Money Market Mutual Funds and Monetary Control

Money market mutual funds have existed since the 1970s; however, it is only in the past three years that they have become a significant portion of the public's portfolio of financial assets. From the end of 1978 to November 1981, money market funds (MMFs) have increased more than sixteenfold. Much of this growth stems from the features which distinguish MMFs from other financial assets. They provide market rates of interest, entail a degree of risk which is acceptable to a wide range of investors, and with the convenience of checking for large withdrawals (generally $500 or more) are highly liquid. Moreover, it is just this unique combination of features that raises important issues for the conduct of monetary policy In particular, are MMFs being used as transactions accounts and, therefore, directly substituting for checkable deposits at commercial banks and thrift institutions? To the extent that this has occurred, it is possible that the below-target growth of the money supply during 1981, as measured by M-1B, may be related to the rapid growth of MMFs.

At the same time, the unique features of MMFs raise a number of definitional questions about their positioning in the monetary aggregates. Should, for example, some portion of MMFs be included in the narrowly defined M-1B aggregate, or is the current inclusion of all MMFs only in the larger M-2 measure still appropriate? Furthermore, including all MMFs in M-2 is complicated by the consideration that institutional investors may view them as close substitutes for large certificates of deposit (*i e.,* CDs, certificates in denominations of $100,000 or more) and other market instruments. Such assets are not included in M-2 but are part of the broader aggregates, M-3 and L

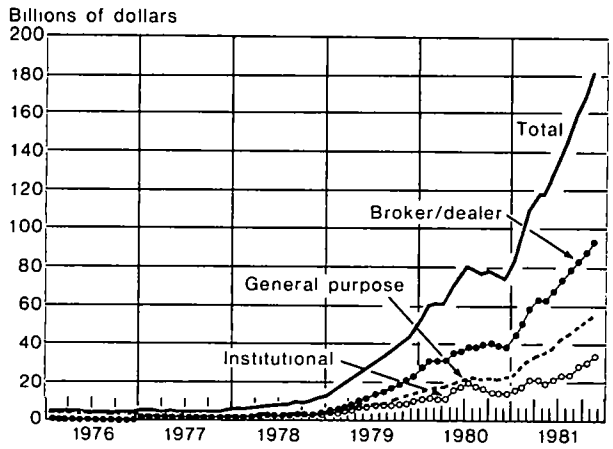
In this article, evidence is presented that suggests MMFs have contributed in a significant way to the weak growth of M-1B during 1981. However, MMFs do not appear to be functioning largely as transactions accounts, although some portion is likely being used in this manner. Rather, the available evidence suggests that MMFs held by individuals more closely resemble savings accounts in their use Hence, the inclusion of MMFs in M-2 but not in M-1B still seems warranted.[1] This result also indicates that the impact of MMFs on the growth of M-1B has been primarily indirect in nature. That is, while not serving as direct substitutes for M-1B deposits, MMFs have provided a high-yielding alternative way to hold liquid assets, causing individuals and businesses to economize on their holdings of transactions deposits The same type of behavior would be expected in the absence of MMFs if the interest rate paid, say, on savings accounts were raised to the level of market rates and large withdrawals by check were permitted In other words, when a new, very liquid instrument that offers market yields becomes widely accepted and used, it is not all that surprising to see slower M-1B growth than would otherwise have occurred

While these conclusions about MMFs can be drawn from past experience, they may not apply to the future in the same way. The United States financial system continues to evolve with new innovations which seem likely to blur the distinction between transactions

[1] As will be shown later, an argument can be made for excluding from M-2 that portion of MMFs which is held primarily by institutional investors, while continuing to include all MMFs in the broader monetary aggregates

Chart 1

Money Market Mutual Fund Assets



Source Investment Company Institute

balances and other monetary assets even further New ways are being developed to provide access to funds invested in MMFs which could over time make them closer substitutes for transactions accounts For example, one major brokerage house allows checks of any size to be drawn on an MMF if the account holder has $20,000 invested through this firm [2] Another MMF is planning to establish a "sweeping" arrangement which would transfer balances between its customer's negotiable order of withdrawal (NOW) account and the MMF account at the end of each day Also, major credit card issuers are planning to offer MMF links with their credit cards Such developments will further complicate monetary control

Types of money market funds and their growth

While new ways to use MMFs are being developed which could well influence their overall pattern of growth in the future, some insights into their past behavior can be gained by dividing all MMFs into two broad categories institutional funds and noninstitutional funds Institutional funds are those MMFs which are available only to or through institutional investors Noninstitutional funds are available to all investors and can be further divided into broker/dealer funds, which are affiliated with stockbrokers, and general purpose funds

All three categories have experienced a dramatic increase in assets during the past three years with broker/dealer funds currently accounting for the largest portion of total MMF assets (Chart 1 and Table 1) General purpose funds have exhibited a somewhat slower rate of growth These two classes of MMFs have similar characteristics, as is shown by the statistics on the size of the average account (Table 1), and for purposes of analysis they have been combined As of November 1981 institutional funds represented only 18 percent of all MMF assets, a substantial reduction from their over 30 percent share at the end of 1978 These MMFs have a considerably larger average account size and have displayed a somewhat more erratic pattern of growth, which suggests that their behavior may be affected by a different set of economic factors than the noninstitutional funds

The growth of MMFs, both institutional and noninstitutional, seems to be closely related to the difference between their own rate of return and the yields of alternative financial assets For example, as is shown in the top panel of Chart 2, the growth of noninstitutional funds since 1979 has responded in a fairly systematic way to the spread between MMF yields and the yields of six-month money market certificates (MMCs) despite the difference in the maturities of these two assets One possible explanation for this pattern is that individual investors are simply choosing the highest yielding asset among the convenient alternatives irrespective of maturity [3] A second explanation stems from the time lag between changes in market yields and MMF yields Because of the accounting method used by most MMFs, their yields will tend to be above those of other short-term assets when interest rates are falling and below them when rates are rising [4] If the average interest rate on six-month Treasury bills, which determines the MMC rate, reflects

[2] Most MMFs restrict the size of check redemptions to a minimum of $500

[3] In a household survey conducted by the University of Michigan Survey Research Center in June 1981, 52 percent of respondents indicated that their funds would have been in MMCs if MMFs were not available

[4] Most MMFs do not take capital gains or losses on securities in their portfolios into account when they are computing their yield Their yield under most circumstances is a weighted average of the yields of their securities at the time that they were purchased, the weights determined by the share of each security in its portfolio Thus, the yields of these MMFs reflect market rates at earlier points in time rather than current rates and tend to lag behind current market yields All institutional and most noninstitutional funds calculate yields in this fashion Even among MMFs which do take capital gains and losses into account in computing yield, many do so only for securities with more than sixty days to maturity When interest rates are stable, the accounting methods do not make too much difference When rates are falling or rising rapidly, MMF yields can be significantly different from market yields

market expectations of average short-term rates over the next six months, then a fall in MMC rates indicates an anticipation of falling short-term rates in the near future. But, because of MMF accounting procedures, this is precisely the circumstance under which the yield on MMFs will exceed other market yields, making MMFs a more attractive investment. Since most short-term interest rates move closely together, charts incorporating other interest rates showed almost the same pattern. However, the spread using the six-month MMC rate appeared to show the best "fit".

A revealing aspect of the relationship between the growth of noninstitutional funds and interest rate spreads is that these MMFs have rarely experienced declines in asset levels. Even when market interest rates were far above MMF yields (*i.e.*, the spread shown in Chart 2 is negative), the assets of noninstitutional funds continued to grow or fell only slightly. This suggests that individual investors are still learning about MMFs and are shifting funds into MMFs as they become acquainted with them even though MMFs may not at times pay as much as is available elsewhere.

Table 1

Assets of Money Market Funds

Assets in billions of dollars and percentage of total, average account size in thousands of dollars

		Broker/dealer			General purpose			Institutional		
End of month	Total assets ($)	Assets ($)	Assets (%)	Average account size ($)	Assets ($)	Assets (%)	Average account size ($)	Assets ($)	Assets (%)	Average account size ($)
December 1976	3 4	0 4	12	16 7	2 4	70	16 6	0 6	18	78 5
December 1977	3 9	0 8	20	17.0	2.1	53	17 3	1 0	27	84 8
December 1978	10 9	3 7	34	16 9	3.9	36	19 5	3 3	31	63 9
December 1979	45 2	22 9	51	16 6	12 7	28	15 8	9.7	21	73 6
December 1980	74 4	38 9	52	14 3	21 6	29	11 8	14.0	19	65 0
November 1981	181 6	93 7	52	17 3	54 2	30	12 5	33 7	18	140 1

Source Investment Company Institute

Table 2

Turnover Rates

	Money market funds				Commercial bank deposits		
Year	Total	Broker/ dealer	General purpose	Institutional	Demand deposits*	NOW/ATS accounts†	Savings deposits‡
1976	2 6	2 7	2 4	3.7	79 8	§	§
1977	2.7	3 2	2 6	2.7	85 9	6 5	1.5
1978	3 4	3 8	3 1	3 5	96 8	7.0	1 7
1979	2 9	3 0	2 4	3 4	113 3	7 8	2 7
1980	3 0	3 0	2 2	3 8	134.3	9 7	3 4
January-September 1981	2 6	2 7	1 8	3 8	178 3	14 3	3.7

* Excluding major New York City banks

† Accounts authorized for negotiable order of withdrawal (NOW) and accounts authorized for automatic transfer to demand deposits (ATS)

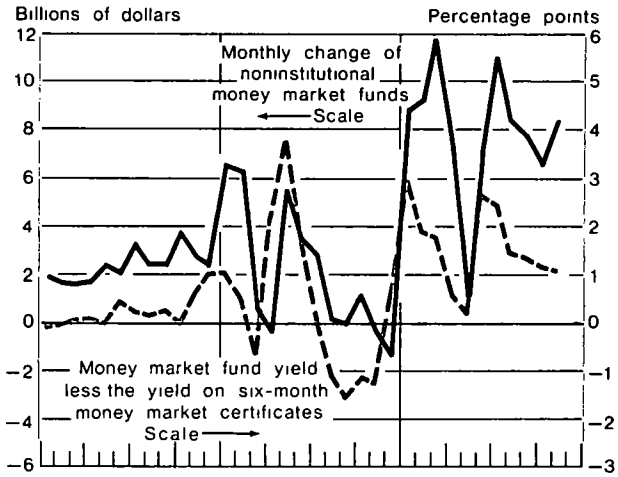
‡ Savings accounts other than NOW, ATS, and business savings

§ Not available.

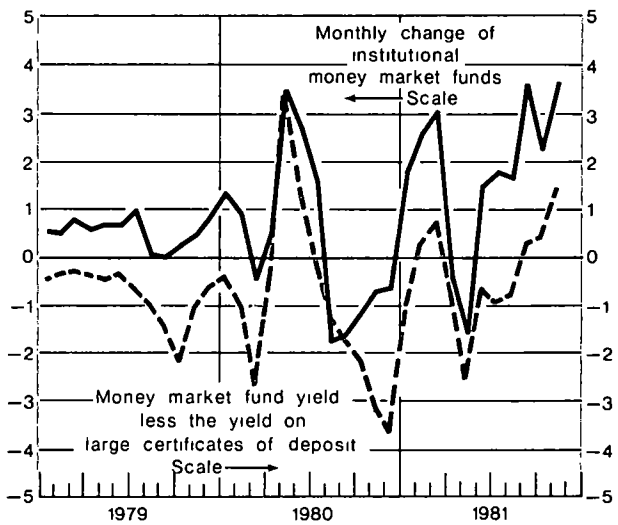
Sources: Investment Company Institute and *Federal Reserve Bulletin*.

Chart 2

The growth of money market mutual funds appears to be closely related to the spread between their yields and the yields of alternative assets . . .



. . . although institutional money market funds appear to be more responsive to changes in interest rates than noninstitutional money market funds.



Sources Investment Company Institute, Donoghue's Money Fund Report (Holliston, Mass), Federal Reserve Bulletin

The pattern of growth of institutional funds, meanwhile, indicates that investors in these MMFs are much more responsive to changes in interest rates. (The lower panel of Chart 2 relates the growth of institutional funds to the spread between MMF yields and the yield on large CDs.) Unlike the noninstitutional funds, which appear to have a strong upward trend, the institutional funds had not shown much growth since mid-1980 until very recently Indeed, there were substantial declines in their asset levels when market interest rates exceeded the yield on MMFs in contrast to the behavior of noninstitutional funds under similar circumstances. The large average size of institutional fund accounts makes it both possible and worthwhile for their holders to consider direct investments in market instruments, such as large CDs and United States Government or corporate securities as alternatives to MMFs.[5] Indeed, the accounting methods of institutional funds insure that the spread between their yield and the yield on alternative investments will change when market rates move up and down. The responsiveness of institutional fund investors to interest rate spreads suggests that they have become much more acquainted with MMFs than noninstitutional fund investors and view them as close substitutes for other financial assets.

Most of the assets which seem to be reasonable alternatives to institutional funds are not included in M-2 As a result, the flow of funds into and out of institutional funds is of concern for monetary control because they can affect the growth of M-2, particularly in the short run For example, the annualized growth rate of M-2 between July and October 1981—a period when short-term rates fell and institutional funds increased sharply—was 8 8 percent. With institutional funds subtracted from M-2, this figure drops to 7.2 percent. Conversely, the exclusion of institutional funds from M-2 during the second half of 1980, when rates increased and institutional funds declined, would have raised the growth rate of M-2 Some of these short-term fluctuations in M-2, stemming from the decision by large investors to hold market instruments either directly or indirectly through MMFs, could be avoided if institutional funds were excluded from this aggregate or if the accounting methods used by these MMFs were changed Of course, institutional funds should continue to be included in M-3 and L, which contain similar financial assets

[5] In fact, most institutional funds have minimum initial investment requirements of $25,000 to $100,000

Use of money market funds

Evidence on the use of MMFs can be obtained by examining data on the volume of redemptions. This allows the calculation of turnover rates , *i.e.,* the ratio of redemptions over a given time period to the average level of assets during that period. A high turnover rate is usually associated with an asset used for transactions purposes, while a low turnover rate would indicate an instrument used for longer term holding of wealth.

Table 2 shows turnover data for MMFs[6] and commercial bank deposits. For the first nine months of 1981, MMF turnover averaged 2.6 at an annual rate, far below the 178.3 annual turnover rate for demand deposits (excluding deposits at major New York City banks) and also lower than the turnover of NOW and ATS accounts (14.3). Indeed, MMF turnover strongly resembles that of savings deposits, which averaged 3.7 during the first nine months of this year.

The turnover rates for MMFs have also been relatively stable over time. While turnover rates for demand deposits and NOW/ATS accounts have risen steadily since 1976, MMF turnover has hovered around an average value of 2 9, even during the last few years. This would suggest that the recent increase in MMF assets has not been for transactions purposes[7]

An alternative method of examining MMF turnover is with an econometric equation that relates the turnover of MMFs to those economic factors which are thought to be its major determinants. Equations for noninstitutional MMF and savings deposit turnover rates are presented in Appendix 1. The results indicate that MMF turnover is similar to that of savings deposits but may reflect some additional transactions use. Both MMF and savings turnover are related to market interest rates, reflecting the movement of funds between different types of financial assets Both series are also influenced by seasonal patterns in the public's demand for transactions balances, although the effect on MMF turnover appears to be a little stronger than for savings turnover Finally, while the turnover of savings deposits does not appear to be related to the level of consumption expenditures, the MMF turnover data show a small but significant relationship to this measure of transactions activity.

Impact of money market funds on the narrow money supply

Even though MMFs do not appear to be widely used as transactions deposits, they may nevertheless be lowering the public's demand for M-1B by providing a good resting spot for funds not needed immediately for transactions. Most models of the transactions demand for money indicate that, as interest rates on savings deposits and market instruments increase, individuals tend to economize on their money holdings, moving funds from the interest-yielding account to a transactions account only as needed. This movement of funds reduces the average amount of transactions balances. MMFs are well suited for making this substitution, offering a unique combination of liquidity and high market yields.

To see whether MMFs are important in the money holding decision, a statistical equation representing the demand for M-1B was estimated (Appendix 2). The statistical results indicate that, as the yield on MMFs rises and as MMFs become a more significant portion of the public's holdings of savings-type assets, the demand for M-1B declines. Furthermore, the impact of MMFs on M-1B growth from the fourth quarter of 1980 through the third quarter of 1981 (on a quarterly average basis) appears to be substantial, possibly as much as 3.9 percentage points at an annual rate, although this figure is subject to considerable uncertainty

In sum, the rapid growth of MMFs during the past year has raised important questions for monetary control, and the future development of this unique financial instrument—as well as other possible innovations—will require careful scrutiny in interpreting and using the monetary aggregates as intermediate targets.

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[6] MMF turnover was calculated from end-of-month data on assets (A) and monthly data on redemptions (R) as follows

$$\text{Turnover}_t = \frac{R_t}{(A_t + A_{t-1})-2} \cdot 12$$

[7] However, the aggregate turnover data could be misleading For example, if MMFs experienced an inflow of funds with a high turnover rate that was counterbalanced by an equivalent or larger inflow of funds with low turnover, the average turnover rate could remain unchanged or possibly decline even though a growing volume of MMFs was being used for transactions purposes Unfortunately, existing data sources do not allow this question to be addressed at a disaggregated level

Appendix 1: Equations for Noninstitutional Money Market Fund and Savings Deposit Turnover Rates

The following equations represent an attempt to explain the turnover rates of noninstitutional money market funds (equation 1) and passbook savings accounts (equation 2) using an econometric approach. By comparing the factors that influence MMF and savings turnover, some light may be shed on the use of MMFs for transactions purposes. In particular, if MMFs are used to replace demand deposits, it would be expected that (1) the turnover rate for MMFs would more strongly reflect the seasonal patterns in the public's holdings of demand deposits and (2) MMF turnover would also be more closely related to overall indicators of the level of transactions—such as consumption expenditures—than savings turnover.

As shown in the accompanying list of definitions, the explanatory variables in the two equations are interest rates on MMFs and six-month Treasury bills, a series of seasonal adjustment factors for household demand deposits,[1] and a measure of consumption expenditures. The interest rate variables capture the shifting of funds between MMFs or savings deposits and alternative investments as interest rates change. The signs on these variables in equation (1) indicate that individuals make fewer redemptions from MMFs when their yield (RMMF) rises and more redemptions when Treasury bill rates (RTB) increase. Since the coefficients on these two variables are of roughly the same magnitude but of opposite sign, the spread between these rates appears to be the important factor, as was suggested by the top panel of Chart 2.[2] In equation (2) the turnover rate of savings deposits is shown to respond positively to changes in the yield on six-month Treasury bills, which determine the yield on six-month money market certificates (MMCs). If holders of savings accounts learned about and responded to the introduction of MMCs only gradually, the impact of MMCs on savings turnover would increase steadily over time. One way to capture such a gradual shift was to include the Treasury bill rate in the equation in two forms: alone and multiplied by a time trend beginning in June 1978 when MMCs were introduced The impact of changes in the Treasury bill rate on savings turnover that results from the combination of the two RTB variables grows from 0.39 in the period prior to June 1978—*i e.*, the coefficient on Ln(RTB)—to 1 4 in December 1980[3]

The seasonal adjustment factors for household demand deposits are included in the equations because they reflect the need for individuals to make withdrawals from both MMFs and savings deposits to meet transactions needs that occur regularly over the course of a year, such as holiday-related expenditures and tax payments. The coefficients on this variable in the two equations are remarkably close in size. This suggests that MMFs are used in much the same way as savings deposits on a seasonal transactions basis.

The variable for consumption expenditures was included as a measure of the overall level of transactions. While the seasonal variable reflects recurrent transactions demands, the consumption variable captures those transactions needs that vary with the level of economic activity. The results from equation (2) indicate that there is little relationship between savings turnover and consumption expenditures—the coefficient is insignificant and of the wrong sign. In contrast, equation (1) suggests that there is a significant and positive relationship between MMF turnover and the level of consumption. The coefficient is not very large, however, and represents evidence of a small transactions use beyond that to which savings accounts have been put.

[1] The seasonal factors were computed by Bruce J Summers and appeared in "Demand Deposits A Comparison of the Behavior of Household and Business Balances", *Economic Review*, Federal Reserve Bank of Richmond (July/August 1979)

[2] The yield on six-month Treasury bills was used in the MMF turnover equation instead of the six-month MMC yield because the sample period began well before MMCs were introduced

[3] To test whether the impact of the introduction of MMCs on savings turnover was immediate instead of gradual, the RTB variable was included in the equation multiplied by a dummy variable, which had a value of 1 from June 1978 to December 1980, and 0 otherwise This variable was not statistically significant In addition, a passbook savings rate was initially included in equation (2), but as this rate was virtually constant over the sample period it was also insignificant

Appendix 1 *(continued)*

Independent variables	**Equation (1)** **Dependent variable:** turnover rate for noninstitutional MMFs *coefficient (t-value)*	**Equation (2)** **Dependent variable:** turnover rate for savings deposits *coefficient (t-value)*
Constant	2 37 (4 93)†	0 90 (0 90)
Ln (RMMF)	−1 59 (−2 87)†	
Ln (RTB)	1 78 (2 80)†	0 39 (0 78)
Ln (RTB)•T		0 03 (6 20)†
Ln (Seasonal)	7 86 (3 89)†	6 04 (2.36)*
Ln (Consumption)	1.43 (3 10)†	−0.32 (−0 57)
Coefficient for first order serial correlation	0 51 (4 62)†	0 35 (2 29)*
$\bar{R}^2$	0.29	0 79
S E E	0 33	0 32
D W	2 22	2.13
Sample period‡	June 1976-September 1981	July 1977-December 1980

* Indicates significance at the 95 percent confidence level.

† Indicates significance at the 99 percent confidence level.

‡ The equation for savings turnover was estimated only through 1980 to avoid the effects of the nationwide introduction of NOW accounts in 1981. Savings turnover data are not available prior to July 1977.

Definitions of independent variables:

Ln	Represents the natural logarithm
RMMF	Yield on money market funds
RTB	Yield on six-month Treasury bills
T	Time trend beginning in June 1978.
Seasonal	Seasonal adjustment factor for household demand deposits (averages to a value of one over the year)
Consumption	Ratio of consumption to the trend in consumption (constant dollars, not seasonally adjusted)

Appendix 2: The Demand for M-1B

To examine whether the weak growth of M-1B during 1981 was related to the very large increase in MMFs, the following demand for money equation was estimated over the period January 1972 to September 1981. The dependent variable was M-1B adjusted for the estimated transfer of funds from non-M-1B sources into NOW accounts. This series was then converted to constant-dollar terms by dividing it by the deflator for personal consumption expenditures. The independent variables were defined as shown in the list below the regression results. They included real personal income, the yield on commercial paper, and the yield on MMFs multiplied by a series of weights (W). This last variable was designed to reflect the impact of MMFs on the demand for money. The MMF yield was weighted under the assumption that it was only as individuals became aware of MMFs over time and began to regard their yields as the opportunity cost of holding transactions balances that the impact on money demand was felt. Hence, the weights were calculated as the *relative* importance of noninstitutional MMFs, compared with other savings-type components of M-2. Finally, in the expectation that the credit control program of 1980 had a transitory effect on the demand for money, a dummy variable was included for this period.[1]

Independent variables:	Dependent variable: ΔLn (M÷P) Coefficient	(t-value)
Constant	−0 003	(−4 51)†
ΔLn (Y÷P)	0 94*	(6 80)†
ΔLn (RCP)	−0 04*	(−5 04)†
ΔLn (RMMF)•W .	−0 24	(−2.92)†
D	−0 006	(−3.34)†
$\bar{R}^2$	0 48	
S.E.E.	0 004	
D W	2.03	
Sample period	January 1972-September 1981	

* Coefficients represent the sum of a six-month second degree polynomial distributed lag with end-point constraints.

† Indicates significance at the 99 percent confidence level.

Definitions of variables

ΔLn ..... Represents the change in the natural logarithm
M ..... M-1B less the portion of other checkable deposits estimated as coming from sources other than demand deposits, primarily savings deposits This adjustment was made to obtain a more accurate measure of transactions balances during the public's adjustment to the introduction of ATS and NOW accounts
P ..... Personal consumption expenditure deflator.
Y ..... Personal income
RCP ..... Yield on thirty-day commercial paper.
RMMF ..... Yield on money market funds.
W ..... The ratio of noninstitutional MMFs to the sum of savings and small time deposits at commercial banks and thrift institutions and noninstitutional MMFs (Over the first nine months of 1981, this ratio increased from 5 percent to 10 percent)
D ..... Dummy variable for the credit control period with a value of 1 for April to July 1980, −1 for August to November 1980, and 0 otherwise

The regression results indicate that the demand for M-1B is positively related to the level of income and negatively related to market interest rates, including the yield on MMFs. However, this estimated relationship with MMFs might be an artificial result stemming from the strong growth of MMFs and the weakness of M-1B in 1981. To check this possibility, the equation was reestimated only through December 1980. The coefficients of the reestimated equation changed very little and remained significant at the 90 percent confidence level.[2] In an attempt to estimate how large the effect of MMFs might be in 1981, the results of this equation were used to project the level of M-1B through September 1981 under two alternative assumptions for the MMF variable The first assumption used the actual values for MMF yields and the series of weights during 1981. The second assumption was that these variables remained fixed at their December 1980 levels. Both simulations used the actual 1981 values for the other independent variables.

Table 3 reports the forecast errors for the two alternative projections of M-1B. The first simulation, using the actual 1981 values of the MMF variable, is fairly accurate on balance for the nine-month period with an average underpredic-

[1] The passbook savings rate was also originally included in the equation but was not statistically significant.

[2] The results of the reestimated equation are available on request

Appendix 2 *(continued)*

Table 3

M-1B Forecast Errors

Actual less predicted; in billions of dollars

1981	**Simulation 1:** used actual 1981 values for RMMF and W	**Simulation 2:** used December 1980 values for RMMF and W	Simulation 1 errors less Simulation 2 errors
January	−0 1	−1.2	1.1
February	−0 5	−3 2	2 7
March	0.1	−4 1	4 2
April	5.2	−0 4	5 6
May	4 4	−2.7	7.1
June	1.1	−7 3	8 4
July	0.0	−10 3	10 3
August	2 0	−10 3	12 3
September	−2 0	−15 6	13 6
Mean error· January-September	1.1	−6 1	7 2
Mean error· July-September	0 0	−12 1	12 1

tion of only $1.1 billion. In contrast, the second simulation consistently overpredicts the actual M-1B level by an average of $6.1 billion. This divergence between the two projections—over $7 billion per month on average—is attributable to the consideration that the second set of forecasts did not take into account the rapid growth of MMFs or changes in their yield. This figure can, therefore, be interpreted as a rough approximation of the average impact of MMFs on M-1B over the first three quarters of 1981. Moreover, the data in the third column of Table 3 show that the impact increased steadily over the nine-month period. This reflects the increased importance of MMFs as a component of the public's holdings of savings-type assets as the year progressed. By the third quarter of 1981 the effect of MMFs on M-1B, as measured by the difference between the two simulations, had increased to over $12 billion. However, this does not imply that $12 billion of MMFs were being used as transactions accounts in 1981-III, which could in principle be added into M-1B. Rather, the regression approach provides an estimate of the sum of two independent effects of MMF growth: the direct substitution of MMFs for transactions accounts as a means of making payments and the indirect impact of lowering the public's demand for M-1B by providing a convenient high-yielding form for holding short-term balances. Both effects reduce the level of M-1B, but only the former is actual transactions use. Furthermore, the results presented here are sensitive to the specification of the money demand equation and the sample period used for estimation. Hence, while they indicate the essential features of the relationship between MMFs and M-1B, they should be used with caution.