

Small Time Deposits and the Recent Weakness in M2

by John Wenninger and John Partlan

By most standard measures, monetary policy has eased considerably since the peak in economic activity in the third quarter of 1990. Total reserves and the monetary base have increased quite rapidly (Charts 1 and 2) relative to their growth in past business cycles, and the federal funds rate has declined in a pattern rather similar to the average in past cycles (Chart 3).¹ Despite this apparent easing in monetary policy, however, M2's growth has been unusually weak since about the time of the peak in business activity. By the fourth quarter of 1991, M2's level was 6 percent below the normal cyclical pattern (Chart 4).

The weakness in M2, however, has not been reflected uniformly across its components.² As Charts 5 and 6 show, the recent weakness in M2 can be traced to its small time deposit component. Small time deposits are currently about 27 percent below the usual cyclical pattern, while M2 less small time deposits has displayed a fairly typical cyclical pattern.³

¹In these charts and the ones that follow, the averages over the past four recessions include the 1960-61, 1969-70, 1973-75, and 1981-82 recessions. The 1980 recession was excluded because of the unique circumstances associated with the 1980 credit controls, and the overlap with the data for the 1981-82 recession.

²M2 consists of a diverse set of depository liabilities, ranging from very liquid transactions accounts and savings accounts to less liquid small time deposits (less than \$100,000) of varying maturities. M2 also contains some nondepository liabilities such as repurchase agreements and money market mutual fund shares. See the appendix for more background on the definition of M2.

³In real terms, the cyclical comparisons tell a slightly different story. As of the fourth quarter of 1991, M2's level would be about 3 percent below the pattern of past cycles, while small time deposits

The first section of this article investigates the developments that have reduced the growth of small time deposits and consequently the growth of M2 over the last two years. We find that the unusually weak growth in M2 and small time deposits appears to stem from both supply and demand considerations. On the supply side, depository lending has been sharply curtailed in what some analysts have called a "credit crunch."⁴ As of the fourth quarter of 1991, depository lending had fallen about 11 percent below the typical cyclical pattern (Chart 7).⁵ This reduced lending by depository institutions has probably contributed to the weakness in M2 from the supply side because banks have had more freedom to use small time deposits as managed liabilities since the phaseout of the interest rate ceilings on bank deposits imposed by Regulation Q. Thus, with curtailed lending, banks have had less need to pursue small certificates of deposit (CDs) as a source of loanable funds.

In addition to these supply-side developments there has been an apparent decline in the demand for small

Footnote 3 continued

would be roughly 23 percent below and M2 less small time deposits about 4 percent above.

⁴See Ronald Johnson, "The Bank Credit Crumble," Federal Reserve Bank of New York *Quarterly Review*, Summer 1991, pp. 40-51. Johnson argues that the sharp curtailment in bank lending resulted primarily from a deflation in asset prices and a broad shortage of bank capital.

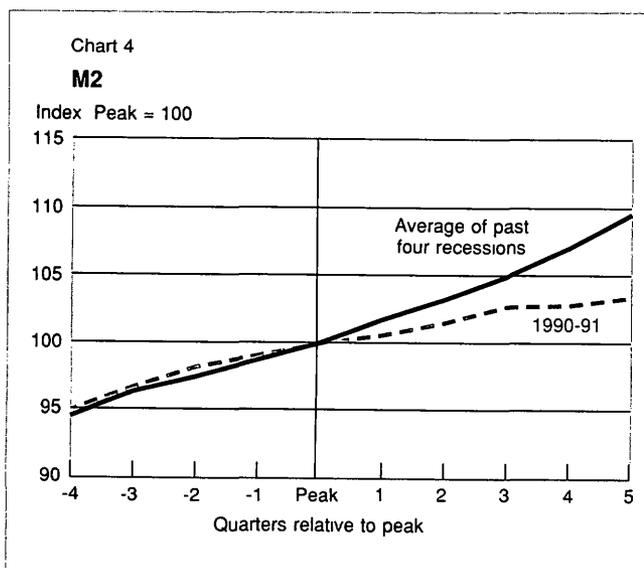
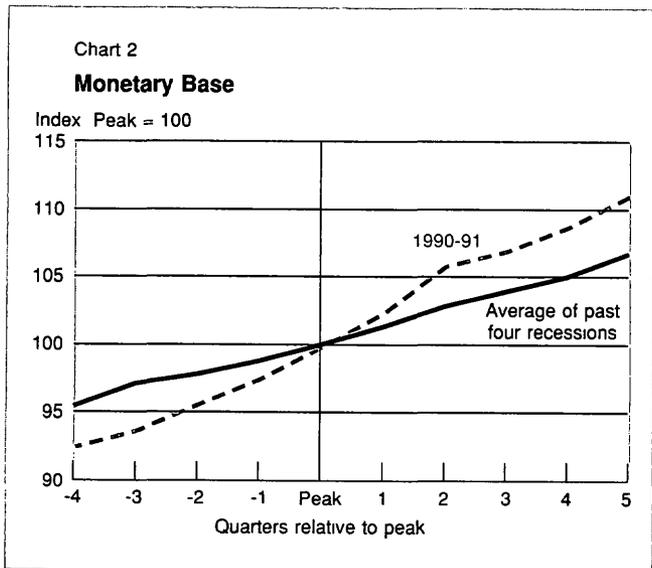
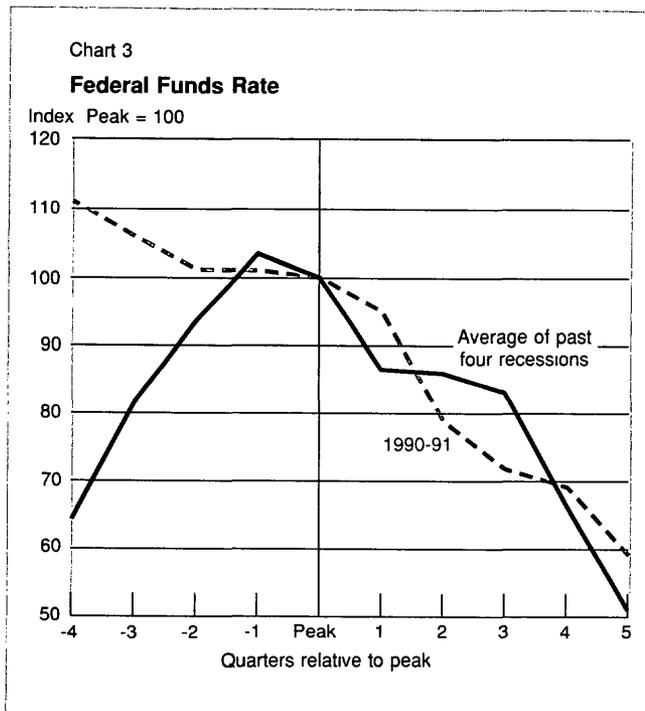
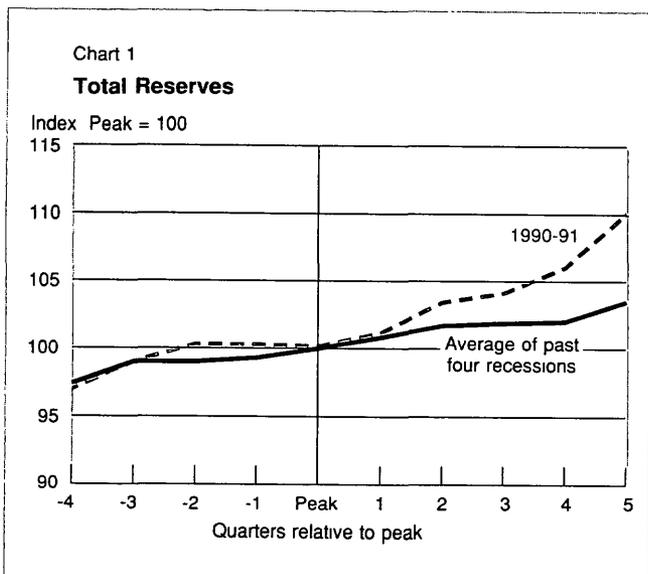
⁵In this article, we use the terms "bank lending" and "depository lending" interchangeably to mean total lending by depository institutions, both banks and thrift institutions.

In real terms, depository lending in the fourth quarter of 1991 was 7.7 percent below the typical cyclical pattern.

time deposits and M2 as a whole. Consumers have become more willing to switch to instruments not counted in M2 now that the yields on small time deposits have fallen to very low levels. Also from the demand side, the closing of thrift institutions by the Resolution Trust Corporation may have prompted some consumers to move funds out of thrift institutions into mutual funds and market instruments.

In the second section of this article, we consider whether it is possible to construct a more useful monetary aggregate by excluding small time deposits from M2. Our analysis suggests that a monetary aggregate

measured as M2 less small time deposits would pose significant problems for monetary targeting. Unlike M2, this aggregate does not seem to have a strong and stable long-run relationship with GDP, a desirable feature for achieving long-run policy objectives through monetary targeting. Moreover, it appears to respond strongly to changes in interest rates, making the Fed-



eral Reserve's task of setting targets in the shorter run more difficult. It is possible, however, that if small time deposits continue to complicate the interpretation of M2, the question of how to define M2 will come up again.

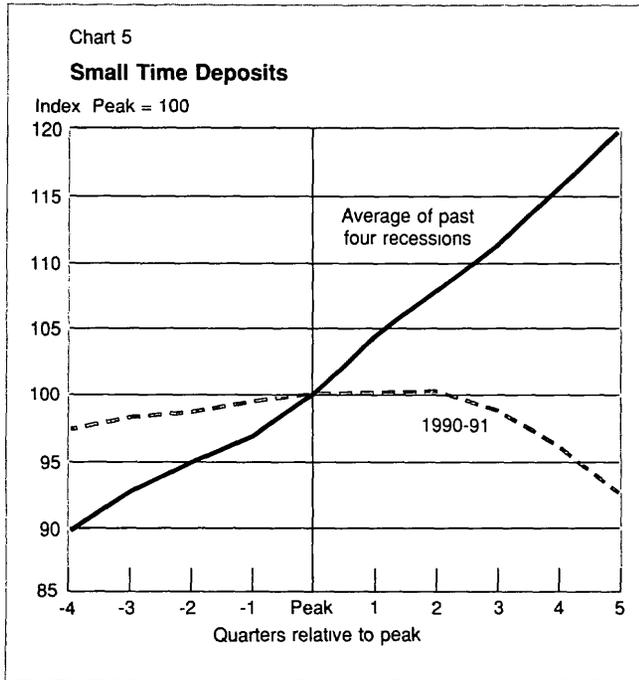
Recent weakness in small time deposits

This section reviews the supply-side and demand-side factors that have lowered the growth of small time

deposits and M2. The section ends with a discussion of the likely interaction of the supply and demand considerations and a brief look at the policy implications.

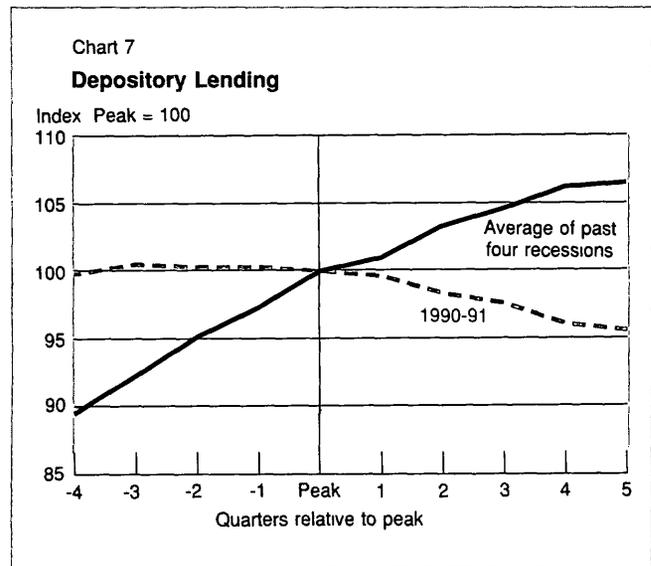
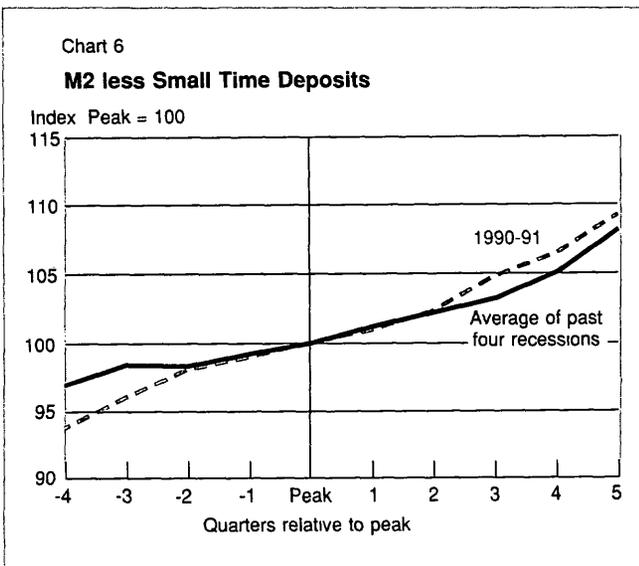
Supply-side considerations

The recent sluggishness in bank lending probably stems from the weakness in economic activity and from some reduction in the willingness of banks to lend. Therefore, both of these developments have probably also contributed to the unusual weakness in M2 and small time deposits. Although sorting out the relative importance of the two developments is difficult, the wider spread between the prime rate and the federal funds rate over the last two years does suggest that the "credit crunch" could be playing a significant role (Chart 8).⁶ Indeed, if the slowdown in bank lending came exclusively from a reduced demand for bank loans in a weak economy, we would expect banks to be lowering, not raising, the prime rate (and other lending rates) relative to market rates to attract additional borrowers.⁷



⁶Spreads comparable to the current ones also occurred in the 1982 recession. Although that period is not generally viewed as a classic "credit crunch" episode, the financial markets were subjected to great uncertainty stemming from the collapse of Drysdale, the Penn Square failure, and the rescheduling of the debts of Brazil, Mexico, and other countries. Had these debts not been rescheduled, the adequacy of the capital of some large U.S. banks would have been in doubt. Some analysts have characterized this period as approaching a credit crunch. For more detail, see Albert Wojniłowicz, "Private Credit Demand, Supply, and Crunches—How Different are the 1980s?" *American Economic Review*, Papers and Proceedings, May 1985, pp. 351-56.

⁷It is not the purpose of this article to document the existence or the severity of the credit crunch over the past two years. Others



In contrast, when a credit crunch is an important supply-side consideration, we would expect to see high lending rates relative to market rates as well as weakness in bank lending on the asset side, and slow growth in managed deposits on the liability side. In addition, all other things equal, the rates paid on these managed deposits should look low relative to market rates as banks bid less aggressively for these deposits. Thus far, however, there has been little evidence of unusually low deposit rates relative to market rates. When bank deposit rates are compared with the rates on Treasury securities of similar maturities, significant changes from the past relationships are not readily apparent (perhaps because banks make some of the adjustment by reducing advertising and promotions). For example, the spread between the six-month consumer CD rate and the six-month Treasury bill rate has been quite stable in

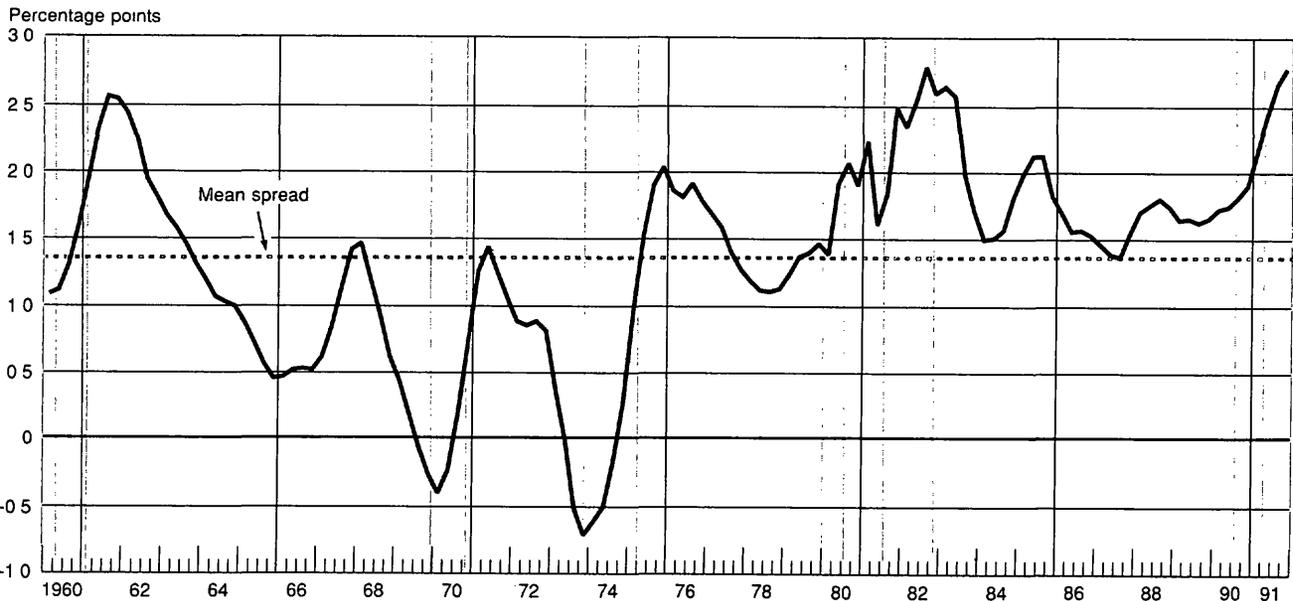
recent years (Chart 9). This spread had shown somewhat greater volatility in the late 1970s and early 1980s when, partly as a result of the change in the Federal Reserve's operating procedures, interest rates in general were more volatile. Moreover, as explained below, the rates banks offer on small CDs may not prove to be unusually low relative to the rates on market instruments, even when bank funding needs are reduced by sluggish loan growth, if the demand to hold these CDs is weakening at the same time.

In any case, it is not surprising that the weakness in bank lending would be reflected in M2 primarily through its small time deposit component. Since the phaseout of Regulation Q (from the late 1970s through the early 1980s), banks appear to be using small time deposits more actively as managed liabilities. The elimination of interest rate ceilings on deposits (except for demand deposits) has given banks the ability to manage the attractiveness of all their various M2 liabilities by adjusting rate and nonrate terms over the longer run. It is reasonable to expect that such adjustments throughout the whole range of these liabilities would eventually reflect a persistent weakness in loan demand and/or a

Footnote 7 continued

have undertaken that work (see footnotes 4 and 11). Rather, we are focusing on the implications of the credit crunch for M2 and small time deposits. In addition, a simple interest rate spread chart such as Chart 8 could not give much insight into the severity of a credit crunch because banks could also adjust the nonprice terms on their loans or simply ration credit at some posted rate.

Chart 8
Prime Rate less Federal Funds Rate
 Four-Quarter Moving Average



Notes: Shaded areas indicate recession periods designated by the National Bureau of Economic Research. For purposes of illustration the trough of the 1990-91 recession is assumed to be April 1991.

reduced willingness of banks to lend.

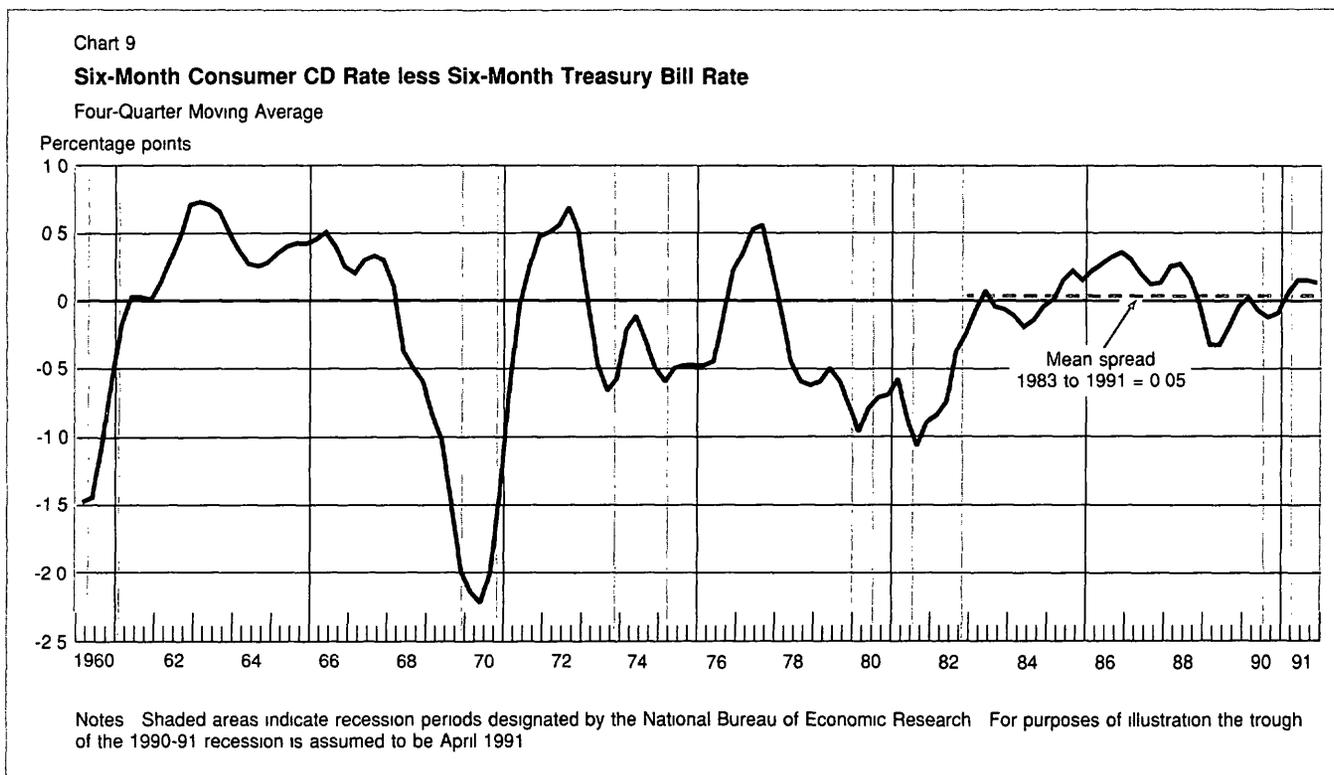
Still, banks are likely to act more quickly to adjust the quantities of small time deposits than the liquid transactions components of M2. Banks actively manage small time deposits as money market conditions change to avoid the large undesired inflows or outflows that would occur if the offering rates on these deposits moved significantly out of line with market rates or the rates offered by banks' competitors. Indeed, the first step in deregulating small time deposits was to link the interest rates on these deposits to market rates, creating the perception for consumers that these are market-rate accounts. Now that banks are free to offer any rate they choose on small time deposits, consumers have become careful CD rate-shoppers, not only in their local markets but also in the national brokered CD market, and banks can raise funds by offering somewhat higher rates than the rates paid by competitors or on market instruments.

In contrast, consumers are usually slow to move their transactions or savings accounts to another bank for a slightly higher rate of return, and nonprice considerations such as convenience and service are also more important. In addition, banks have marketed these accounts more as accounts for which various services are part of the return, and the interest rates paid change less frequently. Hence, banks do not need to be as

active in managing these liabilities, nor can they use these deposits to raise funds in large amounts in the short run. The response by consumers to any change in the terms is likely to be very gradual and not very predictable for purposes of short-run liability management.⁸ In general, when banks fund their asset-liability management strategy in the wholesale money market, they tend to take transactions deposits as given. Over time, however, banks will adjust the rates and other terms on these accounts if they feel the rates have moved out of line with market conditions and their own portfolio considerations.⁹

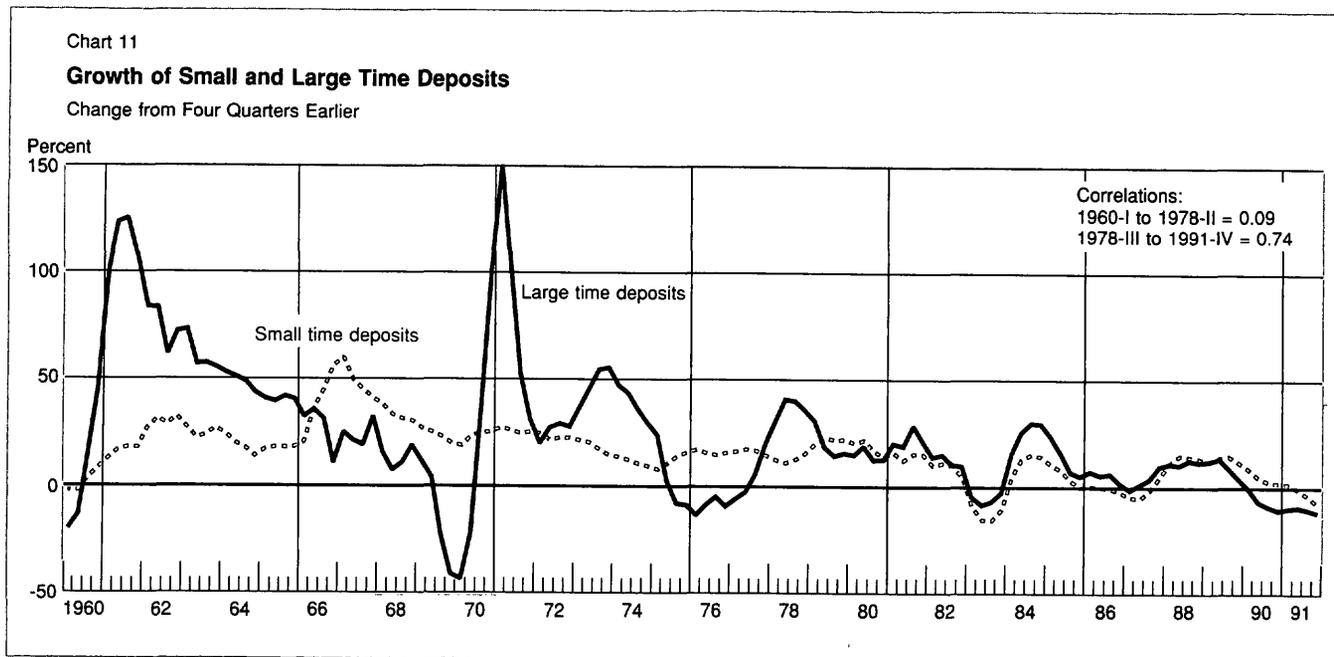
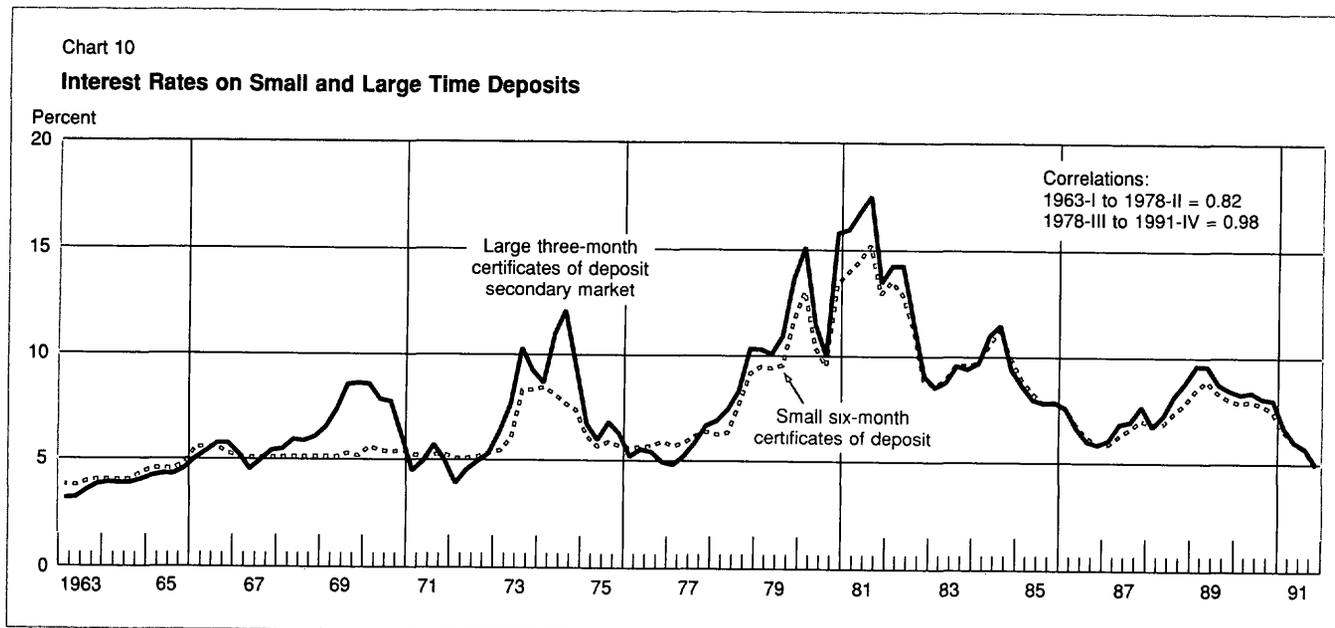
⁸Although consumers do not change the location of their transactions accounts for small differences in yield, they do economize on such balances if attractive alternatives become available. As a result, consumers often transfer some of their liquid balances to small time deposits as banks increase the interest rate on small time deposits more quickly than the rates on the more liquid accounts. The implications of this behavior for monetary targeting are discussed in the next section.

⁹For more detail see Richard G. Davis, Leon Korobow, and John Wenninger, "Bankers on Pricing Consumer Deposits," Federal Reserve Bank of New York *Quarterly Review*, Winter 1986-87, pp. 6-13. For an econometric evaluation of how banks change deposit rates in response to changes in market rates, see John Wenninger, "Responsiveness of Interest Rate Spreads and Deposit Flows to Changes in Market Rates," Federal Reserve Bank of New York *Quarterly Review*, Autumn 1986, pp. 1-10.



Charts 10 and 11 contain some empirical evidence suggesting that banks have used small time deposits more extensively as managed liabilities since the phaseout of Regulation Q. The interest rates paid on small time deposits during the last thirteen years have become more highly correlated with rates paid on large

time deposits (a traditional managed liability). In addition, the growth rates of the quantities outstanding of large and small time deposits have become much more highly correlated since Regulation Q was phased out, increasing from almost zero to about 75 percent. Over the last two years, the rates paid on small time deposits



have continued to follow the rates paid on large time deposits quite closely, and the growth rates of the quantities outstanding have shown a comparable slowing. Hence, both large and small time deposits appear to be reflecting the general weakness in bank lending.

Although the evidence shows stronger correlations in recent years between the interest rates paid on small and large time deposits and on the quantities outstanding of these liabilities, the markets for these two types of deposits are, of course, quite different. The market for large CDs is both highly sophisticated and quite competitive. Thus, a bank offering rates much below the going market rate will essentially not be able to raise any funds, whereas a rate much above the market rate will result in a large inflow of these deposits. Consequently, in the large CD market, major banks must offer a rate close to the market rate when they bid for funds, controlling instead the *quantity* of funding they obtain.

In contrast, the market for small, consumer-oriented CDs, while clearly sensitive to the rates offered by a bank, does allow somewhat more pricing freedom than does the market for large CDs because consumers do not respond as quickly and strongly as professional money managers. However, while banks do have some leeway in pricing in this market, they usually accept all the deposits that are supplied by consumers at the posted rates. Consequently, they can control the funds they get from this source only imperfectly by adjusting

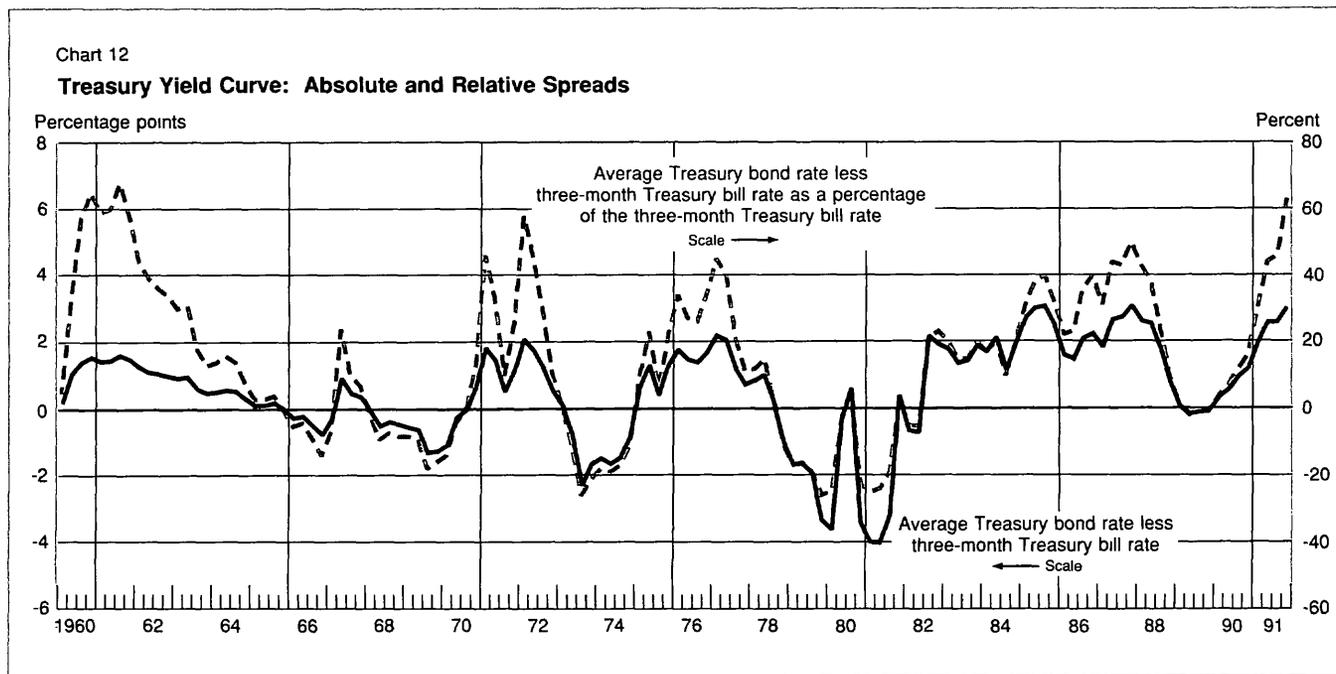
the posted rates up or down relative to money market rates and the rates offered by other institutions.

Even though banks manage these two types of liabilities somewhat differently, both types have reflected the weakness in bank lending. Hence, it would appear that banks use small time deposits as "managed liabilities" to a sufficiently large degree that M2 could be affected from the supply side during this period of weak bank lending.

Demand-side considerations

Small time deposits have probably also been unusually weak because the public's demand for them as investment outlets has fallen. Even though small time deposit rates have declined roughly in step with the drop in market rates, the absolute size of the decline has been a shock to many consumers, particularly those who rely heavily on interest income to finance their spending. Some of these consumers have moved their money to investments outside M2 in a search for higher yields. Indeed, with some banks and thrifts actively promoting families of mutual funds at their branches, switching from time deposits or other depository liabilities into a broad range of mutual funds has been made quite simple for consumers willing to take on some risk in exchange for greater yield.

At the same time, former depositors in institutions closed or taken over by bank regulators have had to

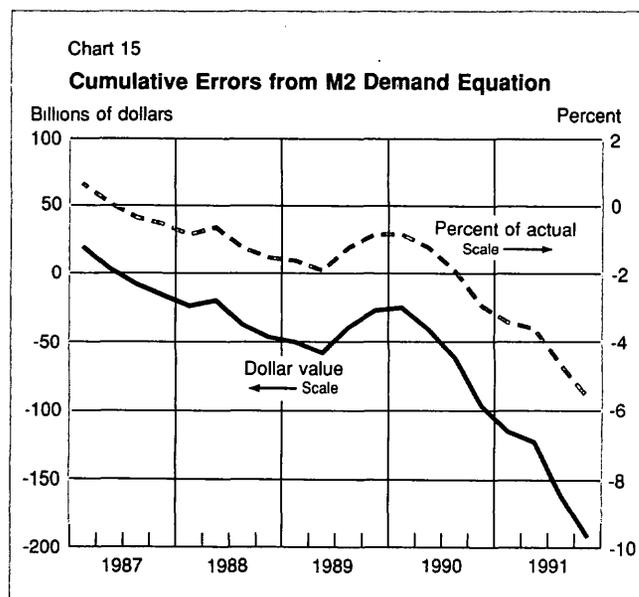
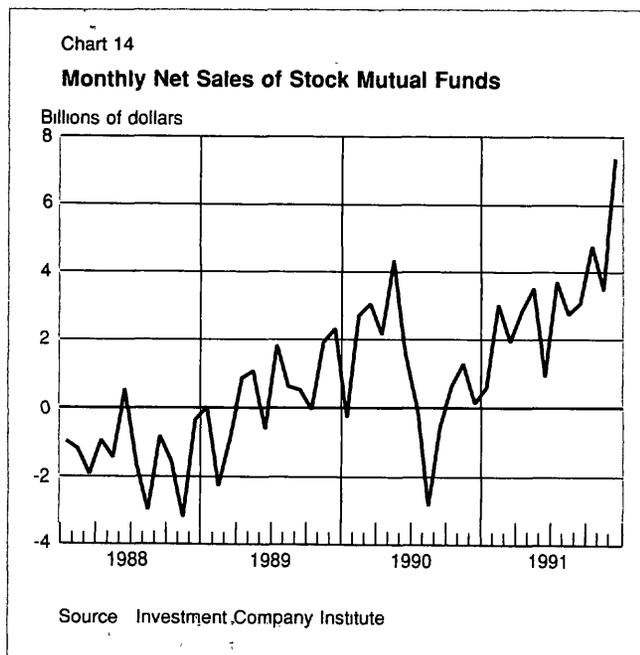
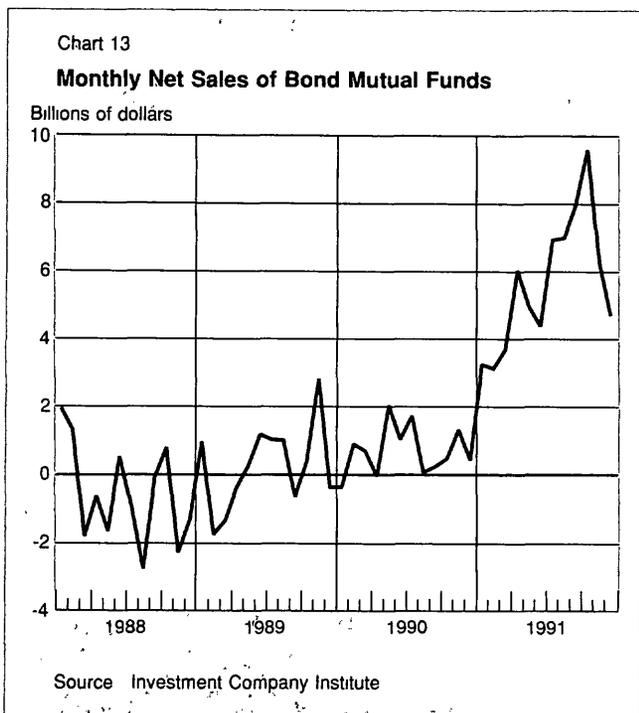


reconsider their investments in a low-rate environment. It seems likely that at least some of these depositors would move their funds outside M2, especially those more sophisticated individuals who were attracted to

small time deposits at these weak institutions by interest rates that were above market rates in the local deposit market or in the brokered CD market. In most cases, the acquiring bank or the regulatory agency would be unwilling to continue paying above-market rates.

Coinciding with these other demand-side developments, a sharp steepening of the yield curve has prompted some consumers to examine whether they should sacrifice some liquidity by moving from small time deposits into long-term instruments to gain some additional yield. As Chart 12 indicates, the gain in yield in percentage terms could be quite large. Moving money into longer term instruments has been made somewhat easier in recent years by the greater availability of alternatives such as bond and stock mutual funds of various kinds, and these funds have grown quite rapidly over the past year or so (Charts 13 and 14). In addition, smaller investors probably now view direct investment in bonds more favorably than they would have the last time such strong inducements to find higher yield alternatives were present.

The available econometric evidence suggests that these demand side factors, when added together, could be quite important in explaining the recent weakness in M2. Simulations of conventional demand equations for M2, which do not allow for the full range of alternatives to holding small time deposits, produce very large negative errors. For example, as shown in Chart 15, an equation estimated by Moore, Porter, and Small over-predicted M2 by nearly \$200 billion, or 5.6 percent, by



Box: Graphical Analysis of Supply and Demand Shifts

The M2 equation, used to calculate the errors in Chart 15, incorporates a measure of the opportunity cost of holding M2 balances, that is, the spread between a short-term market rate and a weighted average of the rates paid on the components of M2.[†] The chart in this

[†]This approach to measuring the opportunity cost does have some problems. First, only the short-term Treasury bill rate is used as an alternative to M2 deposits. Clearly, longer term rates might be important as well, particularly when the yield curve is more steeply sloped. Second, this opportunity cost

box, incorporating this spread concept, illustrates how negative shifts in the supply of and demand for M2 may have interacted recently to produce what appears to be a large error in the demand equation. This chart also demonstrates why deposit rates, for the most part, have not appeared unusually weak relative to market rates during this period of reduced bank lending. In the chart, SM1 and DM1, respectively, are the initial positions of the supply of and the demand for money. Initially, M is the equilibrium level of money balances held and $(r-rd)$ is the spread between the market rate (r) and the weighted average deposit rate (rd).

Assume that there is a reduction in the supply of money (SM1 to SM2) resulting from a credit crunch as well as weaker loan demand. To reduce the liability side of their balance sheets, banks offer lower rates on deposits, a response that increases the spread between the market rate and the deposit rate to $(r-rd)^*$ and reduces the level of money balances to M^* . Because this supply shift represents a movement along the initial demand curve, it should not create any errors in the estimated demand function for money.

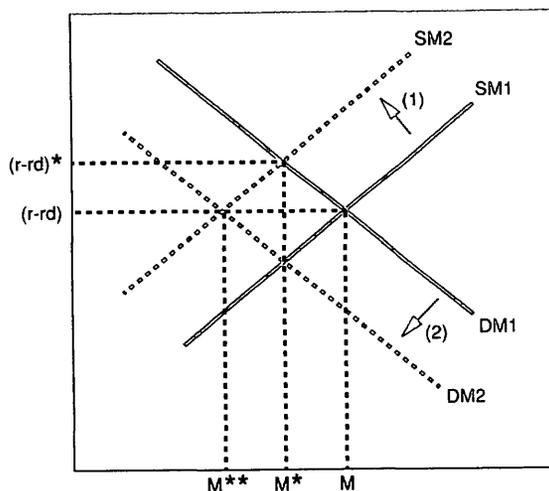
However, suppose the demand for M2 also shifts for the reasons cited earlier: very low deposit rates, the greater acceptance of mutual funds by consumers, the closing of many thrift institutions by the Resolution Trust Corporation, and the steep yield curve. As a result, the shift in the demand for money from DM1 to DM2 will reduce money balances even further (to M^{**}). This shift will also tend to move the rate spread back toward the original level as banks are forced to bid somewhat more aggressively to offset outflows larger than desired.

To see how the supply and demand shifts interact, assume that the rate spread returns to its original position ($r-rd$). When this rate spread is viewed in the context of the original demand function (estimated prior to the shifts in the supply and demand functions), we observe a large error ($M^{**}-M$), partially due to the supply shift along the initial demand function (DM1) and partially due to the demand shift along the second supply function (SM2). Hence, both supply and demand considerations are leading to the observed error in the initial demand function because the demand function shifts along a reduced supply function.

[†] continued

measure cannot capture more subtle changes in bank behavior such as increased advertising and promotion. Finally, although the deposit rates are the most common rates paid by surveyed institutions, they may be different from the rates paid to raise funds in the brokered CD market or the rates paid to larger customers.

Impact of Money Supply and Demand Shifts on Money Balances and Interest Rate Spreads



SM1 = initial supply of money

DM1 = initial demand for money

M = initial quantity of money balances

$(r-rd)$ = initial spread between the market rate (r) and the deposit rate (rd)

SM1 to SM2 = reduction in the supply of money created by drop in loan demand and "credit crunch"

M^* = level of money balances after supply shift ($M^* < M$)

$(r-rd)^*$ = rate spread after supply shift $(r-rd)^* > (r-rd)$

DM1 to DM2 = reduction in the demand for money resulting from greater acceptance of mutual funds and other factors

M^{**} = level of money balances after supply and demand shifts ($M^{**} < M^* < M$)

$(r-rd)$ = level of rate spread after supply and demand shifts $(r-rd) < (r-rd)^*$

Box: Graphical Analysis of Supply and Demand Shifts (Continued)

Small time deposits probably played an important role in both the demand and supply shifts outlined above. As noted in the text, these deposits are probably the component of M2 most vulnerable to demand shifts because consumers have become more willing to shift funds to

alternative instruments outside M2. On the supply side, small time deposits can also have significant impacts on M2 because banks use them at least somewhat as managed liabilities.

the fourth quarter of 1991.¹⁰ Most likely, a large part of this error is due to the omission of these alternatives, especially at a time when consumer attitudes about alternative investments may have changed appreciably (see box for more detail).

Interaction of supply and demand forces and the policy implications

The preceding discussion suggests that reductions in both the supply of and the demand for small time deposits have slowed M2 growth. This combination of supply and demand forces probably explains, in part, why bank deposit rates have not appeared unusually low relative to market rates as a result of weak bank lending. Normally, we would expect banks to respond to weakness in lending by lowering deposit rates relative to money market rates, and perhaps by reducing advertising and promotions as well. But if consumers have been reducing their demand for these deposits at the same time, banks may have been forced to keep deposit rates more in line with market rates to avoid a larger than desired decline in these deposits. The box illustrates this point with supply and demand curves. It also shows how supply and demand forces may have interacted to produce the large error in the M2 demand equation noted above.

How should the weakness in M2 over the past two years be interpreted for policy purposes? A decrease in the supply of money stemming from declining loan demand and a reduced willingness on the part of banks to lend would be consistent with weakness in economic activity, particularly if those consumers and firms relying on bank credit could not find readily available alter-

natives when the banks reduced their lending.¹¹ But a decline in the demand for money caused by the greater acceptance of close money substitutes would not necessarily depress economic activity further. The lower level of money balances resulting from the demand shift could finance the same level of spending through an increase in velocity. If, however, the shift out of insured small time deposits into uninsured holdings of stocks and bonds (directly or indirectly through mutual funds) made consumers feel less secure or less liquid, their spending might be somewhat constrained.

Not only has the recent weakness in small time deposits made it difficult to interpret M2 for policy purposes, but it has also raised the question whether M2 is still defined correctly. In the next section, we consider whether excluding small time deposits from M2 would yield a monetary aggregate better suited for policy purposes.

Redefining M2 to exclude small time deposits

For those readers unfamiliar with the logic behind the current definitions of money, the appendix reviews how the current definitions of money were developed in the early 1980s. The monetary aggregates were redefined at that time to include similar deposits at the same level of aggregation without regard to whether the deposits were the liabilities of commercial banks or of thrift institutions. For example, under the revised definitions, all checking accounts, whether at banks or thrift institutions, are included in M1. In contrast, the preceding definitions had sharply distinguished the liabilities of banks from the liabilities of thrift institutions.

¹⁰The M2 equation used in this exercise was taken from George Moore, Richard Porter, and David Small, "Modeling the Disaggregated Demands for M2 and M1: The U.S. Experience in the 1980s," *Financial Sectors in Open Economies: Empirical Analysis and Policy Issues*, Board of Governors of the Federal Reserve System, 1990, pp. 21-105, Table 11.

¹¹For more background, see Ben Bernanke and Cara Lown, "The Credit Crunch," *Brookings Paper on Economic Activity*, 2 1991, pp. 205-27, and Ben Bernanke and Alan Blinder, "Credit, Money, and Aggregate Demand," *American Economic Review*, May 1988, pp. 435-39. In the Bernanke-Blinder model, a reduction in the willingness of banks to lend shifts the IS curve leftward, reducing output. Hence, the monetary policy response in this model would be better if the Federal Reserve took into account not only developments with respect to money but also bank loans.

Because small time deposits are used by banks at least partially as managed liabilities, some analysts have proposed excluding small time deposits from the current definition of M2.¹² These analysts have also argued that in theory the liquid components of M2 (demand deposits, NOW accounts, savings accounts, and money market deposit accounts) should not be aggregated with less liquid time deposits at the M2 level. Consumers are likely to view these liquid accounts as being more readily available for transaction purposes than the less liquid time deposits. A final consideration, outlined in the first section, is that shifts in the demand for small time deposits may also destabilize the demand for M2 if holders of these deposits become more aggressive over time in looking for alternatives outside of M2.

The case that an M2 aggregate defined to exclude small time deposits might be more suitable for policy purposes than the current M2 aggregate rests on four arguments. (1) the redefined aggregate would probably

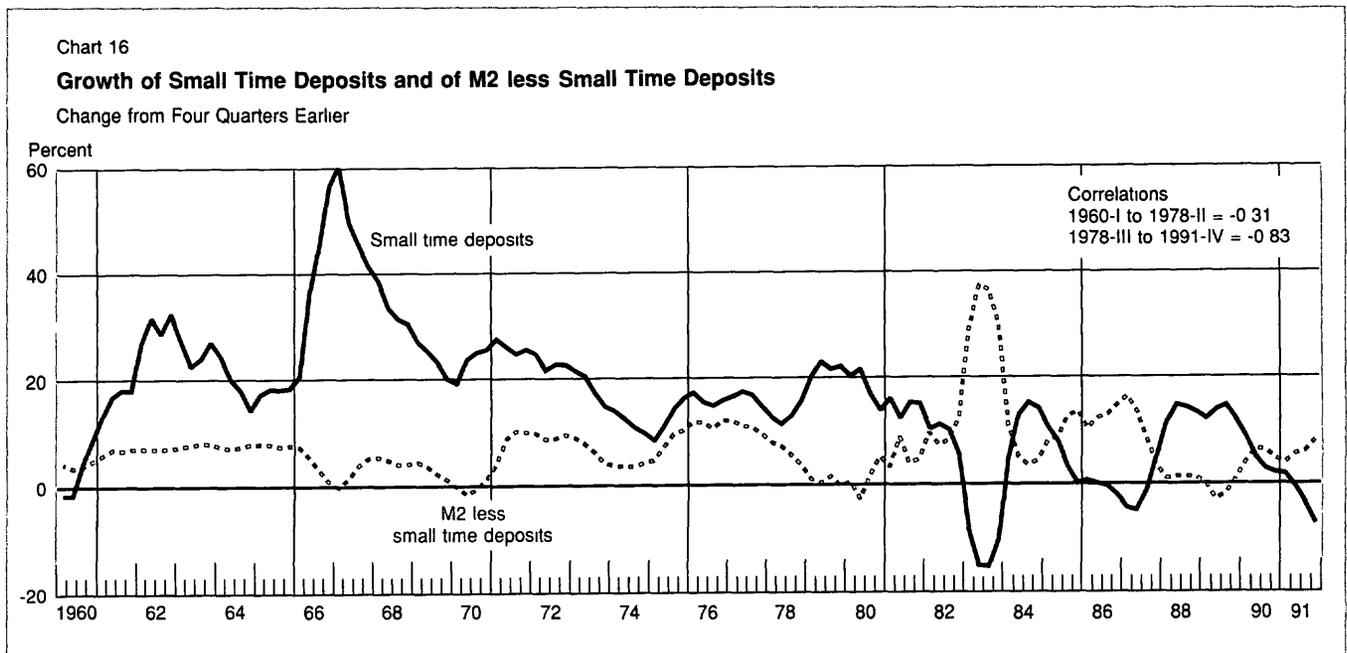
be better insulated from shocks to bank lending in the short run, (2) it would be conceptually cleaner at a theoretical level, (3) it would be more demand-determined because it would not contain a large amount of managed liabilities, and (4) instability in the demand for small time deposits would not translate into instability in the demand for M2.

Other considerations, however, suggest that a redefined M2 might not be better suited for policy purposes than the current definition of M2 over the longer run. Chart 16 shows that consumers tend to move funds between the liquid components of M2 (M2 less small time deposits) and small time deposits. The growth rates of these two components of M2 have developed a strong negative correlation since 1978, when the phase-out of Regulation Q began. Consumers tend to move funds between time deposits and the liquid components of M2 in response to the interest rate spreads that develop when banks quickly adjust the rates on time deposits as market rates change (as would be expected with a managed liability) but only gradually move the rates on the liquid components of M2.¹³

This behavior by banks also suggests that the demand for the liquid assets in M2, like the demand for M1, has a larger interest rate elasticity in the current deregulated financial system than it had under the earlier regulations. When the maximum rates on consumer deposits were set by Regulation Q, the spreads

¹²The case for removing small time deposits from M2 can be found in Brian Motley, "Should M2 be Redefined," Federal Reserve Bank of San Francisco *Economic Review*, Winter 1988, pp 33-51. Also see the Federal Reserve Bank of Cleveland's *Economic Trends*, December 1991, pp 4-5, and William Poole, "Choosing a Monetary Aggregate Another Look," report prepared for the Shadow Open Market Committee for its September 29-30, 1991 meeting. Other analysts have argued at times that institutional money market mutual funds, a highly liquid component of M3 but not of M2, should be included in M2.

¹³See John Wenninger, "Responsiveness of Interest Rate Spreads "



between the rates offered on M1 balances, or on M2 less small time deposits, and the rates paid on small time deposits tended not to change as market rates changed. Hence, while consumers had incentives to switch funds between deposits and market instruments when market rates changed, no such incentives were created to prompt consumers to move money between time deposits and M1 or M2 less small time deposits.

In a deregulated banking system, however, the spreads between the rates offered on time deposits and the liquid components of M2 also change when market rates change, making both M1 and M2 less small time deposits more interest sensitive. Consumers can now choose small time deposits as well as market instruments as alternatives to their more liquid deposits, the rates on which do not respond strongly and quickly to changes in market rates. Indeed, for many consumers it is probably easier to use time deposits at their banks to manage their money than it is to use market instruments. As a result, M2 less small time deposits, if used for policy, would probably have caused many of the same problems encountered with M1 in recent years, problems that stemmed in large part from M1's larger interest rate elasticity in a deregulated banking system.¹⁴

This conclusion is supported by Chart 17, which con-

tains the growth rates of M1 and M2 less small time deposits. Except for a brief period in the early 1980s when the introduction of money market deposit accounts attracted a large amount of money into M2 less small time deposits, the growth rates of M1 and M2 less small time deposits have moved together quite closely since the phaseout of Regulation Q began. The growth rates have also been of about the same order of magnitude, including the 1985-87 period when the Federal Open Market Committee stopped setting targets for M1 because of its unusually rapid growth as interest rates fell in response to lower rates of inflation. Hence, it is not clear that M2 less small time deposits would have worked any better for policy purposes than M1 during the 1980s. The longer run similarities between the growth rates of M1 and M2 less small time deposits make it difficult to create a strong case to redefine M2 because of the unusual weakness displayed by M2 over this most recent business cycle.

Chart 18 contains some additional information that would argue against redefining M2 to exclude small time deposits on the basis of the recent weakness in M2.¹⁵ The chart shows that M2 has been the only monetary aggregate to maintain a stable long-run relationship with GDP (stable growth rate of velocity over the long run), a desirable property from the perspective

¹⁴Econometric evidence that the demand for M2 less small time deposits probably has a large enough interest rate elasticity to cause problems for monetary targeting is also found in Brian Motley, "Should M2 be Redefined?"

¹⁵This chart was adapted from one contained in an article by Susan Black and William Gavin, "Monetary Policy and the M2 Target," Federal Reserve Bank of Cleveland *Economic Commentary*, December 1, 1989.

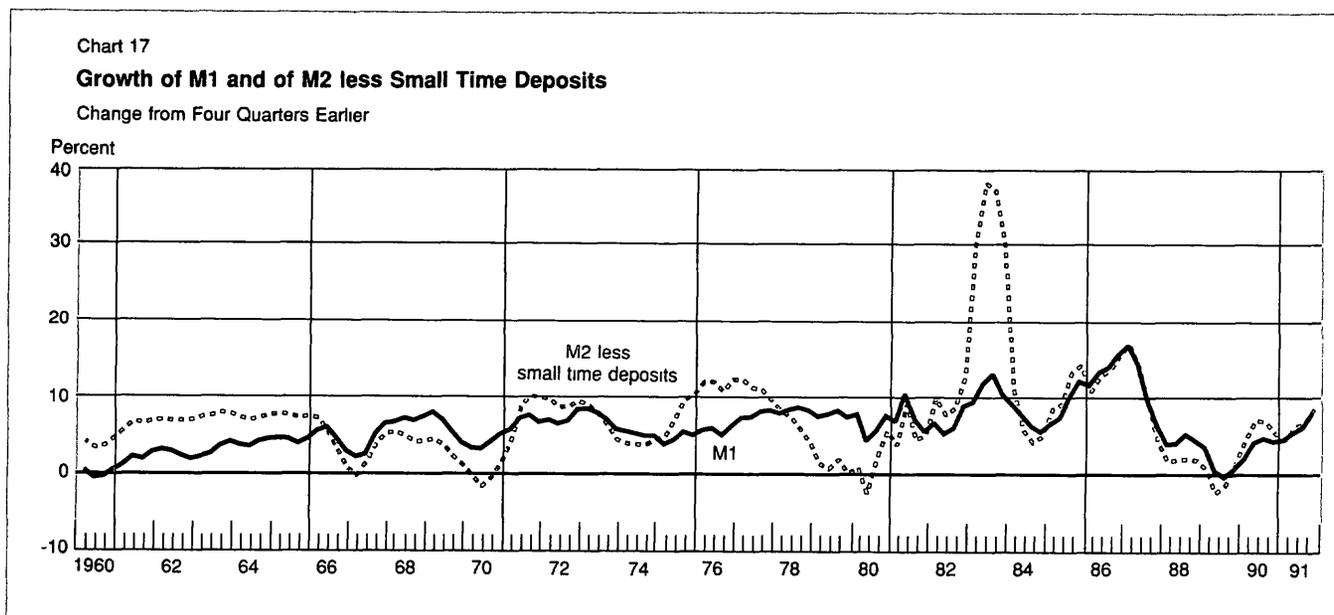
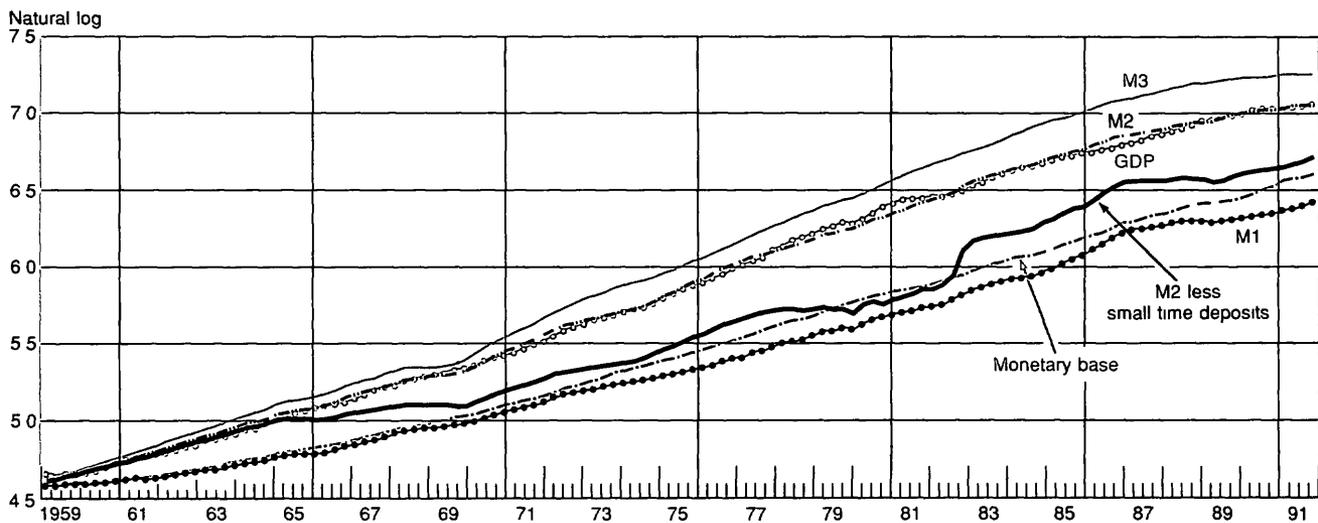


Chart 18

Nominal GDP and the Monetary Aggregates



Note The various monetary aggregates and GDP are normalized to 100 in the first quarter of 1959

of setting monetary targets over time to sustain non-inflationary growth in economic activity M1, M2 less small time deposits, M3, and the monetary base have *not* maintained stable relationships with GDP over the long run (their velocity growth has varied over time). Other analysts, using more sophisticated econometric techniques, have also found M2 to have a stable long-run relationship with GDP.¹⁶ In more technical terms, M2 is cointegrated with GDP.

The statistics in the table also illustrate this point. For the entire period, as well as the first and second halves of the period, M2 has grown at virtually the same rate as nominal GDP. The other monetary aggregates have displayed relationships with GDP that differ from the first half of the period to the second half. Because of its stable relationship with GDP over time (stable growth in velocity over the long run), M2 has received considerable support as a long-run anchor through which monetary policy can control inflation.¹⁷

GDP Growth less Money Growth

Change from Four Quarters Earlier

| | Monetary Base | M1 | M2 less Small Time Deposits | M2 | M3 |
|----------------------------|---------------|-----|-----------------------------|------|------|
| Averages | | | | | |
| 1960 to 1991 | 1.5 | 2.1 | 1.1 | 0.0 | -0.7 |
| 1960 to 1975 | 2.5 | 3.1 | 2.1 | -0.2 | -1.2 |
| 1976 to 1991 | 0.5 | 1.1 | 0.0 | 0.1 | -0.2 |
| Standard deviations | | | | | |
| 1960 to 1991 | 3.0 | 3.7 | 6.8 | 2.8 | 2.8 |
| 1960 to 1975 | 1.8 | 1.6 | 3.1 | 2.4 | 2.8 |
| 1976 to 1991 | 3.6 | 4.7 | 9.0 | 3.2 | 2.7 |

In sum, it appears that the small time deposit component of M2 has five somewhat unique features that pose definitional problems. First, small time deposits are not as liquid as the other components of M2, raising the theoretical question whether small time deposits should

¹⁶See Robert F. Engle and C. W. J. Granger, "Cointegration and Error Correction: Representation, Estimation and Testing," *Econometrica*, vol. 55 (March 1987), pp. 251-76, and Stephen M. Miller, "Monetary Dynamics: An Application of Cointegration and Error Correction Modeling," *Journal of Money, Credit, and Banking*, vol. 23 (May 1991), pp. 139-54.

¹⁷See Jeffrey Hallman, Richard Porter, and David Small, "Is The Price

Footnote 17 continued

Level Tied to the M2 Monetary Aggregate in the Long Run?" *American Economic Review*, vol. 81, no. 4 (September 1991), pp. 841-58, Robert L. Hetzel, "M2 and Monetary Policy," Federal Reserve Bank of Richmond *Economic Review*, September-October 1989, pp. 14-29, and Yash P. Mehra, "An Error Correction Model of U.S. M2 Demand," Federal Reserve Bank of Richmond *Economic Review*, May-June 1991, pp. 3-12.

be aggregated with the other components of M2. Second, small time deposits are used by banks as managed liabilities, a practice that may create short-run instability in the supply of M2 when large shocks to the bank lending function occur. Third, small time deposits in a deregulated banking system are used by consumers to manage their liquidity as interest rate spreads change. This practice creates larger interest rate elasticities for the demand for M1 and the demand for M2 less small time deposits. Fourth, instability in the demand for small time deposits may translate into instability in the demand for M2 as consumers give greater acceptance to instruments outside M2 such as bond and equity funds. Fifth, the small time deposit component of M2 seems to be necessary to maintain M2's stable long-run relationship with GDP (because when market rates change, the shifting of funds between liquid deposits—M2 less small time deposits—and less liquid time deposits is largely internalized in M2 but not in the narrower aggregates).

Taken together, these five features of small time deposits do not make a strong case that M2 should be redefined at this time to exclude small time deposits. To be sure, if small time deposits continue to create shifts in the supply of and demand for M2 that destabilize significantly the short-run relationship between M2, GDP, and interest rates, further consideration might be

given to redefining M2. At present, however, not enough observations are available to know how large a problem this instability will prove to be. If it turns out to be only an occasional problem associated with extreme circumstances (a credit crunch, greater use of instruments outside M2 in a low-rate environment), M2 may still prove a better long-term policy guide. And even if it were eventually decided to exclude small time deposits from M2, the resulting monetary aggregate, while correcting for some of the difficulties with the current M2 definition noted above, would create new policy problems. In contrast to M2, M2 less small time deposits does not share a stable long-run relationship with GDP. In addition, M2 less small time deposits appears to respond strongly to changes in market rates, making it difficult to set targets in the shorter run.

Conclusions

The small time deposit component of M2 has been a source of instability in the supply of and demand for M2, particularly in the short run. Nevertheless, this short-run instability need not imply that M2 should be redefined to exclude small time deposits. More experience with small time deposits in a deregulated financial system will be necessary before this issue can be resolved.

Appendix: Development of the Current Definitions of Money

The monetary aggregates were last redefined in the early 1980s, following the review of a set of proposals put out in the late 1970s.[†] In revising the monetary aggregates, the Federal Reserve Board staff was responding in part to a blurring of the functional distinction between demand deposits and certain types of savings accounts, and between comparable types of deposits at commercial banks and thrift institutions.

Before the 1980 redefinition of the monetary aggregates, M1 was defined as currency plus demand deposits at commercial banks. M2 was also restricted to commercial bank liabilities. To arrive at M2, time and savings balances (except large negotiable CDs) at banks were added to M1. M3 was obtained by adding time and

savings balances at thrift institutions to M2. M4, another commercial bank aggregate, was calculated by adding large negotiable CDs to M2. Finally, an M5 aggregate was created by adding negotiable CDs to M3.

In proposing new definitions for the monetary aggregates, the Board staff took as its guiding principle the notion that monetary assets should be grouped by their liquidity (or availability for use in making transactions) and not by the type of institution (banks versus thrifts). Hence, in 1979 the Board staff proposed a new definition of M1 that included the old components of M1 plus NOW accounts (checking accounts paying the same rate of interest as savings accounts), credit union share drafts, demand deposits at thrift institutions, and savings accounts subject to automatic transfer. This proposed aggregate consisted of the most liquid bank and thrift liabilities.

For the redefined M2, the Board staff proposed adding savings balances at all financial institutions. Savings balances are highly liquid, but not checkable, and

[†]Thomas D. Simpson, "A Proposal for Redefining the Monetary Aggregates," *Federal Reserve Bulletin*, January 1979, pp. 13-42, and Thomas D. Simpson, "The Redefined Monetary Aggregates," *Federal Reserve Bulletin*, February 1980, pp. 97-114.

Appendix: Development of the Current Definitions of Money (Continued)

seemed to be the logical next step in moving from the narrow definition of money to broader definitions ⁴

For M3 the Board staff recommended that all time and savings deposits, including negotiable CDs, be added to M1. This aggregate was designed to capture the total volume of deposits at all depository institutions (commercial banks and thrift institutions). The Board staff also considered including repurchase agreements (RPs) in M3, or possibly in a narrower aggregate, because of evidence suggesting that corporations were using RPs to reduce the level of demand deposits. The staff concluded that the data on RPs were not as reliable as those on the other components and decided not to include RPs in the proposed definitions.

A little over a year later, the Board staff, after reviewing the comments received on the proposed definitions, released the new definitions of the monetary aggregates. The new definitions included five measures of money, which varied somewhat from the three definitions proposed a year earlier.

The Board staff presented two definitions of M1, M1A and M1B. M1B would include NOW and automatic transfer accounts, M1A would not. During the transition to nationwide NOW accounts it appeared likely that consumers would shift balances from both demand deposits (transactions balances) and savings accounts (liquid deposits) into the newly available NOW accounts. Hence, M1B would be likely to overstate the growth of transactions balances and M1A to understate these balances during the transition period. Making both series available would make it easier for analysts to judge the underlying growth of transactions balances ⁵.

The new definition of M2 was considerably different from the proposed definition, which had added to M1 only liquid savings accounts at banks and thrifts. The new measure added to M1 not only savings deposits but also overnight RPs, overnight Eurodollars, small denomina-

tion time deposits, and money market mutual fund shares. Overnight RPs, Eurodollars, and money market mutual fund shares were judged to be liquid assets that were probably close substitutes for liquid bank deposits. Small time deposits (those issued in denominations of less than \$100,000) were included, not because they displayed liquidity similar to the other components, but because the market rates banks and thrifts had recently been allowed to pay on six-month and two-and-a-half-year time deposits would make them very attractive alternatives to savings balances. As a result, the staff concluded that it would be better to internalize any shifts of funds between savings and small time deposits within the M2 aggregate.

To obtain M3, the Board staff added term RPs and large denomination time deposits to M2. These components were viewed as large-dollar instruments that were likely to be close substitutes for one another in most portfolios. A measure of total liquid assets, L, was also defined. It added to M3 the nonbank holdings of bankers' acceptances, commercial paper, savings bonds, short-term U.S. Treasury obligations, and other Eurodollar deposits of U.S. residents. The Federal Open Market Committee, however, has not set targets for L as it has for M1, M2, and M3.

The definitions originally proposed had made sharp liquidity distinctions as they moved from the narrow to the broad aggregates. In addition, these definitions had been limited to the deposit liabilities of depository institutions. The new definitions, by combining time and savings deposits at the same level of aggregation, eased these liquidity distinctions somewhat and grouped together those types of deposits that were likely to be close substitutes. In addition, by including RPs and money market mutual fund shares, the aggregates from the level of M2 on up went beyond the depository liabilities of depository institutions.

⁴The Board staff also proposed M1+, that is, M1 plus savings balances at commercial banks only. This proposal was based on some evidence (higher turnover rates) that these balances at banks were used more for making transactions than were savings deposits at thrifts.

⁵For a period of time, the Board staff also made available a shift-adjusted M1 series in which M1B's growth was lowered to adjust for flows into NOW accounts from savings accounts.