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Measuring Money

The Federal Reserve's narrow monetary aggregate, M1, has traditionally been considered the best measure of transaction balances available for spending. This measure includes coin and currency in the public's hands as well as depository accounts with unlimited checking privileges. Increases in M1 are generally expected to encourage spending and spur growth in nominal output, or the gross national product.

Last year, M1 grew almost 12 percent, overshooting by a wide margin both its initial target growth range of 4-7 percent, established for the year by the Federal Reserve, and its revised range of 3-8 percent for the second half of the year. Despite such rapid growth, the economy was relatively sluggish, and nominal GNP rose by only 5½ percent.

This apparent breakdown in the relationship between M1 and GNP has led some analysts to question the reliability of M1 as a measure of transaction balances and, in turn, its usefulness as an indicator of monetary policy. They point to new financial assets and accounts — such as money market mutual funds and money market deposit accounts that allow checking privileges but are not counted in M1, as well as NOW accounts that bear interest and are counted in M1 — claiming that they compromise the accuracy of M1 as a measure of transaction balances available for spending.

Two methods of measuring money have been proposed as alternatives to the conventionally defined monetary aggregates. These alternatives attempt to construct measures that more closely correspond to the concept of transaction services. By measuring money better, they may be better indicators of the effect of monetary policy on GNP.

Conventional definitions

The Federal Reserve currently constructs and reports several different monetary aggregates. These aggregates — M1, M2, M3, and L — each equal the sum of the nominal value of a set of financial assets, with each broad aggregate including the assets in all narrower aggregates. For example, M2 includes all the assets in M1 plus money market mutual funds (non-institution only), money market deposit accounts, overnight repurchase agreements (RPs) and Eurodollars, and savings and small time deposits. M3 consists of M2 plus large-denomination time deposits, term RPs and Eurodollars, and institution-only money market mutual funds. L consists of M3 plus savings bonds, short-term Treasury securities, commercial paper, and bankers acceptances.

Currently, aggregates are constructed by applying equal weights (of one) to each of the component assets even though the components differ in their liquidity, riskiness, and rates of return. The usefulness of such simple-sum aggregates has long been questioned. Since each aggregate includes items with very different properties, the effect of an increase in an aggregate on economic activity may vary, depending on which component(s) of the aggregate caused the increase.

Instead of weighting each component equally, one might assign weights that reflected the "moneyness" of the component assets. For example, a measure of transaction balances might count both demand deposits and money market deposit accounts but give greater weight to demand deposits to reflect their greater use in transactions.

Alternative approaches

In recent years, two alternative monetary aggregates have been developed using differential weighting. Both try to measure monetary services by adding together the services produced by different monetary assets. Since not all assets yield the same level of transaction services, different assets receive different weights. The two approaches differ in the method used to estimate the monetary service flows produced by particular assets. One approach uses the economic theory of index numbers and the resulting measures are called Monetary Services Indexes. The second approach attempts to measure directly the transaction services yielded by different assets by focusing on how frequently various

deposits are used for making transactions, i.e., their turnover. This measure is called MQ.

The conceptual differences among the simple-sum aggregates, the monetary services aggregates, and the turnover aggregates can be seen by considering how the growth rate of each is related to the growth rates of its components. The simple-sum method of constructing M1 implies that the growth rate of M1 is equal to a weighted average of the growth rate of each of its component parts, where the weight attached to each component is its share of M1. For example, in 1985, demand deposits comprised 44 percent of M1. Thus, in calculating M1's growth rate, the growth rate of demand deposits receives a weight of 44 percent.

The growth rate of a Monetary Services Index also is a weighted average of the growth rates of its component assets. In this case, the weights are designed to measure the contribution each asset makes to the total production of monetary services. The weight on each component equals the estimated share of total monetary services yielded by that component. Hence, the assets that produce large flows of monetary services receive large weights.

The construction of these weights requires estimates of the monetary services that each asset yields. These estimates are currently calculated as the difference in returns between an asset and the asset that is assumed to yield no monetary services. In practice, the rate chosen to represent the return on the asset yielding no monetary services — called the benchmark rate — has been taken to be either the Baa corporate bond rate or the maximum return paid by an asset in L, whichever is higher.

The way the weights are constructed is most easily explained through an example. Suppose NOW accounts yield 5¼ percent interest and Baa corporate bonds yield 12 percent. If Baa bonds and NOW accounts were identical in every respect, NOW accounts would not be held, as they yield lower interest. Since the public holds both Baa bonds and NOW accounts, it must do so because NOW accounts yield some sort of nonpecuniary rate of return, assumed to be "monetary services". The monetary services yielded by the outstanding stock of NOW accounts is then measured by 12 percent minus 5¼ percent — the "benchmark" rate, or 6¾ percent, times the outstanding stock of NOW accounts.

By applying this method to all the assets in the aggregate, estimates of the monetary services of each are obtained. These can be added together to measure the total monetary services used to construct the share weights. Thus, for example, demand deposits in 1985 were estimated to produce 9½ percent of a broad measure of total monetary services, called MSL. The growth rate of demand deposits was therefore given a weight of 9½ percent in calculating the growth rate of the monetary services aggregate.

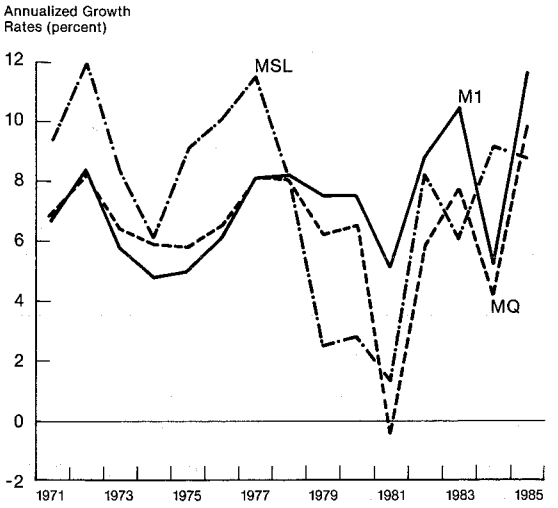
The growth rate of the turnover or transaction money stock, MQ, also equals a weighted average of the growth rates of the component assets. The components of MQ are the same as those in M1 plus money market mutual funds and money market deposit accounts, and the weights equal the share of GNP spending financed by each component. These spending shares are estimated from information on turnover rates for the various types of deposits. Assets that have high turnover rates, and thus finance a large share of GNP, receive large weights.

Thus, the growth rates of currency and traveler's checks were given a weight of 30 percent, and demand deposits a weight of 54 percent in calculating the growth rate of MQ. In contrast, money market deposit accounts receive a very small weight — 1½ percent in 1985.

No clear winner

The annual growth rates of M1, MQ and MSL are shown in the chart. M1 and MQ have behaved similarly except in 1981 when M1 grew 5 percent while MQ fell ½ percent. This divergence was due to the nationwide introduction of NOW accounts. While included in both M1 and MQ, NOWs receive a small weight in MQ because they finance a very small share of total spending. Thus, shifts from demand deposits (which finance more spending) into NOWs leave M1 unaffected but cause MQ growth to fall. In 1982 and 1985, GNP did not grow faster even though there was a surge in the growth of both M1 and MQ. Nevertheless, for those years, MQ may have provided marginally better signals about the economy since it grew somewhat more slowly than M1.

Comparison of Growth Rates of Alternative Money Measures



The chart shows that MSL has differed significantly from both M1 and MQ. The growth rate of MSL fell sharply in 1978 and remained low from 1979 to 1981. From 1978 to 1981, MSL grew by less than 7 percent while GNP grew by 36 percent. Since this was a period of high interest rates on short-term liquid assets, the monetary services yielded by these assets were estimated to be quite low. Consequently, rapidly growing liquid assets received small weights and reduced the growth rate of the monetary services index.

Unfortunately, no one monetary aggregate emerges as a clear winner in comparisons of how well they predict economic activity. Studies that have carefully examined the relationships between the aggregates and GNP with econometric techniques find that none of the alternative money measures appears to provide the most consistently reliable indication of economic activity and inflation. There is, however, some evidence that, in recent periods when M1 has had major problems, MQ has provided somewhat better information as a monetary policy indicator.

The problems with MSL seem to be attributable to the choice of an interest rate to measure the return on an asset that yields no monetary services. Whenever short-term interest rates rise above long-term rates, the maximum yield on a component asset in MSL, such as Treasury securities, becomes the benchmark rate. This means that the weight on that component automatically falls to zero, and that component drops out of MSL. This is what occurred during the period of slow MSL growth between 1979 and 1981 shown in the chart.

In addition, interest rate differentials, which are used to impute monetary service yields of different assets, measure more than just monetary services. When the Baa rate is used as the benchmark, the difference between it and the rate on Super NOWs is used to measure the monetary services Super-NOWs provide. However, part of this difference undoubtedly represents a return to the greater risk of holding a corporate bond. Since the level of risk varies over the business cycle, the risk premium may lead to a problem in the measurement of the Monetary Services Indexes.

MQ can give misleading signals because it treats all funds held in a particular deposit category as equally likely to finance spending. When NOWs were introduced, the shifting of funds from demand deposits to NOW accounts caused MQ to fall because MQ treats the funds withdrawn from demand deposits as highly active balances. However, if depositors had shifted the less active account balances, MQ would have overestimated the decline in transaction balances.

Summary

Current empirical evidence suggests that the narrow transaction measure, MQ, provides little information that could not already be obtained from the behavior of M1 on average. However, MQ may help in understanding periods of unusual M1 behavior, such as occurred in 1982 and 1985. Problems with the weights used to construct MSL seem to reduce its usefulness.

The problems posed by recent instability in the relationship between M1 and nominal GNP have not been solved by either MQ or MSL, although both alternatives appear to have theoretical advantages over simple-sum aggregates. With hope, future empirical research may improve the methods used to measure money and thus provide aggregates that will be better indicators of monetary policy.

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BANKING DATA—TWELFTH FEDERAL RESERVE DISTRICT

(Dollar amounts in millions)

Selected Assets and Liabilities Large Commercial Banks	Amount Outstanding 5/7/86	Change from 4/30/86	Change from 5/8/85 Dollar	Change from 5/8/85 Percent[7]
Loans, Leases and Investments[1] [2]	202,178	−1,178	11,606	6.0
Loans and Leases[1] [6]	183,473	−1,326	11,117	6.4
Commercial and Industrial	52,989	− 168	647	1.2
Real estate	66,507	− 54	3,589	5.7
Loans to Individuals	38,994	− 145	5,026	14.7
Leases	5,639	− 8	263	4.8
U.S. Treasury and Agency Securities[2]	10,865	179	− 364	− 3.2
Other Securities[2]	7,841	− 30	853	12.2
Total Deposits	201,738	−2,809	8,011	4.1
Demand Deposits	49,854	−2,525	4,977	11.0
Demand Deposits Adjusted[3]	34,459	-13,590	5,045	17.1
Other Transaction Balances[4]	15,963	178	2,573	19.2
Total Non-Transaction Balances[6]	135,920	− 463	461	0.3
Money Market Deposit Accounts—Total	45,853	− 343	2,816	6.5
Time Deposits in Amounts of $100,000 or more	36,322	− 136	− 2,139	− 5.5
Other Liabilities for Borrowed Money[5]	26,261	−1,320	5,675	27.5

Two Week Averages of Daily Figures	Period ended 5/5/86	Period ended 4/21/86
Reserve Position, All Reporting Banks		
Excess Reserves (+)/Deficiency (−)	− 15	96
Borrowings	39	43
Net free reserves (+)/Net borrowed(−)	− 55	53

1 Includes loss reserves, unearned income, excludes interbank loans
2 Excludes trading account securities
3 Excludes U.S. government and depository institution deposits and cash items
4 ATS, NOW, Super NOW and savings accounts with telephone transfers
5 Includes borrowing via FRB, TT&L notes, Fed Funds, RPs and other sources
6 Includes items not shown separately
7 Annualized percent change