

Financial Transactions and the Demand for M1

Over the past few years, trading volume in the financial markets has increased at a very rapid rate.¹ At the same time, M1's growth has been considerably stronger than would have been expected given the performance of GNP, creating doubt about the adequacy of GNP as a measure of the total dollar volume of transactions. In other words, GNP may understate the overall transactions demand for M1 when trading in financial instruments is increasing at a considerably faster rate than GNP. If this is the case, some economists suggest using the dollar volume of debits to checking accounts to approximate the transactions demand for money instead of GNP, because debits to checking accounts occur for all types of transactions, financial and non-financial, and not just for sales of goods and services to final purchasers.²

To evaluate whether financial trading has significantly increased the demand for M1 by causing debits to checking accounts to grow much more rapidly than GNP, two links should be established. First, a relationship needs to be found between the volume of financial transactions and debits to transactions accounts; and

second, debits should be a better proxy than GNP for the transactions that affect money demand. If these points cannot be established, then it is somewhat less clear that financial transactions are affecting the growth of M1 to a large degree.

In this article, we examine the data available on these two linkages. By and large, there has been little quarter-to-quarter correlation between trading volume and debits to checking accounts. In addition, the data suggest that in the longer run, debits are not a significantly better measure than GNP of those transactions that matter for money demand. Finally, even in the case of 1985, when debits did track M1 growth better than GNP, it is uncertain whether financial transactions were the primary reason debits predicted M1 growth more accurately. The growth rates of debits and GNP can diverge for reasons other than financial transactions.

Trading volume, debits, and GNP

Chart 1 shows the explosive growth of two readily available data series that are sometimes taken as indicating the general growth of financial transactions: the dollar volume of transactions on the New York Stock Exchange and the dollar volume of trading by dealers in U.S. Government securities.³ Mirroring this explosive growth in financial trading volume has been the growth of debits to checking accounts. And the growth of M1 has generally been faster than expected since the early 1980s, when financial transactions and debits began to

¹This has been true not only for the established stock and bond markets, but also in relatively new markets such as options, swaps, and futures. For more detail, see the 1985 *Annual Report*, Federal Reserve Bank of New York, page 18, and "Demystifying Money's Explosive Growth," *Morgan Economic Quarterly* (March 1986), pages 10-13.

²See, for example, John Wenninger, "Reserves Against Debits," this *Quarterly Review* (Winter 1982-83). Also see, Ralph C. Kimball, "Wire Transfers and the Demand for Money," *New England Economic Review*, Federal Reserve Bank of Boston (March-April 1980). Charles Lieberman, "The Transactions Demand for Money and Technological Change," *Review of Economics and Statistics* (August 1977), and Alexander J. Field, "Asset Exchanges and the Demand for Money, 1919-29," *American Economic Review* (March 1984).

³The trends in the trading volume of these segments of the financial markets, of course, may or may not parallel the growth in the volume of financial transactions in all markets—but the data on other financial transactions are rather limited and analysts have been forced to use these two series as an indication of what is happening more generally.

accelerate sharply relative to GNP. At first glance, the similarity in these longer-run trends implies that the more rapid growth of trading volume in financial instruments relative to GNP has contributed to more rapid growth in debits, and this in turn has increased the demand for M1. In theory, of course, an increase in financial transactions should add to the demand for M1, all other factors equal, but how important are financial transactions in practice?

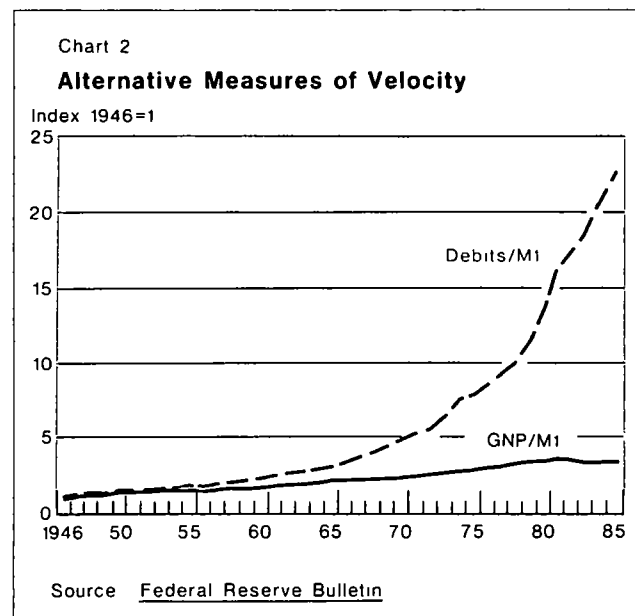
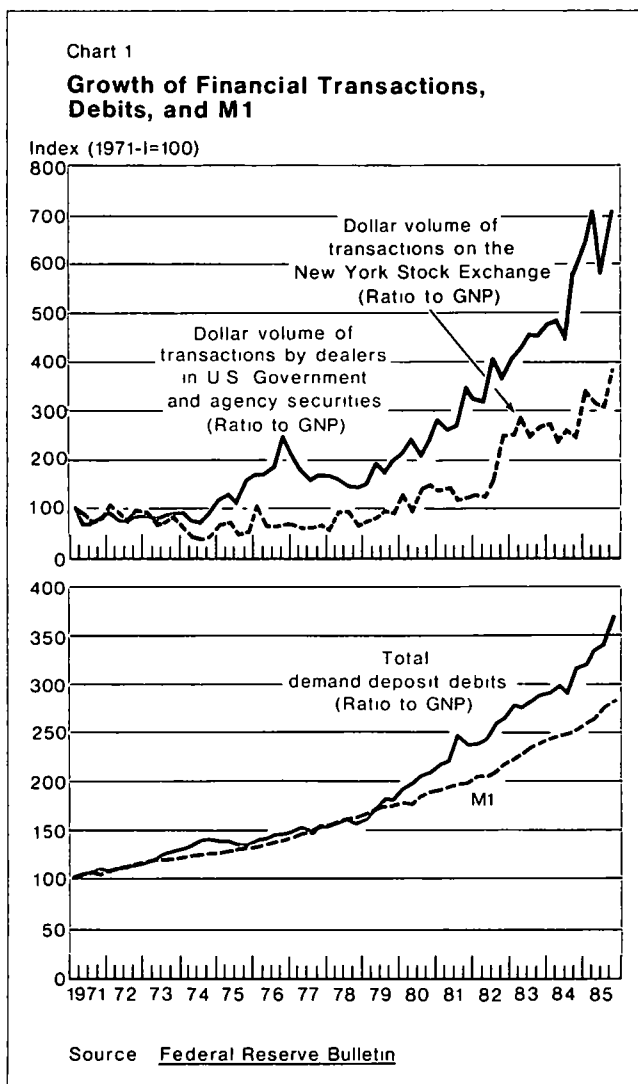
Charts 2 and 3 show that financial transactions may not explain much of M1's growth. Chart 2 compares the long-run trend in the velocity of M1 measured two ways, using debits and GNP. Since the late 1950s, velocity measured with debits has increased by a factor of 11, whereas velocity measured with GNP is only about two

times greater. Indeed, the extremely rapid (and accelerating) growth of velocity measured with debits suggests that many financial transactions—such as arranging an overnight repurchase agreement—are undertaken specifically to reduce checking account balances. Since these transactions directly decrease the volume of M1, rather than adding to the demand for M1 as conventional transactions would, they cause velocity (as measured with debits) to rise. That is, these cash management transactions raise velocity by increasing the numerator in the debits/M1 ratio and decreasing the denominator at the same time.⁴

Another reason the increased volume of debits may not be increasing the demand for M1 can be seen from the components of M1. In recent years, the growth of total debits primarily reflected debits to demand deposit accounts, whereas M1's growth has been dominated by increases in negotiable order of withdrawal (NOW) accounts (Chart 3). If a larger volume of financial transactions was increasing the demand for M1, we would expect the growth of debits and the greater demand for M1 to show up in the same component of M1, but this generally has not been the case for the 1982-85 period.⁵ In 1985, however, the demand deposits

⁴In addition, increased emphasis on cash management in general and technological advances in monitoring money balances have reduced the level of M1 relative to both the level of GNP and the volume of debits over time.

⁵It could be argued, of course, that the key issue is not which component of M1 contributed the most to M1's growth, but rather whether the larger volume of debits to demand deposits increased the demand for these deposits beyond what it otherwise would have been.



category did contribute a larger amount to M1 growth than in recent years, and financial transactions could have played a significant role in M1's very rapid growth last year even though their importance in the longer run is uncertain. In the remainder of this article, we will show that financial transactions added about one percentage point to M1's growth in 1985. But this estimate is subject to sizable error in either direction.⁶

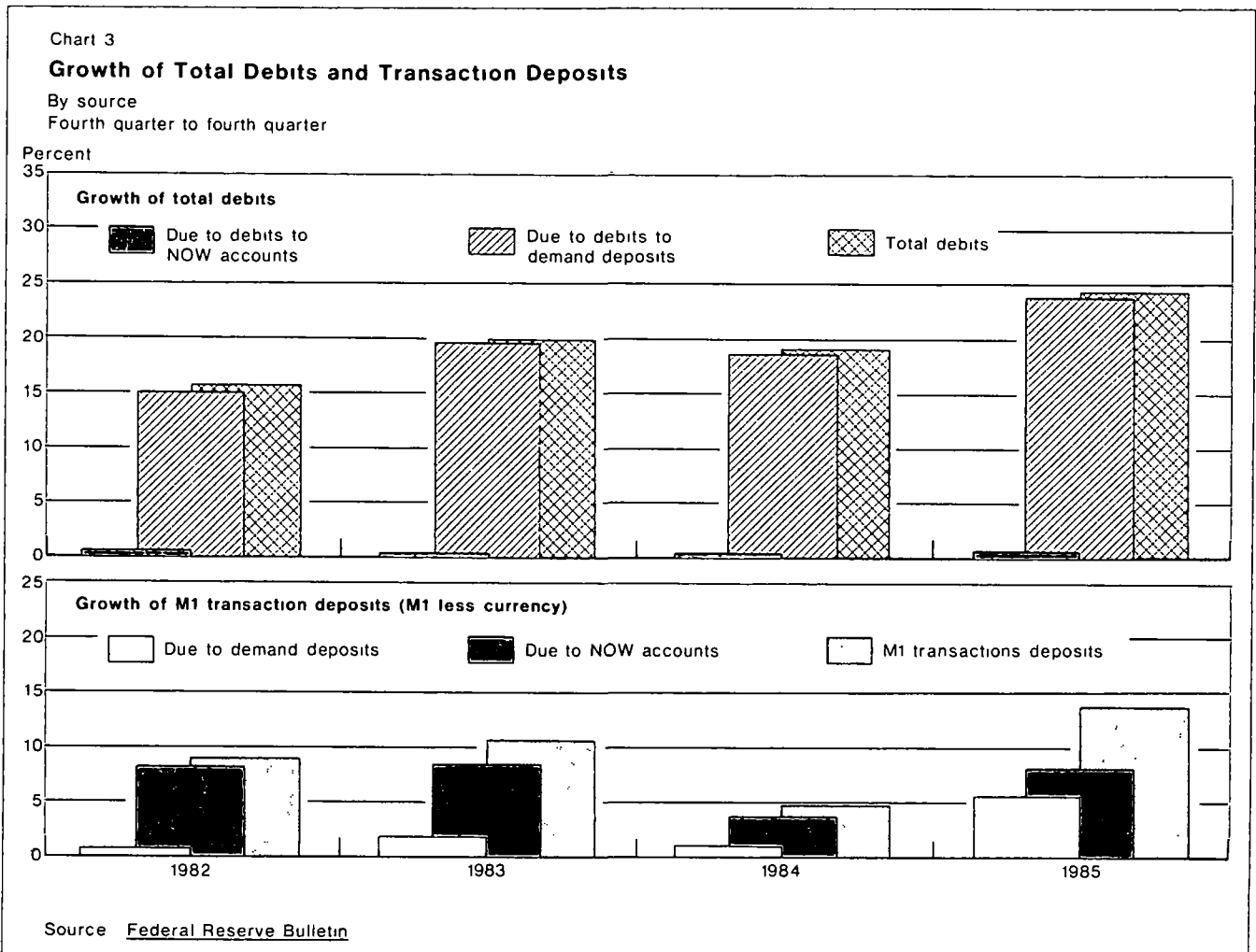
Debits, GNP, and the demand for money

In making this estimate, a conventional money demand equation (relating real money balances to real trans-

actions, a short-term interest rate, and lagged real money balances) was used. Real debits and real GNP were included as alternative measures of transactions.⁷ The left side of Table 1 shows that when debits and GNP are included together in the money demand equation at most one performs well. As alternative proxies for total transactions in the economy, they are competing to explain the movements in M1 and one of the two is redundant. Estimated from 1959 through 1973, the coefficient on GNP is significant and has the

⁶For a more technical and detailed analysis of the transactions demand for M1 that arrives at similar estimates of the possible effects of financial transactions on M1 for 1985, see Peter E. Kretzmer and Richard D. Porter, "The Demand for the Narrow Aggregates—Is a Transactions Approach Sufficient?" Board of Governors of the Federal Reserve System (July 1986), unpublished.

⁷Only the coefficients on the transactions variable are shown. These equations had all the well known problems with stability during the mid-1970s, and the results should be interpreted with caution as a result. Moreover, there are problems with using the real volume of debits as an alternative measure of transactions. That is, while it might be appropriate to use the GNP deflator to calculate real M1 balances and real GNP, it may not be appropriate to calculate real debits this way since debits contain a combination of GNP and non-GNP transactions.



correct sign, whereas the debits variable has a negative coefficient not significantly different from zero. When estimated through 1982, the coefficients retain the same signs as in the earlier period but neither is significant. When the sample period is extended through 1985, the coefficient on debits becomes positive and significant, while the coefficient on GNP turns negative and insignificant. In contrast, when either debits or GNP is included by itself (Table 1, right side), the estimated coefficient is statistically significant and has the correct sign across all sample periods, giving no clear indication of the better measure of transactions for money demand purposes.

Evaluating the regression results over the longer run is complicated by the downward shift in the demand for M1 in the mid-1970s.⁸ Hence, we reestimated the money demand equation over the 1974 to 1984 period. During this period, both GNP and debits continued to have a strong correlation with M1 when included individually. (Their t-statistics are over 6, Table 1, bottom right, memo.)⁹

Next, we use this equation to determine whether GNP or debits can track M1 growth more accurately in 1985. The first column of Table 2 shows that the out-of-sample projection based on GNP substantially underestimated M1 growth last year (four percentage points), whereas the projection based on debits (Table 2, far right column) missed by only about two percentage points. Therefore, it seems that financial transactions played a major role, adding roughly two percentage points to M1 growth. But there are reasons to believe that the actual contribution to M1 growth was somewhat less.

First, there is an alternative reason why GNP understated the demand for money. In the United States, a larger volume of goods and services was purchased in 1985 than was produced. If consumers are purchasing more goods, but those goods come from imports or inventories rather than from current production, the demand for M1 increases to make those additional transactions but GNP does not increase. Hence GNP (current production) understates the transactions demand for M1, and M1 appears unusually strong.¹⁰ When domestic final demand is substituted for GNP, the resulting error is about three percentage points (Table 2, center column). Therefore, after this adjustment, only about one percentage point of M1 growth remains to be

⁸For more detail, see Stephen Goldfeld, "The Case of the Missing Money," *Brookings Papers on Economic Activity* (1976-III)

⁹Equations estimated over this period also have larger (in absolute value) coefficients on the short-term interest rate. This helps them track the rapid M1 growth in 1985 somewhat better than those estimated over the longer run.

¹⁰For more detail, see Lawrence J. Radecki and John Wenninger, "Recent Instability in M1's Velocity," this *Quarterly Review* (Autumn 1985)

attributed to financial transactions (and perhaps other factors as well)

Second, the debits statistics may not adequately capture financial transactions. The link between trading volume and debits on a quarter-to-quarter basis has been weak. Table 3 shows the results of regressing the growth rate of debits on the growth rates of GNP and stock and securities trading volume. The only variable that is statistically significant (that is, has an estimated coefficient with a t-statistic greater than 2.0) is GNP.¹¹

¹¹To investigate further why the trading volume variables were insignificant, we looked at monthly data to see if some of the correlation was masked by quarterly averaging. As it turns out,

Table 1

Coefficients for Alternative Measures of Transactions in a Standard Money Demand Equation*

Years	Included together		Included separately	
	GNP	Debits	GNP	Debits
1959 to 1973	0.152 (3.3)	-0.026 (1.7)	0.115 (3.6)	0.041 (3.1)
1959 to 1982	0.067 (1.8)	-0.014 (1.1)	0.027 (3.0)	0.008 (2.5)
1959 to 1985	-0.005 (0.2)	0.015 (2.0)	0.046 (4.3)	0.013 (5.1)
Memo 1974 to 1985	-0.030 (0.8)	0.025 (3.1)	0.143 (6.4)	0.030 (8.6)

*Standard Goldfeld formulation where the ln (real M1) is regressed on ln (real GNP), ln (short-term interest rate), and the ln (lagged real money). Only the coefficients on the transactions variables are reported.

Table 2

Money Demand Errors for 1985 Using Alternative Proxies for Transactions*

Quarterly growth rates

Quarter	GNP	Gross domestic	Debits
		final demand	
1985-I	3.0	2.1	1.4
1985-II	2.9	1.8	1.0
1985-III	7.3	6.0	5.6
1985-IV	2.9	1.5	0.4
Average	4.0	2.9	2.1

*Equations estimated from 1974 to 1984

This result suggests that a large volume of financial instruments is purchased without debits to the transactions accounts in M1, or that many financial trades completed during a given day by an individual firm are netted before its demand deposit account is debited.

We also tried using trading volume directly in the money demand equation along with GNP. However, it probably is not appropriate to deflate financial transactions by the GNP deflator (Footnote 7). To avoid this problem, the money demand equation was estimated in nominal terms. The resulting coefficients and the 1985 errors in projecting M1 growth are shown in Table 4. All three measures of transactions have significant coeffi-

cients. The coefficients on GNP and on the volume of trading in the stock market also have the correct (positive) sign. The coefficient on the volume of trading in Government securities is negative, again implying that many trades are done for the purpose of managing money balances more efficiently (repurchase agreements, for example). In any case, this equation does not track M1 growth in 1985 very well. Its average error was three percentage points, compared with an error of two percentage points when total debits were used and four percentage points when GNP was used (Table 2). Roughly speaking, the results in Table 4 are consistent with those in Table 2. That is, when a variable measuring financial transactions is included in the equation, the 1985 average error is about one percentage point less than when GNP is used by itself. Hence, nonfinancial transactions not captured by GNP probably account for another percentage point (Table 2, right column), leaving about two percentage points of the error in 1985 unaccounted for.

Table 3

Correlation Between Debits and Financial Transactions

Quarterly growth rates

Debits = 9.7 + 0.92 (GNP)
(2.8) (2.8)
Debits = 9.7 + 0.88 (GNP) + 0.02 (Stocks*)
(2.8) (2.7) (0.9)
Debits = 9.4 + 0.89 (GNP) + .01 (Stocks) + 0.006 (Securities†)
(2.6) (2.7) (0.8) (0.2)

*Dollar volume of transactions on the New York Stock Exchange

†Dollar volume of trading by Government securities dealers

Additional regressions using lags and seasonal dummies did not produce appreciably different results

Table 4

Results When Financial Transactions Are Included Directly in Money Demand Equation*

Coefficients

GNP	0.100
	(3.2)
Stock volume	0.022
	(3.8)
Securities volume	-0.017
	(2.4)

1985 errors (Quarterly growth rates)

1985-I	1.7
1985-II	3.1
1985-III	6.0
1985-IV	2.1
Average	3.2

*Nominal rather than real values were used in this equation for money demand. As in the previous tables, only the coefficients for the variables being studied are reported. The sample period was from 1974 to 1984. Stock volume and securities volume are defined in the same way as in Table 3.

Fedwire activity

Another proxy for the volume of financial transactions is the dollar volume of funds transferred over Fedwire.¹² On a daily average basis, this volume has increased from \$200 billion in 1978 to about \$700 billion in 1985.

Quarterly statistics on the volume of funds transferred over Fedwire are available only since 1977. Therefore, annual data were used to estimate money demand equations, and the sample periods were extended back to 1949 (Table 5). Estimated through 1974, the coefficient on the dollar volume of wire transfers is significant but has a negative sign (Table 5, equation 2), suggesting once again that many financial transactions are made to manage money balances. Estimated through 1984, the coefficient on Fedwire volume remains negative, but declines in absolute value by about one-half (Table 5, equation 4), implying that its effect on M1 has not been stable over time. These results are difficult to interpret, however, because money demand equations have generally not been stable when the sample period is extended beyond 1974. Nevertheless, the negative coefficient on the dollar volume of Fedwire transfers does indicate that more rapid growth of financial transactions over the longer run has not been associated with an acceleration in M1 growth. For financial trans-

Footnote 11, continued

debits were only slightly more likely to increase in any same month that trading volume increased. Over the past ten years, debits and Government securities trading volume moved in the same direction in 52 percent of the 120 months, debits and stock markets volume in 61 percent.

¹²For earlier work using the number of wire transfers (as a proxy for technological change) to explain unusual weakness in M1 in the mid-1970s, see Ralph Kimball, *op cit*, pages 12-22.

actions to explain the rapid growth of M1 in 1985, it would be necessary to find reasons why the historical relationship between financial transactions and M1 might have changed

One reason this relationship might have changed somewhat in recent years is increased concern on the part of banks about their potential exposure to corporate customers that engage in large dollar volumes of financial transactions. On any given day, some inflows that are expected by a corporation may not materialize (or some unexpected outflows may occur) resulting in an overnight overdraft. If the firm does not qualify for a line of credit that would cover the potential overdraft, it might be required to hold a larger balance at the beginning of the day. This could represent an indirect channel through which the rapidly growing volume of financial transactions could increase the level of demand deposits, but it is impossible to quantify the effect.

Another indirect way financial transactions might affect M1 is through the higher level of demand deposits that firms are holding to compensate banks for the costs of making a larger number of transactions, i.e., higher compensating balances. Banks have also been moving toward more explicit pricing of transaction account services, and the growing number of financial transactions may now have a more pronounced effect on M1's growth as a result. Again, due to lack of data on the total number of financial transactions, this effect cannot be quantified. And working in the opposite direction, firms have been moving toward using fees to compensate their banks for transaction account services rather than holding balances. So it is not clear that the net effect of more explicit pricing has been to increase M1 balances.¹³

Conclusions

In general, it appears that the more rapid growth of financial transactions is not having a very large effect on M1's growth.

- Many financial transactions are made explicitly to manage cash balances more efficiently. Such transactions would, of course, tend to reduce M1

¹³Of course, compensating balances could have increased for reasons other than the growing number of financial transactions. As interest rates fall, firms must hold a higher level of balances to compensate banks for the same level of transaction account services. Without any changes in banking practices, this effect should be picked up by the interest rate variable in the money demand equation. However, as banks move toward more explicit pricing of services, they may also enforce balance requirements more strictly. In turn, this could make compensating balances more responsive to interest rate changes than in the past.

Table 5

Volume of Wire Transfers Over Fedwire and the Demand for Money

Annual observations

Coefficients	1949-74		1949-84	
	Equation 1	Equation 2	Equation 3	Equation 4
GNP	0.46 (5.8)	0.58 (5.3)	0.11 (2.3)	0.33 (3.5)
Volume of wire transfers		-0.11 (2.2)		-0.05 (2.1)

*Not included

balances, not increase them, as other transactions would

- A large part of total financial transactions is done by investment firms and dealers. They are among the most sophisticated checking account managers, attempting to keep their balances at frictional levels almost regardless of the volume of transactions undertaken. Of course, as the volume of transactions increases, these frictional balances are likely to increase at least somewhat because of unexpected cash flows or the desire to avoid costly overdrafts.
- Many financial transactions can be completed without using the checking accounts in M1. Stock, bond, and money market transactions are often executed by using accounts at an investor's broker. Moreover, individuals are likely to hold liquid assets suitable for investment in their money market deposit accounts or money market funds, not in M1. These accounts, with their limited transactions features, can be used to make purchases of financial instruments without the funds flowing through an M1 account. Likewise, the proceeds from sales of financial instruments would not need to be deposited in M1 accounts.

Even though stronger-than-expected M1 growth has occurred during a period of rapid growth in volume of financial transactions, longer-run relationships do not confirm that there is a strong linkage between the two

John Wenninger and Lawrence J. Radecki