FEDERAL RESERVE BANK OF SAN FRANCISCO

SAN FRANCISCO, CALIFORNIA 94120

August 31, 1983

JOHN J. BALLES
PRESIDENT

MEMORANDUM TO MEMBERS OF FEDERAL OPEN MARKET COMMITTEE
AND OTHER RESERVE BANK PRESIDENTS

SUBJECT TARGETING M1 AND M2

Since the middle of last year, the FOMC has downgraded the role of M1 and upgraded M2 in conducting monetary policy. The primary reason was the unexpected decline in velocity of M1 in 1982 and early 1983. This development seemed to confirm concern about the possible distorting effects of deregulation on M1. Attached to this letter is a memorandum by my staff which sheds important light on this question, and I would like to share that information with you. In a nutshell, it appears that from both an empirical and a theoretical point of view, there is now considerably more reason to resume targeting M1 than there is to continue targeting M2.

I could summarize their conclusions as follows: The decline in M1 velocity was not in any meaningful sense due to the deregulation of interest rates or to the introduction of new deposit accounts, but rather to the unexpected and parallel decline in inflation and interest rates. This led to a large increase in the public's desire to hold M1 in real terms, starting in mid-1982 after 10 years of declining real M1 balances. (Technically, there was not an upward shift in the demand function for money, but a move along a given demand function, i.e., the amount of money demanded increased as inflation and interest rates declined, with the demand function for money remaining essentially stable.)

My staff estimates that the parallel decline in interest rates and inflation increased the demand to hold M1 by 5½ percent. If this was the major source of the decline in the velocity of M1, then it should stabilize in the second half of 1983 and beyond because the inflation rate has stabilized in the 4 to 5 percent range. In this context the demand for M1 will not increase substantially and velocity will not decline from here on out.

The Board of Governors staff (for example in its May 1983 attachment to the Bluebook) has argued that there was an increase in the interest elasticity in M1, which in concert with the 1982 interest rate decline, could explain the increase in M1 demand and the decrease in M1 velocity in 1982-83. Moreover, they suggest that this change in elasticity may have been due to the deregulation of interest rates on checkable deposits. The most important of these episodes was the introduction of NOW accounts in January 1981 and Super NOWs in January 1983. If the recent deregulation increased the interest

elasticity, then we can't be sure what its consequences are for the future movements in M1. The deregulation process is not over and according to this view it will take some time to assess the impact on M1 velocity.

My staff has evaluated this alternative interpretation by examining whether the interest elasticity of M1 demand has increased since the introduction of NOW accounts in 1981. Their results, summarized in the attached paper, suggest that the interest elasticity of M1 that was observed in the 1970s did not increase by adding data from 1981 to 1983. That is, the deregulation of M1 by the introduction of NOW accounts does not appear to have affected the interest elasticity of M1. This admittedly somewhat surprising result suggests that deregulation has had a limited impact on the interest elasticity of M1, while the financial innovation in the 1970s appears to have had a rather large effect. If this result is confirmed by further analysis, it means that we do not have to wait for an extended period of time to evaluate the impact of deregulation on the relationship between M1 and income. We can use the data we currently have. If M1 demand has, in fact, remained essentially stable, then it will be a reliable guide to monetary policy in the future.

With respect to M2, I was impressed by the results of my staff's analysis which suggested that in recent years it has become a less reliable guide to policy than it had been. It appears that deregulation has a more substantial distorting effect on M2 than M1. For example, before 1978, M2 moved closely in line with growth in income with about a six-month lead. Since 1978, M2 appears to be completely unrelated to the cyclical variations in nominal income. July 1978 was the start of M2 deregulation with the payment of market interest rates (tied to six-month Treasury bills) on a large and growing component of M2. The net result of this deregulation has been that M2 growth since 1978 has remained in a 8 to 9 percent range on a 12-month average basis. It is no longer a good leading indicator of the growth in income. My staff memo contains speculation on the sources of this development, which I find quite plausible. The key point, however, is that since 1978 M2 has grown in a narrow range of 8 to 9 percent no matter what was happening to interest rates or to the growth in income. It is neither a reliable guide to policy, nor a variable which the Federal Reserve can control very easily.

These considerations lead me to put M1 toward the top of the agenda of monetary aggregate guides to policy and to de-emphasize the role of M2.

Sincerely yours,

John

John J. Balles
President

Attachment

cc: Stephen Axilrod, Board of Governors
Directors of Research

FEDERAL RESERVE BANK OF SAN FRANCISCO

SAN FRANCISCO, CALIFORNIA 94120

Confidential (FR)
Class II, FOMC

September 1, 1983

MEMORANDUM TO: JOHN J. BALLES, President
Federal Reserve Bank of San Francisco

THROUGH: MICHAEL W. KERAN, S.V.P. and Director
Economic Research Department

FROM: JOHN P. JUDD, Research Officer
Economic Research Department

BRIAN MOTLEY, Senior Economist
Economic Research Department

SUBJECT: M1 VERSUS M2: WHICH IS MORE RELIABLE?

I. Introduction

Over most of the period since the Federal Reserve has taken monetary aggregates seriously, M1 has been regarded as the primary aggregate or at least has been given equal weight with M2 in formulating monetary policy. This situation changed in mid-1982, when the FOMC began placing "less than the usual weight" on M1, and giving more attention to the broader aggregates, especially M2. There appear to have been both empirical and theoretical reasons for this change in emphasis. The major empirical problem was that the velocity of M1 declined sharply in 1982 and early 1983, falling far below its 3 percent growth rate trend of the past 20 years. At the theoretical level, deposit rate deregulation has been envisioned as raising many potential problems for the reliability of the M1/GNP relationship (currently and in the future), and the controllability of M1 (primarily in the future).

The analysis and evidence in this paper suggests that the case for emphasizing M2 at the expense of M1 is far from conclusive. First, even

though substantial deregulation of transaction deposit rates has already occurred, the public's demand for M1 appears to have remained relatively stable since the mid-1970s. Second, upgrading M2 as a target relative to M1 should be done only if M2 is a more reliabile indicator than M1. In our view, this point has not been proven. Moreover, the point has seldom even been addressed. Even a convincing demonstration that the reliability of M1 has deteriorated in recent years would not prove that M1 is less reliable than M2. The latter point requires an analysis of the stability of M2 in addition to the frequently seen studies of M1.

In keeping with this methodological observation, we examine both aggregates in this paper. The results are not definitive, but do show that there are solid reasons to doubt that M2 is more reliable than M1. Moreover, the apparent source of M2's problems is the deregulation of deposit rates. As noted earlier, deregulation has been cited as a reason to de-emphasize M1. This paper argues that since deregulation appears to have distorted M2 more than M1, deregulation actually may have increased the reliability of M1 compared to M2. Hopefully, more analysis will be done in this area, especially to evaluate M2 and the other broader aggregates.

II. The stability of M1

The de-emphasis of M1 apparently arose from the FOMC's perception that the link between M1 and GNP had become less reliable. It was argued that the introduction of NOW and later of Super-NOW accounts was causing M1 to include an increasing proportion of "savings-type" balances. As a result, modest changes in interest rate "spreads" and in investor sentiment potentially could cause shifts of funds into and out of M1. If the Federal Reserve offset these

shifts by strictly controlling M1, policy automatically would become "tighter" or "easier" (as the case may be) than intended by the FOMC.

These potential sources of M1 instability appeared to be materializing with the marked shift in the trend of M1 velocity in 1982. This development led to the suggestion, mentioned in several FOMC Directives to the Trading Desk, that the demand to hold the narrow aggregate had shifted upward. The argument was that this shift occurred as the public responded to the uncertainty of the recession by putting precautionary balances into NOW accounts. This view of the rapid M1 growth (and the velocity decline) suggested that M1 demand is unstable and most likely will not be a reliable indicator in the years to come.

The FRBSF Staff has advanced an alternative view of what happened to velocity in 1982-83. It presented evidence from its M1 demand equation that the decline in velocity *did* not represent a shift in the demand for money function, but rather was the predictable result of the decline in nominal interest rates associated with the slowing of inflation since late 1981.[1/] The evidence for this conclusion is dynamic simulations of the M1-demand equation over 1982-83, as well as ex ante forecasts of M1 made over that period. Both exercises tracked M1 quite well, showing no evidence of a shift. These results are reproduced in Table 1 below.

1/ Michael W. Keran, "Velocity and Monetary Policy in 1982" Weekly Letter, Federal Reserve Bank of San Francisco, March 18, 1983; John P. Judd, "The Recent Decline in Velocity: Instability in Money Demand or Inflation?", Economic Review, Federal Reserve Bank of San Francisco, Spring 1983, pp. 12-19; John P. Judd and Rose McElhattan, "The Behavior of Money and the Economy in 1982-83", Economic Review, Federal Reserve Bank of San Francisco, Summer 1983 (forthcoming), and Brian Motley, "Money, Inflation and Interest Rates", Weekly Letter, August 5, 1983.

Table 1*

M1 Growth at Annual Rates**

	Actual	Dynamic Simulation	Ex Ante Forecast***
1982/Q1	7.3	5.5	6.5
1982/Q2	4.3	5.1	6.1
1982/Q3	8.6	11.9	7.1
1982/Q4	13.0	15.9	17.4
1983/Q1	16.1	10.5	12.5
Average for the period	10.3	10.2	9.9

*This table is taken from Judd, "The Recent Decline in Velocity," see Footnote 1.

**Calculated as the annualized percent change of the last month in a quarter over the last month in the previous quarter.

***Three-month ahead forecasts made in the middle of the first month of forecast period using the San Francisco money market model. See John P. Judd, "A Monthly Model of the Money and Bank Loan Markets," Working Papers in Applied Economic Theory and Econometrics, Number 8301. Federal Reserve Bank of San Francisco, May 1983.

The conclusion that the decline in the velocity of M1 was a predictable response to the sharp drops in inflation and nominal interest rates last year led to the following interpretation of events in 1982-1983. The decline in nominal interest rates caused the quantity of money demanded to rise, while the decline in inflation raised real interest rates and prevented an acceleration in nominal GNP. According to this explanation, the decline in velocity should prove to be only temporary. M1 will rise relative to GNP only so long as the public's demand for money is stimulated by declines in interest rates. Once rates stabilize at new lower levels, the effects on money growth should dissipate according to the lagged response of the demand for money to interest rates. The empirical results of the FRBSF staff suggest that these interest

rate changes should be having only minor effects on M1 growth in 1983/Q2 and beyond. This result implies that M1 velocity now should be behaving more normally, and that it would be risky to allow a continuation of the rapid M1 growth of the past year.

An attachment to the May 1983 Bluebook provided partial support for the FRBSF Staff view.[2/] The attachment presented simulation results from four M1 demand models -- three were Board Staff models, and one was an FRBSF Staff model. Three of these models showed that M1 growth in 1982-83 could be explained by the drop in interest rates, and that M1 demand was stable. The one model that showed instability was a Board Staff model that was estimated with data from the 1960s through the mid-1970s (1960/Q2-1974/Q2). It failed to predict the sharp increase in M1 growth in 1982 because it had a low estimated interest elasticity compared to the other equations, which were estimated from data that included the 1970s and early 1980s. One possible interpretation of the Bluebook attachment is that the 1982 decline in interest rates does explain subsequent M1 growth (and thus the decline in velocity), but only because the interest elasticity of M1 demand has increased in recent years owing, in large part, to the relaxation of regulations on transaction deposit interest.

It has been argued that a change in elasticity may have occurred because NOW accounts have become an increasing share of M1. First, it is possible

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2/ See "Review of Evidence Relating to Recent M1 Bahavior", May 20, 1983 (Confidential (FR), Class II, FOMC). A similar viewpoint was expressed in the Mid-Year Review: "The unusually large and sustained drop in M1 velocity may in the circumstances in large part reflect an enhanced demand for M1 that arose from the decline in inflation and the related sharp fall in market interest rates during the second half of 1982." Mid-Year Review, Appendix p. 18.

that NOWs include a sizable savings component, which may be more responsive than true transaction balances to interest rates. Second, since NOWs pay explicit interest but demand deposits do not, a given change in market interest rates causes a larger proportionate change in the opportunity cost of holding NOWs than of demand deposits.[3/] As a consequence, changes in market rates may cause larger changes in NOWs than in demand deposits. Thus the responsiveness of M1 as a whole to interest rate changes may become larger as NOWs become a larger share of M1.[4/]

This view acknowledges that the rapid growth in M1 can be explained by declines in interest rates, but argues that this is only because the interest-responsiveness of M1 has increased with deregulation. This leads to the argument that M1 is an unreliable guide for policy in the future because deregulation is not complete and the interest elasticity may change again. To test the hypothesis that the interest elasticity of money demand has increased in recent years in response to deregulation, we estimated an equation describing the public's demand for the deposit component of M1 (similar to the one in the San Francisco Money Market Model) over five sample

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3/ This point has been made by Chairman Volcker in discussing recent rapid money growth: "While a number of more temporary factors may have contributed, a significant part of the reason appears to be related to the fact that a major portion of the narrow 'money supply' now pays interest, and the 'spread' between the return available to individuals from holding M1 'money' and market rates has narrowed substantially, more than the decline in market rates itself implies". Ibid. p. 13.

4/ Another explanation for a higher interest elasticity given in the May Bluebook Attachment is that under compensating balance arrangements that have become common since the mid 1970s, the balance requirements of some corporations move inversely with market interest rates.

periods.[5/]

1. 1971-76
2. 1976-80
3. 1976-81 (Nationwide NOWs introduced)
4. 1976-82
5. 1976-mid-1983 (Super-NOWs and MMDAs introduced)

The first sample provides a benchmark estimate of the interest elasticity prior to the financial deregulation that has occurred since the mid-1970s. Sample 2 ends just prior to the introduction of nationwide NOW accounts. Samples 3, 4, and 5 add small increments of time to the sample to see if the elasticity changed as NOW accounts became a larger fraction of M1. The samples are divided at mid-1976 because mid-1974 through mid-1976 were watershed years for the demand for M1, in that financial innovation induced a major downward shift in M1-demand in those years. Given that this shift is now widely acknowledged, it is important to know whether M1 demand has been "well-behaved" since mid-1976.

Two commonly employed specifications of the interest elasticity were tested. Table 2 uses an equation where the interest elasticity is estimated as a constant over the sample period. Table 3 uses a specification where the interest elasticity varies with the level of interest rates. (See the Appendix for details).

5/ The only difference between the specification used here and the one used previously in the model is that the previous equation uses Almon lags, whereas in this paper a lagged dependent variable was used. The lagged dependent variable specification has a markedly lower standard error, and is better suited to a comparison across different sample periods because it allows the lag length to be estimated freely. The SF money market model is described in John P. Judd, "A Model of the Money and Bank Loan Markets", Working Papers in Applied Economic Theory and Econometrics, Number 83-01, Federal Reserve Bank of San Francisco, May 1983.

Table 2

Demand for Deposit Component of M1

(Constant Interest Elasticity Specification)

Estimation Sample Period	Long-Run Interest Elasticity	Mean Lag	Standard Error of Regression
1. 1971.01-1976.07	-0.23	13.5 months	0.0035
2. 1976.08-1980.12	-0.20	5.7 months	0.0052
Nationwide NOWs introduced			
3. 1976.08-1981.12*	-0.22	5.8 months	.0050
4. 1976.08-1982.12	-0.21	5.8 months	.0051
Super-NOWs introduced			
5. 1976.08-1983.06	-0.23	6.1 months	.0055

*Equations estimated after 1980.12 include an intercept shift term during 1981.1-1981.12 to capture possible shifts in funds following the introduction of nationwide NOWs. This term was included to disentangle possible intercept shifts from possible changes in interest elasticity. However, even when the equation excludes the intercept shift term, the estimated interest elasticity over 1976.08-1981.12 is -0.21, nearly identical to the above estimates. Without the intercept shift, the mean lag is 6.9 months and the standard error of the regression is 0.0054. Qualitatively similar results were obtained for the equations in Table 3.

Table 3

Demand for Deposit Component of M1

(Varying Elasticity Specification)

	Estimation Sample Period	Long-Run Interest Elasticity			Mean Lag	Standard Error of Regression
		CPRT = 5%	CPRT = 10%	CPRT = 15%		
1.	1971.01-1976.07	-0.12	-0.24	-0.36	8.9 months	0.0036
2.	1976.08-1980.12	-0.08	-0.16	-0.24	5.3 months	0.0050
Nationwide NOWs introduced						
3.	1976.08-1981.12	-0.08	-0.16	-0.24	4.9 months	.0048
4.	1976.08-1982.12	-0.08	-0.17	-0.26	4.9 months	.0048
Super-NOWs introduced						
5.	1976.08-1983.06	-0.10	-0.21	-0.32	5.7 months	.0054

NOTE: CPRT = 6-month commercial paper rate.

The results of these experiments are strikingly uniform. The estimated long-run interest elasticity is quite similar for all of the sample periods considered under both specifications. Samples 3, 4, and 5, which include NOWs, yield very similar interest elasticities to samples 1 and 2, which do not include NOWs. Thus these results suggest that NOWs (and financial deregulation in general) have not had a significant effect on the long-run interest elasticity of demand for the deposit component of M1.

Tables 2 and 3 do reveal a change in the speed with which the public's demand for transaction balances responds to changes in interest rates, even though there was no substantial change in the size of the total response. In the pre-1976 period (sample 1), the mean lag (the number of months it takes for one-half of the total response to occur) was significantly longer than in the post-1976 period. However, this change in mean lags seems to have had nothing to do with NOW Accounts. There is no significant difference in the estimated mean lag between the 1976-80 (pre-NOW Account) sample 2 and the subsequent (post-NOW Account) samples.

One likely reason that NOWs have not affected the interest elasticity of M1 is that deposit holders have received implicit interest on checking account balances for many years.[6/] Thus deregulation of deposit rates may not have drastically changed the general level of compensation (implicit plus explicit) received by the public on the deposits in M1. In any event, the evidence presented supports the view that potential changes in the interest elasticity of M1 demand associated with the introduction of NOWs have not materialized.

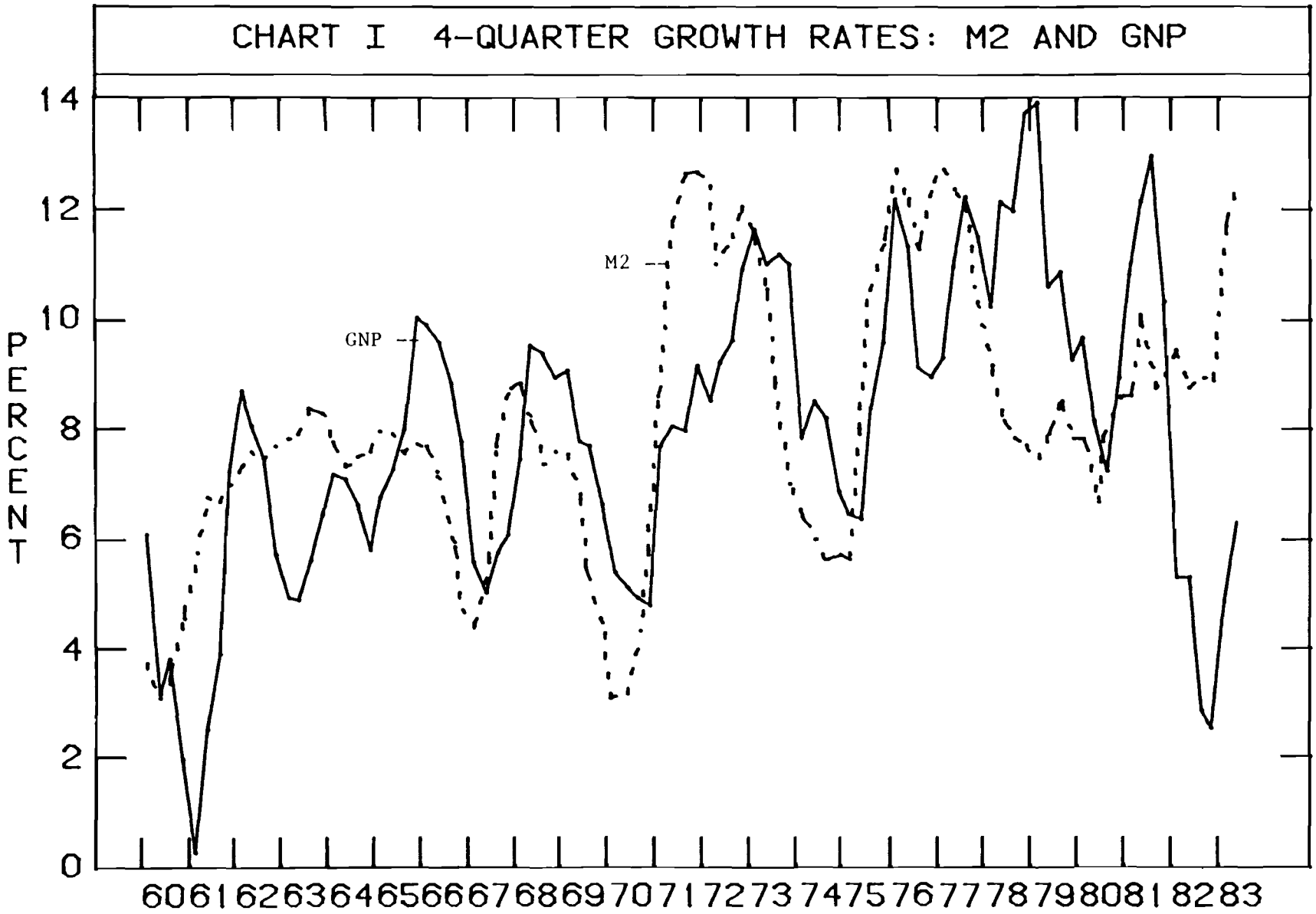
6/ Evidence on this subject is summarized in John P. Judd and John L. Scadding, "Financial Change and Monetary Targeting in the United States", in Interest Rate Deregulation and Monetary Policy, Federal Reserve Bank of San Francisco, November 1982, pp. 78-106.

III. How Reliable is M2?

The preceding section argues that there is reason to doubt that the introduction of NOW accounts has made M1 unreliable as a guide to policy. In this section, we examine the reliability of M2. A primary conclusion of this examination is that M2 appears to have deteriorated substantially as both a target and an indicator of monetary policy since the middle of 1978. The primary reason appears to be that interest rates on the non-M1 component of M2 (M2-M1) have been substantially deregulated.

This deterioration is illustrated in Chart I which shows moving four-quarter growth rates of M2 and nominal GNP over the 1960-83 period. This chart suggests that M2 became a less useful indicator of policy at about the same time as money market certificates were introduced in mid-1978. Since that time, its growth rate has remained within much narrower limits than formerly, despite equally wide variations in nominal income. Moreover, most of the variations in M2-growth which appear in this chart are associated neither with policy nor with macroeconomic developments but with "institutional" changes: the credit control period in the Spring of 1980, the introduction of NOW accounts in 1981 and that of MMDA's in December 1982. Thus, apart from institutional changes, M2 grows steadily at 8-9 percent per year, almost regardless of what is happening in the economy. To the extent that some relationship with income remains, it appears to be largely a coincident rather than a leading one. This suggests that M2 now merely responds to the real economy rather than influencing it.

The timing of this change in the usefulness of M2 (mid-1978) strongly suggests that it is closely related to the deregulation of interest rates which began at that time. Until 1978 the great bulk of M2 yielded a fixed rate of return; more than sixty percent of M2 consisted of passbook savings



accounts plus M1 at the beginning of 1978. It responded in much the same way as M1 to the Federal Reserve's monetary control instruments and had a broadly similar influence on nominal aggregate demand. By June 1983, roughly three-fifths of M2 yielded close to a market rate of interest. Virtually all of the non-M1 component of M2 today yields rates of return which are either fully market-determined (e.g. MMMDAs) or have ceilings which are linked to rates on other market instruments (e.g., money market certificates).[7/] This change in the composition of M2 is illustrated in Chart II.

The result is that increases and decreases in (M2 - M1) tend to represent the endogenous response of wealth-owners and of financial intermediaries to investment motives rather than to provide a useful indicator of the setting of policy.[8/] For example, when (M2 - M1) declines, this provides information about the channels through which society's savings are flowing to investors. It tells us that less savings are moving through the financial intermediaries which issue M2 assets. But this information may be only marginally useful as an indicator of the thrust of monetary policy. It does not tell us that

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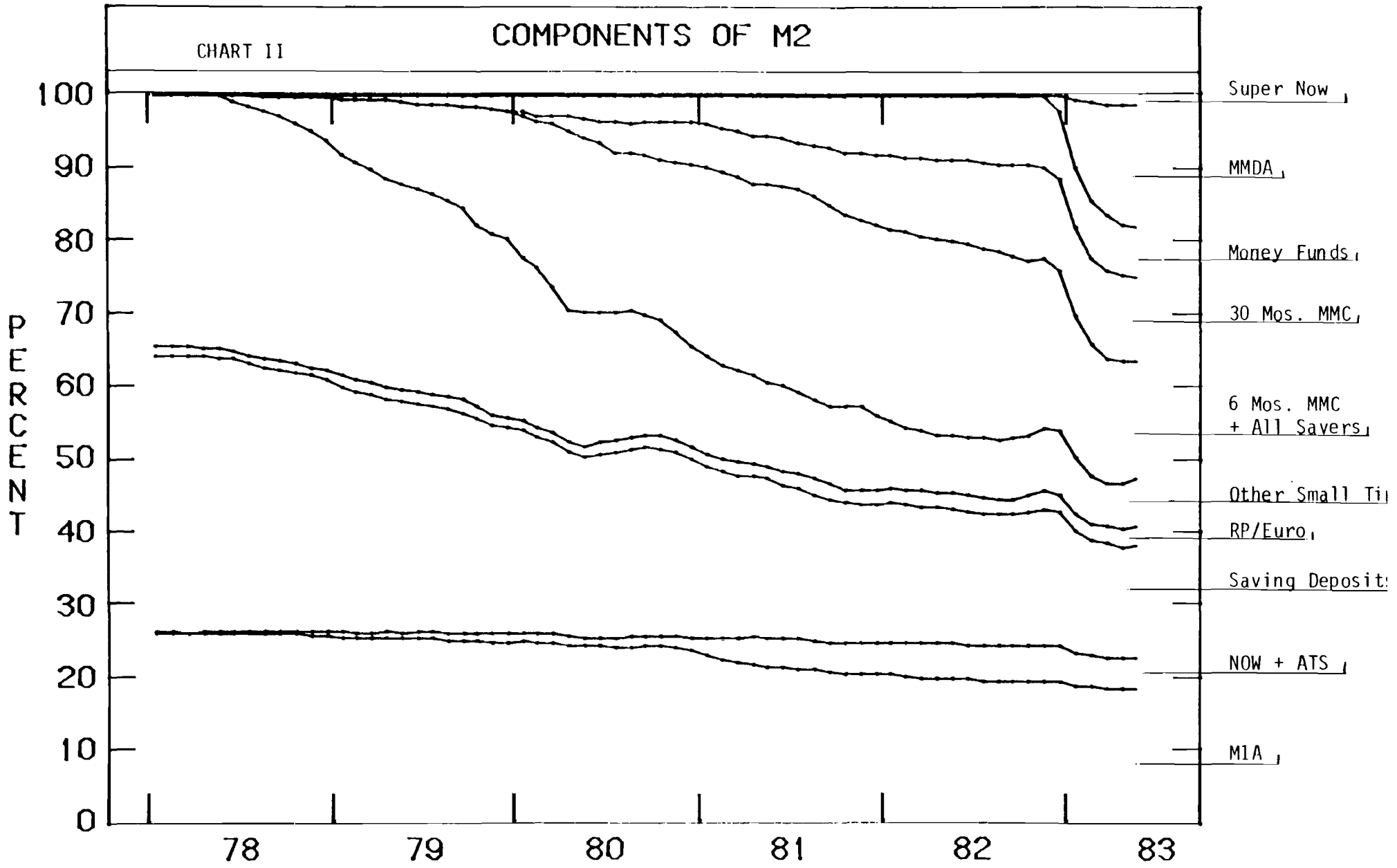
7/ The only significant remaining component of the non-M1 portion of M2 which bears a fixed return is passbook saving accounts. These accounts now represent only about one-fifth of the non-M1 portion of M2.

8/ In this sense M2 is analogous to the government deficit. The size of the deficit reflects not only the expenditure and tax decision of the fiscal authorities but also the level of nominal GNP, because the latter affects the deficit which a given fiscal policy will generate. It is for this reason that the high-employment deficit rather than the actual deficit is used as an indicator of the setting of fiscal policy. For analogous reasons, M2 is a poor indicator of the setting of monetary policy.



This Chart shows the cumulative proportion of M2 which consists of components shown at the right.

policy has become significantly more restrictive, since the liquidity and interest rate implications of such a change are small and ambiguous.

Suppose, for example, that the FOMC moves to a more restrictive policy by reducing the supply of non-borrowed reserves. This will slow the growth of M1 and raise short-term market interest rates; i.e., policy tightens and M1 shows it.[9/] Initially, this policy widens the differential between market interest rates and the average return on the assets which comprise the non-M1 component of M2, and so reduces the attractiveness of the latter to investors.[10/] Hence the growth rate of M2-M1 does slow. However, the effect of higher market interest rates on M2-M1 is much smaller than that on the demand for M1, largely because the own rates of return on most of the assets in M2-M1 also move up when market rates rise, so that the differential does not widen by much. The net result is that the impact of a tighter policy on the path of M2 is very small and can easily be 'swamped' by other factors such as changes in investor sentiment.

This is illustrated in Chart III which shows the effect in the San Francisco model of an increase in the commercial paper rate from 10 percent to

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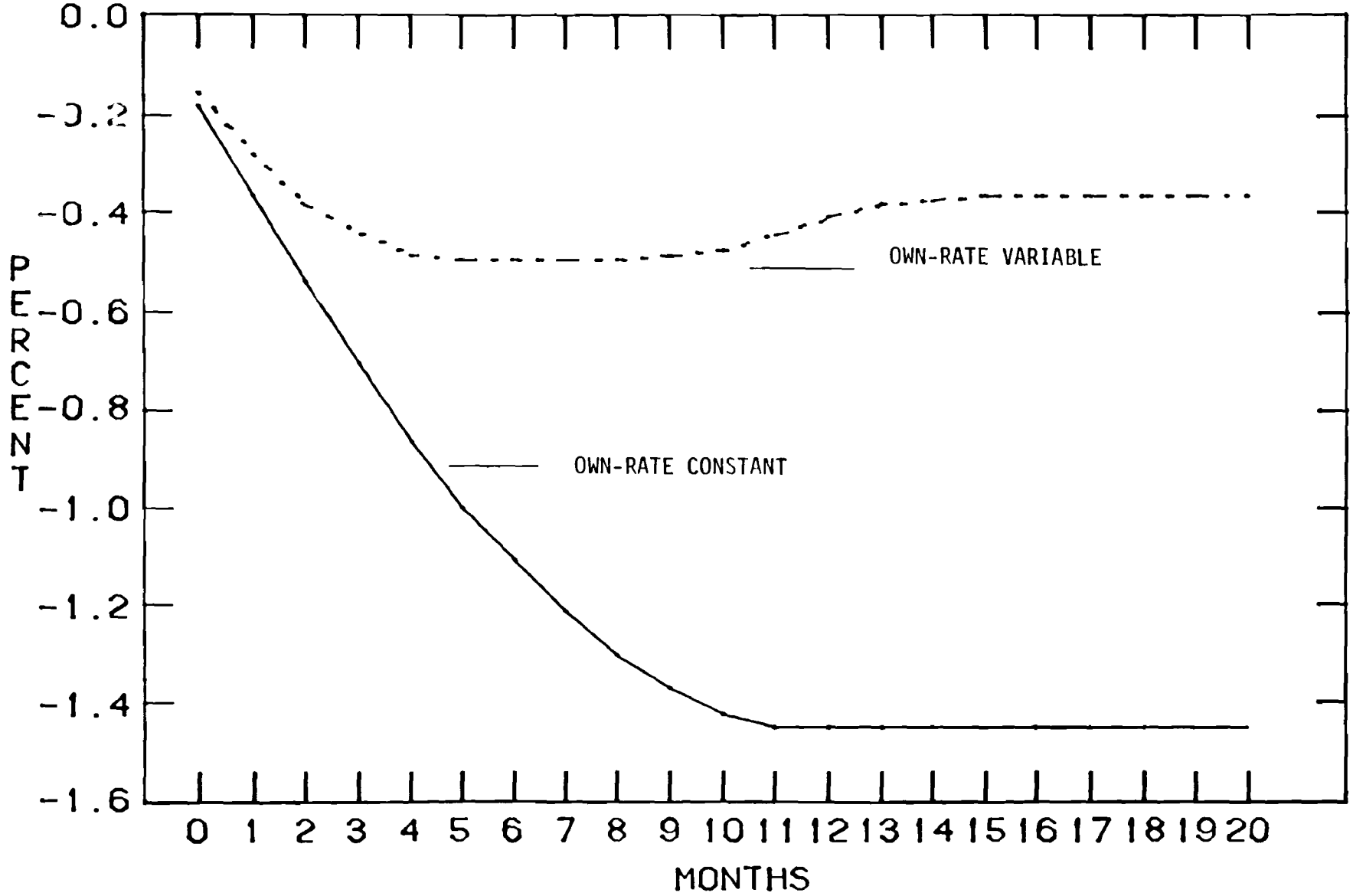
9/ Notice that because M1 is the medium of exchange, an open-market sale of securities by the Trading Desk to a non-bank automatically reduces this aggregate. Similarly, when banks -- in response to a rise in the cost of reserves -- either sell securities or managed liabilities or reduce bank loans, the level of M1 declines. This automatic response of M1 occurs because transactions between the public and either the central bank or the commercial banks are conducted in terms of the medium of exchange. This is not the case for the non-M1 components of M2.

10/ In the San Francisco money market model this differential is measured by the difference between the 6-month commercial paper rate and the so-called Fitzgerald rate which represents the own-rate on the non-M1 component of M2. In the BOG Model the 6-month CD rate is used in place of the commercial paper rate.

CHART III TIME-PATH OF THE EFFECT ON THE LEVEL OF M2-M1 OF A RISE IN THE COMMERCIAL PAPER RATE FROM 10% TO 11%.



11 percent on the non-M1 portion of M2.[11/] The solid line shows what this effect would be if the own-rate on M2-M1 were to remain constant. That aggregate would decline by slightly more than 1.4 percent. The dashed line shows the effect after allowing for the influence on the commercial paper rate on the own rate. In this case (M2-M1) would decline by less than 0.4 percent.

One way to explain why this tends to make M2 an unreliable intermediate target is that the path of M2 responds to the differential between market rates and the own-rate on M2 assets, whereas the aggregate demand for goods and services depends on the absolute level of market rates. Since the own-rate is largely deregulated, it follows market rates closely. As a result, the M2 growth rate need not be closely related to the level of market interest rates and hence is no longer a leading indicator of nominal aggregate demand. This also explains why M2 is difficult to control in the short run, since the Federal Reserve does not have a "handle" on the differential as it did in the days when Regulation Q was binding.

This idea also may be explained in terms of the effect of policy on the flows of funds through financial intermediaries. The change in the regulatory environment means that when market rates rise, the M2-issuing intermediaries are able to raise their deposit rates and continue to capture their share of the total intermediation business. As a result, changes in the growth rate of M2 are also less useful as indicators of shifts in the flows of funds. This contrasts dramatically with the situation when Regulation Q was binding. In those days a rise in market rates caused a major shift of funds out of thrift

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11/ This chart is derived from Equations A3 and D3 of Judd, "A Monthly Model of the Money and Bank Loan Markets", Op. Cit.

institutions which showed up in the larger elasticity of demand for M2. Hence M2 was both a controllable aggregate and a useful leading indicator of the real economy. Indeed, because such shifts caused a drying up of funds to the housing industry, they had an even more dramatic impact on aggregate demand. Today, M2 has lost most of these attributes.

The results of this change in the nature of M2 have already been illustrated in Chart I. Prior to mid-1978, the cycles in M2 preceded those in nominal income in a relatively regular pattern. Since 1978, M2 has grown in a much narrower range than previously--in fact its growth rate has been almost constant--despite the wide gyrations of nominal income. It is difficult to see the usefulness for monetary policy purposes of an aggregate which has grown at virtually a constant rate for five years despite wide swings in interest rates, real GNP and inflation.

APPENDIX

Demand for the Deposit Component of M1
1976.08-1982.12

1. Constant Interest Elasticity Specification.

$$\ln TRD_t = \underset{(-1.44)}{-0.45} + \underset{(3.57)}{0.53\, CHBL_t} + \underset{(4.77)}{0.18 \ln Y_t} + \ln P_t - \underset{(6.28)}{0.031 \ln CPRT_t} + \underset{(24.1)}{0.85 \ln TRD_{t-1}} + \underset{(1.73)}{0.0036 T_t} - \underset{(-2.10)}{0.00098 T_t^2} + \underset{(2.03)}{0.000052 T_t^3}$$

$\bar{R}^2 = 0.998$
SER = 0.0051
DW = 1.99
RHO(1) = 0.12 (1.04)
RHO(2) = -0.19 (1.58)

2. Varying Interest Elasticity Specification

$$\ln TRD_t = \underset{(0\ 060)}{0.015} + \underset{(3.97)}{0.55\, CHBL_t} + \underset{(4.75)}{0.12 \ln Y_t} + \ln P_t - \underset{(7.34)}{0.0029\, CPRT_t} + \underset{(25.13)}{0.83 \ln TRD_{t-1}} + \underset{(2.21)}{0.0042 T_t} - \underset{(2.21)}{0.00094 T_t^2} + \underset{(1.94)}{0.0000426 T_t^3}$$

$\bar{R}^2 = 0.998$
SER = 0.0048
DW = 1.97
RHO(1) = 0.092 (0.78)
RHO(2) = -0.22 (1.88)

Definitions of Variables:

CHBL = change in the log of total loans at commercial banks, including loan sales to affiliates, and adjusted for the introduction of international banking facilities.

CPRT = six-month commercial paper rate. Instrumental variables used for CPRT. (Current and lagged P and Y, lagged values for the other explanatory variables, lagged currency and M2-M1).

P = personal consumption expenditures deflator.

T = 1, 2, 3,..., 12 in January-December 1981, zero prior to 1981.01 and 12 after 1981.12. Included to capture possible change in the constant term associated with introduction of nationwide NOW accounts.

TRD = M1 minus currency in the hands of the public.

Y = real personal income.

NOTE: Specification of equations used for other sample periods reported in the text is the same as those shown in this Appendix, except that an intercept shift variable was used in 1974.07-1976.06 in the 1971-76 sample period.