holding company, but a lower ratio in the *third* year.

panies on the post-acquisition performance of subsidiary banks.¹⁰ In attempting to control for the influence of other factors on performance, these studies paired holding company banks with similarly-sized independent banks from the same market. These studies failed to adequately control for bank size and market characteristics, and high correlations among financial variables made univariate tests of statistical significance uninterpretable.¹¹ The univariate studies also can be criticized for eliminating from further study banks that could not be suitably paired.

Most recent performance studies have used multivariate statistical techniques, principally multiple-regression analysis.¹² Until recently, the multiple-regression models were single-equation models, which were estimated using ordinary least squares regression analysis. These models compared performance at a point in time, rather than over a post-acquisition period. The effect of holding companies on bank performance was estimated by including a dummy variable representing holding company ownership. Some studies also included interaction variables.¹³

The multivariate studies have several weaknesses. First, most of them presumed that performance differ-

ences at a point in time were due to changes in performance after the acquisition. Second, some studies continued to pair independent and holding company banks.¹⁴ Third, high multicollinearity involving interaction variables may have biased the coefficient estimates. Finally, single-equation models ignore interdependence among bank decisions.¹⁵

Graddy and Kyle attempted to account for interdependencies among financial ratios by estimating an ad hoc system of 13 equations. Although it was an improvement over earlier models, their model did not capture the hypothesized complexity of the interdependence among bank decisions; furthermore, their interpretation of certain financial ratios was questionable.¹⁶

Distortions in Financial Ratios

Specific distortions in the financial ratios can be traced to the nature of the banking firm and the bank holding company, and to the effect of regulation on bank prices. Banks sell many different products and acquire many different deposit liabilities. Revenues and expenses depend on portfolio composition, and prices depend on the size, type and risk of the assets and liabilities in the portfolio. Bank holding companies are vertically and horizontally integrated corporations. This form of organization potentially affords real advantages, but also creates accounting differences between independent and subsidiary banks. Deposit ceilings place a statutory limit on the price of certain kinds of deposits, causing banks to engage in non-price competition for loanable funds.

Problems with Ratios as Measures of Price — Performance studies represent the prices that banks

¹⁰Robert J. Lawrence, *The Performance of Bank Holding Companies* (Board of Governors of the Federal Reserve System, 1967); Samuel H. Talley, *The Effect of Holding Company Acquisitions on Bank Performance*, Staff Economic Studies 69 (Board of Governors of the Federal Reserve System, 1971); Robert F. Ware, "Performance of Banks Acquired by Multi-Bank Holding Companies in Ohio," Federal Reserve Bank of Cleveland *Economic Review* (March–April 1973), pp. 19–28; and Stuart G. Hoffman, "The Impact of Holding Company Affiliation on Bank Performance: A Case Study of Two Florida Multibank Holding Companies" (Working Paper Series, Federal Reserve Bank of Atlanta, January 1976).

¹¹Rodney D. Johnson and David R. Meinster, "An Analysis of Bank Holding Company Acquisitions: Some Methodological Issues," *Journal of Bank Research* (Spring 1973), pp. 58–61.

¹²Rodney D. Johnson and David R. Meinster, "The Performance of Bank Holding Company Acquisitions: A Multivariate Analysis," *Journal of Business* (April 1975), pp. 204–12; Jackson, "Multibank Holding Companies;" Arthur G. Fraas, *The Performance of Individual Bank Holding Companies*, Staff Economic Studies 84 (Board of Governors of the Federal Reserve System, 1974); Mingo, "Managerial Motives, Market Structures and Performance," pp. 411–24; Mayne, "Comparative Study," pp. 147–58; Rose and Scott, "Performance of Banks," pp. 18–37; and Duane B. Graddy and Reuben Kyle, III, "Affiliated Bank Performance and the Simultaneity of Financial Decision-Making," *Journal of Finance* (September 1980), pp. 951–57. Johnson and Meinster used multiple-discriminant analysis; the others used multiple-regression analysis.

¹³These were the studies by Mingo, and Graddy and Kyle. See *Ibid.* The interaction variables were products of the dummy variable and other independent variables. They tested the hypothesis that an independent variable's effect on bank performance depended on the bank's form of ownership.

¹⁴These were the studies by Johnson and Meinster, and Mayne. See *Ibid.* The former study actually used a sample of banks from Lawrence's original performance study.

¹⁵Duane B. Graddy and Reuben Kyle, III, "The Simultaneity of Bank Decision-Making, Market Structure, and Bank Performance," *Journal of Finance* (March 1979), pp. 1–18. This interdependence causes the high correlations among financial ratios noted earlier by Johnson and Meinster. The use of single equation regression models under these circumstances introduces simultaneous equation bias into the ordinary least squares estimates of the regression coefficients. Note that this criticism does not pertain to the Johnson and Meinster study, in which financial ratios entered only as independent variables in a multiple-discriminant analysis.

¹⁶The authors' choice of financial ratios to represent input and output decisions led them to interpret certain ratios as quantities. For example, the ratios of total loans to total assets, and salaries and wages to total assets, were interpreted as quantities of output and input, respectively. The authors' interpretation of the ratio of total capital to total risk assets as the bank's lending limit is doubtful. See *Ibid.*, pp. 7–8.

charge for their products and pay for deposits as ratios of income statement items to balance sheet items. For example, the price paid for deposits has been measured by the ratio of interest paid on deposits to total time and savings deposits, and the price of loans by the ratio of interest received on loans to the loan portfolio. There are four reasons that these financial ratios are inadequate proxies for such prices.

First, the ratios do not account for a bank's portfolio composition.¹⁷ The sizes and types of a bank's loans or deposits affect its operating costs and, hence, the prices the bank both pays and charges. These effects are not captured by the ratios of income statement to balance sheet items. Such ratios are actually weighted averages of many different prices; they measure average revenues and average expenses rather than prices.

Second, the ratios include risk premiums. Banks can be expected to charge higher rates of interest on loans with greater perceived default risk. Banks that choose to make riskier loans will tend to have higher average revenue from loans (and also more bad debts), although they may charge the same rate as other banks for loans of comparable default risk. Interest rate risk increases with the maturity of loans. Banks that choose to make longer-term loans also will tend to have higher average revenue from loans.

Third, the ratios fail to account for the effects of price ceilings on some deposits. When the legal rate of interest on deposits is fixed below the market rate, banks have an incentive to incur non-interest expenses to attract deposits. These additional costs are not counted as interest expense on a bank's income statement. Consequently, the average expense ratio understates the true cost of deposits. This understatement is probably greater for some banks than for others, depending on the demand and supply conditions for deposits in different banking markets.

Fourth, the ratios fail to account for interdependencies among certain prices. Some banking services are purchased in a package, for example, a borrower's agreement to maintain a compensating balance with the lending bank in return for a lower nominal rate of

interest on a loan. The true interest rate depends on the size of the compensating balance; however, the ratio measuring average loan revenue depends only on nominal rates.

Different average revenue and expense ratios are not necessarily due to different prices for a standard product. Systematic differences in portfolio composition, risk or other business strategies between independent banks and holding company banks cause systematic differences in the average revenue and expense ratios. The ratios are ambiguous guides to the prices banks charge for products and pay for deposits.

Problems with Ratios as Measures of Efficiency— In performance studies, the term "efficiency" is used to describe the relationship between bank costs and some measure of output, generally total assets but occasionally total revenue. The relationship between total costs and output is measured by the ratio of operating expenses to total assets or total revenue; the relationship between two particular elements of total cost is measured by the ratios of salaries and wages expense to total assets and other operating expenses to total assets. Smaller values of these ratios are interpreted as evidence of lower cost (i. e., more efficient) production. This interpretation is invalid.

Banks are multiproduct firms that obtain funds from a variety of sources. Some banking products and some sources of funds are more costly than others; therefore, the operating expense ratios depend on the composition of a bank's portfolio. Presumably, more costly portfolios yield higher revenues, so the ratio of operating revenue to total assets depends as well on portfolio composition. Because operating revenue also depends on the control the bank exercises over price, no ratio incorporating operating revenue is an adequate proxy for a bank's cost of production.

Bank holding companies are vertically integrated organizations; the parent company provides a variety of services to its subsidiary banks. In some cases, these services have been centralized in the holding company as an economy measure. In other cases, the salaries of some bank employees are assigned arbitrarily to the parent company instead of the subsidiary. In either case, the salaries of some employees who provide services to a subsidiary bank are carried on the books of the holding company instead of the bank itself. This introduces a systematic downward bias into the reported salaries and wages expense of holding company banks and, thus, a downward bias into the salaries and wages expense ratio of holding company banks.

¹⁷Graddy and Kyle did account for certain aspects of portfolio composition. Their equation for the average interest rate on loans included as arguments the ratios of business, real estate, and installment loans to total assets. Their equation for the average deposit rate included as arguments the ratios of demand deposits to total deposits and savings deposits to total time and savings deposits. See *Ibid.*, p. 9. These specifications are an improvement over those of other performance studies; nevertheless, they fail to account for many aspects of portfolio composition, including size differences within any category of loans or deposits.

Some bank activities are more labor-intensive than others. Consequently, the salaries and wages expense ratio may vary systematically between holding company banks and independent banks due to differences in portfolio composition. This source of distortion may reinforce or offset the downward bias discussed in the preceding paragraph.

Bank holding companies usually charge their subsidiaries for services provided by the parent company. These charges, which are internal accounting transfers, are referred to as management fees. As the "other operating expense" category on a bank's income statement includes management fees, this expense is biased upward if holding companies charge their subsidiary banks for services provided.

Problems with Leverage as a Measure of Capital Adequacy or Risk — Leverage is the ratio of debt to capital. A bank's leverage may reflect the attitudes of owners or managers toward risk; it may be related to other factors as well. Performance studies have advanced one reason that holding company banks should be less highly leveraged and another that they should be more highly leveraged, irrespective of attitudes toward risk.

Some performance studies have argued that bank holding companies have greater access to capital markets than independent banks. As this advantage should translate into a lower cost of capital, banks owned by holding companies should hold more capital in relation to debt than independent banks. On the other hand, holding companies also are better able than independent banks to diversify geographically.¹⁸ Other performance studies have argued that geographically diversified holding companies reduce their risk by lessening their dependence on any single geographic area. With this advantage, they should require less capital for any given level of debt. Both arguments have been used to rationalize empirical results. Because the arguments do not unambiguously predict the effect of bank holding companies on the ratio of debt to capital, leverage measures neither capital adequacy nor risk.

Certain accounting conventions obscure any comparison of the capital of holding company banks and independent banks. Holding companies can borrow funds to augment the reported capital of their subsidiary banks. (This practice is known as double leveraging.) For accounting purposes, the funds are capital to the bank and debt to the holding company; therefore, the effect of the borrowing is to increase the leverage of the parent company and decrease the leverage of the subsidiary bank.

Does double leveraging improve the capital position of the bank? To put the question differently, is a bank that borrows through its parent holding company actually exposed to less risk than an independent bank that incurs the same debt itself? The answer depends ultimately on whether a subsidiary bank is insulated from the financial problems of its parent company. On one hand, the bank is a separate legal entity; the holding company is prohibited legally from draining the bank of its assets or capital. On the other hand, the operating policies of the bank are dictated by the parent company; if faced with insolvency, the holding company is likely to operate the bank in a risky manner in an attempt to meet the interest payments on its debt. It seems that the practice of double leveraging obscures the distinction between debt and capital, causing an overstatement of the capital positions of subsidiary banks and an understatement of risk.

Problems with Ratios as Measures of Portfolio Composition — Several portfolio ratios are used in performance studies. They measure the proportions of total assets held as loans, cash, U.S. government securities and so forth, and the proportions of the loan portfolio devoted to different kinds of loans, such as business, real estate and installment loans. Differences in portfolio mix are partly responsible for the biases in other financial ratios.

The portfolio ratios are less subject to potential distortion than other financial ratios. Nevertheless, certain portfolio ratios may be biased due to the division of a bank holding company into bank and non-bank subsidiaries. This division creates reporting differences between holding company and independent banks. For example, a mortgage loan by an independent bank would be reported on the bank's call report, but the same loan by a holding company's mortgage subsidiary would appear on the books of the non-bank subsidiary. Although non-bank subsidiaries account for a small proportion of total holding company activities, the legal and accounting divisions may distort particular portfolio ratios, such as the ratio of real estate loans to total loans.

¹⁸Bank holding companies can own non-bank subsidiaries in any state, whereas banks are limited by state branching restrictions. Banks cannot locate offices in states other than their home states, and in some states are limited to conducting all or most of their business from a single office. In states that restrict branching, multibank holding companies can circumvent legal restrictions on the geographical extent of a bank's operation by acquiring or chartering banks in different areas of the state. Thus, to some extent they are substitutes for branch banks.

The portfolio ratios do not indicate unambiguously the extent of lending to the local community. A higher ratio of loans to total assets is not necessarily evidence of greater local lending, because some loans on the bank's books may represent loan participations or purchased paper.

CONCLUSION

The financial ratios used in bank performance studies are subject to substantial distortion when used to assess the impact of bank holding companies on bank performance. These distortions are attributable to the nature of the banking firm and the bank holding company organization, and to the effect of regulation on deposit interest rates. As a result, the performance studies generally have not provided reliable evidence about the effect of bank holding companies on either bank performance or the factors that the Board of Governors has identified as prospective benefits of holding company acquisitions.

Previous investigations have found that the Board of Governors has not given much weight to convenience and needs. The finding that orders approving bank holding company acquisitions "seldom dwelt" on the benefits of the case when an acquisition had an unim-

portant competitive effect, and the slight weight given prospective benefits in orders of denial seem to support this conclusion.¹⁹ This is consistent with the results of past performance studies, which usually have attributed only small effects to holding companies, and often have contradicted each other at that.

There is no evidence that the Board has relied on either financial ratios or the results of performance studies in reaching its decisions. The assessment made in this article indicates that it should use neither. Although the shortcomings of previous empirical approaches eventually may be overcome, the problems with using financial ratios to measure either performance or the public interest appear intractable.

Performance studies are not without potential value, however. If properly designed, the studies can identify differences between the reported operating results of independent banks and holding company banks. These differences may suggest directions for research into the incentives for bank holding company formation and growth. But they are not likely to provide useful evidence of the desirability of bank holding company acquisitions.

¹⁹Jessee and Seelig, "Analysis of Public Benefits Test," pp. 161-62.

