

BASE DRIFT AND THE LONGER RUN GROWTH OF M1: EXPERIENCE FROM A DECADE OF MONETARY TARGETING

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I.

INTRODUCTION: THE NATURE OF BASE DRIFT

This article discusses a technical aspect of the Federal Reserve's monetary targeting procedure that has come to be known as "base drift." The Fed has been announcing target ranges for the growth of M1 and other monetary aggregates since 1975.¹ These ranges have been expressed in terms of rates of growth from a base quarter to the quarter four quarters later.² The term "base drift", refers to the Fed's practice of using the actual dollar level of an

aggregate in the base quarter as the base level for the target range, rather than the midpoint of the targeted range set in the preceding targeting period.

Figure 1 provides a hypothetical illustration. The figure assumes that the 6 percent midline of the 4 to 8 percent target range set for the growth rate of M1 at the beginning, of year 1 implies an M1 level of \$500 billion in the fourth quarter of the year. The actual growth of M1 in year 1, however, exceeds the target range, so that the actual level in the fourth quarter is \$520 billion. In this situation, the base level for the target range in year 2 is \$520 billion, and the amount of base drift is \$20 billion.

A long-standing objective of Fed monetary policy has been to reduce the longer run growth of M1 and the other monetary aggregates over time to noninflationary rates in order to restore price stability.³ To date, however, relatively little progress has been made toward reducing the longer run growth of M1. Most

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¹M1 is the narrowly defined money supply. It currently includes (1) currency outside the Treasury, Federal Reserve Banks, and the vaults of commercial banks; (2) travelers checks of nonbank issuers; (3) demand deposits at all commercial banks other than those due to domestic banks, the U. S. government, and foreign banks and official institutions less cash items in the process of collection and Federal Reserve float; and (4) other checkable deposits (OCD) consisting of negotiable order of withdrawal (NOW) and automatic transfer service (ATS) accounts at depository institutions, credit union share draft accounts, and demand deposits at thrift institutions. The currency and demand deposit components exclude the estimated amount of vault cash and demand deposits respectively held by thrift institutions to service their OCD liabilities.

²The Fed began announcing target ranges following the passage of House Concurrent Resolution 133 in March 1975. The first targets for each aggregate were expressed in terms of growth rates from March 1975 to March 1976. Subsequent targets were expressed as growth rates from a particular quarter to the quarter four quarters later. From 1975 through the end of 1978, a new four-quarter target was established in each successive quarter. Since then, under the terms of the Humphrey-Hawkins Act of 1978, targets have generally been set only once a year. These targets extend from the fourth quarter of the base year to the fourth quarter of the current year. The one exception to this procedure since 1978 occurred in mid-1983 when a new target was set for the second half of the year. With this exception only the nonoverlapping fourth quarter-to-fourth quarter targets are considered in this article.

³The importance of this objective has been emphasized by all Federal Reserve Chairmen in recent years. For example, Chairman Burns made the following statement in testimony before the Banking and Currency Committee of the House of Representatives on July 30, 1974:

A return to price stability will require a national commitment to fight inflation this year and in the years to come. Monetary policy must play a key role in this endeavor, and we, in the Federal Reserve, recognize that fact. We are determined to reduce, over time, the rate of monetary and credit expansion to a pace consistent with price stability.

See Burns (1974), p. 258.

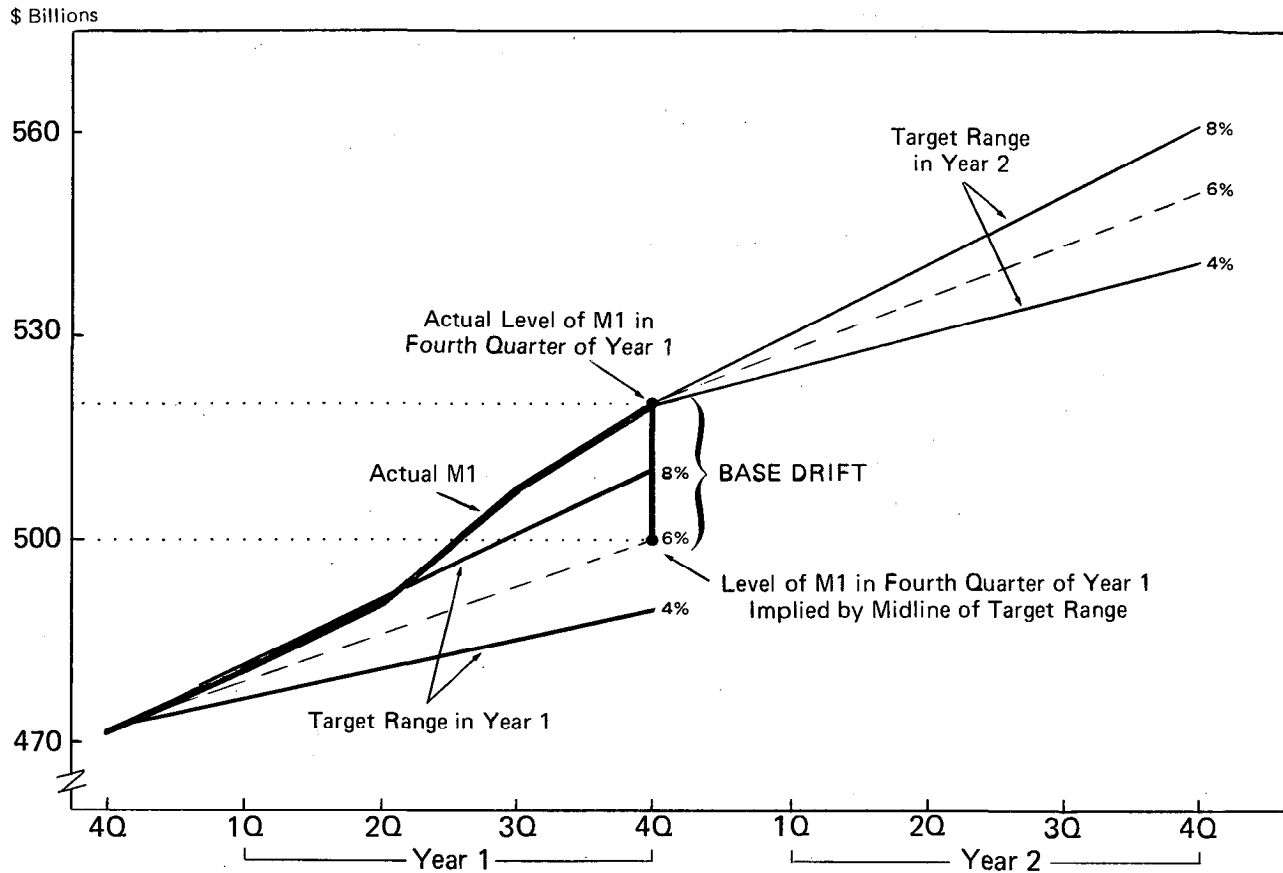
More recently, Chairman Volcker made the following statement before the Senate Committee on Banking, Housing, and Urban Affairs on February 25, 1981:

These technical considerations should not obscure the basic thrust of our policy posture. Our intent is not to accommodate inflationary forces; rather, we mean to exert continuing restraint on growth in money and credit to squeeze out inflationary pressures. That posture should be reflected in further deceleration in the monetary aggregates in the years ahead and is an essential ingredient in any effective policy to restore price stability.

See Volcker (1981), p. 240.

Figure 1

HYPOTHETICAL ILLUSTRATION OF BASE DRIFT



economists believe that the Fed should give greater emphasis to M1 than the other monetary aggregates, because M1 has had the most predictable relationship with nominal GNP over the longer run, and it is more amenable to Fed control than the other aggregates. Perhaps for these reasons, M1 is the monetary aggregate that receives the greatest attention from the general public. The trend growth rate of M1 was 6.7 percent over the nine-year period from the beginning of 1976, which was the first full year for which monetary targets were announced, until the end of the fourth quarter of 1984, compared to 5.6 percent in the preceding ten years.^{4,5} Further, there has been little change in the trend rate within the period.⁶

⁴These rates were calculated on a least squares basis. The calculation for the 1976-1984 period was made using the effective M1 data in Table I.

⁵Making similar comparisons for M2 and M3 would be more problematic than in the case of M1 because of the sharper break in the data when the definitions of the aggregates were changed at the beginning of 1980.

In terms of the mechanics of the Fed's targeting procedure, one can allocate the discrepancy between the objective and actual M1 growth to two factors that at least in principle are separable: (1) insufficient reductions in the targeted rates of growth and (2) net upward base drift over the period. The next two sections of this article develop an estimate of the contribution of base drift to the discrepancy in the case of M1. Section II explains the construction of an "effective" M1 time series and a corresponding set of target ranges for effective M1 that are used in developing the estimate, and Section III reports the estimate. The remainder of the article is organized as follows. Section IV explains why base drift matters. Section V assesses the potential benefit of base drift in the case of permanent monetary distur-

⁶The 6.7 percent trend rate includes the period of exceptionally rapid growth in M1 in 1982 and 1983, which in hindsight appears to have been appropriate in that as of early 1985, inflation has remained low. See the discussion in Sections V and VII of this article.

bances. An alternative targeting procedure that would eliminate base drift is outlined in Section VI. The effective M1 data constructed in Section II provide evidence on the role of monetary targeting in the recent reduction of inflation. This evidence is discussed in a postscript in Section VII. Section VIII briefly summarizes the main points made in the article.⁷

II.

CONSTRUCTING A TIME SERIES FOR EFFECTIVE M1 AND CORRESPONDING TARGET RANGES FOR EFFECTIVE M1

In order to measure base drift accurately over time, it is necessary to construct data series for both M1 itself and the M1 target ranges that are conceptually consistent both over time and with one another. Doing so is complicated by two events that occurred during the period. First, M1 was redefined at the beginning of 1980. Second, as explained below, the reported growth of M1 was distorted by the legalization and rapid growth of negotiable order, of withdrawal (NOW) accounts and other interest-bearing transactions accounts in several years during the period. This section describes how each of these problems is handled. The mechanics involved are somewhat tedious but are essential to a full understanding of the results presented below.

Tables I and II contain the constructed data. Table I shows "effective" M1, i.e., M1 adjusted for the shifting of funds between various categories of deposit accounts occasioned by deregulation. These adjustments were made on an ex post basis using the latest estimates of the actual shifting that occurred. The details of the adjustments are described below. Table II shows the target ranges for the growth of effective M1. In the majority of the years covered, these ranges are the same as the ranges announced by the Fed. In one year where the growth rate of effective M1 diverged from the growth rate of reported M1 due to deregulation, however, it is necessary to infer the target for the growth of effective M1 from the publicly announced targets for the growth of reported M1. The guiding principle is to develop a series for the target ranges that indicates the growth rate of effective M1 that the Fed sought for each

⁷ It should be noted that the potential problems with base drift were recognized by several economists shortly after the Fed began announcing targets. See, in particular, Poole (1976) and Kane (1975).

year, whether the rate was expressed or implied. The nature of each adjustment is described below.⁸

Change in the Definition of M1

M1 as it was defined before 1980, which is referred to as "old M1" in this article, included mainly 'currency in the hands of the public and demand deposits at commercial banks. In 1980, a "new M1" series was defined that includes the major components of old M1 and, in addition, what are now designated "other checkable deposits" (OCD). OCDs include NOW accounts and automatic transfer service (ATS) accounts at commercial banks and thrift institutions, credit union share draft accounts, and demand deposits at mutual savings banks.⁹

Prior to 1980 the Fed established M1 targets in terms of old M1. Since 1980, the M1 targets have been set in terms of new M1. In measuring base drift it is necessary to calculate the deviation of the particular measure of M1 that was actually targeted in a given year from the midpoint of the target range for that year. Therefore, the most straightforward way to proceed is to calculate money growth and base drift prior to 1980 using old M1 and subsequently to make the calculation in terms of new M1. This is what was done. Fortunately, the difference between the respective dollar levels using the two definitions is small in the quarter when the definition was changed.¹⁰ Specifically, new M1 exceeded old M1

⁸ It is important to note that while the adjustments made in constructing the effective M1 series (Table I) were made on an ex post basis, the adjustments to the target ranges (Table II) were made on an ex ante basis. That is, estimates of the actual shifting of funds caused by deregulation were used in constructing the effective M1 series. In contrast, the adjustments to the target ranges, where they occur, reflect the deposit shifts that the Fed anticipated would occur during a year as seen at the beginning of the year.

⁹ See footnote 1 in this article for the precise current definition of M1, which, in addition to the changes made in 1980, incorporates some additional minor changes made in 1981. It should be noted that the Fed published data for two M1 series, known as M-1A and M-1B, in 1980 and 1981. The M-1A measure, which was close to the pre-1980 M1, was dropped at the beginning of 1982, and M-1B was designated as M1. All references in this article to M1 in 1980 and 1981 are to what was then designated M-1B.

¹⁰ This small difference in dollar levels results from the netting out of two discrepancies. As noted above, M1 as currently defined includes OCDs, while old M1 excludes them, which tends to raise the level of M1 as currently defined relative to the level under the old definition. In addition however, old M1 included demand deposits of foreign commercial banks and foreign official institutions, which are excluded under the current definition. This second discrepancy raises the level of old M1 relative to the level under the current definition.

Table I

EFFECTIVE M1

(Quarterly Average Data)

(\$ billions)

Quarter	M1	Quarter	M1
1975:4	295.1	1980:1	394.3
1976:1	298.5	2	390.0
2	303.3	3	404.5
3	306.4	4	414.1
4	312.1	1981:1	413.2
1977:1	317.9	2	417.9
2	323.8	3	420.5
3	330.8	4	424.1
4	336.9	1982:1	435.4
1978:1	342.5	2	437.9
2	350.4	3	444.8
3	357.3	4	462.3
4	361.1	1983:1	477.5
1979:1	364.4	2	491.8
2	371.8	3	503.8
3	380.8	4	510.0
4	385.6/387.4	1984:1	519.4
		2	527.6
		3	533.7
		4	536.3

Notes for Table I

1. Data for 4Q75 through 4Q79 are based on the old definition of M1 to maintain comparability with the target ranges. These data were derived from the final data released by the Board of Governors using the old definition. (The data through 1978 are contained in "Historical Money Stock Revisions," February 1979. The data for 1979 are contained in the Board's H.6 release dated January 10, 1980.) Subsequent data are based on the new definition, which was referred to as M-1B in 1980 and 1981. These data were derived from published data as of January 1985. For 4Q79, the first figure is for the old definition and the second figure is for the new definition. The difference between the two figures is \$0.9 billion.
2. Data for 1Q79-4Q79 are adjusted to correct for the shift of funds from demand deposits to ATS accounts following the authorization of ATS accounts in late 1978. ATS accounts were not included in M1 under the old definition, and the adjustment in 1979 added these funds back into M1. This adjustment raised the growth rate of M1 from 4Q78 to 4Q79 by 1.25 percentage points. This adjustment and all adjustments in subsequent notes to this table are based on estimates published by the Board of Governors.
3. Data for the second half of 1980 are adjusted to correct for shifts of funds from assets not included in the new definition of M1 into ATS accounts in anticipation of the legalization of NOW accounts nationwide scheduled for December 31, 1980. This adjustment reduced the growth rate of M1 from 4Q79 to 4Q80 by 0.5 percentage point.

by less than \$2 billion or by roughly 0.5 percent on an effective basis as described directly below in the fourth quarter of 1979, just prior to the change in definition. For this reason, simply switching from the old M1 measure to the new measure in the first quarter of 1980 introduces only a small error in the cumulative base drift calculation.

Adjustments for Shifts into and out of NOW Accounts and Similar Accounts Due to Deregulation¹¹

As pointed out above, the reported growth of M1 was distorted by the ongoing deregulation of transactions accounts on several occasions during the period covered by this analysis. Both the distortions themselves and the manner in which the Fed dealt with them differed from one year to the next. The following paragraphs describe the situation on each occasion and indicate the nature of the adjustments made in each case in constructing the data in Tables I and II.

1979. In late 1978 all commercial banks were permitted to offer ATS accounts, which are interest-bearing transactions accounts functionally equivalent to NOW accounts. Funds switched from demand deposits to ATS accounts presumably retained the characteristics of transactions accounts. Therefore, shifts from demand deposits, which were in old M1, to ATS accounts, which were not, caused the reported growth of old M1 to understate the effective growth of M1 in 1979. Consequently, an estimate of the volume of funds shifted from demand deposits to ATS accounts was added to old M1 in 1979 in constructing the effective M1 series in Table I. This adjustment raised the M1 growth rate in 1979 by 1¼ percentage points.

At the beginning of 1979, the Fed announced a target range for reported M1 of 1½ to 4½ percent.

¹¹ All of the adjustments described in this article are based on estimates published by the Board of Governors of the Federal Reserve System.

4. Data for 1981 are adjusted to correct for the shift of funds from assets not included in the new definition of M1 into NOW accounts as a result of the legalization of NOW accounts nationwide. This adjustment reduced the growth rate of M1 from 4Q80 to 4Q81 by 2.7 percentage points.
5. Shifts of funds associated with the legalization of NOW accounts nationwide are believed to have been substantially completed by the end of 1981. In order to maintain a continuous series, however, the cumulative downward adjustment of \$13.4 billion applied to the 4Q81 figure was applied to all subsequent figures.

At the time, the Fed estimated that shifts of funds from demand deposits to ATS accounts would reduce old M1 growth by 3 percentage points over the year. The 1½ to 4½ percent target range explicitly allowed for this anticipated reduction in the reported growth rate.¹² The implication is that the Fed was willing to accept effective M1 growth in a range of 4½ to 7½ percent as shown in Table II.

1980. The Monetary Control Act of 1980, which was signed into law in March of that year, authorized NOW accounts nationwide effective December 31, 1980. Consequently, many banks in states where NOW accounts were not yet permitted marketed ATS accounts aggressively in the second half of 1980 to position themselves competitively for the anticipated legalization of NOWs the following year. In 1980, however, in contrast to 1979, the Fed set targets in terms of new M1, which included ATS accounts. For this reason, a different kind of adjustment for shifts into ATS accounts, was needed in constructing the effective M1 series for 1980. Specifically, since ATS accounts are included in new M1, the shifting of funds from demand deposits to ATS accounts did not affect new M1 and therefore required no adjustment. Some funds, however, were shifted into ATS accounts from savings accounts and other instruments not included in new M1. These shifts increased reported new M1. It was assumed that these latter funds largely retained their nontransactions character after they were shifted into ATS accounts and hence into new M1. This implies that reported new M1 growth overstated the effective growth of transactions balances in 1980. Therefore, an estimate of the portion of the growth of ATS and similar accounts due to transfers of funds from savings and other non-M1 instruments was subtracted from reported new M1 in the second half of 1980 in constructing effective M1 in Table I. This adjustment reduced the growth rate one-half of a percentage point in 1980.

In announcing its targets for 1980, the Fed recognized, that if NOW accounts were legalized during

¹² See "Monetary Policy Report to Congress" (March 1979), p. 196. It should be noted that the target range for reported growth was raised from 1½ - 4½ to 3 - 6 percent in the middle of 1979. (See "Monetary Policy Report to Congress" (March 1980), p. 187.) This increase reflected new estimates which indicated that the growth of ATS accounts would reduce the reported growth rate by only 1½ percentage points, over the year rather than by the 3 percentage points estimated at the beginning of the year. However, the implied target for effective growth was not changed, i.e., both the estimated impact of the shifting of funds and the target range for reported growth were revised by the same amount.

Table II

EXPRESSED OR IMPLIED ANNUAL TARGET RANGES
FOR EFFECTIVE M1 AND CORRESPONDING
ACTUAL EFFECTIVE M1 GROWTH, 1975-1985

Target Period	Target Range	Midpoint of Target Range	Actual
4Q75 - 4Q76	4.5 - 7.5	6.0	5.8
4Q76 - 4Q77	4.5 - 6.5	5.5	7.9
4Q77 - 4Q78	4.0 - 6.5	5.25	7.2
4Q78 - 4Q79	4.5 - 7.5	6.0	6.8
4Q79 - 4Q80	4.0 - 6.5	5.25	6.9
4Q80 - 4Q81	3.5 - 6.0	4.75	2.4
4Q81 - 4Q82	2.5 - 5.5	4.0	9.0
4Q82 - 4Q83	4.0 - 8.0	6.0	10.3
2Q83 - 4Q83	5.0 - 9.0	7.0	7.4
4Q83 - 4Q84	4.0 - 8.0	6.0	5.2
4Q84 - 4Q85	4.0 - 7.0 ^p	5.5	—

Notes for Table II

1. The ranges in this table are the same as, or were derived from, the target ranges that were announced by the Federal Reserve at the beginning of the year to which the target applied. For 1979 and subsequent target years announcements have been contained in the Federal Reserve's annual Monetary Policy Report to Congress, which is usually published in the March issue of the Federal Reserve Bulletin. For 1976, 1977, and 1978, the announcements are contained in Burns (1976), Burns (1977), and Miller (1978), respectively.
2. The target ranges for 1979 and 1981 are adjusted for anticipated shifts into or out of NOW accounts or similar, accounts as explained in the text. The ranges for the periods 4Q79-4Q80 and 4Q80-4Q81 are the ranges that were set for what war then referred to as M-18.

^p preliminary

the year, the legalization would cause shifts of funds. Because it was not clear at the beginning of the year if legalization would occur or when, no allowance was made for it in setting the range. Therefore, the 4 to 6½ percent announced range was the target range for effective M1 growth.¹³

1981. NOW accounts were authorized nationwide at the beginning of 1981, and this change produced substantial shifts of funds from non-M1 instruments, such as savings deposits, to NOW accounts during the year. Presuming again that these funds retained

¹³ See "Monetary Policy Report to Congress" (March 1980), p. 178.

their nontransactions character, it follows that the reported growth of M1 overstated effective growth. At the beginning of the year, the Fed estimated that the shifting of funds would reduce effective M1 growth relative to reported growth by 2.5 percentage points. The 3½ to 6 percent range announced at the beginning of 1981 and shown in Table II reflects these anticipated shifts.¹⁴

The effective M1 data for 1981 in Table I reflect the most recent estimate of the actual NOW account effect, which indicates that in fact the shifts reduced the growth rate for the year by 2.7 percentage points. It should be noted that the effective M1 levels reported in Table I for 1981 incorporate both the 1981 adjustments and the adjustment for the final quarter of 1980, since any adjustment must be carried permanently in a continuously adjusted series such as this one. The two adjustments together put effective M1 \$13.4 billion below reported M1 in the fourth quarter of 1981.

1982, 1983 and 1984. In order to maintain a consistent series, all of the data in Table I for 1982, 1983 and 1984 incorporate the \$13.4 billion adjustment made in the final quarter of 1981. No further adjustments, however, are made in these years. This absence of further adjustments may seem curious in view of the authorization of money market deposit accounts (MMDAs) in late 1982 and Super NOW accounts in early 1983. Since the MMDA accounts were not included in M1, any transfers of funds from accounts included in M1 to the MMDAs would cause the reported M1 data to understate effective growth of M1 if it is assumed that the funds retained their transactions character after the shift. On the other hand, since the Super NOW accounts were included in M1, any transfers of funds from non-transactions accounts not included in M1 to the Super NOWs would cause the reported M1 data to overstate the effective growth of M1 to the extent that the funds retained their nontransactions character after the shift. As it turned out, the Fed's estimates of these two shifts are roughly equal and therefore offsetting.¹⁵ For this reason, no further adjustments are made.

¹⁴ In 1981, in contrast to other years in which such shifting occurred, the Fed released and focused on "shift-adjusted" (i.e., what this article has called "effective") M1 data, and it also announced its target range in terms of effective growth.

¹⁵ See "Monetary Policy Report to the Congress" (February 1984), p. 80.

III.

THE ESTIMATE OF CUMULATIVE BASE DRIFT

With the "effective" M1 data and the corresponding target ranges in hand, the computation of cumulative base drift is straightforward. The heavy solid line in Figure 2 plots the effective M1 series from Table I. The target ranges attached to this line are the adjusted fourth quarter-to-fourth quarter target ranges for effective M1 given in Table II. (To avoid cluttering the chart, the numerical ranges are shown along the horizontal axis.) As the chart shows, M1 finished the year near the midpoint of its range on two occasions: in 1976 and in the second half of 1983. It ended 1981 slightly below the lower bound of the range, and it ended 1984 in the lower half of the range. In every other year, it ended the year either in the upper third of the range (1979) or above it (1977, 1978, 1980, 1982, and the first half of 1983).

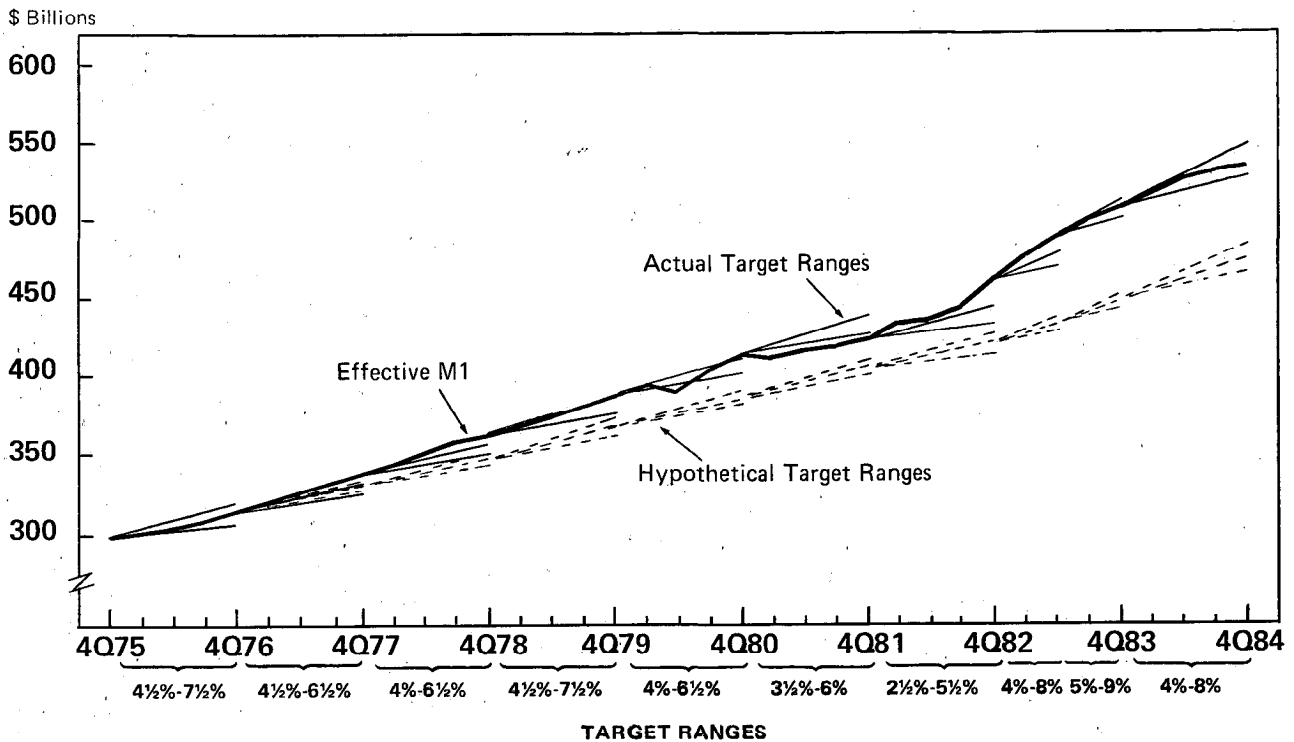
This tendency to exceed the range more frequently than not has led to substantial net upward base drift over the period as a whole. One way to estimate the cumulative drift is to compare the actual level of M1 at a point near the end of the period with the level that M1 would have attained if the Fed had (1) hit the midpoint of its target range at the end of every year and (2) set the same ranges for growth rates that it actually set. The midlines of the target ranges drawn with dashed lines in Figure 2 indicate the path M1 would have followed if the midpoints had been hit. On this path, effective M1 would have been \$477.2 billion in the fourth quarter of 1984, compared with the actual level of \$534.5 billion net of the definitional discrepancy in 1980. The \$57.3 billion difference between these levels is a measure of the net upward base drift that occurred under the Fed's targeting procedure from the fourth quarter of 1975 through the end of 1984. In other words, about 25 percent of the increase in effective M1 during this nine-year period can be attributed to base drift.¹⁶

The estimate given above is a rough approximation of cumulative base drift because the Fed might have set somewhat different targets from those actually set if it had hit the midpoint of the range each year. For this reason, the estimate is unavoidably hypothetical.

¹⁶ It should be noted that while base drift is measured here as any deviation from the midpoint of the target range, the Fed itself has avoided setting the midpoint of its range as a point target. In some years, it has explicitly indicated that growth at a rate different from the rate implied by the midpoint would be acceptable. Nevertheless, since the base for each target range is a point, it seems reasonable to quantify base drift in terms of deviations from the midpoints of the ranges.

Figure 2

ACTUAL LEVELS AND TARGET RANGES FOR EFFECTIVE M1^{1/}



^{1/} Effective M1 levels are quarterly averages.

In particular, if changes in the midline target growth rates were negatively correlated with the base drift at the end of the preceding target year, the estimate would be biased upward. This is the case because with negative correlation, if there had been no base drift as in the hypothetical, situation shown by the dashed lines in Figure 2, the growth targets would have been higher on average than those that were actually set. Figure 3 shows the observed relationship between actual base drift and subsequent change in the target. There is no evidence of negative correlation. Indeed, Figure 3 suggests a positive correlation, which would imply that the above estimate is biased downward.

IV.

WHY BASE DRIFT MATTERS

The preceding section showed that cumulative base drift has been quantitatively significant during the years that the Fed has used the present targeting procedure. Moreover, because there has been both upward and downward base drift over the period, the

cumulative measure understates the quantitative significance of base drift on a year-to-year basis.¹⁷ Beyond its quantitative impact, however, allowing base drift would seem to rob the Fed's targeting strategy of some of its most important benefits.

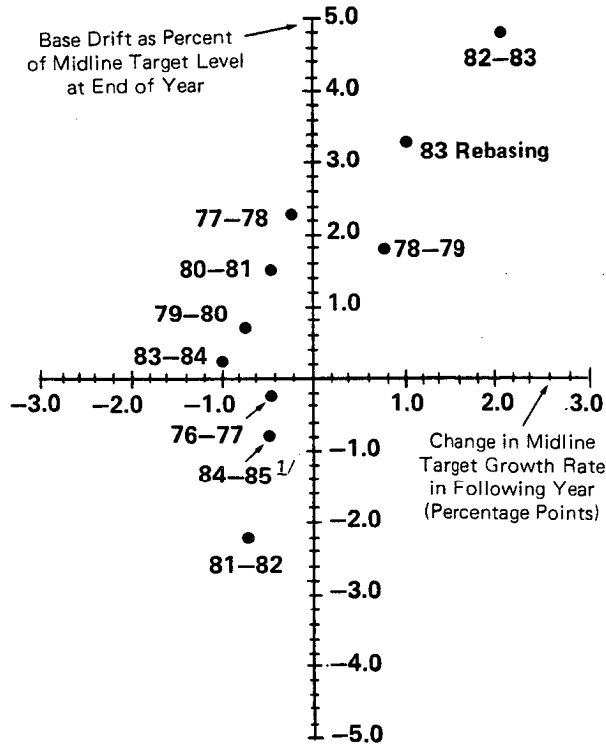
Erosion of Public Confidence in the Effectiveness of the Targeting Procedure

The effectiveness of monetary targeting in controlling inflation depends largely on the public's confidence in the Fed's commitment to long-run control of the money stock. More specifically, the public must believe that the Fed will hit its announced targets on average over time. The contribution of the present targeting procedure to this confidence is almost certainly diminished by the frequent discrepancies between the targets and actual money growth in particular years and the incorporation of each miss in the base set for the next annual target.

¹⁷ Annual base drift measured as a percentage of midline target levels at the end of each target year can be seen in Figure 3.

Figure 3

THE RELATIONSHIP BETWEEN BASE DRIFT AND SUBSEQUENT CHANGE IN MIDLINE TARGET GROWTH



^{1/}At the time this article was prepared, the Fed had not yet established a final target range for M1 for 1985. Therefore, this observation uses the 5.5 percent midline of the preliminary 4 to 7 percent range announced in July 1984, before the base drift was known.

Diminished Incentive for the Fed to Hit Its Target

A closely related point is that the allowance of base drift reduces the incentive for the Fed to hit its target in any particular year. At least as far as the procedure is concerned, any target miss that occurs in a given year is forgiven when the target for the next year is set, and the miss is therefore only temporarily in the public eye.¹⁸ The Fed's incentive to correct a deviation from the target that arises during a year is therefore reduced because no matter how large the

¹⁸In principle, base drift could be offset by moving subsequent targeted growth in the opposite direction. However, as seen in Figure 3, in practice change in targeted growth seems to be positively correlated with prior base drift. In any case, it would not seem desirable to use a targeting procedure where announced growth rates are routinely adjusted in response to prior money supply disturbances. The alternative procedure outlined in Section VI would not require such routine adjustment.

deviation might be at the end of the year, the money stock is back on target when the new range is set. This feature of the present targeting procedure substantially reduces the disciplinary benefits of monetary targeting.

Propagation of Transitory Disturbances

The secular inflation rate tends to follow the trend rate of M1 growth over time. With unbiased monetary targeting, where target misses are truly random, the Fed could control inflation on average with the current targeting procedure as long as persistently noninflationary target paths were set. Even in these circumstances, however, allowing base drift would be an inferior targeting strategy.

Figure 4, which is similar to Figure 1, illustrates this point with another hypothetical example. In the first of the two years shown, actual M1 grows at a rate close to the midline of the target range through the first three quarters of the year. It then declines in the final quarter of the year to point B, which is only slightly above the 4 percent lower bound of the range. The growth rate targeted in the second year is shown to be the same as in the first year. Because of the downward base drift, however, the level of the target path given by the midline of the range has declined by the difference between points C and B. That is, the target path in the second year is \$9 billion below what it would have been if the base had not been allowed to drift. This hypothetical example has its counterparts in actual experience. As shown in Figure 2, above-target growth in 1978 significantly raised the level of the target path for 1979, and below-target growth in 1981 lowered the path for 1982.

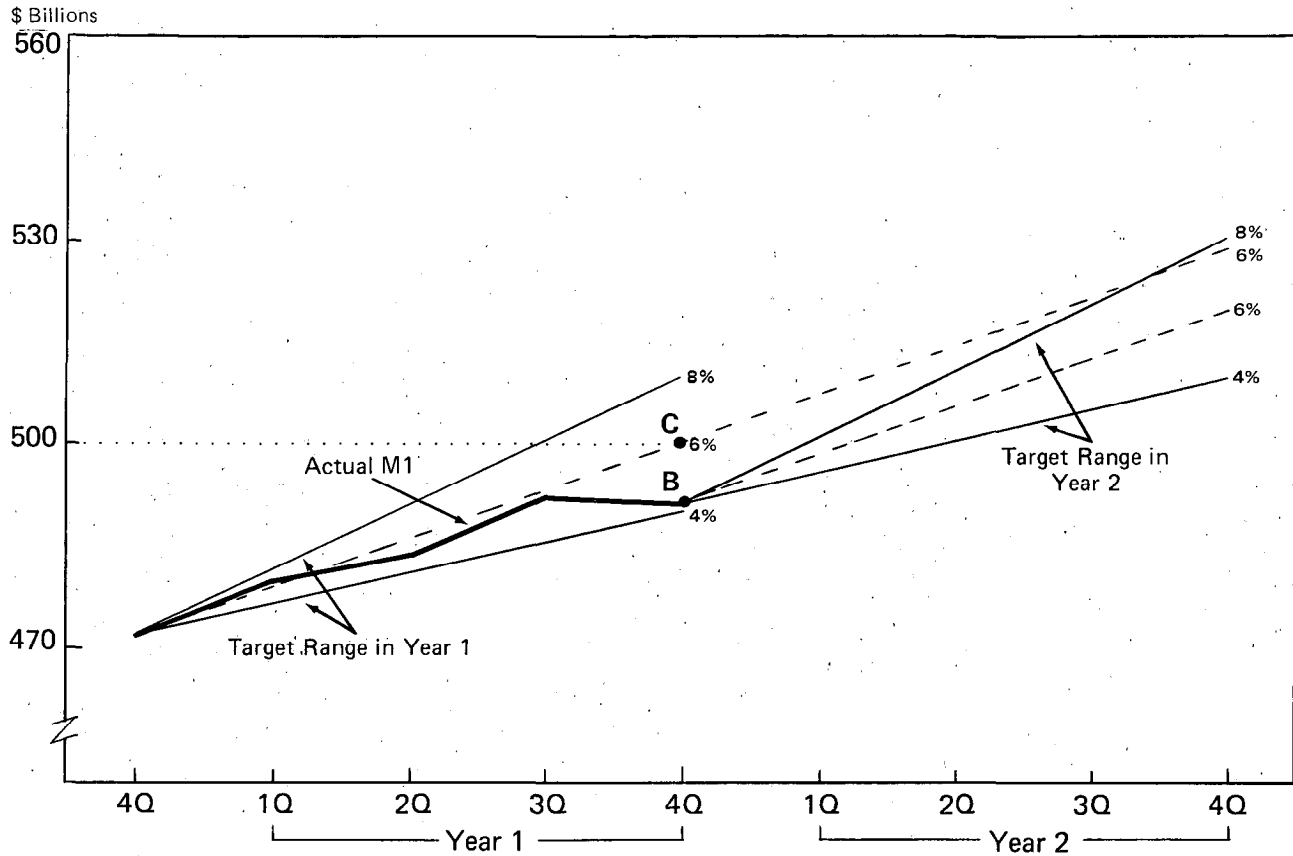
To the extent that short-run target misses are due to transitory shifts in credit or money demand,¹⁹ base drift needlessly allows temporary disturbances to affect the money stock and the price level permanently. Consequently, uncertainty about the future price level tends to be greater with base drift than without it. The contribution that monetary targeting makes to economic efficiency by reducing uncertainty surrounding the future price level is therefore smaller when base drift is built into the targeting procedure.²⁰ In short, because M1 growth is prone to significant quarterly disturbances that would otherwise be transitory, it would not appear to be desirable for the Fed's targeting procedure to build these disturbances into the following year's target path.

¹⁹ See Goodfriend (1982).

²⁰ For more discussion of this point see Goodfriend (1984).

Figure 4

EFFECT OF A SHORT-RUN DISTURBANCE ON THE LONGER RUN TARGET



V.
BASE DRIFT AND "PERMANENT"
MONETARY DISTURBANCES

Figure 2 shows that a sizable portion of the cumulative upward base drift to date arose at the end of the 1982 targeting year and during the 1983 targeting year. As is well known, the velocity of M1 declined unusually sharply in the late stages of the recession that ended in the fourth quarter of 1982 and expanded unusually slowly during the first year of the recovery. In this situation, the Fed deliberately allowed M1 growth to exceed its target range substantially in the second half of 1982 in order to prevent the economy from weakening further.²¹ Since it thought that the decline in velocity might be permanent, the Fed apparently felt comfortable basing its 1983 range at the high actual level of M1 in the fourth quarter of 1982.²²

²¹ See "Monetary Policy Report to Congress" (March 1983), p. 134.

On the basis of this episode, it might be argued that base drift is a desirable feature of the Fed's targeting strategy, since it allows the Fed to accommodate permanent disturbances in the relationship between income and the public's demand for money. Even if it were possible to identify such permanent disturbances at the time they occur, however, it does not follow that allowing base drift as a routine feature of the targeting procedure would be either necessary or desirable. Faced with such a disturbance, it might be necessary for the Fed to raise its targeted growth rate temporarily or to raise the level of the target path. Discretionary adjustments of the targets in reaction to conclusive evidence of permanent monetary disturbances, however, would be very different from rou-

²² Similar reasoning led the Fed to set a new base for the period between the second quarter of 1983 and the fourth quarter of 1983 after M1 growth had exceeded its original 1983 range during the first half of the year. It should be noted that the Fed de-emphasized M1 between October 1982 and July 1984. The 1983 M1 range was referred to officially as a "monitoring" range.

tinely permitting any base drift to affect the target path.

VI.

AN ALTERNATIVE TARGETING STRATEGY

Two relatively simple changes in the Fed's targeting procedure would eliminate base drift and the problems associated with it.²³ First, whatever money growth rate the Fed chooses to target in a given year, the base level for the target path should be the midpoint of the target range for the preceding year. In terms of Figure 1, the base level for the midline of the second year range should be the end point of the first year midline, or \$500 billion. This change would be sufficient to eliminate base drift.²⁴ A second helpful modification, although strictly speaking not needed to eliminate base drift, would be to set the upper and lower bounds of the target range in terms of a band rather than the present wedge. The band would give the Fed the same room to maneuver throughout the targeting year. In particular, the Fed would have more room to maneuver early in a targeting year, when it might be desirable to deal gradually with money supply disturbances inherited from the previous targeting year.

Figure 5 shows how this procedure would work using the hypothetical data from Figure 4. As drawn, the chart indicates that the 6 percent target for money growth in the first year is retained in the second year. If the targeted growth rate were lowered to, say, 5 percent in year 2, the slope of the path would be lowered in the second year, but the base would still be the \$500 billion level given by the midline of the year 1 target range in the fourth quarter of the first year. The width of the band could be 2 or 3 percentage points of the targeted level. Obviously, a narrower band would encourage greater monetary control in the short run and vice versa.

In the example in Figure 5, actual M1 ends year 1 near the lower bound of the target band. The example can be used to illustrate the advantages of both of the modifications suggested above. Regarding the first modification, since point A would be the year 2 target, the modified procedure would require the Fed to aim to offset the first year shortfall in year 2 rather than forgiving the miss as under the present pro-

²³ These modifications were originally suggested by Poole (1976), pp. 255-57.

²⁴ If there were conclusive evidence of a permanent monetary disturbance, the base could be adjusted to take account of it, but such adjustments would only be made under exceptional circumstances.

cedure. The Fed would also have a stronger incentive to prevent a target miss from occurring in year 1. This additional discipline would almost certainly increase the public's confidence in the Fed's ability to achieve its longer run objective of fostering steady, noninflationary growth in the money supply.

Regarding the second modification, it would be much easier for the Fed to use the year 1 target as the base for year 2 with a target band than with a wedge. As should be evident from Figure 5, if the Fed were to eliminate base drift but retain the wedge-shaped range from the old procedure, the money supply would be more likely to begin each new targeting year outside the range. This situation would be difficult for the Fed and confusing to the public. Using a band would allow the Fed to move the money supply gradually back to the target midline while remaining inside the target range.

VII.

A POSTSCRIPT ON THE ROLE OF MONETARY TARGETING IN THE RECENT REDUCTION IN INFLATION

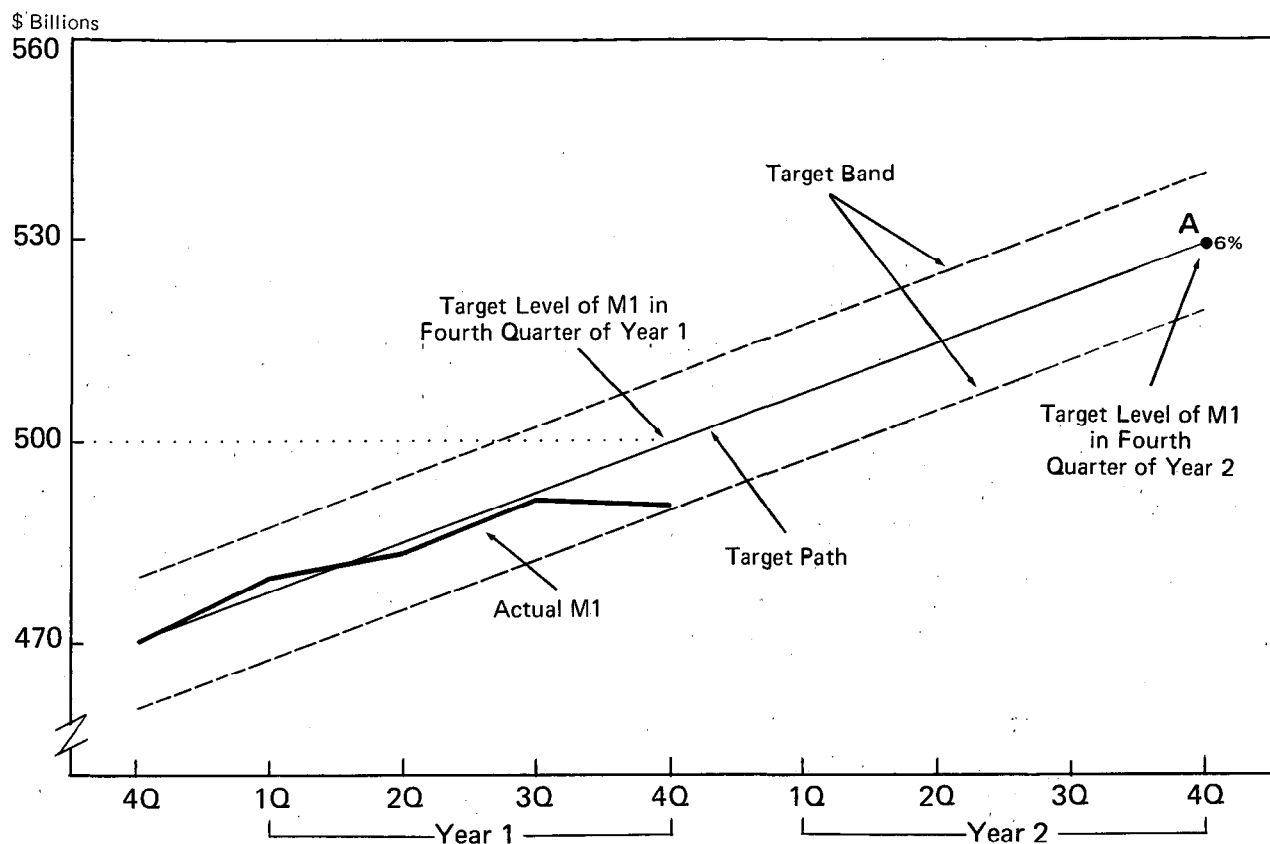
The United States has experienced a sharp reduction in inflation since 1980. For example, annual inflation as measured by the GNP deflator declined from 10.2 percent in 1980 to 4.3 percent in 1982 and has remained below 4 percent since then. The Fed must be given credit for pursuing the restrictive monetary policy that made this reduction in inflation possible. What role did monetary targeting *per se* play in achieving the reduction? The effective M1 data in Table I provide some evidence on this question.

Inflation actually increased sharply during the first five years of monetary targeting. Annual inflation as measured by the GNP deflator rose from 4.7 percent in 1976 to 8.2 percent in 1979 and 10.2 percent in 1980. As shown in Table II, effective M1 overshot the upper bound of the Fed's target ranges in 1977 and 1978, and it came in within the upper third of the implied range in 1979. This performance created doubts about the Fed's commitment to its money supply targets and tended to encourage the increase in inflation in the late 1970s.

After renewing its commitment to disinflationary policy in October 1979, the Fed again let effective M1 overshoot its target in 1980, and the inflation rate remained high throughout that year. Then, in sharp contrast to the preceding four years, effective M1 actually undershot its range in 1981. As the data in Table I show, effective M1 grew 4.6 percentage

Figure 5

A TARGET BAND TO ELIMINATE BASE DRIFT



points slower in 1981 than its average annual growth over the preceding five years.²⁵ Further, the 2 percent downward base drift in 1981 (see Figure 3) was built into the 1982 target path. This slower M1 growth was not the gradual deceleration built into the Fed's announced targets. Rather, it was a sharp deceleration that brought about an 'unexpectedly rapid decline in inflation-and may have worsened the 1981-1982 recession.'²⁶ In short, the discipline of mone-

tary targeting per se does not appear to have contributed significantly to the reduction in inflation. Instead, it appears that the reduction was due to the shock of an unanticipated undershooting, of the M1 target range following a four-year period during which growth either exceeded the range or came in well in the upper portion of the range.

By the summer of 1982, the unusual decline in M1 velocity together with the recession and developing strains in financial markets led the Fed to deemphasize its M1 target. M1 grew over the next four quarters at a very high 12.3 percent rate. In retrospect, the 1982 decision to accommodate the increased demand for M1 appears to have been appropriate in the sense that inflation has remained low.

An argument can be made, however, that the unusual decline in velocity in 1982 and some of the strain in financial markets that accompanied it have been due to the substantial deceleration in the growth of effective M1 in 1981 and the sharp reduction in actual inflation that followed. It was reasonable to expect that velocity would decline as falling

²⁵ The effective M1 data in Table I may understate the deceleration somewhat, since, as noted in Section II, the data in the Table I series for the years prior to 1980 are based on the old definition, which excluded OCDs. Since OCDs began to grow significantly more rapidly in the late 1970s, an effective M1 series that uses the current definition throughout shows more rapid growth in the five years preceding 1981 and hence a sharper deceleration in 1981. Specifically, average annual effective growth in the five years preceding 1981 under the current definition is 7.4 percent, and the 1981 deceleration is therefore 5.0 percentage points.

²⁶ It should be noted that during the course of 1981, the Fed felt that the weakness in M1 growth might be due in part to a lasting decrease in velocity resulting from improvement in cash management practices. Its limited reaction to the weakness in M1 was also affected by relatively strong growth in M2 and M3. See "Monetary Policy Report to the Congress" (March 1982), p. 129.

inflation reduced nominal interest rates and lowered the cost of holding money. But it was extremely difficult to predict either how much or how quickly the public would revise its inflationary anticipations downward in the face of the pronounced monetary shock ; hence, it was particularly difficult to forecast the size and timing of the decline in velocity. As mentioned above, in retrospect rapid money growth in 1982-1983 has proven to be appropriate. Nevertheless, making monetary policy choices during a rapid disinflation is particularly difficult. If M1 had followed the gradual announced deceleration built into the targets, inflation would more likely have come down gradually, the recession and financial strains might have been less severe, and velocity might have fallen more gradually and predictably.

VIII. SUMMARY

This article has described the nature of base drift. estimated its cumulative impact on the effective

growth of M1 since 1975, and indicated several ways in which it undermines the Fed's present monetary targeting strategy. As noted in Section III, net base drift was substantially upward over the 1975-1984 period, although in retrospect some part of the drift that occurred in 1982 and 1983 may have been fortuitous in the sense that inflation has remained low through 1984. In any event, since there has been both upward and downward base drift during the period, the cumulative drift tends to understate the quantitative significance of base drift on a year-to-year basis. As pointed out in Section IV, the allowance of base drift greatly reduces the disciplinary features of monetary targeting and therefore probably reduces its effectiveness and credibility. The modifications of the present procedure noted in Section VI would eliminate base drift, give the Fed an incentive to control the growth of the money supply more closely in the short run, and in all likelihood increase the public's confidence in the Fed's commitment to restore and maintain price stability.

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