Research Department
Federal Reserve
Bank of
San Francisco

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FRBSF Weekly Letter

Innovation and Money Demand

Since the 1979 change in operating procedures, the Federal Reserve has eschewed active counter-cyclical policy in favor of a policy stance which seeks gradually to reduce the growth rates of the monetary aggregates and thus to wind down the rate of inflation without provoking a sharp reduction in output or employment. Although the Federal Reserve monitors several aggregates, the public generally focuses its attention on M-1B (currency plus transaction, or checkable, accounts) because theory and empirical evidence suggest that output and inflation are reliably related to the stock of transaction money. However, in 1981 a number of institutional changes—some anticipated, others not—combined to alter the quantity of money demanded by transactors, and thus to shift the historical relationship between the money stock and income and interest rates.

ATS/NOW accounts

The Federal Reserve anticipated a major institutional change with the recent spread of interest-bearing checkable accounts, notably NOW and ATS accounts. Congress, under the Monetary Control Act of 1980, clarified the legal status of ATS accounts and, beginning in January 1981, permitted all depository institutions to offer NOW accounts. The Fed anticipated that these regulatory changes would provoke a large movement of funds into such interest-bearing accounts. To the extent that these funds came from traditional demand deposits, this movement would have had no effect on M-1B, which includes both demand and ATS/NOW deposits. However, to the extent that funds shifted from other types of deposits—such as savings accounts—the *stock* of M-1B would be inflated and, while the shift was going on, its *growth rate* would accelerate.

The shift of funds occurred generally as expected. In the first eleven months of 1981, the category of "Other Checkable Deposits," increased by some $47 billion, of which almost $12 billion came from sources outside M-1B. This $12-billion figure represents the difference between actual M-1B and "shift-adjusted" M-1B, which excludes the (estimated) portions of other checkable deposits which are "disguised" savings accounts rather than transaction accounts (see chart). However, this transfer of funds apparently took place more rapidly than expected, being largely completed by April. M-1B growth accelerated sharply during the early part of the year, but after April, transfers of funds into ATS/NOW accounts from sources outside M-1B slowed dramatically and amounted to less than $2 billion in the seven months ending in November.

Other financial innovations

The introduction of NOW accounts thus had effects which, apart from timing, were close to those anticipated. But as 1981 progressed, it became increasingly clear that something else had been happening to the public's demand to hold M-1B. Under the impetus of historically high interest rates, transactors apparently found new ways of getting along with smaller holdings of (M-1B) money. For example, many households shifted funds into money-market mutual funds. In the first 11 months of 1981, investments in these funds increased by roughly $100 billion. Various other types of cash-management services, which permit businesses and wealthy individuals to reduce their demand-deposit holdings, also increased in popularity during 1981. Thus the public was able to transact the same dollar volume of business with a smaller holding of the traditional transaction media which are included in M-1B.

The volume and source of funds flowing into ATS/NOW accounts can be measured directly, but no similar evidence can be brought to bear on this second institutional change. At best, the impact of financial innovations on the demand for M-1B can be assessed only indirectly by examining recent changes in the

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relationships between the stock of M-1B and various macroeconomic variables. The research on this issue has tried to determine the extent to which financial innovations have altered these relationships and especially whether the effect of money-market mutual funds and other financial innovations in reducing M-1B demand approximately has offset the effect of the NOW/ATS introduction in increasing that demand.

Testing for changes in demand

Two types of tests were conducted. 1.) The most straightforward method of testing for a shift in money demand is to estimate a statistical demand equation for the period prior to a suspected shift, and then examine whether that equation accurately predicts its behavior through the shift period. Systematic over-prediction of the level of M-1B then would provide evidence of a downward shift in demand. A variation of this approach is to estimate a demand equation which includes one or more "dummy" variables for capturing any demand shift. The hypothesis of shifting demand may then be tested by examining the statistical significance of these dummy variables.

Both techniques have been used, with similar results, in research conducted at the Federal Reserve Bank of San Francisco. Both methods suggest that the growth of money-market mutual funds and other financial innovations steadily reduced the demand for M-1B during 1981. Up to mid-year, this effect was approximately offset by the transfer of funds into ATS/NOW accounts from sources outside M-1B—leaving no net effect on M-1B. But when this movement of funds ceased, continuing financial innovations produced a significant net decline in M-1B demand.

2.) Both monetarist and Keynesian models imply a relationship between changes in the money stock and changes in output and the inflation rate. The San Francisco reduced-form econometric model finds that the growth rate of real output responds positively and promptly to an acceleration in monetary growth. The stability of this relationship depends on the stability of the relations both between money demand and interest rates and between interest rates and aggregate demand. Hence, if either of these relationships undergoes a shift, the overall relation will also shift. Thus, the examination of GNP predictions from the econometric model provides a second way of testing for a shift in M-1B demand.

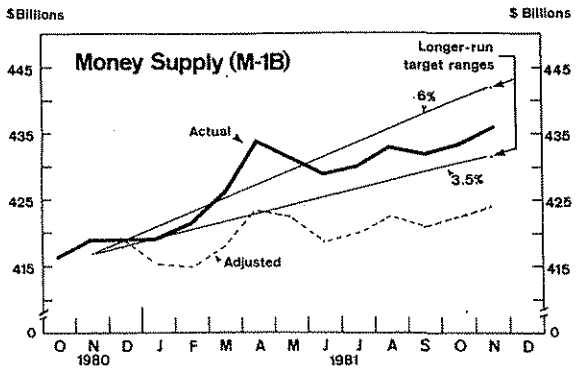
Since 1979, the model has followed the trend of the economy quite well. For the first half of 1981, the model exactly predicts the average growth rate of real GNP when actual M-1B is used as the monetary variable, but produces a sizable under-prediction when the shift-adjusted M-1B measure is used. This suggests that, during that period, the various factors tending to shift M-1B demand were mutually offsetting, so that actual M-1B provided a better measure than adjusted M-1B of the net monetary stimulus to the economy. This result supports the conclusion reached by direct examination of the demand for M-1B.

Types of money demand changes

These pieces of research strongly suggest a steady downward shift, through the third quarter of 1981, in the demand for shift-adjusted M-1B. This shift in demand reflects two kinds of changes in the financial system—a *definitional* change and a *behavioral* change.

To the extent that transactors use money-market funds as media of exchange in place of traditional demand deposits, this means a change in the empirical *definition* of "transaction balances." Hence if we want M-1B to represent the stock of transaction balances, it should include some portion of these funds. But the proportion of money funds representing transaction balances rather than investment balances is not measurable or even observable.

However, the shift in money demand may reflect not only a change in the types of assets which the public uses to finance its transactions, but also changes in *behavior* which reduce the demand for transaction balances



(Note: Effective January 1, 1982 the M-1B designation will be discontinued and replaced by M-1.)

of all types. For example, banks offer various cash-management services under which surplus transaction funds are automatically moved into investment accounts which yield market rates of interest. Use of these services increased in 1981 and is likely to increase further in 1982. These behavioral changes represent a true shift in demand rather than simply a change in the empirical definition of transaction money.

This distinction is important because the behavioral shift is less likely to be reversed if interest rates decline. New modes of doing business which reduce transaction costs—even though initially adopted to cope with high interest rates—will probably continue in use even when the original reason for their adoption has passed. By contrast, the use of different transaction media (such as money funds) can be readily reversed if interest rates decline. For example, transactors may willingly dispense with deposit insurance if it has a very high opportunity cost (as measured by the spread between the yields on NOW accounts and money-market funds), but they may shift back into more traditional transaction media if this differential narrows.

Policy implications

Our analysis raises several important policy questions of relevance to the current recession period. Was policy tighter than planned in 1981? Should monetary growth be accelerated in 1982?

Most of the evidence suggests that policy was not overly tight in 1981. Both the money-demand evidence and the reduced-form model evidence suggest a declining demand throughout 1981 for adjusted M-1B. This means that money growth provided greater impetus to aggregate demand than was indicated by the growth of adjusted M-1B. In the first half of the year, the downward shift in demand approximately offset the effects of the ATS/NOW introduction, implying that the *unadjusted* M-1B series was the appropriate indicator of the degree of monetary stimulus. After midyear, the ATS/NOW effect largely ceased but financial innovation continued, so that the degree of stimulus was greater than indicated by the month-to-month growth of M-1B. Nonetheless, this growth rate represented a sharp deceleration in monetary stimulus compared to 1980 and previous years. Will the downward shift in money demand continue? If not, will it be reversed? To the extent that high interest rates stimulate financial innovations, the present move toward lower rates should tend to slow and perhaps eventually halt the shift. However, as long as market interest rates remain high and rate ceilings hold NOW-account rates below market levels, some downward shift is likely to persist. Hence, below-target M-1B growth does not necessarily mean that policy is tighter than planned, and hence does not imply that monetary growth should be increased.

Will the shift in money demand be reversed if interest rates fall significantly? To the extent that the observed shift represents the substitution of one type of transaction media for another, one could expect some reverse substitution to occur if interest rates decline significantly. But this would not be true if the shift reflects the adoption of new financial techniques which reduce the overall demand for transaction media. Unfortunately, we cannot reach any firm conclusions on the sources of the shift. Money-market funds grew substantially in 1981, but we cannot measure the extent to which these funds were used as transaction rather than investment balances. The use of cash-management services also expanded in 1981, thus reducing the overall demand for transaction media—and banks will continue to expand such services in 1982.

As long as interest rates remain relatively high, the question of any upward shifts in money demand need not be high on policymakers' agenda in the new year. However, if rates were to fall substantially, policymakers would need to be alert to the possibility of an upward shift in M-1B demand during 1982.

Brian Motley

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BANKING DATA—TWELFTH FEDERAL RESERVE DISTRICT

(Dollar amounts in millions)

Selected Assets and Liabilities Large Commercial Banks	Amount Outstanding 12/16/81	Change from 12/09/81	Change from year ago Dollar	Change from year ago Percent
Loans (gross, adjusted) and investments*	156,685	1,479	9,583	6.5
Loans (gross, adjusted) — total#	135,643	1,521	10,875	8.7
Commercial and industrial	41,952	991	4,671	12.5
Real estate	55,640	152	5,411	10.8
Loans to individuals	23,468	80	− 648	− 2.7
Securities loans	2,261	− 13	938	70.9
U.S. Treasury securities*	5,837	35	− 913	− 13.5
Other securities*	15,205	− 77	− 375	− 2.4
Demand deposits — total#	42,510	1,461	− 3,976	− 8.6
Demand deposits — adjusted	28,529	− 969	− 4,736	− 14.2
Savings deposits — total	30,022	− 88	1,428	5.0
Time deposits — total#	88,810	771	17,464	24.5
Individuals, part. & corp.	80,048	578	18,087	29.2
(Large negotiable CD's)	35,538	761	7,469	26.6

Weekly Averages of Daily Figures	Week ended 12/16/81	Week ended 12/09/81	Comparable year-ago period
Member Bank Reserve Position			
Excess Reserves (+)/Deficiency (−)	− 34	93	72
Borrowings	9	100	63
Net free reserves (+)/Net borrowed(−)	− 43	− 7	9

* Excludes trading account securities.

Includes items not shown separately.

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