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Monitoring Money: Should Bond Funds Be Added to M2?

*"The Federal Reserve
watches money and interest
rates because money is a
useful warning device."*

The growth of M2—a monetary aggregate policymakers use to measure the money supply—has been unusually weak in the early 1990s (*Chart 1*).¹ In the first two quarters of 1993, M2 has been below the 1993 target range set by the Federal Open Market Committee (FOMC).²

Although M2 indicated a slowdown in economic growth in the early 1990s, M2 has overstated the extent of that slowdown by about 2 percentage points. One explanation for this unusually weak or "missing" M2 is that people shifted away from bank deposits toward higher yielding bond mutual funds.

This possibility raises the question of whether the addition of bond funds to M2 would give policymakers

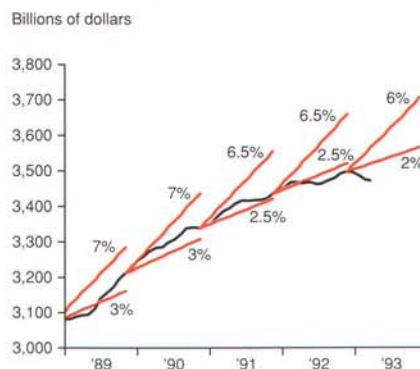
a more accurate view of what is happening in the economy. To find the answer, I review why the money supply has been used as an indicator of nominal gross domestic product, explain why declines in bank competitiveness have led to episodes of missing money and describe bond funds. This discussion provides a basis for examining results from modeling M2 with and without bond funds. The major policy implication of this research is that a measure of M2 that includes bond funds should be monitored.

Why Money Is Used as an Economic Indicator

Gross domestic product, or GDP, is arguably the major gauge of the economic well-being of our nation. Nominal GDP growth equals inflation plus real GDP growth, the latter of which has trended around 2½ percent. The Federal Reserve has sought to stabilize nominal GDP growth around a moderate rate, so as to keep inflation under control. Curtailing inflation fosters long-run decision-making and investments, thereby boosting real economic growth over the long run.

However, GDP is not something that we can observe day to day, or even month to month. Yet it is in this time frame that policy decisions are

Chart 1
Actual and Targeted M2



“One explanation for this unusually weak or ‘missing’ M2 is that people shifted away from bank deposits toward higher yielding bond mutual funds.”

Chart 2
M2 Velocity and Its Opportunity Cost



made. The Federal Reserve watches money and interest rates because money is a useful warning device. Though today's GDP is unobservable, today's GDP is correlated with today's money stock and interest rates, which *are* observable.

This correlation can be illustrated with the equation of exchange:

$$\dot{M} + \dot{V} = \dot{P} + \dot{Q}$$

Money Velocity Inflation Real
Growth Growth GDP
 Growth

At any given time, money growth plus growth in velocity equals inflation plus real GDP growth. Velocity is, by definition, the amount of nominal GDP per dollar of money in circulation.

M2's velocity has historically tended to move with its opportunity cost, the returns investors forgo by holding M2 balances instead of other assets. M2's opportunity cost has traditionally been measured by the spread between the three-month Treasury bill rate and the average interest rate paid on M2. The higher the market interest rate is relative to M2 yields, the higher velocity tends to be because people have a greater incentive to economize on their M2 holdings. More generally, the attractiveness of M2 relative to other assets reflects

differences not only in pecuniary returns, but also in the services provided by an asset, such as convenience and liquidity.

Recent M2 growth has been weak relative to its target range as well as relative to estimates from econometric models of M2 that were used in the late 1980s. Such models, which typically estimate M2 mainly on the basis of nominal GDP growth and interest rates, explain M2 growth well through the middle of 1990. However, since then, the ability of these models to track M2 has fallen, with M2 growth overpredicted by around 2 percentage points. Such unusual weakness in M2 is problematic for policymakers because it is no longer clear what slow M2 growth signifies. According to the quantity equation, slow money growth can reflect that inflation has fallen, that real GDP growth has weakened, or that velocity growth has accelerated:

$$\dot{M} = \dot{P} + \dot{Q} - \dot{V}$$

Low Low? Weak? High?

The breakdown of M2 models reflects that the long-standing relationship between M2's velocity and interest rates has broken down. Until 1990, M2's velocity broadly moved

with its measured opportunity cost. However, since 1990, the velocity of M2 has surged while its measured opportunity cost has fallen (*Chart 2*).

What has happened? The answer is that the relative attractiveness of M2 has declined in ways not reflected by its measured opportunity cost. My research indicates that other asset yields have become more important, that government regulations have made M2 less attractive and that the private sector has made bond funds more attractive. A review of some recent monetary history will be helpful in explaining these results.

Bank Competitiveness and Episodes of Missing Money

Episodes of missing money have occurred in the past. For example, the “missing M1” of the mid-1970s has been attributed to the interaction between high interest rates and bank regulations that limited banks’ ability to offer deposit and credit services to firms. As a result, many firms reduced noninterest-bearing demand deposits by substituting repurchase agreements and adopting cash management. In addition, many large firms shifted away from bank loans toward commercial paper. This shift reduced compen-

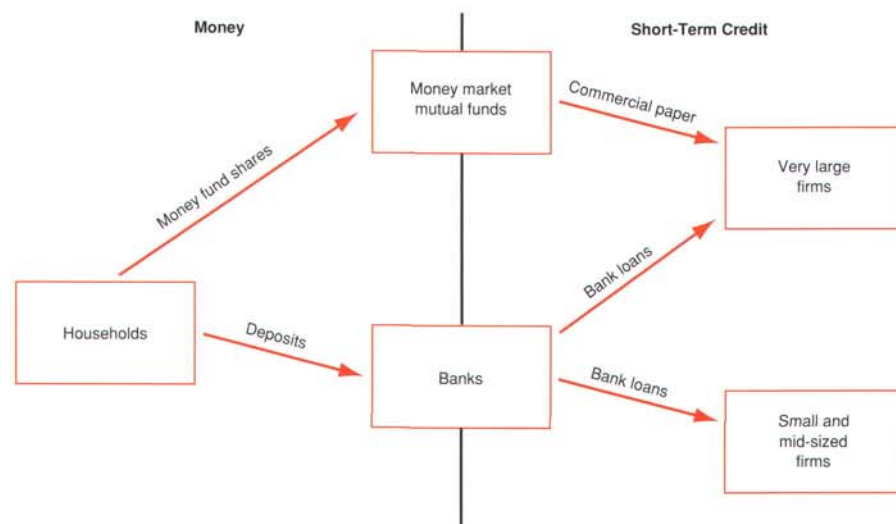
sating demand deposit balances that were held in proportion to firms’ bank loans.

Deposit growth was also unusually weak in the late 1970s. Once again, the interaction between regulations and high interest rates put banks at a competitive disadvantage. In that episode, most of the “missing money” was reflected in the rapid growth of money market mutual funds (MMMFs), which invest in short-term Treasury bills, bank certificates of deposit (CDs) and commercial paper. For households, money funds offered interest rates higher than those on bank deposits, which were then subject to binding rate ceilings. By expanding the number of households that could directly or indirectly invest in commercial paper, money funds made commercial paper cheaper than bank loans for high quality firms. In addition to banks, money funds provided a new channel through which short-term credit could flow from households to firms (*Chart 3*).

In response to these episodes, the Federal Reserve in 1980 attempted to create a better economic indicator by redefining M2 to internalize shifts between bank and nonbank-like deposits. Over time, M2 has

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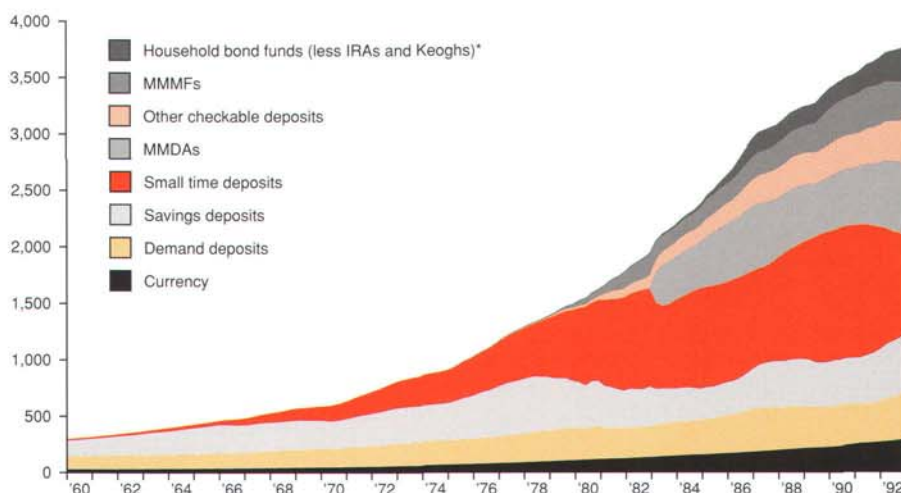
Chart 3
Sources of Funds for Short-Term Credit



"Until 1990, M2's velocity broadly moved with its measured opportunity cost."

Chart 4
The M2 Monetary Aggregate

Billions of dollars



*Household bond funds not currently in M2.

evolved to include instruments that, in effect, did not exist before the mid-1970s—most notably, money funds and the bank version of money funds, money market deposit accounts (MMDAs) (*Chart 4*).

However, because of redefinitions, much of M2's apparent value as an indicator before 1980 is misleading. For example, taking just money funds out of M2 subtracts about 3 percentage points from M2 growth in 1979, the year before money funds were officially added to M2. Thus, one partial explanation for the high inflation of the late 1970s and early 1980s is that much of the buildup of inflationary pressures was not evident in money supply measures until too late (*Chart 5*).

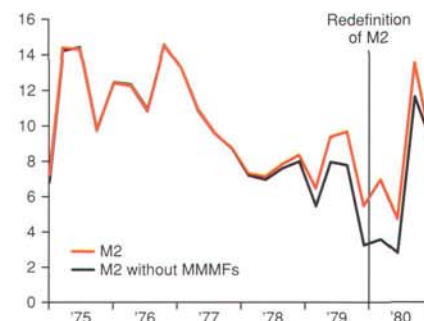
Bond Funds

More recently, bond funds have grown rapidly, largely at the expense of money funds and bank deposits. In particular, the big declines in small time deposit rates have made bond funds more appealing. Investors can choose among bond funds specializing in Treasury, tax-free municipal, mortgage-backed, corporate or foreign bonds. Increasingly, bond and equity funds are being offered by banks.

Bond funds have attractive features. Because they are mutual fund shares, they offer investors lower risk through diversification and professional management. In addition, because many funds are in asset management accounts, they provide liquidity by giving investors credit lines and by allowing investors to shift assets among equity, bond and checkable money funds at little or no cost. Increasingly, banks are allowing depositors to shift between mutual funds and bank deposits. With these characteristics, bond funds can substitute

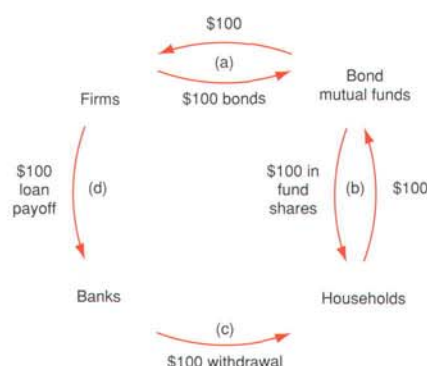
Chart 5
M2 Growth With and Without MMMFs

Growth percent*



*Seasonally adjusted annual rate.

Chart 6
Bypassing the Banking System:
Transfers of Funds



for both direct bond holdings and M2 deposits.

Bond funds are good substitutes for M2 for several reasons. First, like M2, they have a high degree of liquidity. In addition, because most bond fund assets are invested in U.S. government and other high grade bonds, they generally have low credit risk. One relative advantage of bond funds is that they offer higher expected returns than M2, largely because bond funds invest in assets with longer maturity. However, this longer maturity creates a disadvantage because investors face a price risk since a rise in bond rates is accompanied by a decline in the market value of existing bond fund shares. Furthermore, this price risk rises with the average maturity of the bonds in the portfolio.

(As an aside, although equity funds, bond funds and M2 have some common features, the high price risk associated with equity funds makes them much less substitutable for M2 than bond funds. For this reason, I focus on bond funds.)

Let's review an example of how bypassing the banking system can lead to an episode of missing money (*Chart 6*). Suppose a firm raises \$100 by issuing bonds bought by a bond fund (exchange a). The bond fund pays the firm with \$100 it raises from selling mutual fund shares to a household (exchange b).

The household obtains the \$100 used to purchase bond fund shares by withdrawing \$100 from a small time deposit (transaction c). Using the \$100 from issuing a bond, the firm pays down \$100 in bank loans (transaction d).

The declining role of banks in this example shows up on balance sheets (*Chart 7*). For the firm, total liabilities are unchanged; the \$100 decline in bank loans matches the \$100 increase in bonds. For the household, total assets are unchanged because the \$100 decline in small time deposits matches the \$100 increase in bond funds. The bond fund, however, rises by \$100 in both assets and liabilities. By contrast, banks are hit with a \$100 decline in commercial and industrial (C&I) loans and a \$100 fall in deposits. Thus, even though economic conditions are unchanged, M2 falls by \$100 while the sum of bond funds and M2 is unchanged.

This example is very relevant. Recently, many firms have shifted from bank loans toward bonds for finance partly because the spread of the prime rate over short-term rates has risen as banks passed on the higher cost of the new risk-based capital standards and other new regulatory costs, such as higher deposit insurance premiums. At the

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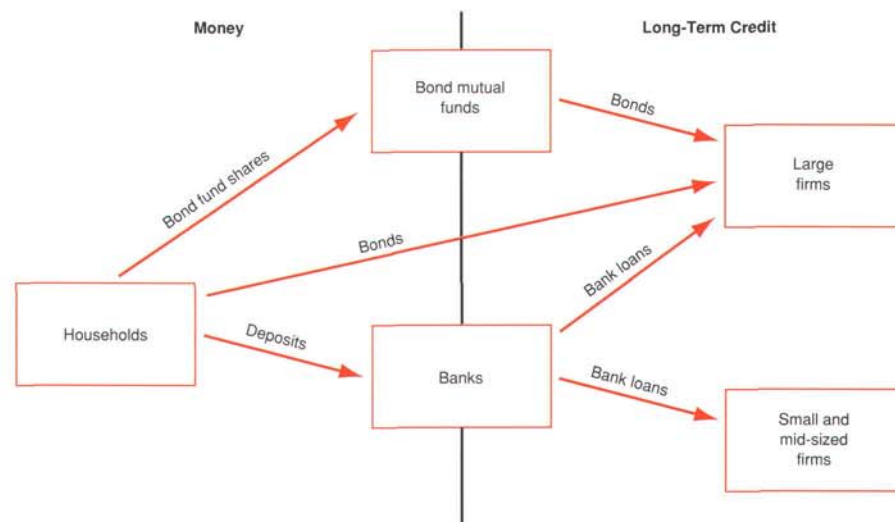
Chart 7
Bypassing the Banking System:
A Balance Sheet Example

Firm		Bond Mutual Fund	
A	L	A	L
	-100 C&I loans	+100 bonds	+100 mutual fund shares
	+100 bonds		

Bank		Household	
A	L	A	L
-100 C&I loans	-100 small time deposits	-100 small time deposits	+100 bond mutual fund shares

*“Bond-fund-adjusted
M2 may give better
signals about the
economy in real time,
when policy is made.”*

Chart 8
Sources of Funds for Long-Term Credit



same time, households have shifted out of M2 to bond funds. In addition to banks and direct purchases of bonds by households, bond funds provide another channel through which long-term credit can flow from households to firms (*Chart 8*).

Empirical Findings

Adding bond funds may help restore M2 as an economic indicator by internalizing shifts between bank and bond instruments by investors and borrowers. *Chart 9* plots total bond funds and bond funds held by households (the two upper-most lines) and household bond funds minus individual retirement accounts (IRAs) and Keogh assets (the bottom line). Of these series, the bottom one is most comparable to M2 because M2 also nets out IRA and Keogh assets, along with institutional holdings of money funds.

In the mid-1980s, households flocked to bond funds as the eligibility restrictions on IRAs and Keogh accounts were loosened. As more households learned about bond funds when opening IRAs, many shifted assets into non-IRA and non-Keogh bond fund accounts as well. Balance sheet data suggest that more of these bond fund in-

flows came from direct holdings of bonds than from M2. After the 1986 tax reform tightened IRA and Keogh rules, bond funds were nearly flat during the late 1980s. More recently, bond funds have surged, this time more at the expense of M2 than of directly held bonds. Adding non-IRA and non-Keogh bond funds to M2 produces an adjusted M2 that has grown faster than M2 in recent years (*Chart 10*).

A standard econometric model of M2 was used to estimate M2 with and without bond funds. There are two key results. First, more of the variation in the bond-fund-adjusted series is explained

Chart 9
Bond Fund Measures

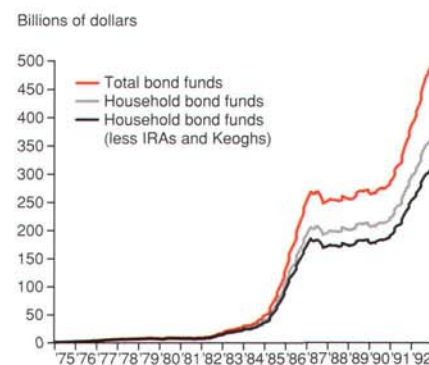
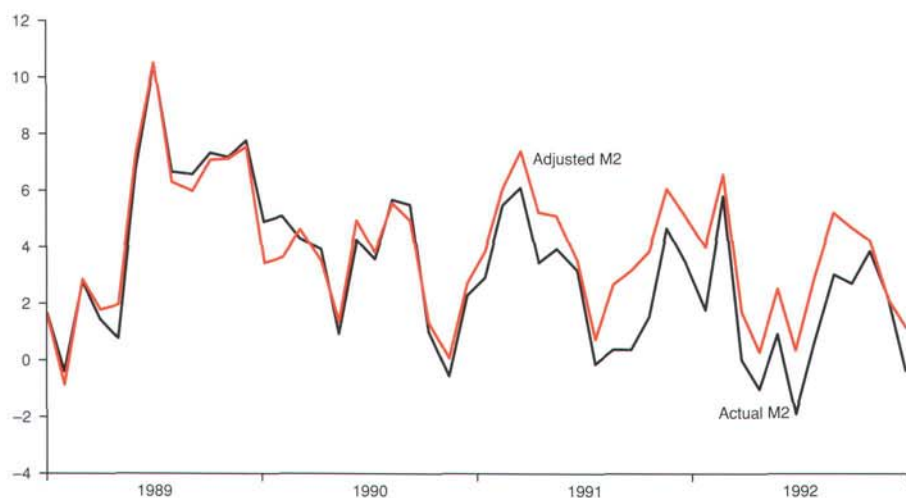


Chart 10
Growth of M2 and Bond-Fund-Adjusted M2

Annualized growth rate



than for M2. Second, the degree to which adjusted M2 is overpredicted during the early 1990s is smaller than is the case for M2.

However, adding bond funds does not fully account for the missing M2. The reason is that models of M2 from the late 1980s typically do not reflect three special factors that have recently depressed M2. The first is the huge spread between long-term and short-term interest rates, which encourages households to shift out of M2 into bond funds and other assets. Another factor is that savings bonds offered interest rates that exceeded market interest rates by about 1 percentage point during much of 1992. As a result, households purchased savings bonds at the expense of M2 and other assets. The third factor is the depressing effect on M2 stemming from the resolutions of deposits at failed thrifts by the Resolution Trust Corporation (RTC). RTC activity has encouraged households to shift out of M2 into other assets including, but not limited to, bond funds.

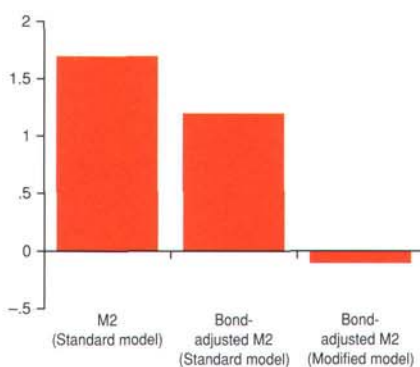
When the RTC resolves deposits, it either pays depositors directly or sells the deposit to an institution that has the right to reset that account's deposit rate. Either way, resolutions can cancel existing high yields on deposits, thereby acceler-

ating the downward adjustment of deposits to declines in deposit interest rates. In addition, resolutions create a call risk for other deposits at failed thrifts since any high rates offered may be subsequently canceled. As a result of this call risk, the opportunity cost of M2 is higher than indicated by the spread between market and deposit interest rates. By understating the true opportunity cost of M2, such spreads will cause econometric models to overpredict M2.

I have modified an M2 model to control for these three factors. Relative to the unmodified model, the

Chart 11
Missing Money
Average Growth Shortfall 1990:3–92:4

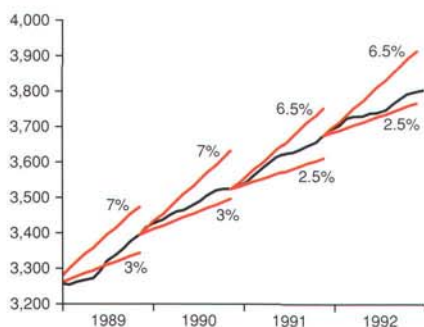
Percentage points



"A case can be made for monitoring bond-fund-adjusted M2 and for continuing research on bond funds....Because the private sector innovates to create better financial products, we need to periodically reevaluate broad monetary aggregates."

Chart 12
Adjusted M2 With M2 Target Growth Cones

Billions of dollars



modified model does not substantially overpredict the growth of M2 with or without bond funds in the early 1990s. The first two bars in Chart 11 indicate the extent to which the standard model overpredicts M2 and adjusted M2 growth since mid-1990, respectively, whereas the right-most bar indicates that the modified model ever-so-slightly underpredicts bond-fund-adjusted M2 growth over the same period.

Relative to the unmodified model, the modified model also explains much more of the variation of M2 and somewhat more of the variation in adjusted M2. These findings reflect that inflows into bond funds account for much, but not all of the outflows from M2 caused by the special factors. Nevertheless, bond-fund-adjusted M2 is more explainable than M2. Furthermore, the estimated effects of interest rates and nominal GDP on bond-fund-adjusted M2 are more stable than those of M2. This suggests that bond-fund-adjusted M2 may give better signals about the economy in real time, when policy is made.

In contrast to M2, which ended 1991 and 1992 at or below the bottom of its target range, bond-fund-adjusted M2 ended those years near the middle of its equivalent target range (*Chart 12*).

Available bond fund data indicate that in the first quarter of 1993, adjusted M2 grew by about 3 percentage points faster than M2, which

is much more in line with the overall pace of inflation plus real economic growth.

Conclusion

This research has four policy implications. First, policymakers may need to monitor bank competitiveness to be able to discern quickly whether slow money growth reflects banks losing market share to nonbanks or the onset of economic weakness, or both. Second, to the extent that federal deficits and other factors affect spreads between long- and short-term interest rates, they also affect bond funds and M2. Third, in addition to M2, a case can be made for monitoring bond-fund-adjusted M2 and for continuing research on bond funds. Finally, the findings support the view that because the private sector innovates to create better financial products, we need to periodically reevaluate broad monetary aggregates.

—John V. Duca

¹ M2 is the sum of all savings accounts, small-denomination time deposits, shares in money market mutual funds (other than those restricted to institutional investors), overnight Eurodollars and repurchase agreements, plus M1, which is the sum of currency held by the public, plus travelers' checks, demand deposits and other checkable deposits.

² The FOMC is the 12-member committee that sets objectives for the growth of money and credit that are implemented through purchases and sales of U.S. government securities in the open market. The FOMC consists of the seven members of the Federal Reserve Board and five of the 12 presidents of Federal Reserve Banks. (The New York Fed president is a permanent member, and voting membership rotates among the other 11 presidents.)

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