Policy Implications of Recent M2 Behavior

By Bryon Higgins

Monetary growth has proven to be somewhat disappointing in recent years as a guide for conducting the Federal Reserve's monetary policy. Growth of the narrow aggregate, M1, became increasingly unreliable in the 1980s as an indicator of the future course of the economy and inflation. As a result, the FOMC deemphasized M1 growth and eventually discontinued its use altogether. Since then, the broader M2 measure of money has been the preeminent variable used in implementing monetary policy.

Unfortunately, M2 has also become unreliable over the last two years. The growth of M2 in the 1990s has been much slower than can be explained by traditional relationships to income and interest rates. The M2 slowdown has resulted in part from special factors that have overshadowed traditional relationships. If such factors are merely temporary, M2 growth may soon return to a more normal relationship with the goals of monetary policy. Most analysts have implicitly assumed this would be the case.

But what if M2 growth remains unreliable for several more years? Worse yet, what if its properties have become so altered that M2 will never again be predictably related to policy goals? The Federal Reserve would then be forced to reassess the framework for implementing monetary policy.

This article argues that the erratic behavior of M2 in recent years is symptomatic of fundamental changes likely to continue impairing the usefulness of M2 as a policy guide. As a result, the Federal Reserve will probably need to reassess the framework for conducting monetary policy. The first section reviews the history of using monetary growth rates in the conduct of monetary policy. The next section reviews empirical evidence to determine what has caused the slowing of M2 growth in recent years. The final section evaluates the extent to which persistence of these factors will continue to diminish the usefulness of M2 in the conduct of policy.

MONETARY AGGREGATES AND MONETARY POLICY

The Federal Reserve has used various monetary aggregates over the years in the conduct of monetary policy. The role played by the aggregates has also varied depending on circumstances. At times, a monetary aggregate has approached the status of an intermediate target that is the focal point of policy actions. At other times, one or more aggregates have been the preeminent variable among the many that provide information about the economy or inflation. To fully appreciate

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the quandary resulting from the recent puzzling behavior of M2, it is useful to review the history of using monetary growth in the implementation of monetary policy.

Intermediate target or information variable

There is considerable confusion about the role monetary aggregates should play—even about the role they have played—in the conduct of policy. Part of this confusion stems from lack of precision in terminology. The distinction between intermediate target variable and information variable is particularly critical for understanding what properties are desirable for a monetary aggregate used in the conduct of policy.

An intermediate target is a variable that can be controlled so as to achieve the desired policy goals. To serve this role, a variable must first be reliably related to the goal variables of monetary policy, which can usefully be summarized by the growth rate of nominal income. For a monetary aggregate serving as a policy target, the ratio of income to the aggregate—its velocity—must be predictable. In the simplest of all cases, velocity would be constant and nominal income would grow at the same rate as the money stock. Keeping the money stock growing at a constant rate would ensure that nominal income would grow at the same rate.

This points up the second requirement for a target variable, its controllability. A target variable need not itself be subject to direct control, but it must be strongly and predictably influenced by the policy instruments that can be directly controlled. For example, the Federal Reserve influences monetary growth by adjusting reserve requirements, the discount rate, or the amount of securities acquired through open market operations. If this influence is sufficiently precise, the Fed could achieve monetary growth very near the rate corresponding to the desired growth of income. Such reasoning underlies the call by Milton Friedman and other monetarists to focus solely on monetary growth as an intermediate target to help achieve monetary policy goals.

Instead, the Federal Reserve has for the most part used monetary aggregates as information variables. An information variable provides information about the prospective behavior of policy goals. Unlike target variables, information variables need not be subject to control by manipulating policy instruments. Moreover, a monetary aggregate can be used as an information variable in conjunction with other real and financial variables that may also shed light on the future course of the economy. Because it is not the sole focus of policy, an information variable need not be as closely and reliably related to policy goals as a target variable must be. The conditions for using a monetary aggregate as an information variable are thus much less demanding than for using it as a policy target. For most of the past two decades, Federal Reserve officials have argued that no monetary aggregate met the stringent requirements for a target variable. Monetary aggregates have served instead primarily as information variables. The major exception to this was an experiment in the early 1980s with controlling M1.

The rise and fall of M1

Monetary aggregates came to play an increasingly important role during the 1970s, primarily because Congress expressed the legal mandate for the Fed more specifically in terms of monetary growth. In 1975, for example, Congress passed a resolution requiring the Fed to report on its objectives for monetary growth. This requirement was embodied in law with the 1978 Humphrey-Hawkins Act, which also mandated semiannual reports to Congress that have become the focus of Congressional oversight of the Federal Reserve. Increased emphasis on controlling monetary growth no doubt also reflected a desire to halt, and eventually reverse, the runaway of inflation that characterized the 1970s.

Alarm about inflation led the Fed in October

1979 to adopt a program for controlling inflation through enhanced control of monetary growth. At the time, M1 was generally considered the most theoretically appealing measure of money because it included only assets used for transactions purposes. Monetary control was to be improved in part by implementing new operating procedures that were based on using a nonborrowed-reserves rather than a federal-funds-rate operating variable. Since most reserves were held against transactions deposits, use of a reserves operating variable lent itself to controlling M1 growth. Under the new procedures, M1 growth above the target path would result in the demand for reserves growing faster than the supply of nonborrowed reserves. Through this mechanism, excessive M1 growth would automatically result in higher interest rates, which eventually would dampen inflationary pressures. The change in operating procedures was thus intended to support the overall objective of restraining inflation by keeping M1 growth within its target range.

The results of the program were far different than had been expected. Control of M1 growth, for example, continued to be elusive due to several special factors distorting M1. Soon after President Carter announced in March 1980 a special credit control program, both the economy and M1 began to nosedive. By summer, M1 had fallen far below its target range, but it rebounded sharply after the credit control program was ended. For the year as a whole, M1 growth was within or, if measured differently, above the target range. Alternative measures of M1 were necessary in the early 1980s because such new accounts as NOWs were being introduced. The Federal Reserve responded by redefining the monetary aggregates in 1980. Even after settling on a definition that seemed to make sense in the long run, the transitional problems surrounding inflows into newly authorized accounts were formidable.

Moreover, uncertainty about M1 remained even after the transition to NOW accounts was complete. By the fall of 1982, M1 growth was far above its target range even though the U.S. economy was mired in the worst recession in decades and inflation showed signs of abating. This anomalous behavior led the FOMC in October 1982 to abandon the new operating procedures and to place somewhat less emphasis on M1 as a policy guide. However, after unexpectedly accelerating even further in 1983, M1 growth seemed to return to "normal" in 1984. The period of normalcy was short-lived, however, as M1 growth again skyrocketed to 12 percent in 1985 and 15.5 percent in 1986.

The FOMC finally concluded that the fundamental properties of M1 had been permanently altered by financial deregulation. The sensitivity of M1 growth to interest rate changes, for example, had been so heightened by deregulating the interest paid on personal checking accounts that M1 growth over periods as long as a year was dominated by the behavior of interest rates. As a result, M1 growth no longer bore much relation to ultimate policy goals over the short and intermediate runs. The FOMC thus discontinued target ranges for M1 in 1987.

Since then, M2 has become the preeminent information variable for the Federal Reserve's monetary policy. Although the FOMC also sets annual growth ranges for M3 and debt, M2 has clearly been the most important of the financial aggregates in policy implementation. M2 growth, for example, is more frequently referred to than any other variable in the FOMC's record of policy actions. Moreover, M2 growth relative to its range is thought by some to be the most important single means for communicating the goals of monetary policy to the Congress and the public. The persistent sluggish growth of M2 in recent years, however, has raised questions about whether it has become too unreliable to serve as the preeminent information variable for monetary policy.

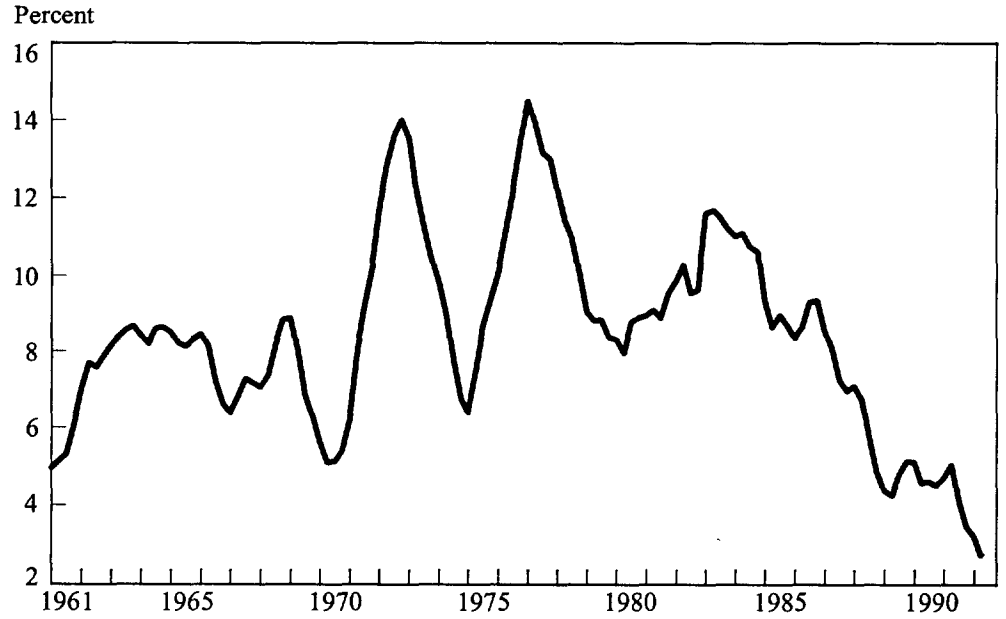
Extent of the M2 slowdown

The slowdown in M2 growth in recent years is unprecedented. The trend growth rate of M2,

Chart 1

M2 Growth

(Eight-quarter average)



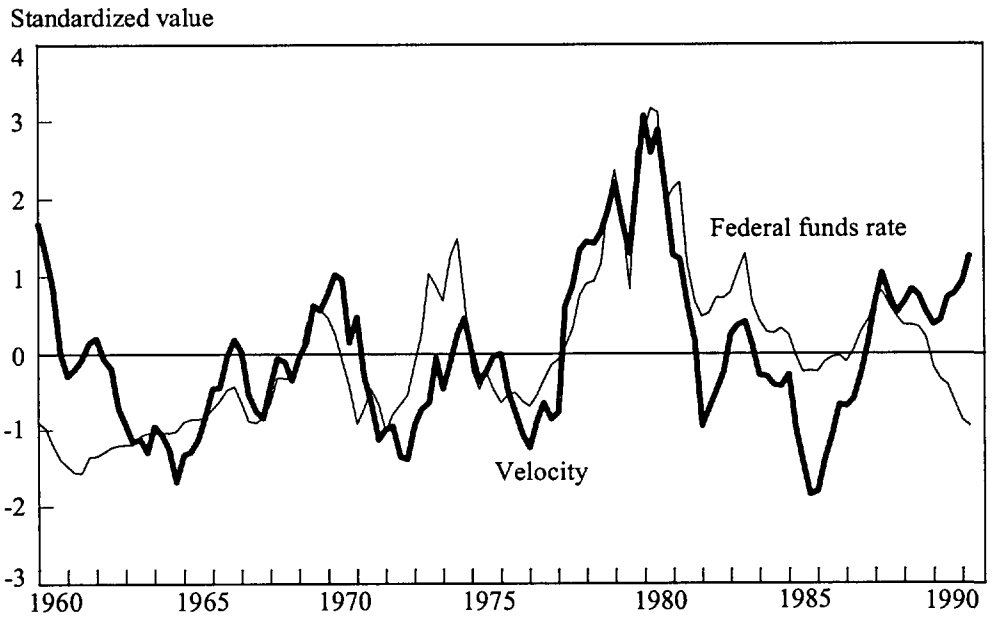
Source: Board of Governors of the Federal Reserve System.

defined as the average growth rate over a two-year period, has declined from 9.3 percent in late 1986 to only 2.7 percent by mid-1992 (Chart 1). Through the second half of the 1980s, slower M2 growth was not so puzzling. Market interest rates were generally trending upward over this period, so the opportunity cost of holding deposits increased, especially for such liquid deposits as checking accounts and money market accounts on which rates adjust only sluggishly. In these circumstances, a slowing of M2 growth could be explained by the standard relationship of M2 to income and interest rates.

Continued slowing of M2 growth since market interest rates peaked in early 1989 is much more of an enigma. One factor contributing to sluggish M2 growth is the slowdown in economic growth. The overall economy began to grow more slowly about the same time M2 growth inexplicably fell off. Over the three years ending in the second quarter of 1992, real GDP growth averaged only 0.9 percent, down substantially from the 3.2 percent in the preceding three years. The sluggish rate of economic growth in recent years, together with accompanying lower inflation, has surely contributed to the M2 slowdown. Other factors have also contributed, however. This can be seen by examining the velocity of M2, which summarizes the relation of M2 to real output and the price level (Chart 2). The velocity of M2 has remained fairly constant over the past several quarters, indicating that M2 has grown at about the same rate as the sum of the growth rate of real output and the rate of inflation. Such stability of

Chart 2

M2 Velocity and Interest Rates



Note: The series are standardized by subtracting from a given value in a series the mean of the series and dividing the result by the standard deviation of the series.
Sources: Board of Governors of the Federal Reserve System and the Department of Commerce, Bureau of Economic Analysis.

velocity would not be surprising during a period of unchanged market interest rates. When market interest rates are declining, however, the velocity of M2 typically falls. The reason for this direct relationship between velocity and interest rates is that a fall in market interest rates lowers the opportunity cost of holding M2 deposits. Individuals and firms thus hold more deposits relative to their spending, causing M2 growth to accelerate relative to income, and velocity to decline. The puzzle about M2 growth in recent years is why the very large drop in market interest rates has failed to stimulate M2 growth relative to income growth as much as would be expected on the basis of past relationships.

Simulations with a standard money demand function illustrate just how much M2 behavior has departed in recent years from past relationships. Staff members at the Board of Governors of the Federal Reserve System have developed such a model of the demand for M2. The estimated equation can be used to show how much M2 would have increased in recent years given the slow growth of nominal income and the decline in market interest rates. From the $3,094 billion level in the second quarter of 1989, the equation predicts that M2 would normally have increased 21 percent to $3,743 billion by the second quarter of 1992. Instead, M2 increased only 12 percent to $3,465 billion. Thus, M2 has grown only about half as much as predicted over the past three years. Such a large shortfall from what can be explained by past relationships is the puzzle that several analysts have set out to solve.

As background in resolving this puzzle, it is useful to identify which component of M2 accounts for most of the shortfall. As shown in Chart 3, an outflow of funds from time deposits is the most obvious aberration. Since a peak in 1991:Q1, time deposits at banks and thrifts have declined almost $200 billion. In contrast, the components of M2 that have no specific maturity have on balance continued to increase. Explaining weak M2 growth, therefore, must entail an understanding of why time deposits have declined so much.

CAUSES OF THE M2 SLOWDOWN

Several factors may have contributed to weak M2 growth in recent years. But the impact of some factors may have been only temporary, while the impact of others may have been more lasting. For the Federal Reserve to draw conclusions about how M2 should be used in the conduct of policy, it is important to determine the persistence of the major factors depressing M2 growth. If the major causes of the M2 slowdown are all transitory, the FOMC may want to deemphasize M2 only temporarily. On the other hand, if some of the major causes are longer run changes in the financial system, the FOMC is more likely to search for alternatives to using M2 as the preeminent information variable for monetary policy. For these reasons, it is useful to review the empirical evidence on the permanent as well as the temporary factors causing the recent M2 slowdown. Most analysts attribute the slowdown to reduced demand for M2 by households and businesses or reduced supply of M2 by depository institutions.

Factors reducing the demand for M2

One factor reducing the demand for M2 is the progressive steepening of the yield curve in recent years. Although both short-term and long-term interest rates have trended down since the spring of 1989, the total decline has been far greater for short-term rates. The rate on 3-month Treasury bills, for example, has declined almost 5 1/2 percentage points since the spring of 1989, while the yield on 30-year Treasury bonds has fallen less than 1 1/2 percentage points. The return on long-term financial assets has thus become increasingly attractive relative to the return on such assets as short-term time deposits, whose yields closely track short-term market interest rates. Explosive growth of stock and bond mutual funds in recent years, for example, may have come in part at the expense of consumer time deposits.

To some extent, reduced demand for M2 in recent years is a manifestation of longer term trends in financial markets. Many M2 deposits have become much closer substitutes for other financial assets since deposit rates were deregulated in the early 1980s. Enhanced substitutability would be expected to lead to an increase in the responsiveness of depositors to changes in the spread between market rates and deposit rates. Increased availability of bond and stock mutual funds, for example, may have increased the responsiveness of the demand for time deposits to changes in long-term interest rates. If so, the reduction in time deposits due to the sharp upward slope of the yield curve would be much more pronounced now than in previous decades.

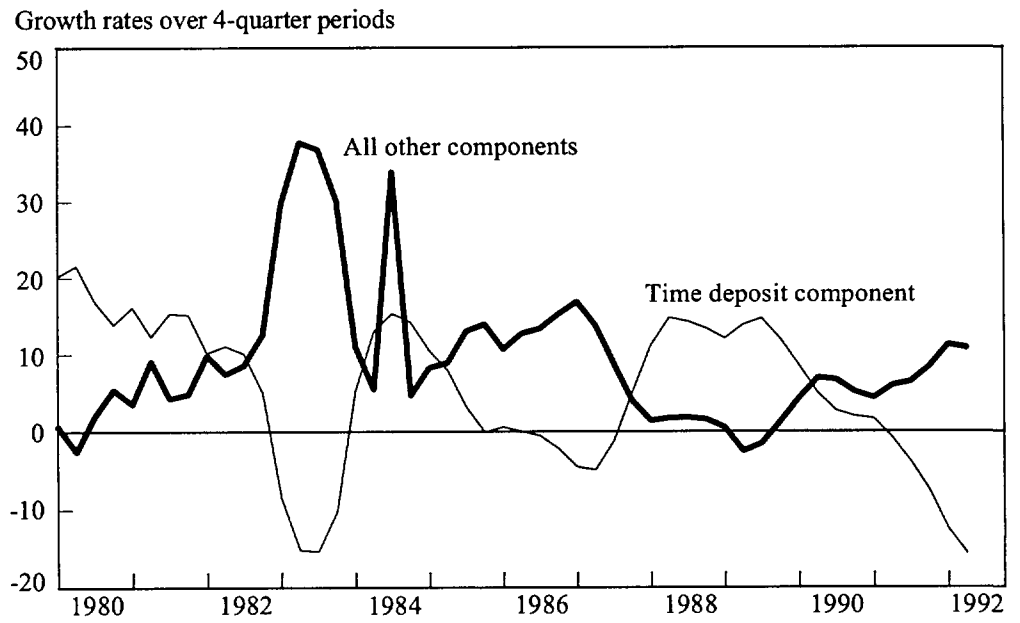
Factors reducing the supply of M2

One factor contributing to the decline in M2 supply is a long-run trend toward less of a role for banks and thrifts in providing credit. The share of new credit extended by banks and thrifts to nonfinancial U.S. firms declined from more than 60 percent in the early 1960s to less than 40 percent by the mid-1980s. An increasing fraction of such credit was extended directly in money and capital markets or through nondepository financial intermediaries. This downward trend in the amount of intermediation through banks and thrifts has accelerated sharply in recent years, thus leading to a pronounced decline in the supply of M2.

Another reason for reduced supply of M2 is a

Chart 3

Growth of Components of M2



Source: Board of Governors of the Federal Reserve System.

sharp slowdown in loan growth. Total loans at banks and thrifts have declined so far in the 1990s. Resolution of S&L failures after the passage of FIRREA accounts for much of the slower loan growth at thrifts. But the reasons for slower loan growth at banks are more varied. The national recession and a subpar recovery help explain why the demand for bank loans moderated. Lower demand was also accompanied by restricted supply, however, as banks became more cautious due to higher capital requirements and the collapse of real estate prices on much of the east and west coasts. The combination of a credit crunch and sluggish economic activity reduced the need for banks and thrifts to compete aggressively for funds. As a result, the rates offered on time deposits may have been lowered even more than would be expected for the given decline in market interest rates. Before rates on consumer deposits were deregulated in the early 1980s, the effect on M2 would have been negligible because banks and thrifts did not treat consumer time deposits as managed liabilities. Since deregulation, however, consumer time deposits have come to be used almost as much for liability management as are large negotiable certificates of deposits. As a result, the supply of M2 now depends on the amount needed by banks and thrifts to fund loan growth.

Competition for funds may have been further reduced by the liquidation of failed thrifts. Throughout most of the 1980s, the impaired financial condition of many S&Ls required them to pay a premium in order to attract funds. Many such S&Ls, especially those that tried to "grow out of"

their troubles, resorted to deposit brokers, which gathered funds nationwide by paying higher rates than were generally available at local institutions. To retain customers in the face of such intense competition, many banks and solvent S&Ls found it necessary to maintain deposit rates higher than normal. As insolvent S&Ls were taken over by the Resolution Trust Company, the previously inflated CD rates began to recede. Not only were contracts abrogated on CDs at failed institutions but also their local competitors reduced offering rates, especially at institutions that acquired the deposits of a failed S&L. The resolution of insolvent S&Ls thus reinforced weak loan growth in limiting the rate competition for funds.

In summary, the long-run trend toward less depository credit has been reinforced in the last few years by reduced competition for funds because of S&L insolvencies and sluggish growth of bank lending. Both have contributed to a reduced supply of M2 deposits, which together with reduced demand for M2 deposits due to more attractive rates on long-term assets, produced the unprecedented sluggish M2 growth in recent years. One useful way of analyzing the recent slowdown is to examine empirical evidence on both the short-run and long-run factors reducing M2 growth.

Short-run factors

Resolutions of insolvent thrifts by the RTC are generally thought to account for much of the weakness in M2. In a recent study, for example, Duca uses a variable to measure the total impact of RTC activities on M2. By including a variable measuring the cumulative value of deposits at failed thrifts in an M2 demand equation, he significantly improves the equation's ability to explain the M2 slowdown. The increased risk of holding M2 deposits is deemed to be one of the reasons for this improvement. The other reason Duca cites for the significance of the RTC variable is that depositors at failed thrifts may respond more quickly to alternative rates than if their deposits were allowed to mature. By exercising a call option on such deposits, the RTC forces depositors to evaluate alternative assets. The combined effects of RTC activity, according to Duca, account for most of the M2 shortfall. He concludes that "until its completion, the thrift resolution process could continue to create a missing M2 phenomenon" (p. 19). This process should not, according to Duca, have any lasting effect on the behavior of M2, however. He finds, for example, that thrift resolution activity has not changed the interest elasticity of demand for M2.

Several other studies have also attempted to gauge the effects of RTC activity on M2 deposits. One of the first was by Carlson and Parrott. They test the hypothesis that restructuring the thrift industry led to changes in the pricing of deposits. Although surveys ask banks and thrifts about the most common rate paid on each deposit category, the changes in pricing may have been altered in ways that would not fully be captured by the surveys. The rates on high-tiered and brokered deposits may have been reduced substantially as RTC funding was substituted for private funding. Yet such reductions might not have much effect on the rate paid most commonly on deposits. Carlson and Parrott thus use the change in thrift deposits as a proxy for the effect of RTC resolutions on the rates offered on M2 deposits. Their equation with this proxy better explains the M2 shortfall. According to these results, RTC resolutions have temporarily reduced the supply of M2 deposits by enabling banks and S&Ls to compete less aggressively for deposits. In a follow-up study, Carlson and Byrne emphasize that "the effects of restructuring influence the adjustment of M2 to its equilibrium level but do not affect the equilibrium level itself." And following a similar strategy, Duca reaches a similar conclusion about the importance of deposit pricing for the M2 shortfall.

Feinman and Porter offer several pieces of evidence to bolster this conclusion. They show that brokered CDs began to decline about the time

that widespread S&L closings began. This decline would be expected to lower the average rate paid on time deposits. The lower offering rate would not be captured in the survey measures of deposit rates, however, because rates on brokered CDs are unlikely to affect the most common rate paid. Similarly, banks have chosen to pare the rates offered on their highest yielding MMDAs rather than on the more common accounts. Feinman and Porter conclude from this and similar evidence on other offering rates that banks and thrifts have pursued M2 deposits less aggressively than before RTC resolutions began.

Another reason for not pricing deposits more attractively is the weakness of bank loan growth. Motley finds that the change in bank loans is a significant determinant of M2 growth. He does not emphasize this aspect of his empirical work, perhaps because his article was published before the recent credit crunch began. His results nonetheless are consistent with the view that sluggish growth of bank loans, whether due to overzealous regulation or to weak demand for bank loans, may have led banks to offer relatively unattractive rates on such managed liabilities as retail time deposits. If so, resumption of normal growth in bank lending could lead to more aggressive pricing of time deposits and a consequent increase in M2 growth.

Compounding the effect of unattractive offering rates on time deposits has been increasingly attractive rates on alternative assets. Outflows from low yielding time deposits into such higher yielding assets as bond and stock mutual funds have contributed to the M2 slowdown. The rate of return on these funds has become increasingly attractive in recent years because long-term interest rates have declined much less than short-term interest rates.

Duca finds only a small effect on M2 from transfers into bond mutual funds. He shows that inflows to bond funds surged in the early 1990s as the yield on bond funds rose relative to the yield on time deposits, which are generally less than one year in maturity. Duca estimates the effect of inflows to bond funds by adding various types of bond fund series to M2. He finds that adding bond funds to M2 yields an aggregate that can more easily be explained by a conventional money demand equation than can M2 by itself. He concludes that large inflows to bond funds in recent years depressed M2 growth somewhat. His results suggest, however, that inflows to bond funds, while statistically significant, explain at most about one-fourth of the total M2 shortfall.

A different impression is given by Wenninger and Partlan. They do not conduct statistical tests but do note that rapid sales of bond mutual funds, together with a steepening yield curve, coincided with the slowdown of M2 growth. They conclude that this and other demand-side factors, when added together, could be quite important in explaining the recent weakness in M2.

An even more important role for the yield curve and bond fund explanation is found by Feinman and Porter. They estimate a simple model of M2 demand using the difference between the 30-year Treasury bond yield and 3-month Treasury bill rate. This difference has increased about 250 basis points in recent years. From their estimated equation, Feinman and Porter conclude that more than two-thirds of the total M2 shortfall may be due to the steepening yield curve. One reason a steeper yield curve led to large deposit outflows, they argue, is that banks have been more aggressive in pricing short-term CDs than in pricing longer maturity CDs. Feinman and Porter also report on an experimental model that includes as explanatory variables market yields on Treasury securities of various maturities. While not yielding superior results before deposit interest rate deregulation, the model outperforms alternative models in recent years. In fact, the experimental model *fully* explains the M2 slowdown in the early 1990s.

The results from this experimental model reinforce earlier findings of Carlson and Parrott. They also include longer term market interest rates in a money demand function. Doing so improves the fit of their equation. Unfortunately, they do not

report how much of the M2 shortfall might be due to yield curve effects.

In summary, actions of both depository institutions and their customers have contributed to the recent M2 shortfall. Banks and thrifts offered relatively low rates on time deposits because of slow loan growth and ample availability of funds due to RTC resolutions. Individual depositors have reacted by transferring funds into longer term assets, especially bond and stock mutual funds. The preponderance of evidence shows that both short-run factors are important in explaining the recent M2 shortfall.

Long-run factors

Less attention has been given to how long-run changes may have contributed to the recent M2 shortfall. Several authors note that longer run trends in financial markets have provided fertile ground for portfolio shifts to alter M2 growth. Wenninger and Partlan, for example, argue that shifting funds out of M2 deposits has become easier in recent years because such alternatives as bond and stock mutual funds have become more readily available. But empirical estimates of the importance of such long-run trends on M2 demand are scarce, in part because of the paucity of data. What evidence is available, however, supports the view that changes in financial markets have permanently altered the interest elasticity of demand for M2, made retail time deposits instruments of liability management, and reduced the size of the depository sector.

Motley finds that deregulation of deposit rates since the late 1970s has reduced the sensitivity of demand for M2 to changes in short-term market interest rates. Before 1980, a rise in short-term market interest rates would appreciably slow M2 growth as depositors transferred funds out of deposits whose yield was constrained to remain below market rates. But the same M2 demand equation estimated with data since 1980 indicates that changes in market interest rates have a negligible—and statistically insignificant—effect on the demand for M2 in the long run.

A very different finding is reported by Feinman and Porter. They agree that the interest elasticity of demand changed substantially in the 1980s, but the change suggested by their regression results is toward sensitivity to a wider range of market interest rates. Feinman and Porter find that over the last decade the demand for M2 has responded significantly to intermediate-term and long-term market interest rates as well as to short-term rates. The experimental model estimated using the full range of market interest rates accurately predicts the M2 growth slowdown in the 1990s. According to this finding, the recent M2 shortfall has been entirely due to persistently high interest rates beyond the very short end of the yield curve.

The experimental model developed by Feinman and Porter has important implications. It implies that long-run changes in the financial system are responsible for much of the seemingly mysterious outflows from time deposits in recent years. The authors themselves do not emphasize this implication, though, perhaps in part because they recognize that "the unprecedented nature of the ongoing changes in financial intermediation and regulation make it difficult to quantify precisely these effects [causing weak M2 growth]."

Another prospective long-run trend is the growing use of small time deposits for liability management. Motley provides evidence on the response of offering rates on time deposits to changes in market interest rates. His regression results show that offering rates on small time deposits now adjust as much to changes in market interest rates as do rates on large CDs. Unlike the period when rates on retail time deposits were constrained by Regulation Q ceilings, banks now use both retail and large CDs as managed liabilities. As a result, the responsiveness of M2 to changes in short-term market interest rates has declined substantially. In the long run, the amount of M2 deposits desired by the public is hardly

affected at all by the level of market interest rates because the opportunity cost of holding time deposits is unaffected. This change in deposit pricing behavior has become a permanent feature of the supply of M2.

Wenninger and Partlan provide visual confirmation that offering rates on small CDs closely mirror market interest rates. A graph of the difference between 6-month consumer CD rates and 6-month Treasury bill rates, for example, shows wide divergence between the two rates before deposit rate deregulation. Since deregulation, however, the differential has remained very narrow, never exceeding 50 basis points. Wenninger and Partlan point out that the use of retail CDs as managed liabilities implies that the growth rate of M2 can be affected from the supply side depending on the strength of bank loan growth. This link between M2 growth and bank loan growth may help explain why weak M2 growth accompanied the credit crunch in recent years. But the link could persist long after all vestiges of the recent credit crunch have vanished.

Feinman and Porter argue that recent events surrounding thrift resolutions are merely an accentuated part of the long-run decline in the size of the depository sector. They demonstrate that the share of total credit extended by depository institutions began to trend down long before the precipitous drop in recent years. One implication of this secular decline in the size of the depository sector is that the long-run supply of M2 deposits would also be declining. Rechanneling of credit demands outside depository institutions would normally be accompanied by a decline in deposit offering rates relative to market rates. Even after the effect of RTC resolutions fade, therefore, the supply of M2 deposits will continue on a downward trend. As a result, "the long-run value of the velocity of M2, V2*, will be permanently higher."

Summary

Too little time has passed for researchers to determine precisely the importance of the various factors reducing M2 growth in recent years. Authors using the same data, for example, come to different conclusions about whether RTC resolutions of failed thrifts were the principal reason for the M2 slowdown. On net, the evidence supports the conclusion that balance sheet restructuring by banks and by their depositors has led to a substantial reduction in time deposits. This restructuring resulted in part from such special factors as a sharply upward sloping yield curve, resolution of failed S&Ls, and sluggish growth in bank lending. Abrupt portfolio shifts were made easier, however, by long-run trends set in force by financial deregulation. For that reason, the recent unusual behavior of M2 might not be an isolated instance that the Federal Reserve can confidently predict will not recur under different circumstances in the future. Moreover, financial deregulation may have so altered the properties of M2 that its role in the conduct of monetary policy might need to be reevaluated.

IMPLICATIONS FOR MONETARY POLICY

Persistently weak M2 growth has led the FOMC to deemphasize its importance in the conduct of monetary policy. In his recent midyear report on monetary policy to Congress, Chairman Greenspan explained why the Committee did not adjust the annual growth range for M2 despite the substantial shortfall from the existing range:

> [Specifying a new range] would carry the presumption that the new range was clearly more consistent with broader economic objectives, and in view of the uncertain relationships involved, the FOMC did not want to convey that impression.... In light of the difficulties predicting velocity, signals conveyed by monetary data will have to continue to be interpreted together with other sources of information about economic developments.

In the terminology of this article, Chairman Greenspan's comments indicate that M2 is currently not reliable enough to serve as the preeminent information variable for monetary

policy, but rather as one of many information variables that guide monetary policy.

What then are the prospects that M2 can be reinstated as the principal policy guide in the future? The answer depends in part on how much longer special factors continue to retard M2 growth. But the answer also depends on whether unwinding of the special factors causes unusually rapid M2 growth for a while and on whether the longer run forces resulting from deregulation have so altered M2 that its use in monetary policy is limited.

Prospective behavior of M2

Some of the factors distorting M2 growth in recent years may begin to abate soon. Resolution of failed thrifts, for example, is projected to peak in 1993. Outlays by the RTC are thus likely to decline sharply beginning in 1994. Soon thereafter, the competition for funds might intensify as the deposit inflows from failed thrifts cease. Offering rates on deposits, especially high-tiered deposits, would be expected to increase relative to market interest rates as banks and surviving thrifts bid for depositors' funds. High-rate, brokered CDs are nonetheless unlikely to be nearly as important in the future as they were in the second half of the 1980s, when insolvent thrifts had to pay premium rates to attract deposits. The growth rate of M2, however, might be temporarily boosted above its long-run equilibrium rate as deposit offering rates rise faster than market interest rates for a while. Such a temporary spurt in M2 growth would be all the more likely if the unwinding of thrift resolutions happens to coincide with a strengthening of loan demand. The resulting intense competition for deposits could push offering rates on deposits well above equilibrium levels.

Reversal of flows between bond mutual funds and M2 deposits could also lead to a temporary burst of M2 growth. The flows have been primarily out of time deposits in recent years as the steep yield curve increased the attractiveness of longer term assets. But the yield curve could flatten over the next few years due to maturing of the current economic expansion and a reduction in the long-run rate of inflation expected by financial market participants. As short-term interest rates approach, and perhaps eventually exceed, long-term rates, time deposits will become increasingly attractive. Funds may thus begin to flow out of bond funds into M2 deposits. If so, the growth rate of M2 would be temporarily elevated due to reversal of the flows between M2 deposits and bond funds.

Taking account of the likely future course of the two major factors depressing M2 growth in recent years, the problem for the Federal Reserve by the mid-1990s might well be excessively rapid M2 growth. The FOMC within the next few years might thus be confronted with explaining to the Congress, the public, and financial markets how rapid M2 growth is consistent with monetary policy goals. A convincing explanation would be particularly important to prevent a rise in expected inflation just as reasonable price stability might be within reach.

Even though a spurt of M2 growth is the most likely outcome, too little is understood about the cause of the M2 slowdown to predict accurately the course of M2 growth over the next few years. Such uncertainty warrants considerable caution in interpreting the growth rate of M2, at least until researchers have enough data to more confidently determine the reasons for the recent behavior of M2.

Prospective properties of M2

In addition to the growth spurt that may occur in the next few years, the Federal Reserve must be concerned about whether the properties of M2 will make it useful in policy implementation. The empirical evidence cited above suggests that the determinants of M2 growth may well change. Some of these changes could detract from the Federal Reserve's ability to control M2 growth, thereby precluding using it as a policy target similar to the way M1 growth was used from 1979 to 1982.

One such change is a decline in the responsiveness of M2 to short-term market interest rates. Motley's results suggest that the public's demand for M2 is likely to be largely unaffected by changes in money market rates. The offering rate on M2 deposits, especially time deposits, will so closely mirror market rates that the opportunity cost of holding liquid assets in depository institutions will be small and relatively unaffected by the level of money market rates. This property of M2 has both positive and negative aspects for monetary policy.

The positive aspect is that M2 growth may be more highly correlated to nominal income growth than in the past. With less responsiveness to short-term market interest rates, it could be argued that income will become the only significant determinant of the demand for M2. This by itself would seem to enhance the usefulness of M2 both as a target variable or an information variable for monetary policy. Nominal income growth is generally thought to be closely related to ultimate policy goals since it comprises inflation and growth in real income. Controlling growth of an aggregate the demand for which is primarily determined by income growth should enable the Federal Reserve to indirectly control income growth and, in the absence of unexpected supply shocks, achieve its goals for inflation and real output.

Unfortunately, the ability to control M2 will be seriously impaired. Like most central banks, the Federal Reserve has relied mainly on a short-term interest rate as the instrument for achieving monetary growth objectives. Open market operations and discount rate policy can be used to keep the federal funds rate at whatever level is deemed appropriate. Since other money market interest rates closely track the funds rate, the Federal Reserve can thereby strongly influence the general level of short-term interest rates. But if the demand for M2 does not depend on market rates, the ability is lost to use open market operations and the discount rate to influence M2 growth.

It might have been plausible in the past that the Federal Reserve could nonetheless control monetary growth from the supply side. The textbook explanation of how a central bank could control monetary growth by estimating the money multiplier and injecting or absorbing reserves as necessary is in all cases an oversimplification. During some periods, however, the Federal Reserve has used money multiplier relationships to derive a reserve path consistent with monetary growth objectives. But doing so now would be virtually impossible as a means of controlling M2 growth. Time and savings deposits no longer have reserve requirements. As a result, the multiplier relationship between M2 growth and reserve growth would be highly uncertain. Controlling M2 from the supply side is probably no longer a feasible alternative to the rapidly disappearing ability to control M2 growth from the demand side using an interest rate operating variable. Overall, then, the negligible elasticity of M2 demand with respect to short-term interest rates that is implied by Motley's empirical work might preclude the close control over M2 growth necessary for using M2 as a policy target.

In contrast, the same feature should enhance the attractiveness of M2 as an information variable. The close correlation between M2 growth and nominal income growth implies that the Federal Reserve could gain information about likely inflation and output developments by monitoring M2 growth. Assuming there are no major supply or demand disturbances of the kind evident in the last two or three years, unexpected slowing of M2 growth could reliably be interpreted as portending weak growth in output. Similarly, unexpected strength in M2 growth would suggest an imminent acceleration of inflation. The Federal Reserve could then adjust policy instruments as appropriate in light of this information.

In contrast, the greater sensitivity of M2 to long-term interest rates would reduce the usefulness of M2 as an information variable. The findings of Feinman and Porter suggest that M2 growth is increasingly affected by the shape of the yield curve. If researchers could pin down the

precise relationship between M2 growth and interest rates at various maturities, there would be no problem in interpreting M2 growth. Such certitude appears several years away, however. Only recently have bond and stock funds, for example, been accessible enough to make them good substitutes for time deposits. Too little information is available to determine precisely what effect such funds will ultimately have on the sensitivity of M2 to long-term interest rates.

Another factor contributing to the uncertainty of the relation between M2 and income is the use of small time deposits for liability management. Wenninger and Partlan among others have documented that banks now adjust offering rates on time deposits as necessary to attract loanable funds. The growth rate of M2 is thus likely to remain dependent on the growth of loans, which can be affected by either loan supply or loan demand. Dependence on loan demand might not appreciably distort the relationship between income and M2 since loan demand is itself related to income growth. Changes in the willingness to supply loans, on the other hand, can arise for reasons largely unrelated to economic growth or inflation. The recent credit crunch, for example, is generally thought to have resulted in part from banks' attempts to meet higher regulatory capital standards. Recurrence of such regulatory effects on bank lending could on occasion seriously distort the relation of M2 to income. During those occasions, M2 would not be a useful information variable for monetary policy.

The informational content of M2 growth could also be impaired by variations in the speed at which credit flows are channeled away from depository institutions. The downward trend in the share of total credit extended by depository institutions, as noted by Feinman and Porter, has occurred in fits and starts. If interstate branching were authorized and the Glass-Steagall Act repealed, the banking system might even increase its share of lending for a while. The supply of M2 deposits would thus increase relative to income, thereby lowering the velocity of M2. Alternatively, continued shrinkage of the depository sector would tend to raise the velocity of M2 at a rate that depends on the degree to which financial innovations and regulations channel borrowing away from depository institutions. To the extent that the Federal Reserve cannot accurately gauge the effects this process was having on M2, its usefulness as an information variable will be reduced.

Overall, the prospective properties of M2 may change its role in the conduct of policy. The reduced sensitivity to short-term interest rates effectively precludes using M2 as a policy target. It may nonetheless remain useful as an information variable. However, susceptibility to changes in the slope of the yield curve, in the growth of bank credit, and in the size of the depository sector will continue to require considerable judgment about what M2 growth portends for future output and inflation. M2 is therefore unlikely to be reliable enough in the future to be restored as the preeminent information variable for monetary policy.

Alternative monetary targets

In light of the ongoing uncertainty about M2, some economists have proposed redefining the monetary aggregates. The primary goal of such a redefinition would be to produce an aggregate whose properties make it more amenable to use in the conduct of policy.

One proposal is to exclude time deposits from M2. Motley, for example, argues that deregulation of deposit interest rates has resulted in M2 including two fundamentally different kinds of assets. Rates on transactions and savings deposits adjust little to changes in market interest rates, but rates on time deposits adjust rapidly and completely. Consequently, the behavior of time deposits is very different from the behavior of other M2 assets. Moreover, Motley argues on both theoretical and empirical grounds that time deposits should not be included in the same monetary measure with deposits that are immediately avail-

able. His empirical findings confirm that omitting time deposits from M2 would in some ways increase its usefulness for monetary policy. Because the empirical evidence is mixed, though, Motley recommends that an aggregate omitting time deposits be used only as a supplement to M2 in the conduct of policy.

Instead of narrowing M2, as Motley suggests, other economists advocate broadening M2 to include more assets. Poole, for example, would include institution-only money market mutual funds in M2 because they have similar properties to other M2 assets. Although not explicitly advocating redefinition of the aggregates, Duca uses an adjusted measure that includes bond funds to help explain the M2 shortfall in recent years. Like Poole's expanded measure, the aggregate constructed by Duca has grown faster than M2 in recent years due to the rapid growth of mutual funds. These expanded M2 measures have thus been more closely related to income in the 1990s than has the traditional M2. Redefining M2 on the basis of the most recent evidence, although appealing in some ways, runs the risk of mistaking a coincidence of timing with long-run stability. For this reason, redefinition of monetary aggregates would require more extensive empirical evidence on the properties of the proposed aggregate over a longer time period.

Such evidence is provided by Feinman and Porter. They compare both narrower and broader aggregates to M2 based on variability, stability of demand functions over time, and Granger causality tests. The least desirable by all criteria are narrower measures, which suffer from the same problems as M1 in terms of extreme interest sensitivity. The broader aggregates behave much like M2 over the sample period as well as for simulations over a more recent period. None seems to explain the M2 shortfall using estimated relations over a longer period. In short, there is little reliable evidence that redefining the monetary aggregates would yield a monetary measure more able than M2 to serve as the principal guide for monetary policy.

CONCLUSION

It is too soon to be certain about the policy implications of the recent M2 slowdown. Too few data are available to sort out with confidence the major causes of the slowdown, let alone to predict its long-run consequences. Given the experience with M1, however, it should not automatically be assumed that the M2 slowdown is merely a temporary aberration due to special factors. Special factors have almost certainly played a role, but so have the general properties of M2 in a deregulated financial environment in which the importance of depository institutions is waning.

The implication is that the Federal Reserve may need to consider contingency planning in case M2 never again can serve as the principal focus of monetary policy. One response might be to seek an alternative definition of money that would provide a new policy guide. But one should also admit the possibility that in a deregulated financial environment no monetary aggregate may be reliably enough related to policy goals to become the preeminent information variable. In that case, the appropriate response might well be to design a new framework for implementing policy and communicating to the Congress and the public. Such a framework would presumably rely less on growth ranges for monetary aggregates.

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