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"Shift-Adjustments" to the Monetary Aggregates

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The actions of the Federal Reserve System, as the nation's central bank, have a major impact on economic activity and the level of prices. The impact of these actions, however, cannot be observed apart from the effect of other influences such as fiscal policy decisions. As a result, the Fed must rely on intermediate measures such as the money supply or interest rates to gauge the effectiveness of its policy actions. To be useful as an intermediate target, such a measure should, first, be related to economic activity (GNP) in a stable and predictable manner, and second, be susceptible to Federal Reserve control.

Since the mid-1970s, the Federal Reserve has used the money supply as its intermediate target by setting—and striving to meet—annual growth rate targets for several monetary aggregates, including M1, M2, M3 and a measure of bank credit. M1 comprises currency, demand deposits, other interest-bearing checkable deposits and travellers' cheques. M2 includes M1, savings deposits, small denomination time certificates, noninstitutional money market mutual fund shares, overnight repurchase agreements and overnight eurodollar deposits held by U.S. residents. M3 comprises M2, term repurchase agreements, institutional money market fund shares and large denomination certificates of deposit.

Despite this wide array of measures of the money supply, the public and the Federal Reserve have, in practice, tended to focus on the narrower aggregates. These measures have the most stable and predictable relationship to economic activity historically, and they are most closely under the control of the central bank. Recent changes in U.S. financial markets, however, may be changing the nature of that relationship, making the impact of monetary policy decisions temporarily harder to gauge than in the past. The virtual revolution in cash management techniques of the past decade has permitted businesses and households to transact a greater volume of transactions with a given level of transaction balances than was true previously. Innovations involving the increased use of automation in bill collection (such as automated lockboxes) and in funds transfer (such as automatic investment of idle funds) have increased the rate of turnover of transaction balances and reduced the demand for narrowly defined money relative to income or spending. Furthermore, the growing acceptance of new high-yielding and highly liquid instruments, such as money market mutual funds and retail repurchase agreements, has profoundly affected the ways the public chooses to hold its wealth and accommodate its transaction needs. Likewise, regulatory and legislative changes allowing depository institutions to pay interest on transaction balances that are held in ATS (automatic transfer from savings) and NOW (negotiable order of withdrawal) accounts have led to substantial shifts of funds into these interest-bearing accounts from traditional demand and savings deposits.

Changes in the public's demand for various types of financial instruments have altered the meaning of the monetary aggregates, making observed growth in these aggregates harder to interpret. The growth in M1, in particular, has slowed considerably over the past few years; yet, with the proliferation of higher-yielding substitutes for the traditional M1-type transaction instruments, slower *observed* growth may not necessarily be associated with a slowdown in the economy.

The Federal Reserve System has sought ways to minimize the effects of recent innovations and regulatory changes upon the meaning of the monetary aggregates and their relationship to economic activity. One part of this effort has centered around the redefinition of the monetary aggregates announced in early 1980. By including ATS and NOW ac-

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counts in the narrow definition of money and by acknowledging the potential transaction characteristics of money market funds and overnight RPs and eurodollars, the redefined aggregates correspond more closely than did the old measures to the new ways in which the public has chosen to hold its transaction balances and liquid assets. This redefinition has helped to reduce the distortion in observed growth rates caused by shifts of funds among financial instruments which are now viewed as close substitutes but which, for whatever reasons, were formerly classified as components of different aggregates.

The Federal Reserve has also come to place greater emphasis in its policy deliberations on broader aggregates whose growth rates and relationships to economic activity are affected less by shifts of funds among financial instruments. As recently as 1980, the most prominent measure of the money supply—then termed M1-A—included only currency and demand deposits. Today, the policy focus has shifted to M1-B—which includes ATS and NOW accounts as well as traditional demand deposits and currency—and, to a certain extent, to M2. Reflecting this change of emphasis, M1-A is now no longer published and M1-B has been renamed M1. In 1981 the Federal Open Market Committee (FOMC) appeared, at times, to give considerable weight to M2 growth. Some Committee members argued at that time that at least some of the surprisingly sluggish growth of (shift-adjusted) M1 may have been due to the public's ability to reduce its holdings of traditional transaction balances by shifting funds to the higher-yielding substitutes (such as money market funds) included in M2.[1]

The Federal Reserve System also has attempted to cope with the problem of measuring and interpreting money growth by adjusting observed growth rates (or growth-rate targets) of the aggregates to account for distortions that are caused by shifts of funds among financial instruments resulting from readily identified changes in law. The Fed's treatment of the growth in other checkable deposits that occurred after the nationwide introduction of NOW accounts at the end of 1980 is an example of this approach. Shifts of funds into NOW accounts from sources other than demand deposits "artificially" boosted M1 growth at that time. To compensate, the Fed began using a "shift-adjusted" measure of M1 in its policy deliberations. Although until now the Fed has used this approach to accommodate specific regulatory changes, similar shift-adjustments to account for other types of financial change may become possible and desirable in the future. For example, the explosive growth of money market funds in 1981 may have "artificially" reduced M1 growth, thus increasing the desirability of a shift-adjustment to account for that distortion. Likewise, the growing acceptance of deposit-sweeping arrangements, whereby excess balances in transaction accounts are automatically "swept" into money funds, may also distort future M1 growth and encourage consideration of a shift-adjustment.

This paper analyzes the shift-adjustment technique, both as it has been used to compensate for the distorting effects of rapid NOW account growth during a transition period and as it might be used to compensate for the distorting effects of changes in the demand for other financial instruments. The first section presents the rationale for adjusting M1 to compensate for growth in NOW balances. The second section examines the alternative approach of adjusting the growth rate target for M1. Since the shift-adjustment technique is essentially a "sources-and-uses" concept, the third section provides an interpretation of the technique from a money demand context. The fourth section describes the methodology used to calculate the published measure of shift-adjusted M1, and the fifth section analyzes the sensitivity of that measure to alternative assumptions about the sources of growth in NOW balances. The sixth section examines the merits of using the shift-adjustment technique to compensate for other changes in financial markets, and develops a shift-adjusted measure of M1 that would incorporate the impact of growth in money market funds. The paper concludes with a discussion of potential uses and limitations of the shift-adjustment technique in the future.

I. Rationale for Shift-Adjusted Measure

The nationwide introduction of NOW accounts at the end of 1980 distorted the observed growth rates of the narrow monetary aggregates, which were identified then as M1-A and M1-B. (As noted earlier, M1-A is no longer published and M1-B has been renamed M1.) By causing funds to shift to NOW accounts from both transaction and nontransaction accounts, this development altered the growth rates of M1-A and M1-B relative to the rates that would otherwise have prevailed. As a result, the growth rates of the Fed's yardsticks—M1-A and M1-B—were distorted by these shifts of funds. Because the extent of the distortion was not directly observable, analysts lost some ability to measure the impact of monetary policy on economic activity. As early as July 1980, the Federal Reserve acknowledged this problem, when in his monetary policy report to Congress Chairman Volcker stated that:

> The introduction of negotiable order of withdrawal (NOW) accounts on a nationwide basis in January will accelerate the shift from regular demand deposits into interest-earning transactions balances, thereby depressing M1-A growth next year. On the other hand, M1-B probably will be boosted somewhat next year by shifts from savings deposits and other interest-bearing assets into NOW accounts. The range for M1-B thus may have to accommodate a period of abnormal growth as the public adjusts to the availability of a new instrument.[2]

The extent to which M1-B was boosted and M1-A depressed depended on first, the rate of growth in NOW balances and second, the sources of that growth. Had NOW balances grown only slightly, the distortions in growth would likewise have been minimal. However, the rapid growth in NOW balances that actually occurred during 1981, from $28.1 billion to $77.0 billion, meant a distortion in the growth of one or both of the narrow (M1-A and M1-B) aggregates from these shifts of funds.

Conceivably, this distortion could have occurred in the growth rate of only one of the two aggregates —M1-A, if the growth in NOW balances had come entirely from demand deposits, or M1-B, if that growth had come entirely from savings deposits and other non-M1 assets. In fact, however, NOW growth affected both aggregates. M1-A growth was affected to a greater extent because NOWs have the transaction features of checking accounts—plus 5¼ percent interest. However, NOWs were generally offered in connection with high minimum-balance requirements and offered almost the same rates of return as savings accounts, and thus distorted M1-B growth also by inducing depositors to combine checking and savings funds to open accounts.

Faced with potential distortions in the M1-B growth rate, then, the Federal Open Market Committee announced an annual growth target for that aggregate which abstacted from any shifts of funds related to the introduction of NOW accounts on a nationwide basis. The target growth range was set, in other words, as if NOW accounts had not been introduced at the end of 1980. In order to evaluate M1-B growth against its growth target, then, the observed growth of this aggregate required an adjustment to account for shifts related to NOW growth. The adjustment, in essence, involved subtracting from observed growth that proportion of the growth in NOW balances which came from transfers of funds from savings accounts and other nontransaction accounts.

II. Adjustments to Growth Rate Targets

As an alternative to adjusting the *actual* growth rate of M1, the Federal Reserve could have adjusted the growth rate *target* for that aggregate in such a way that observed growth could then be compared directly to the target. These two approaches are equivalent, in theory. The Federal Reserve, in fact, had employed this second approach earlier to account for shifts of funds that were caused by the introduction of Automatic Transfer from Savings (ATS) accounts. In 1979, following the late-1978 debut of ATS accounts, the FOMC chose to lower the target range for old M1, thereby widening the difference between the midpoints of the annual targets for old M1 and M2—old M1 comprised only currency and demand deposits, while old M2 added small denomination time and savings deposits and

other checkable deposits. By widening the spread between the growth rate targets, the FOMC was able to compensate for the divergence in the observed growth rates caused by shifts of funds from demand deposits (included in M1) to ATS accounts (included in the non-M1 component of old M2).

Likewise, in 1980, the Federal Reserve adjusted the growth rate targets of the aggregates to accommodate shifts of funds into ATS accounts. At the beginning of the year, the FOMC set the spread between the midpoints of the targets ranges for M1-A and M1-B at 1/2 percentage point, on the assumption that shifts into ATS accounts would slow over the course of the year. However, with the passage of the Depository Institutions Deregulation and Monetary Control Act (March 1980), which permanently authorized ATS accounts and authorized NOW accounts on a nationwide basis as of year-end, commercial banks began to promote ATS accounts more vigorously in order to get a "head-start" on the NOW account competition. (To the depositor, ATS and NOW accounts are virtually indistinguishable.) As a result, the growth of ATS balances accelerated as depositors shifted funds from checking and interest-earning assets. Hence, M1-B grew more rapidly than it would have otherwise, while M1-A grew more slowly. In light of these shifts, Chairman Volcker stated in the Board's February 1981 Policy Report to Congress that the 1980 growth targets for M1-A and M1-B should have been adjusted to take account of these shifts: "If the FOMC's [target] ranges are adjusted for current estimates of the actual impact of shifting into ATS and NOW accounts, the [observed] increases in both narrow aggregates are close to the upper bounds of the FOMC's ranges for 1980."[3]

Although the two ways of compensating for distortions in aggregate growth are equivalent in theory, adjustments to the observed growth rates may be preferable in practice, since less information about the nature of the shifts of funds is required *a priori* than is needed for adjustments to the targets. Also, given the potentially greater impact on money growth rates anticipated from the nationwide introduction of NOW accounts, the Fed decided to adjust the observed growth rates in 1981. Raising the M1 growth rate target at a time when the Federal Reserve was anxious to demonstrate its commitment to a gradual reduction in money supply growth might have confused the general public. Furthermore, it might have been more confusing to change publicly announced growth rate targets as new information on NOW sources became available than to change the shift-adjustment of the levels of the monetary aggregates.

III. Interpretation of Shift-Adjustment

The theoretical concept of a shift-adjustment—whether to the observed growth rate or to the target growth rate—has never been particularly well-defined in Federal Reserve publications. It has generally been described as a means of abstracting from, or compensating for, shifts of funds which temporarily produce an "abnormal" rate of growth in a given aggregate. But what is "abnormal?" Abnormal growth is not merely any deviation from an aggregate's trend rate of growth, since that deviation may be due to changes in the levels of interest rates or income which influence the demand for money. Instead, abnormal growth is growth that cannot be accounted for once adjustments are made for such changes in income and interest rates. How, then, should the shift-adjustment technique be interpreted? Essentially, it has been used to quantify *shifts* in the *level* of the money demand function that are caused by the introduction of new instruments and other legislative and regulatory changes.

The shift-adjustment technique is based on an analysis of the shifts of funds among financial instruments that apparently arise from shifts in the money demand function—i.e., from shifts of funds into (or out of) a given monetary aggregate. Implicit in this approach is the assumption that the introduction of a new instrument (such as NOWs) does not change the way the monetary aggregate responds to changes in income growth or the level of interest rates. Of course, shifts of funds into a new instrument frequently alter the composition of the aggregate and, possibly, alter the income- and interest *elasticities* of the demand for that aggregate as well as the *level* of money demanded. To the extent, then, that these shifts change elasticities, the use of a shift-adjustment will not fully capture the change

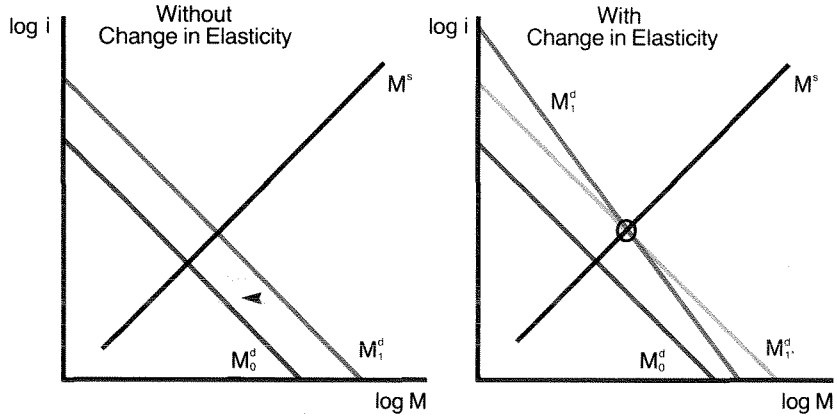
in the relation between the aggregate and the economic variables of ultimate concern—income, prices, employment, etc.

This inability to measure fully the nature of the shift in money demand may not represent a serious shortcoming of the shift-adjustment technique in the short-run, however. Initially, while the public rearranges its portfolio of financial assets in response to the availability of a new instrument, the effect on money growth of changes in elasticities (the slope of the money demand curve) is likely to be much less pronounced than the effect of changes in the level of money demanded (the intercept of the money demand curve). As a result, shift-adjusted measures may be useful temporary measures of money growth even if the income- and interest elasticities of money demand have changed. The Federal Reserve has, in fact, used shift-adjustments as merely temporary yardsticks. The Fed stopped calculating shift-adjusted M1, for example, when the shifts of funds were apparently over. Once the public has rearranged its portfolio, of course, shift-adjustments are no longer necessary. This is because either the level of measured money demand has changed and the aggregate's long-term growth rate has not been affected, or else the elasticities have changed and the shift-adjustment is incapable of capturing the change in the long-term money growth rate. (In the latter case, the long-term growth rate target must be changed to reflect the new relationship between money growth and income and interest rates.)

The shift-adjustment to M1 that was associated with the nationwide introduction of NOW accounts illustrates the way in which shift-adjustments attempt to cope with shifts in the slope as well as in the intercept of the money demand curve. Clearly, the introduction of NOWs increased the demand for M1, causing the level of the money demand curve to shift outward. Whether that shift was also characterized by changes in either the income- or interest-elasticities of money demand depended on the way that both the suppliers and demanders of NOW-account services responded to their availability. Prior to the introduction of interest-bearing transaction accounts, of course, depository institutions could not pay explicit interest on transaction balances. Although they were able to evade this restriction by offering free services to their customers, the yield on transaction balances tended to be low and unresponsive to changes in market interest rates. By allowing depository institutions to pay up to 5¼ percent explicit interest, then, NOWs (and ATS) undoubtedly raised the average yield on transaction

Chart 1

Alternative Assumptions About NOW Accounts' Effect on the Demand for Money (M1)



M^s = money supply curve
M_0^d = initial money demand curve
M_1^d = new money demand curve after NOWs
$M_{1'}^d$ = assumed new money demand curve for shift-adjustment

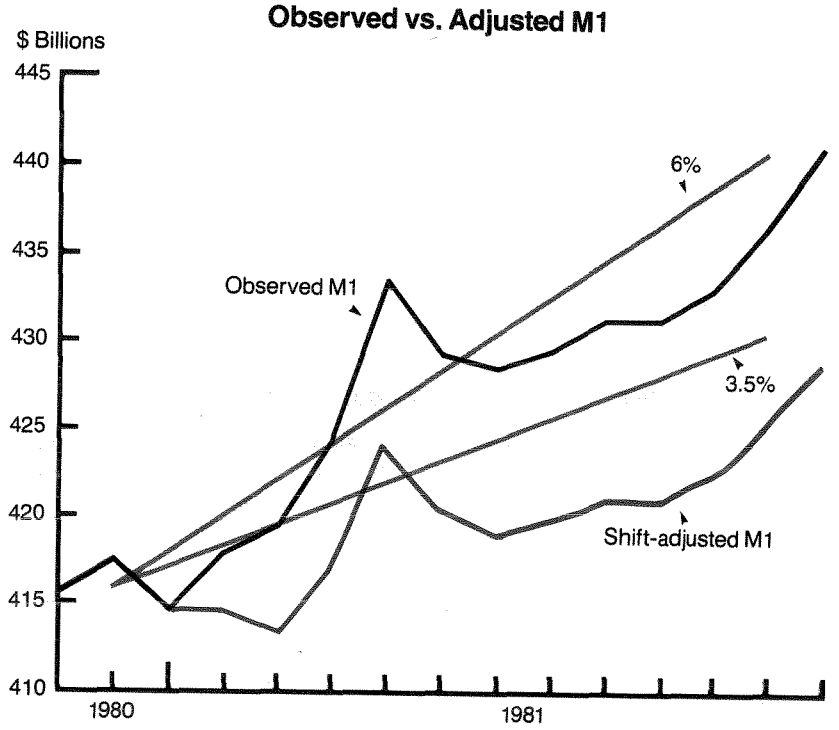
balances substantially.

A one-time upward adjustment in yield would increase the demand for M1, but would not affect the income- and interest-elasticities. As illustrated in Panel A of Chart 1, the money demand curve has shifted to the right, parallel to the old demand curve. In this case, a shift-adjustment to M1 would produce an M1 measure that would, in effect, return the demand curve to its original position, as indicated by the arrow. The Federal Reserve would then be able to use the old relation between the M1 aggregate and income and interest rates to judge whether its policies were appropriate.

The results are not so straightforward if NOW accounts did, in fact, change the income- and interest-elasticities of money demand. This situation may have arisen for two reasons. First, the introduction of NOW accounts changed the composition of M1 by raising the proportion of household deposits contained in M1 relative to the proportion of business deposits. Since the demand for household deposits may respond somewhat differently to changes in income and interest rates than would the demand for business deposits, this change in composition could have changed the slope of the demand for M1. Second, because depository institutions are now permitted to pay up to 5¼ percent on transaction balances, they have more flexibility (and possibly more incentive) to vary the yield in accordance with changes in market rates. Of course, given current levels of market rates, most institutions are offering the ceiling rate; however, they are still able to vary the average yield (and have done so on occasion) on NOWs by changing other features such as minimum balance requirements. The possibility that the yield on transaction balances now varies more than before with changes in market rates may mean a decline in the elasticity of the demand for money. Panel B of Chart 1 depicts this new, steeper slope. Since the shift-adjustment technique cannot measure this change in slope, shift-adjusted M1 will treat the new demand curve as if it were parallel to the old curve at the new equilibrium point. The lightest colored line and the circle indicate that the shift-adjustment accurately measures the impact of monetary policy at only one point on the new demand curve.

Chart 2

Observed vs. Adjusted M1



To the extent that the introduction of NOW accounts altered the income- and interest-elasticities of the demand for M1, then, distortions in the measurement of money growth could have arisen. However, the post-NOW rearrangement of the public's portfolio of financial assets apparently happened very rapidly, thereby temporarily swamping the effects of any changes in demand elasticities that might also have occurred. Distortions in shift-adjusted M1, as a result, were probably minimal. Problems with such distortions might have been more serious, however, if the public's portfolio adjustment had not occurred so rapidly and if NOW accounts had been allowed to yield higher and more flexible rates—since this clearly would have caused major changes in the income- or interest-elasticities of money demand. Similarly, distortions in shift-adjusted measures are likely to be more pronounced when we consider some of the other, higher-yielding substitutes for traditional transaction accounts, such as money market funds (Section VI).

IV. Calculation of Shift-Adjusted M1

The calculated NOW-account distortion in the M1 growth rate was quite substantial during 1981, particularly during the first four months of the year, when the difference between the actual and shift-adjusted measures widened by several billion dollars each consecutive month. (See Chart 2 and Table 1). The spread widened at a much slower pace in the latter half of the year, however, which suggests a weakening of the shifts of funds creating such a divergence.

As noted earlier, the calculation of shift-adjusted M1 involves a subtraction from the observed M1 level of the increment in ATS and NOW balances, or "other checkable deposits" (OCD), which originally came from accounts not included in M1. Though conceptually simple, the arithmetic involved in the Federal Reserve's calculation of shift-adjusted M1 was actually quite complicated because of seasonal adjustment factors. The basic calculation can be described somewhat more simply (Table 2). As a first step, the Fed estimates the level to which OCD balances would have grown assuming normal, trend growth in such accounts, but without the nationwide introduction of NOWs. According to these estimates, the trend growth rate was $200 million per month during the first half of 1981 and $300 million per month in the latter half of the year. Growth in NOW balances in the Northeast, where NOWs had been available prior to 1981, would be included in this trend since, presumably, such growth was not affected by the change in the law. Likewise, some of the growth in ATS balances was included in trend growth since ATS accounts had been introduced by commercial banks in 1978. (Still, the ATS trend was harder to measure because banks began promoting such accounts more aggressively in late 1980 and early 1981 as an alternative to the newly authorized NOW accounts.)

The above-trend growth in OCD—the growth attributable to the introduction of NOWs—then could be obtained by subtracting the trend level from the observed growth of OCD. The amount of growth in OCD balances that can be attributed to

Table 1
Monthly Levels of M1 and Shift-Adjusted M1
(Billions of Dollars, Seasonally Adjusted)

Month	M1	Shift-Adjusted M1	Difference	Change in ATS/NOW Balances
Jan.	417.9	414.4	3.5	15.1
Feb.	419.4	413.4	6.0	10.1
Mar.	424.4	416.8	7.6	6.2
April	433.3	423.6	9.7	7.0
May	429.2	420.1	9.1	−1.3
June	428.4	418.8	9.6	1.5
July	429.4	419.5	9.9	1.4
Aug.	431.1	420.9	10.2	1.4
Sept.	431.2	420.7	10.5	1.7
Oct.	432.9	422.2	10.7	0.4
Nov.	436.4	425.0	11.4	3.1
Dec.	440.9	428.7	12.2	2.3

Table 2
Calculation of Shift-Adjusted M1
(Billions of Dollars, Seasonally Adjusted)

Calculation	January 1981	February 1981
1) Observed level of OCD	43.2	53.3
2) Less trend level of OCD	28.3	28.5
3) Yields above-trend growth in OCD (cumulative)	14.9	24.8
4) Less previous month's above-trend level	0.0	14.9
5) Yields current month's above-trend growth	14.9	9.9
6) Times fraction of growth associated with shifts from nontransaction sources	.225	.275
7) Yields OCD from nontransaction sources	3.4	2.7
8) Cumulative nontransaction OCD	3.4	6.1
9) Observed level of M1	417.9	419.4
10) Less cumulative nontransaction OCD (from line 8)	3.4	6.1
11) Yields shift-adjusted M1	414.5	413.3

Figures in this table may not agree precisely with Table 1 figures, due to slight differences in the calculation of seasonally adjusted totals.

shifts of funds from savings and other non-M1 deposits, then, is obtained by multiplying the above-trend growth in OCD by the fraction of that growth assumed to come from nontransaction sources—estimated at .225 during January and .275 in subsequent months. Shift-adjusted M1 is obtained, finally, by subtracting from observed M1 the cumulative amount of OCD estimated to have come from nontransaction sources. Alternatively, shift-adjusted M1 could be calculated by adding its individual components: currency, demand deposits, travellers' cheques, cumulative trend OCD and cumulative OCD estimated to have come from demand deposits.

V. Importance of Assumptions

These calculations reveal that the magnitude of the shift-adjustment depends on several factors—the growth in OCD balances outstanding, the assumed trend growth in those balances, the proportion of the above-trend growth attributable to shifts from non-M1 sources and, finally, the duration of the stock adjustment process. Only one factor—the overall growth in OCD balances—actually can be observed, and the other three factors can only be estimated from indirect evidence. As a result, the shift-adjusted measure of M1 could be subject to error, possibly providing the FOMC with misleading signals about the impact of its policy decisions.

Estimates of the trend growth in ATS/NOW balances and the proportion of above-trend growth associated with shifts from savings and other nontransaction sources were based on econometric evidence and on surveys of depository institutions and households. The econometric evidence came from several regressions which related the monthly changes in NOW balances at individual banks to reported changes in other deposit categories. The underlying hypothesis was that, with the diversion of funds to NOWs from other deposit categories (either within each institution or intraregionally), institutions with substantial growth in NOW balances would report a smaller increase in other deposit categories than would institutions with smaller NOW increases. In each regression, the change in NOW balances was the independent variable, while the changes in the other deposit categories—demand, personal savings, nonpersonal savings, personal time and nonpersonal time deposits—were each treated in separate regressions as dependent variables. Each equation took the form:

$\Delta DC/Z = -\beta_1(\Delta N/Z)+\beta_2+u$, where

ΔDC = change in outstanding balance of each specific deposit category

ΔN = change in NOW balances;

Z = bank size;

β_2 = constant representing effects of "other factors"; and

u = error term.

A statistically significant coefficient on the NOW account variable in each equation could be interpreted loosely as the proportion of NOW growth coming from each deposit category. However, only the regressions for demand deposits and personal

savings deposits yielded statistically significant results—approximately 80 percent of NOW growth in January outside of the Northeast came from demand deposits, while nearly 20 percent of that growth came from savings deposits (adjusted for the relative market shares of banks and savings and loan associations).

This approach has some advantages for estimating the proportion of NOW growth attributable to shifts from savings. By using a cross section of institutions and a cross section of regions, we need not specifically include general influences on deposit levels (such as interest rates and economic activity) in the regressions, since most of those influences presumably do not vary across institutions. However, to the extent that any omitted variables are correlated with specific variables, the regression results may be biased. For example, institutions that report large changes in demand and NOW balances may also have more "sophisticated" depositors who behave differently from depositors in general. These depositors are likely to shift checking balances into NOWs and at the same time continue to shift passbook savings balances into higher-yielding instruments. Because these shifts of savings will appear to be correlated with NOW growth, the savings deposit regression will tend to overstate the NOW effect.

In addition to regression data, the Federal Reserve obtained estimates of the sources of NOW growth from a number of surveys of depository institutions and households. Depository institutions were asked to provide data on the percentages of the total inflows to their *new* NOW accounts that came from their own checking and other types of accounts. Likewise, consumers were asked what proportions of their NOW balances were transferred from various types of assets.

Like the regression results, these surveys had a number of weaknesses. The first was simply the quality of the responses, particularly from the banks —many of the respondents may have provided only rough estimates. Furthermore, the original source of each NOW deposit may not have been the account from which funds were actually transferred, because this transaction would represent only one in a chain of related portfolio-balance transactions. And the surveys, by addressing only the new accounts, would not have captured any shifts to existing accounts. However, the agreement between survey and regression results lends added credence to the estimates.

Nonetheless, small errors in estimating the sources of NOW account growth could have significantly distorted the shift-adjusted measure of M1. Table 3 shows the sensitivity of this measure to alternative assumptions about the proportion of NOW growth attributable to one-time shifts from savings.

The growth rate of the shift-adjusted measure of M1 varies widely, depending on the estimate of the proportion of OCD growth associated with shifts of funds from savings and other non-transaction accounts. If 17 percent of the above-trend growth in OCD balances had come from nontransaction sources, instead of 27.5 percent as assumed, "effective" M1 in 1981 would have grown 4.2 percent instead of 3.2 percent—in the lower half of the target range instead of below the lower bound of the range. (See Chart 3). The disparity in the estimated effective growth rates was even larger during the early months of the year because of the rapid growth in OCD balances at that time.

Table 3
Shift-Adjusted M1 Under Alternative Shift Assumptions
(Billions of Dollars, Seasonally Adjusted)

Shift Assumption (Percent from savings)	January Level	January Annual Rate*	February Level	February Annual Rate*	December Level	December Annual Rate*
0	$417.9	6.6%	$419.4	5.5%	$440.9	6.1%
17	415.4	−0.6	415.2	−0.6	433.1	4.2
22.5 (Jan.)						
27.5 (after Jan.)	414.5	−3.2	413.4	−3.2	428.7	3.2
50	410.5	−14.7	407.0	−24.8	417.9	0.6

*Growth since December 1980 at simple annual rate

Another source of possible distortion is the assumption regarding the duration of the stock adjustment process. Instead of extending throughout 1981 as assumed, the process may have been substantially over by June—as Table 1 possibly suggests. Thus, if the Fed had stopped adjusting M1 at the end of May, the calculated growth rate for the full year would have been nearly 4 percent, instead of 3.2 percent.

Given the sensitivity of the shift-adjusted measure of M1 to alternative assumptions about the sources of OCD growth and the duration of the stock adjustment process, the success of the Federal Reserve's efforts to obtain a truly reliable measure of effective money growth cannot be determined with any degree of precision. Depending on the assumptions one uses in calculating shift-adjusted M1, monetary policy in 1981 could be viewed as having been either moderately expansionary or fairly contractionary. Clearly, then, the Fed's measurement problems did not disappear once shift-adjusted M1 had been calculated.

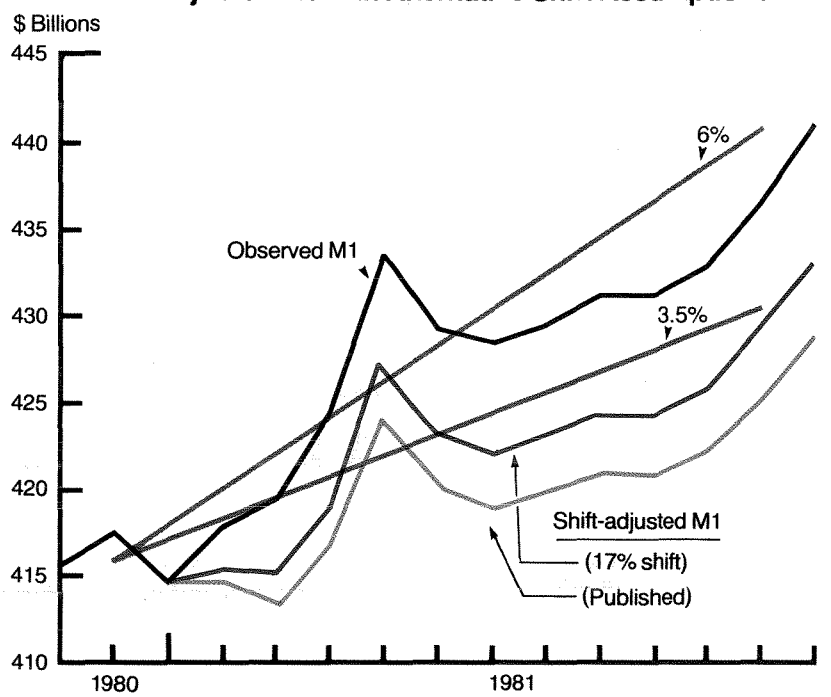
VI. Adjustments for Other Shifts

Although the Fed has used shift-adjustments primarily to account for shifts of funds engendered by regulatory and legislative changes such as the introduction of ATS accounts (1978) and NOW accounts (late 1980), the rationale for using a shift-adjusted measure of money growth applies equally well to shifts of funds that are related to other types of financial change. In fact, shift-adjustments for regulatory changes probably address just a small part of the whole money measurement problem. After all, it is the sweeping changes in financial markets that create the pressure for legislative and regulatory remedies. For example, the pressure for payment of interest on transaction balances and for deregulation of deposit rate ceilings generally would be less pronounced if financial markets were unable to offer depositors nondeposit alternatives.

Money market mutual funds, deposit-sweeping arrangements, retail repurchase agreements, and loophole accounts—all changes occurring largely

Chart 3

Adjusted M1 with Alternative Shift Assumptions



outside the regulatory framework—may have contributed significantly to the current problem of interpreting money growth. Money market mutual funds (MMFs), which are included in the M2 aggregate, are technically open-end short-term investment pools. They invest in a variety of highly liquid money market instruments such as Treasury bills, large negotiable certificates of deposit and commercial paper. However, minimum initial investment requirements are generally low ($1,000 to $2,500), and shareholders may write checks against their accounts and/or transfer funds to third parties by wire, so that MMFs may be viewed as partial substitutes for the transaction accounts included in M1. Deposit-sweeping arrangements also may create money measurement problems, since they permit depositors to keep their transaction account balances to a minimum, while automatically transferring idle funds to a highly liquid and higher yielding instrument (usually MMFs).

With retail repurchase agreements and loophole accounts, banks and thrift institutions have created alternatives to traditional transaction deposits as well. Retail repurchase agreements (RPs) are essentially short-term investments in denominations of less than $100,000—minimum investment requirements are usually in the $1,000 to $2,500 range—with maturities as short as one day or as long as 89 days. In order to compete with MMFs, banks and savings and loan associations frequently offer retail RPs in connection with a checking or NOW account, permitting the depositor to order transfers of funds between the two accounts by telephone. Loophole accounts also permit depositors to earn market interest rates on funds that might otherwise have been held in a transaction account. They offer a line of credit which can be drawn on by check, in connection with instruments such as the six-month money market certificate, and thus grant depositors access to funds before the stated maturity date.

The current proliferation of high-yielding short-term instruments with low minimum investment requirements may be reducing the demand for M1-type balances. In the past, small savers did not have many alternatives to low-yielding accounts, even during periods of high interest rates, and thus had little incentive to reduce holdings of M1-type balances. Now, however, they do have such an incentive. First, the public may be able to use these new instruments—MMFs and loophole accounts especially—as substitutes for demand deposits and other checkable deposits. Second, these new instruments yield market rates far in excess of ATS and NOW rates, and thus induce depositors to limit their

Chart 4

Noninstitutional Money Market Fund Assets

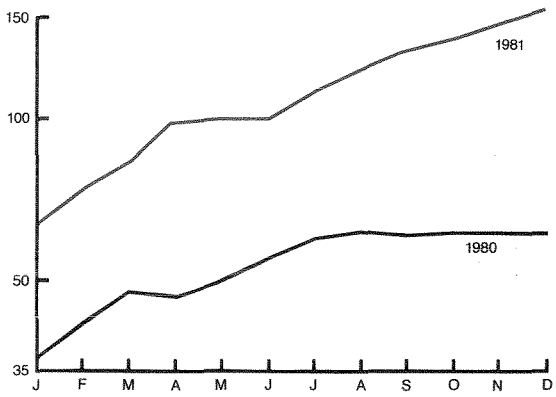
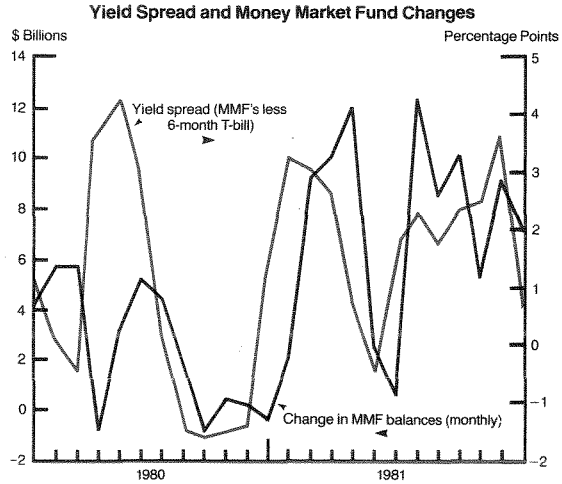


Chart 5

Yield Spread and Money Market Fund Changes



holdings of all types of transaction balances. As a result, M1 growth may give misleading policy signals, particularly during the stock adjustment period when the growth in these new instruments is very rapid. Shift-adjustments to compensate for these shifts out of M1 thus may be appropriate.

The phenomenal growth in money market funds (from $75.8 billion to $184.5 billion in 1981) in particular may reflect this adjustment in the public's stock of assets. Of course, one could argue that this growth was *only* a normal response to high interest rates, which induced the public to shift funds into MMFs (as one of several options) from lower-yielding assets. The 1980–81 experience does not support this argument, however. Although interest-rate patterns were similar in both years, MMF balances grew much more rapidly in 1981 than in 1980. (Chart 4). Furthermore, the response to changes in the spread between MMF yields and the six-month T-bill rate was much more dramatic in 1981 than in 1980 (Chart 5).

Instead, some sort of stock adjustment apparently increased the MMF growth rate substantially. Some of this growth may have come from stocks of demand and other transaction balances, causing observed M1 to grow more slowly (after the NOW-account adjustment) than if MMFs had not been available. In fact, according to one source, MMFs reduced M1 demand by more than $12 billion by September 1981.[4] Therefore, just as the Fed adjusted M1 growth *downward* to account for NOW-induced shifts of funds from interest-earning assets, so it should have made an *upward* adjustment to account for MMF-induced shifts of funds out of M1.

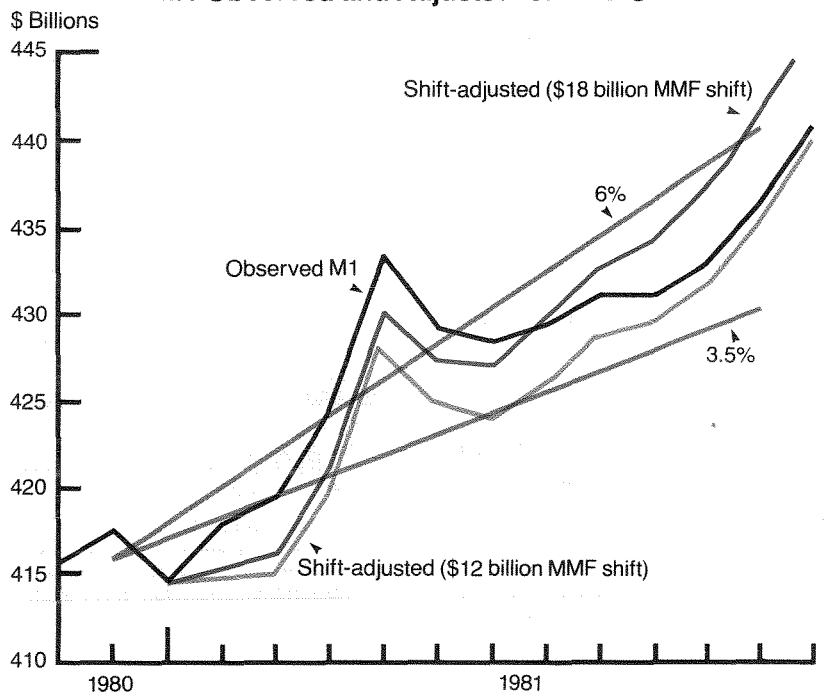
Table 4
Shift-Adjusted M1 Under Alternative MMF-Shift Assumptions (Billions of Dollars)

Shift Assumption	Year-End Level of M1* (adjusted)	Annual Growth Rate Over 1981
$ 0	$428.7	3.2%
12	440.7	6.0
18	446.7	7.5

*This measure of M1 also incorporates the Federal Reserve estimate of the NOW shift-adjustment.

Chart 6

M1 Observed and Adjusted for MMF Shifts



Various measures of M1 can be calculated, depending on whatever assumption is made about the percentage of noninstitutional MMFs (coming from a reduction in M1-type balances (see Table 4). Incidentally, we exclude institution-only MMFs because such funds are generally regarded as substitutes for direct money-market investments. For this reason, institution-only MMFs are included only in M3, while other MMFs are included in M2. Shareholders of institution-only funds generally have other options for earning market rates on transaction balances, and these funds thus may not attract balances held for transaction purposes. Noninstitutional MMFs, by contrast, tend to be close substitutes for small-denomination deposit instruments and, because of the lack of options their shareholders have for earning market rates, such MMFs are more likely to attract demand and other transaction balances.

With a $12-billion reduction in M1-type balances resulting from MMF growth, the adjusted M1 measure would have grown at a 6.0-percent annual rate, even after the NOW shift adjustment. But the $12-billion shift assumption referred only to the first nine months of 1981, and moreover, simulation results showed the MMF impact increasing steadily over that period.[5] Therefore, we could assume up to an $18 billion shift from transaction accounts into MMFs. In that case, shift-adjusted M1 would have grown at a 7.5 percent rate—more than the 6.1-percent growth in observed M1, offsetting the downward NOW adjustment (see Chart 6). Relative to its target range, then, M1 growth may actually have been somewhat expansionary in 1981. However, this result seems contrary to the sluggish economic growth observed in 1981. Furthermore, this apparent inconsistency illustrates the difficulties inherent in measuring demand shifts when the instrument involved, unlike a NOW account, pays market interest rates.

VII. Conclusion

We have not seen the last of the sweeping changes recently taking place in the U.S. financial system. Money market funds continue to grow rapidly. Increasing numbers of brokerage firms and depository institutions are announcing deposit-sweeping services, while larger numbers of banks and thrift institutions are offering retail repurchase agreements and loophole accounts. The pressure to deregulate deposit interest rates continues to mount. Furthermore, the Depository Institutions Deregulation Committee (DIDC) has created a new market rate 91-day account and is currently considering the creation of other, more liquid accounts to permit depository institutions to compete more effectively with MMFs.

Thus, observed M1 growth may continue to give somewhat misleading policy signals. To the extent that distortions in M1 growth can be traced specifically to the growth in certain financial instruments, shift-adjustments may be useful. Many of these changes, however, cannot be quantified with even the same degree of certainty as the NOW-account shift. We have insufficient data to make shift-adjustments for certain innovations, such as deposit-sweeping arrangements. Furthermore, many of these new instruments pay market rates (unlike NOW accounts), so that shifts of funds become harder to classify, either as shifts in the demand for money or as changes in the quantity of money demanded due to interest rate changes. As a result, the ability of shift-adjustments to compensate for these changes and to reduce uncertainty about the effective growth rate of money may be somewhat limited, compared to what could be achieved with the NOW shift-adjustment.

FOOTNOTES

1. See, for example, the minutes of the August 18, October 5–6 and November 17, 1981, meetings of the Federal Open Market Committee.

2. **Federal Reserve Bulletin**, July 1980, p. 535.

3. **Federal Reserve Bulletin**, March 1981, p. 199

4. Michael Dotsey, Steven Englander and John C. Partlan, "Money Market Mutual Funds and Monetary Control," **Federal Reserve Bank of New York Quarterly Review**, Winter 1981–82, Volume 6 No. 4, pp. 9-17.

5. **Ibid.**, p. 17