



BOARD OF GOVERNORS
OF THE
FEDERAL RESERVE SYSTEM
WASHINGTON, D. C. 20551

STRICTLY CONFIDENTIAL (FR)
CLASS I - FOMC

TO: Federal Open Market Committee

DATE: July 2, 1985

FROM: S. H. Axilrod

A handwritten signature in dark ink, appearing to be "S. H. Axilrod", written over the printed name.

The attached paper, prepared in response to issues raised at the Committee meeting in May, provides background for discussion of long-run targets at the July meeting.

Attachment

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FROM: S. H. Axilrod^{1/}

SUBJECT: Assessment of Recent
M1 Growth and Implications for
Monetary Targeting.

Since the fall of 1982, the Committee has given less weight to M1 in policy than had been the case after October 1979, though the weight has varied with the degree to which velocity of M1 has seemed to exhibit more or less "normal" behavior. The reduced weight has reflected uncertainties about the behavior of M1 under varying economic and financial circumstances. One important factor has been the considerable change in its deposit composition following the great expansion of NOW accounts after they became available nationwide, the introduction of super-NOWs, and the further development of competing instruments such as money market deposit accounts that to a degree also function as checking accounts.

It was believed that these new accounts may have altered usual--in the sense of predictable on the basis of historical evidence--relationships among M1, interest rates, and key economic variables of concern to the Committee, such as economic activity and prices. To some extent, with accounts offering explicit interest returns now included in M1, the demand for M1 would be expected to respond more than in the past to motives affecting the level and distribution of saving and wealth rather than to the need to finance transactions. At a minimum, time has been required to determine the responsiveness of demand for money as newly composed to interest rates, income, and other factors, and to assess how the trend and cyclical behavior of velocity might be affected.

^{1/} Messrs. Lindsey, Porter, and Kohn contributed to the preparation of this paper.

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The decline in the the income velocity of M1 over the first two quarters of 1985--averaging around 4-3/4 percent at an annual rate--again raises questions about the stability and predictability of money demand and its usefulness as a monetary target, similar to issues raised when M1 was expanding rapidly from mid-'82 to mid-'83 and its velocity was also declining substantially and atypically for postwar experience. In both periods M1 growth was accompanied by considerable increases in NOW accounts and declining market interest rates.

The next section of the paper compares these two periods in an effort to isolate the impact of various economic and financial factors on demand for M1 and its components, partly to assess the extent to which regularities in behavior might be observable within the existing deposit composition of money and in an effort to evaluate the predictability of the M1 response to evolving economic and financial conditions. In addition to examining influences on the demand for money, the section will also assess whether the changing deposit composition of and attitudes toward M1 in recent years have weakened the reliability of that variable as a predictor of nominal GNP in simple monetarist-type models. Implications for monetary targeting will be discussed in the final section of the paper.

Recent experience in comparison with 1982-83

M1 has grown rapidly since late last year, outpacing the expansion of income, resulting in a substantial and somewhat unusual decline in velocity in the first two quarters of 1985. In some respects, this experience parallels that from mid-1982 through mid-1983, when rapid money growth also was accompanied by falling velocity. These two periods are compared in Table 1 below, which shows that velocity dropped 4-3/4 percent

over the second half of 1982 and the first half of 1983--an unprecedented decline over a four-quarter interval. Velocity has fallen at near the same annual rate in the first half of this year.

Table 1

Changes in M1, Velocity and Interest Rates
(in percent; at annual rates, except where noted)

	<u>M1</u>	<u>Velocity</u>	<u>Interest Rates</u> ^{1/}	
				<u>Memo:</u> <u>Not Annualized</u>
<u>1982-1983</u>				
June to May	13.1		-45.1 ^{2/}	-41.3 ^{2/}
QII to QII	11.9	-4.7	-39.3	-39.3
<u>1984-1985</u>				
October to June	11.4		-44.3 ^{3/}	-29.5 ^{3/}
QIV to QII	10.4	-4.8 ^{4/}	-29.0 ^{5/}	-14.5 ^{5/}

^{1/} The federal funds rate.

^{2/} April to March.

^{3/} September to May.

^{4/} Based on Greenbook estimate of QII GNP.

^{5/} This figure differs from the monthly change largely because on a quarterly average basis the interest rate peak was in the third quarter of 1984.

An important factor boosting money growth relative to income in both periods was a substantial decline in interest rates around the start of each period. In the 1982-83 period rates fell about 45 percent--shown at an annual rate for comparability with annualized percent changes in M1 and velocity--from a funds rate of nearly 15 percent in April, 1982 to around 8-3/4 percent in March, 1983. More recently, interest rates have moved down about the same amount on an annualized basis (from 11-1/4 percent in September of last year to an 8 percent average in May). As these rate declines decrease the opportunity costs of holding the various

components of M1, the public would be expected to increase its desired money balances at each level of income and transactions. As the opportunity cost of holding such balances declines, money holders would manage their transactions balances less intensively and would be willing to hold a larger proportion of their savings balances in M1-type instruments.

Estimates of the effects of falling interest rates on money demand in the two periods are given in Table 2. This table shows how the money demand sectors of the Board's monthly and quarterly models allocated estimated money growth among its principal determinants over the two intervals. In the earlier period, both models indicate that declining rates added more than 5 percentage points (annual rate) to M1 growth, accounting in large measure for the fall in velocity. As can be seen in the last column, however, even after allowance for interest rate effects, money growth in 1982-83 was stronger than the growth predicted by the models on the basis of historical experience, perhaps reflecting precautionary demands for cash in a period characterized by unusual uncertainty about prospects for income.^{1/}

Money growth in the more recent period has also exceeded model predictions, though by a somewhat smaller amount than earlier for the

^{1/} The quarterly model makes an allowance for the introduction of super NOW accounts in early 1983 but not for the introduction of MMDAs in late 1982. Staff estimates at the time suggested that shifts into super-NOWs from outside M1 were offset by shifts out of M1 to MMDAs, suggesting that the quarterly model's error in the first half of 1983 is biased downwards.

Table 2

Decomposition of Predicted Money Growth in Staff
Monthly and Quarterly Models
(in percent at annual rates)

Period	M1		Decomposition of Predicted			Pre- diction Error ^{1/}
	Actual	Predicted	due to interest rates	due to nominal income	due to trend and other	
June 1982 to May 1983	13.1	9.1	5.2	4.9	-1.0	4.0
1982 QII to 1983 QII	11.9	9.4	5.6	4.4	-.6	2.5
Oct. 1984 to June 1985	11.4	8.8	4.0	5.8	-1.0	2.6
1984 QIV to 1985 QII	10.4	7.9	2.5	6.6	-1.2	2.5

^{1/} Actual growth less predicted growth.

monthly model.^{1/} Stronger nominal income growth has contributed more to recent growth, while interest rates appear to have had less of an impact according to both models, partly because of the pattern of interest rate movements within the periods. Moreover, for the quarterly model, the

^{1/} The magnitude of the prediction errors in both models depends importantly on the interval of time selected for comparison. The errors would be smaller over spans extending further back in time. For example, while the quarterly model error averages about 2-1/2 percentage points in the periods shown in the table, its error would decline to about 1.4 and .9 percentage points, in the '82-83 and '84-85 periods, respectively, if the interval for comparison was extended back by one quarter. Similarly, for the monthly model, extending the intervals 3 months back would reduce the errors to 3.4 and .6 percentage points for each period respectively. Thus, the model errors in the periods shown in the table tend to offset earlier errors of the opposite sign, presumably reflecting random influences.

relatively small interest rate effect also reflects the interaction of long lags in this model and the resumption of rate declines in the spring, with the result that the impact of lower interest rates on money demand is not yet fully reflected.

As shown in Table 3, the expansion of M1 in both periods was accompanied by relatively rapid growth in NOW accounts, as might be expected since there was comparatively more to be gained by shifting funds into those accounts rather than non-interest earning demand deposits as market rates declined. The relative share of NOW accounts in M1 growth was greatest in the earlier period, while growth of M1A has accounted for somewhat more of M1 growth in the present period.

Table 3
Contribution of M1 Components to Total Growth

	Total M1	Total M1A	Total NOW Accounts
Annual growth rate, June 1982 to May 1983	13.1	6.6	40.4
Percent contribution to M1 growth		41	59
Annual growth rate, Oct. 1984 to June 1985	11.4	8.7	19.1
Percent contribution to M1 growth		56	43

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The interpretation of Table 3 is complicated by the transition to super-NOW accounts and MMDAs introduced around year-end 1982 and by the reduction of minimum balance requirements on both accounts at the beginning of this year. Table 4 attempts to shed some light on this issue by looking at sources of M1 growth over subperiods before and after those regulatory changes as well as at subcomponents of total M1A and total NOWs. Both regulatory changes were followed by an increase of 3 to 6 percentage points in the contribution of NOW accounts to M1 growth compared with the prior subperiod, although the growth rate of M1 itself appears to have been little affected. Thus, the regulatory changes may have added to the relative attractiveness of NOW accounts, but with little effect on growth of M1 as a whole, as the bulk of funds were shifted into super NOWs out of demand deposits and regular NOW accounts.^{1/}

Abstracting as best we can from transitional shifts, estimates of long-run interest elasticities for M1 components from our quarterly model suggest that the availability of regular NOW accounts has increased the overall interest elasticity of M1 but that the introduction of super NOW accounts is serving to mute that effect. However, regular NOW accounts still comprise about two-thirds of the \$160 billion of total NOW accounts.

Regular NOW accounts played a more important role than M1A in the response of M1 in the second half of 1982 because the relative attractiveness of NOWs was enhanced by the decline in market yields. Since these accounts have a fixed ceiling of 5-1/4 percent, a given change in market rates has a much larger percentage impact on their opportunity costs--the difference, that is, between market rates and the 5-1/4 percent

^{1/} Over the first half of 1983 the share of demand deposits in M1 growth also fell in part owing to shifts into MMDAs.

Table 4
 Contribution of M1 Components to the Total Growth:
 Selected Subperiods

	M1 Growth (annual rate)	Percent Contribution to M1 Growth					
		Total M1A:	Demand Deposits	Currency and Travelers Checks	Total NOWs:	Regular NOWs	Super NOWs
June '82 to May '83	13.1	41	19	22	59	0	59
<u>Subperiods:</u>							
June '82 to Dec. '82	12.9	43	25	18	57	57	n.a.
Dec. '82 to May '83 ^{1/}	12.5	37	12	26	63	-65	129
Oct. '84 to June '85	11.4	56	38	18	43	20	23
<u>Subperiods:</u>							
Oct. '84 to Dec. '84	11.2	58	40	18	41	22	20
Dec. '84 to June '85 ^{2/}	11.3	56	37	19	44	19	25

^{1/} After introduction of super NOWs and MMDAs.

^{2/} After reduction of minimum balance requirement on super NOWs and MMDAs.

n.a. -- Not applicable.

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own rate--than on the opportunity costs of holding currency and demand deposits (old M1A).

More recently, NOW accounts have continued to elevate the overall interest elasticity of M1 relative to M1A but by a smaller amount than in 1982-83. Regular NOW accounts are now a slightly smaller fraction of total M1. In addition, the interest elasticity of demand for regular NOW accounts probably has declined a little because of the drop in the level of opportunity costs between the two periods. Elasticities in the quarterly model decline with the levels of market interest rates and opportunity costs because of the largely fixed transaction costs of switching between transactions accounts and other financial instruments as well as the likelihood that the public simply becomes less sensitive as the absolute opportunity cost narrows. Finally, the introduction of super-NOW accounts has worked to reduce total M1 long-run interest elasticities because banks can adjust offering rates and also in view of their relatively low opportunity cost.

On balance, all these influences appear to have led to a small decline in the overall long-run interest elasticity of M1 between 1982-83 and the current period--as best we can estimate on the basis of the quarterly model from .12 to .10. The interest elasticity of M1A is estimated at about .09 percent at present.

These estimates represent the long-run adjustment of money holders to interest rate changes, and the aggregate elasticity is currently well within the wide range of various econometric estimates made prior to NOW accounts. There may, however, be substantial impacts on M1 growth rates in the short-run when market rates change, depending on the speed with which banks and thrifts adjust offering rates on super NOW accounts.

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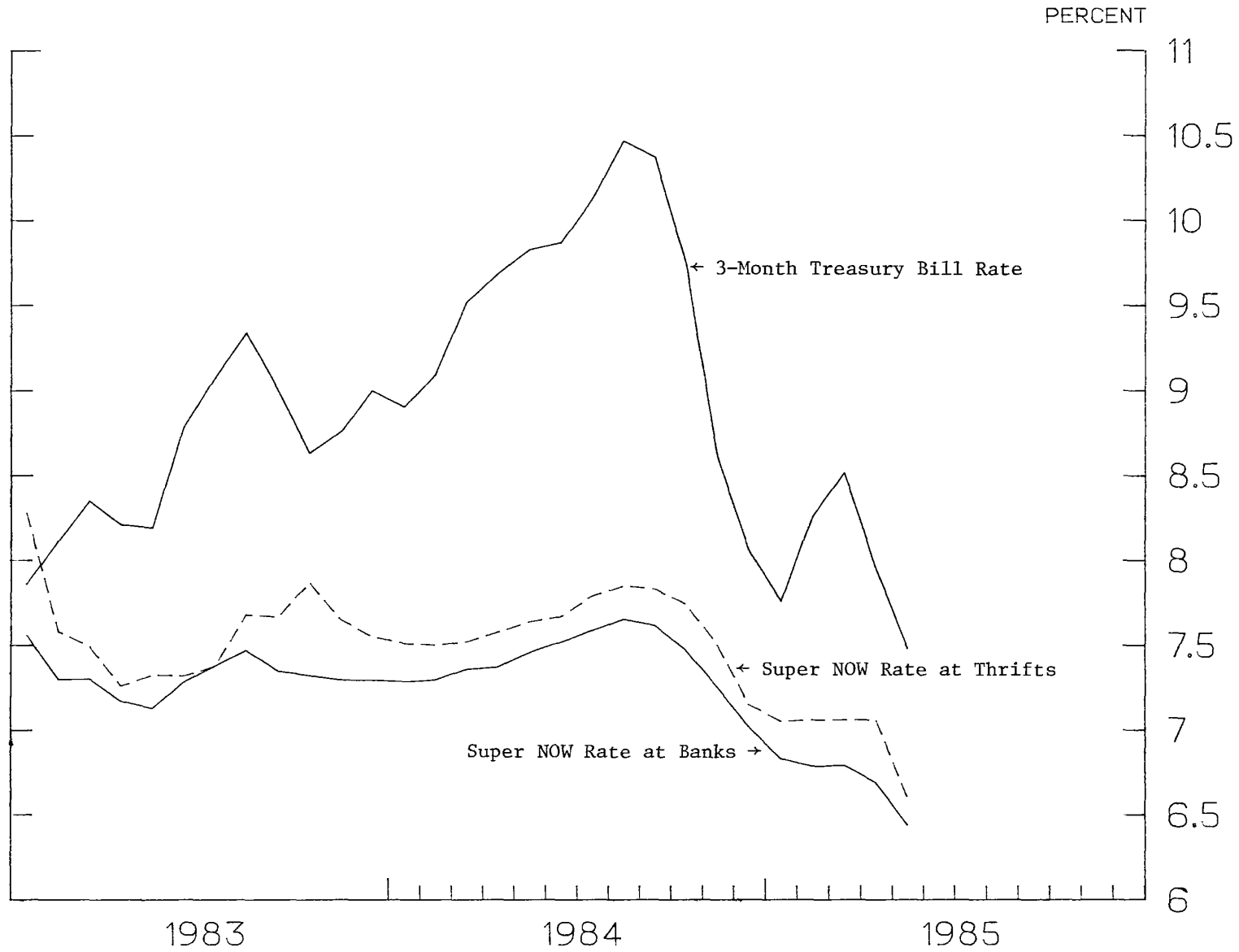
As may be seen on Chart 1, these rates do seem to have adjusted sluggishly to changes in open market rates, though with more flexibility on the downside than on the upside, but over the long-run they would be expected to adjust fairly completely.

The behavior of NOW accounts may differ from that of demand deposits not only because of divergent responses to interest rates. They may differ also because those accounts have a large savings component, and holders may respond as well to the variety of factors affecting the propensity to save out of income and the allocation of wealth. In that context, some light on the reliability of M1 as a guide might be obtained by examining relatively simple reduced-form equations that predict nominal GNP growth from current and past M1 growth (and also a fiscal policy variable) while not allowing explicitly for interest rate movements. A comparison with predictions made on the basis of M1A growth might tend to indicate the extent to which NOW accounts have disturbed the stability of the M1 to GNP relationship, either because these accounts have tended to raise the interest elasticity of the aggregate in some degree or because the deposits are otherwise responding to wealth and savings motives.

As can be seen in Table 5, the equation using M1 significantly overpredicted GNP from mid-1982 through 1983. While errors in GNP predictions based on M1 were better on average in 1984 when interest rates changes were less large on balance, a pattern of overprediction errors similar to the 1982-83 period appears to be emerging for this aggregate recently.

M1A made smaller prediction errors in 1983, but its performance was on average worse than M1 in 1984. The 1983 predictive performance of M1A may have been rather fortuitous, however, since expansion of M1A was

CHART 1



held down in that year by shifts into newly introduced money market deposit accounts and also super-NOWs. Both M1 and M1A appear to be over-predicting GNP growth in the current year.

While on balance M1A may have been somewhat more reliably related to GNP in a predictive sense than M1 over the past twelve quarters on average, the relationship of both has been quite loose. The results, still, are not inconsistent with a view that the introduction of NOW accounts may have disturbed, in some degree, past historical relationships between M1 and GNP--although, as will be discussed in the concluding section of the paper, the sharp drop of nominal interest rates implicit in the reduction of inflation would lead in any event to substantial

Table 5

Predictions of Growth in Nominal GNP Using
M1 and M1A in Reduced-Form Equations
(compounded rates of growth)

	<u>Actual</u>	<u>using M1</u>		<u>using M1A</u>	
		<u>Predicted</u>	<u>Error</u>	<u>Predicted</u>	<u>Error</u>
1982 QIII	2.5	9.9	-7.4	6.9	-4.4
QIV	3.9	13.1	-9.2	7.7	-3.8
1983 QI	8.5	15.9	-7.4	8.9	-.4
QII	12.3	18.1	-5.8	8.9	3.4
QIII	10.1	14.7	-4.6	10.8	-.7
QIV	10.6	13.1	-2.6	9.4	1.1
1984 QI	14.9	10.6	4.4	7.7	7.3
QII	10.7	9.5	1.2	8.2	2.5
QIII	5.6	8.9	-3.3	8.0	-2.4
QIV	7.1	8.2	-1.1	8.4	-1.3
1985 QI	5.6	7.5	-1.8	7.5	-1.8
QII ^{1/}	5.0	10.1	-5.1	8.6	-3.6
Mean error			-3.6		-.3
Root mean square error			5.1		3.3

^{1/} Based on Greenbook estimate.

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divergences between growth in money and GNP at times during the transition period toward reasonable price stability.

Implications for monetary targeting

Just as was the case during the 1982-83 period of rapid growth, the extent to which M1 has grown above its long-run target during the past several months can be explained to a considerable degree by the behavior of interest rates that was unexpected at the time the targets were set. Indeed, interest rate declines may explain somewhat more of the recent M1 acceleration than our econometric results suggest if the lagged responses built into the models' structure (based on historical experience) exaggerate the delays in adjustment of money holders who may have become more sensitized in recent years to changing market conditions. In a sense, the ability to explain strong M1 as a response to declining interest rates can be viewed as assuring since it may be taken to indicate that M1 behavior has not been aberrant or basically unpredictable. But in another sense, questions are raised about the reliability of M1 as a guide for policy if preannounced targets need to be frequently breached because of changes in underlying market conditions.

The economic case for monetary targeting rests essentially on the view that the demand for money relative to income, while subject to some degree of uncertainty, can be more readily predicted than the demand for goods and services given interest rates; thus, there would be less chance of an undesirable economic outcome if money is employed as a guide rather than interest rates, or at least in addition to interest rates. With money as a guide, unexpected variations in the demand for goods and services will tend to be offset by contra-cyclical movements of interest rates. If interest rates are taken as a guide, and the economic forecast

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is wrong at that level of interest rates, ensuing movements of money will be pro-cyclical, intensifying recession or inflation as the case may be.

The potential benefits of monetary targeting assume that money demand is relatively stable in relation to GNP. But the experience of the past decade has shown that institutional changes can alter the relationship between money and income, requiring special adjustments in money targets or redefinitions of money. And more recent experience within the past three years has also shown that, even over subperiods when money seems well defined and institutional changes are not causing large shifts in the forms in which money is held, the interest elasticity of money demand may be sufficiently high or uncertain to undermine the appropriateness of a preannounced money target if interest rate changes generated by an unexpected shift in the demand for goods and services are also sufficiently large.

The above target increase in M1 of 1982-83 and of late 1984 to date may be viewed from one perspective as reflecting overestimation of the strength of demands for goods and services when the monetary targets were set. As such demands turned out to be much weaker than anticipated at interest rate levels prevailing when the monetary targets were initially formulated, larger growth in money was needed to help sustain the economy. If the weakness in demand for goods and services and the associated decline of interest rates could have been anticipated, it would have been appropriate, given the interest elasticity of money demand, to set much higher monetary targets--assuming that in the environment of the time the higher targets would not themselves have had adverse effects on inflationary expectations. Of course, one purpose in having a range for money growth targets is to allow for some variation in the relationship

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of money to income as conditions change, but when needed interest rate changes are quite large the usual range may well not be sufficiently wide.

Short-run variations of interest rates accompanying variations in the demands for goods and services are not likely to throw M1 off path over a long period when, say, an upward impact on the amount of money demanded of an interest rate decline has time to be reversed by later interest rate increases. Nor need M1 be thrown outside the target range on a sustained basis when interest rate changes are relatively small even if they are not reversed. However, if the economy is going through a period when interest rates, both nominal and real, may be phasing down, though lumpily, from historically high levels to lower levels more consistent with price stability and full employment, then intervals of sizable money growth can be expected as interest rates ratchet to a lower plateau and as prospects for price stability make holding cash more attractive. This would involve a "permanent" drop in the velocity of money. If monetary policy does not accommodate to such enlarged money demands, interest rates would remain higher than consistent with the economy achieving its growth potential. Once such enlarged cash demands are satisfied, growth in money can be resumed at the slower pace consistent with the underlying trend in velocity and the economy's growth potential.^{1/}

Most observers would now agree that the drop in velocity in 1982-1983 was "permanent." It occurred as rapid money growth of that period was not followed by a sharp increase in velocity and by as rapid

^{1/} Such issues with respect to money growth in the transition to price stability were discussed in a memorandum from S. Axilrod to Chairman Volcker, "Money Growth and Price Stability," dated January 23, 1984 and circulated to the Committee at the time.

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nominal GNP expansion as simple monetarist models would have predicted. To be sure, the subsequent increases in velocity in late 1983 and 1984 were above trend, but only moderately so--assuming, what is still quite uncertain, that trend, absent interest rate effects, is now about 1 to 2 percent. The overage likely was related to the rapidity of the cyclical expansion in economic activity, the upward drift in interest rates over much of the period, and an unwinding of that part of the earlier increase in money that reflected precautionary demands for cash.

The appropriateness of rapid money growth above target under present circumstances in part depends, then, on whether or not it represents a needed one-time adjustment to the higher demands of cash balance holders and savers as interest rates rate ratchet down, stage by stage, to levels more consistent with price stability and with sustaining real growth. That judgment could not be made simply by observing that the demand for money is explained by a a model relating money growth to income and interest rates. In an inflation or recession, the model might, for example, also indicate that a rapid or slow, respectively, actual growth of money was adequately explained by actual income and interest rates. However, such an over-all policy toward money supply would clearly be wrong; the policy in one case would be fostering inflation and in the other recession.

The practical judgment that needs to be made about the appropriateness of recent above target M1 growth involves, among other things, the question of whether it will be followed by excessive demand pressures and a sustained acceleration of price inflation, or a failure to make further progress toward deceleration. In that respect, it can be observed, however, that, despite the recent declines in nominal interest rates, the

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present level of real market rates remains historically quite high. This should work to restrain spending, particularly since it is very likely that real expected returns to investment by businesses may have declined as the current expansion matured and the initial stimulus from the favorable tax changes affecting businesses dissipated.

On the other hand, the recent expansion in M1 has been accompanied by a sizable expansion of old M1A, whose record in predicting GNP was more accurate than M1 in the 1982-83 period. This could possibly suggest some strength in present and prospective transactions--more so if the unusually rapid growth of demand deposits during the past few weeks does not prove transitory and is not reversed over the weeks ahead.

If the expansion of M1 were in fact followed by excessive demand and price pressures, then a need would arise for relatively low M1 growth to offset the impact of the recent surge. But if subsequent expansion in the economy were moderate, there would be little or no need to offset the recent rapid M1 growth. That growth could be viewed as accommodating another "permanent" downward movement in velocity. It would appropriately be followed by a trajectory for M1 more consistent with the trend growth of velocity as modified by variations in actual velocity related to the speed at which the Committee wishes to move toward reasonable price stability and the need to encourage real growth. The recent rapid money growth would then in effect be "forgiven," or at least mostly so.

The possible need to accommodate to a higher money demand as interest rates notch down to levels more consistent with price stability and sustaining real growth does not arise simply because the deposit

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composition of M1 has shifted toward accounts with a large savings component. Such an accommodation would have been needed even if M1 still comprised only currency and demand deposits, given past evidence about their interest sensitivity. But it may well be that the presence of NOW accounts has increased, at least for a while, the interest sensitivity of M1. This can occur because funds held for savings purposes may respond more readily and promptly to interest rate opportunities than funds held primarily for transactions purposes. Or it can occur because the explicit positive rate offered on NOW accounts means that more is to be gained by shifting to such accounts when market rates decline than by shifting to demand deposits which have a zero explicit rate (and perhaps for many holders a relatively low implicit rate, at least on the margin).

While NOW accounts may be affecting the interest elasticity of M1 in some degree and have probably in other respects worked to loosen and make less certain earlier relationships between M1 and key economic variables, the accounts themselves have not completely undermined the role of M1 as a policy guide. The behavior of M1 has been reasonably predictable after the initial transition period to nationwide NOW accounts. Nonetheless, these accounts add sufficient uncertainties about M1's behavioral properties to argue for continuing with the policy of judging the aggregate in the context of other economic and credit conditions. Among these uncertainties are the speed of bank adjustment in offering rates to changes in market rates, how this might be affected by the coming final deregulation of ceiling rates,¹ and the continuing influence

1. The ceiling rate on regular NOW accounts (and also savings accounts) will be lifted on March 31, 1986, while the \$1,000 minimum balance on super NOWs (and also MMDAs) will be removed on January 1, 1986.

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of savings and wealth motives on behavior of NOW account holders. Thus, an M1 range would need to be adequately wide for some time.

More basically, however--and even apart from the presence of NOW accounts--so long as nominal interest rates remain well above those consistent with reasonable price stability and full employment, and with a significant interest elasticity to M1 demand, the Committee would need to anticipate the possibility of further substantial bursts of M1 growth as nominal and real market rates phase down. The staff expects the long-run interest elasticity of M1 demand to diminish over time as ceiling-free NOW accounts become increasingly important, but even so there may be periods of varying length with large M1 growth if any declines of market rates are sufficiently large and sustained. That possibility should probably be kept in the public's consciousness so as to enhance understanding that the process of achieving reasonable price stability while sustaining real economic growth may not involve simple year-by-year reductions in the rate of growth in M1. However, it remains true that the underlying trend rate of money growth--that is, apart from one-time level adjustments--will need to decelerate if reasonable price stability is to be attained.