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To Federal Open Market Committee

Subject Issues Related to Monetary Aggregate Targeting

From Messrs. Kohn, Madigan, and Small

This memorandum provides background for discussion at the December 15-16 FOMC meeting of several issues pertaining to monetary aggregates targets in preparation for the choice of long-run ranges in February (agenda item 6) It draws on a recent staff paper on M1-A and the other aggregates that was recently forwarded to the Committee. One issue is whether a target for a narrow monetary measure, such as M1 or M1-A, should be reestablished. Another is the emphasis to be given in policy implementation to any or all of the monetary aggregates relative to other variables indicating the thrust of monetary policy and the economic and financial situation. Related to this issue is the desirable width of the target ranges for the respective aggregates

The first section discusses general properties of M1-A, M1, and M2, including income and interest rate elasticities, the results of simulations using each of the aggregates as targets, and velocity behavior The second section considers the implications of these characteristics for monetary targeting An appendix to the memorandum discusses the behavior of the monetary and debt aggregates in 1987

General Properties of the Monetary Aggregates as Targets

This section examines empirical evidence on the characteristics of the various aggregates that are relevant for monetary targeting. This evidence is drawn from examination of standard velocity measures and from the historical relationships among money, interest rates, and

income embodied in the econometric money demand models used by the staff. The income and interest rate elasticities implied by these models are presented along with simulations that also take some account of the historical unpredictability of money demand; these results are interpreted in light of the behavior of the aggregates and their demand functions in recent years.

The Board staff's models of demand for the narrow money measures consist of separate equations for currency, demand deposits, and other checkable deposits. For M2, the staff has relied on an equation that treats this aggregate as a whole, rather than using a building-block approach.[1] All of these equations specify that the demand for each aggregate or component is a function of a scale variable--spending, income, or wealth--and that aggregate's or component's opportunity cost.[2] The staff also has estimated equations that attempt to explain and predict opportunity costs by relating deposit offering rates of interest to market interest rates.

Table 1 shows the estimated elasticities of the aggregates with respect to changes in market interest rates and with respect to income.[3] The elasticities depend on the time horizon, because

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1 An alternative M2 model, included in the MPS model, builds on the currency, demand deposit, and OCD equations, but the aggregate approach used in this memo has been substantially more accurate in recent years. The models are discussed in detail in appendix B of the staff paper recently distributed to the FOMC.

2. The scale variable used in the equations for the components of M1 is personal consumption expenditures. In the aggregate M2 equation, both GNP and wealth are used as scale variables.

3. For purposes of constructing this table, consumption, which is used as a scale variable in the M1 equations, has been assumed to grow at the same rate as GNP, which is used as a scale variable in the M2 equation.

Table 1

Estimated Properties of M1-A, M1, and M2[1]

INTEREST ELASTICITIES[2]

Time Horizon	M1-A	M1	M2
One quarter	-.03	- 12	- 06
Four quarters	-.07	- 25	-.13
Long run	- 09	-.11	- 07

1. For M1-A and M1, based on Board quarterly model; for M2 based on single-equation quarterly aggregate model
2 With respect to the federal funds rate Incorporates estimated responses of Treasury bill rates and deposit rates

INCOME ELASTICITIES

Time Horizon	M1-A	M1	M2[4]
One quarter	.64	.76	.32
Four quarters	1.02	1.02	.96
Long run[5]	.99	.99	1.00

4 Incorporates estimated response of wealth to changes in income, both of which are used as scale variables in the M2 equation
5 Long-run income elasticities for all components and aggregates, except that for currency, are constrained to equal unity in the long-run

TREND VELOCITY GROWTH
(percent)

M1-A	M1	M2
1.6	1 0	.2

depositors seem to react with a lag to changes in opportunity costs and income and because the response of opportunity costs to changes in market rates also varies with time The table also shows estimates of trend velocity implied by the models

The model estimates must be viewed as at best rough approximations Changes in financial markets and technology have affected the behavior of both depositors and depository institutions in recent years, and it is likely that adaptation to these changes is continuing Model estimates also have been evolving over time, probably lagging the actual changes in financial behavior, and current versions certainly are not the final word on money demand after deregulation Even so, elasticities and other characteristics derived from model estimates provide some guidance as to relative orders of magnitude of these relationships for the various aggregates

M1-A. The interest elasticity of M1-A is estimated to be very low over one quarter but increases substantially as the time horizon is extended Still, its elasticity is considerably less than that of M1 owing to the exclusion of NOW accounts from M1-A. NOW account balances are highly interest-sensitive over the short to intermediate run owing to the sluggish adjustment of own rates on these accounts and to the marked responsiveness of the public to changes in NOW account opportunity costs NOWs retain some of their heightened sensitivity to interest rates over longer periods because their rates are presumed to adjust only partially to changes in market interest rates, reflecting in part the effects of reserve requirements In the models, M1-A also is

less interest sensitive than M2 through the intermediate run, given lagging own rate adjustments on some M2 components. The middle panel of the table shows that M1-A is estimated to respond fairly promptly to income, with full adjustment occurring within a few quarters

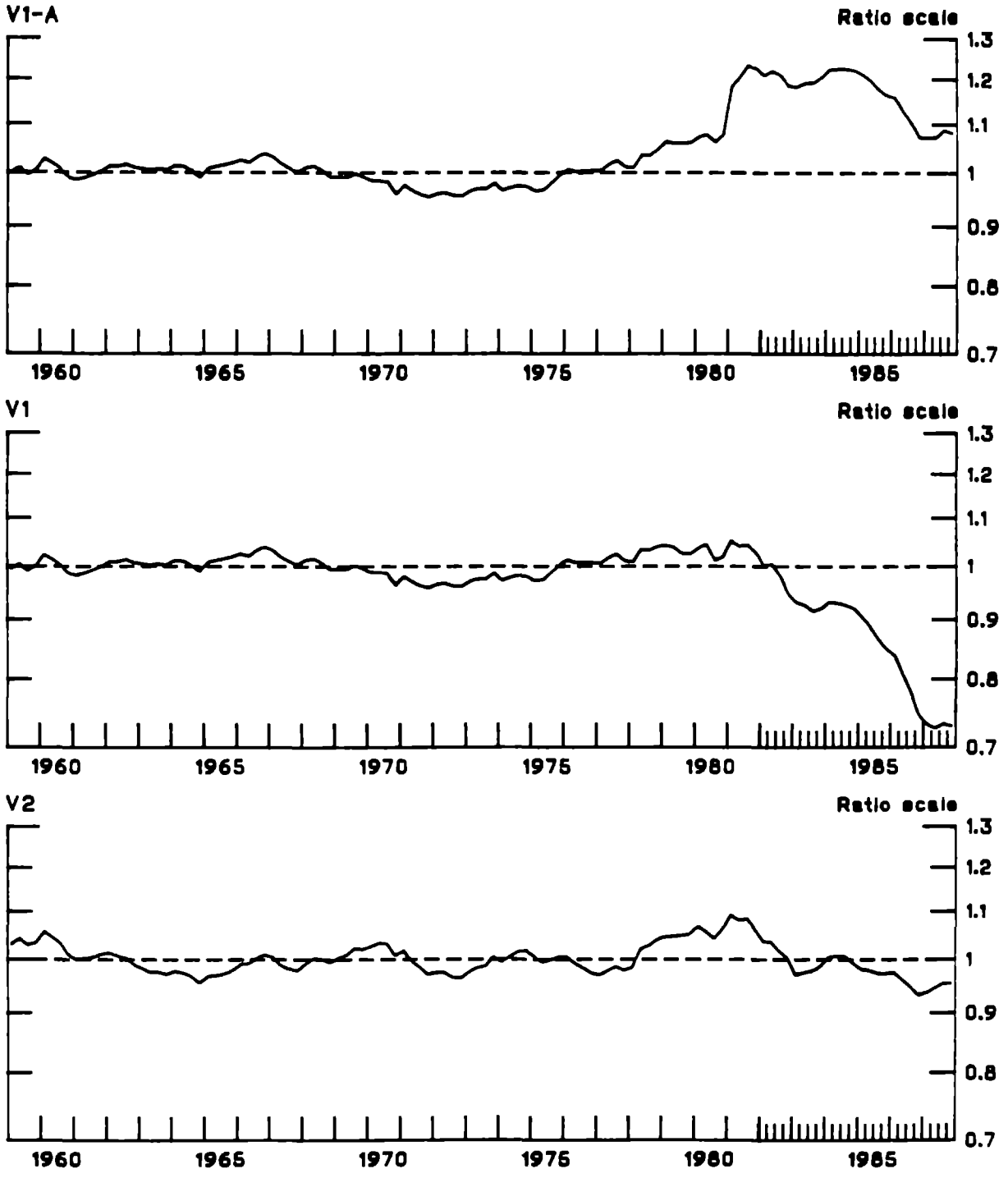
Taken at face value, these model elasticity results would suggest that M1-A is superior to M1 and M2 as an objective of monetary policy. Its relatively high income elasticity and low interest elasticity would tend to keep this aggregate relatively well connected to nominal income, stabilizing its velocity However, focusing solely on elasticities ignores differences in the stability or predictability of the estimated equations More comprehensive experiments involving simulations of the staff quarterly model under alternative monetary targets, and taking the degree of money demand stability into account, suggest only a marginal superiority for M1-A as judged by deviations of GNP and prices from objectives.

These results are based on empirical relationships estimated over long historical periods But experience during the 1980s tends to cast considerable doubt on any conclusion of the superiority of M1-A. The upper panel of chart 1 shows the income velocity of M1-A normalized around its 1959-1979 trend After fluctuating around trend during the most of the 1960s and 1970s, a sharp increase in the level of V1-A occurred in 1981, as the wider availability of NOW accounts caused a large volume of funds to shift out of demand deposits More important, though, is the large drop in V1-A in 1985 and 1986 This drop of about 13 percent of the normalized measure in two years clearly undermines any

Chart 1

Normalized Velocities

Normalized Around 1959-79 Trend



view that the trend of V1-A is essentially stable. The decline occurred during a period when nominal interest rates were dropping. Conversely, over 1987--a period when interest rates were rising--the velocity of M1-A has reversed course. Table 2 shows that the staff model of the demand for demand deposits, which is intended to capture interest rate effects, has forecasting errors that are inversely correlated with interest rates over the last several years Several staff investigations have failed to uncover any specific factors responsible for these errors other than those associated with interest rate movements

These observations suggest that the interest elasticity of M1-A may be larger than is captured by the models, perhaps because it has increased during the 1980s The changing composition of M1-A--from household accounts toward business accounts--may explain some heightened interest elasticity if businesses are more interest-sensitive in their cash management behavior than are households. Also, the effects on demand deposits of prepayments of mortgage-backed securities, which have become quantitatively significant only in the 1980s, may have increased the interest elasticity of M1-A.

M1 The interest elasticity of M1 is strongly influenced by that of its other checkable deposits component, which makes up one-third of M1 Because NOW account yields are relatively close to market rates and because depository institutions tend to be quite sluggish in adjusting their rates paid on NOWs, even small changes in market rates of interest may have large percentage effects on their opportunity costs Moreover, it appears that depositors are very sensitive to small

Table 2
Demand Deposit Forecast Errors[1]
(percent growth errors: actual minus predicted)

	Actual (1)	Predicted (2)	Interest Rate Contribution (3)	Errors (4)	T-Bill Rate[2] (5)
1984	1 6	2 1	- 4	- 5	8 83
1985	8 9	8 8	2 5	2	7 16
1986	11.6	6 3	2 4	5 4	5.35
1987	-1 0	4 2	.6	-5 2	5 75

1. Based on a dynamic simulation of the Board Quarterly Model.
2. Fourth-quarter levels on discount basis

changes in opportunity costs, perhaps reflecting a willingness to shift savings funds between NOW accounts and small time deposits or other nontransactions deposits

Table 1 shows estimated interest elasticities for M1 demand [4] The elasticities are considerably larger than the estimated elasticities for M1-A--three to four times larger over the course of a year The estimated income elasticities for M1 demand shown in Table 1 are generally in line with those of M1-A, indicating a full response of money demand to income within a few quarters. Thus, on the surface the higher interest elasticity would suggest that M1 might not be as good an intermediate target for monetary policy as M1-A However, simulations of the full quarterly model, which includes spending and labor market sectors in addition to the monetary sector, do not show as much of a difference between the two aggregates as might be suggested by the elasticity analysis This result occurs because the simulation takes account of the forecasting record of the demand functions, and the size of the errors for the M1-A equations are about 50 percent larger than the errors for M1.

The effects of the large interest elasticity of M1 demand on its velocity are obvious in chart 1 From the end of 1983 to the third

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4 The experience of the last few years suggests that adjustments in own rates on NOW accounts are asymmetric, with depository institutions increasing rates relatively slowly and lowering them relatively quickly The figures shown in table 1 represent averages of elasticities for downward and upward interest rate changes, estimated using both econometric and judgmental techniques. The downward adjustments are estimated econometrically. But owing to limited experience under deregulation with rising interest rates, the elasticities for increasing interest rates incorporate judgmental estimates of the response of NOW account rates to market rates

quarter of 1987, the normalized velocity of M1 dropped about 20 percent Staff models attribute about three-fourths of this drop to lower opportunity costs

M2 As shown in chart 1, M2's velocity has maintained a relatively stable long-run relationship to its trend compared with the other aggregates, although in absolute terms the short-run deviations have been somewhat large--as much as 10 percent in level terms M2 demand and velocity evidently also have been affected by movements in interest rates, as suggested by the decline in velocity from its 1981 peak to its low reached late in 1986 and its subsequent rise But the effects of market rates appear to have been smaller for M2 than for the other aggregates, mainly because the own rates on some of the nontransactions components of M2 adjust fairly quickly to changes in market rates, tending to stabilize M2's opportunity cost.

As shown in table 1, the interest rate elasticity of M2 over four quarters is estimated to be about twice that of M1-A but is markedly lower than that of M1. Income elasticities suggest that the short-run connection of M2 to income is weaker than for M1-A and M1, with its income elasticity after one quarter being only about one-half those of the narrower aggregates As captured in the staff econometric models, M2 demand is related to a measure of wealth as well as to GNP, tending to hold down income elasticities in the short run The relationship to wealth is consistent with the observation that three-quarters of M2 is made up of instruments that serve primarily as stores of value rather than as media of exchange

The full quarterly model simulations tend to temper the apparent superiority of M1-A over M2. Because the percentage errors of the demand function for M1-A are nearly three times as large as are those for M2, the simulations suggest that the average divergences of real GNP and prices from expected paths would be only a little smaller using M1-A rather than M2 as a monetary target

Implications for Selection of Monetary Targets

The econometric results presented above seem to indicate that if a narrow aggregate were to be targeted, M1-A would be preferred to M1 owing to M1-A's lower interest elasticity. However, the very large errors made by the model in predicting demand deposit growth over the last few years would make the use of an M1-A target more risky than suggested by the elasticities and model simulations presented above Especially in light of these errors, it is far from clear that supplementing the current M2 and M3 targets with a range for M1-A would aid in the implementation or interpretation of monetary policy over the coming year

For all of the aggregates, there appears to be considerable uncertainty about the relationship of prospective money growth to the ultimate objectives of policy One important source of uncertainty is the looseness in the relationship between variations in money, and those in income and interest rates, even given knowledge of the actual values of these variables Such slippages are evidenced by the fairly sizable errors in the money demand equations, over the last four years, the

M1-A, M1, and M2 equations used in this memorandum have four-quarter-ahead root mean squared errors of 1 8, 1 3 and 1 2 percent, respectively

The strength of spending and its relationship to interest rates in any projection constitute another major source of uncertainty about what money growth targets are consistent with a desired outcome for the economy Unanticipated movements in interest rates needed to keep the economy on track in the face of shocks to spending may have major implications for velocity behavior and appropriate money growth, given the relatively high interest elasticities of the aggregates For example, the model elasticities imply that a one percentage point increase or decrease in open market interest rates would affect M1-A, M1, and M2 growth over four quarters by 1, 3-1/2, and 2 percentage points, respectively

These uncertainties give rise to significant potential slippages in the money-income relationship, which are reflected in the large errors made by reduced-form predictions of GNP as reported in the previous paper sent to the Committee. Such errors would imply the need for fairly wide ranges for the aggregates to encompass possible money outcomes consistent with progress toward underlying objectives for economic activity and prices

The evidence and analysis reviewed in this note and the staff paper would seem to support a policy strategy of continuing to interpret movements in the aggregates in light of collateral evidence on the thrust of monetary policy and its effects on the economy. The

aggregates can convey information about current and future income movements, and over time they have demonstrated a long-term relationship to trends in prices But the effects of innovations and deregulation of recent years appear to preclude placing a very heavy weight on aggregate movements alone as guides to policy.

APPENDIX

MONEY AND CREDIT GROWTH IN 1987[1]

With interest rates rising over most of the year, expansion of money and credit weakened in 1987, despite a pickup of GNP growth M2 is estimated to have risen at a 4-1/4 percent rate from the fourth quarter of 1986 through the current quarter, as shown in table A-1, less than half the pace of last year and well below the lower bound of its 1987 target growth range [2] M3 also decelerated this year, although not as markedly, to a 5-1/2 percent rate, at the lower edge of its target range Reflecting the large interest elasticity of M1, this aggregate recorded the sharpest slowing, expanding by only 6 percent in 1987, down from 15-1/4 percent the previous year Domestic nonfinancial debt is estimated to have expanded at an annual rate of 9-1/2 percent over the last four quarters, well below the 13-1/4 percent pace of the preceding year, and at the midpoint of its monitoring range

M1 M1 growth was sluggish in 1987. Inflows to demand deposit and OCDs both weakened steadily through the third quarter, as shown in table A-2, as generally rising interest rates led to higher opportunity costs and, for demand deposits, reduced compensating balances While the slowdown in OCDs was largely explained by money demand models, the deceleration in demand deposits was much sharper than the models predicted As mortgage interest rates rose through mid-October, demand deposits likely were depressed by a slowing in the rate of mortgage

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1 Prepared by Thomas F Brady, Division of Monetary Affairs

2. The fourth-quarter to fourth-quarter growth rates for 1987 cited in this memorandum incorporate staff projections for growth in December

Table A-1

MONETARY AND CREDIT AGGREGATES, 1983-1987
(Q4 to Q4 averages, seasonally adjusted unless noted otherwise)

Growth rates or flows	1983	1984	1985	1986	1987[1]	Levels in billions of dollars Nov 1987
Growth rates (percent)						
M2	12 1	7 9	8 8	9 0	4 3	2894 0
M3	9 8	10 7	7 7	8 9	5 6	3660 0
M1	10 2	5 4	12 1	15 3	6 0	756 5
M1-A	5 3	3 7	8 5	10 0	2 7	501 0
Domestic nonfinancial debt[2]	11 6	13.9	13 2	13 2	9 6	8231 7
Bank credit	10 6	11.2	10 2	9 8	7 8	2224 4
Thrift credit	16.4	16 4	9.6	9 6	8 8	1699 5
Flows ($ billions)						
M1-A	20 0	14 6	34 8	44 4	13 1	
Currency	13.8	10 6	11 9	12 7	15 7	198 4
Demand deposits	5 8	3 8	22 0	31 2	-3 1	295 7
M1	48.4	28 3	66 9	94 6	43 2	
Other checkable deposits	28 4	13 7	32 0	50 2	30 2	255 5
M2	234 9	170 9	206 5	228 4	118.5	
Nontransactions M2	186.6	142 5	139 7	133 9	75 1	2137 5
MMDAs (NSA)	361.5	29 5	103 8	59 0	-40.3	526 3
Savings deposits	-49 5	-18 9	11 4	56 5	55 0	411 9
Small time deposits	-88.7	106 0	.3	-21 9	41.2	901.6
M2-type MMMFs (NSA)	-49 4	23 5	14.9	30 6	14.1	221 6
Overnight RPs and Eurodollars (NSA)	12.9	2.5	11.1	10.8	4.4	79 9
M3	237.7	286 1	226.9	283.2	194.0	
Non-M2 component	2.8	115 3	20.4	54.7	75 5	766 0
MMMFs (NSA)	-8 6	14 5	7 0	19 6	2 0	88 5
Large time deposits	-9 5	93 5	19 7	12.8	38 2	486 0
Term RPs (NSA)	13.5	17 3	-2 6	19.5	26 4	109 7
Term Eurodollars (NSA)	6 8	-7 6	-4 1	2 5	10 2	90 3
Memo:						
Velocities of						
M1-A	4 8	4 8	-1.8	-5.0	4.0	
M1	2	3 1	-4.9	-9.4	7	
M2	-1 6	7	-2 1	-4.1	2.5	
M3	5	-1 9	-1 0	-4.1	1.2	
Domestic nonfinancial debt	-1 1	-4.7	-5.9	-7.7	-2.5	

1. Data for the fourth quarter incorporate staff projections for December for monetary aggregates, bank credit, and domestic nonfinancial debt, and for November and December for thrift credit
2. Based on month-average data.

Table A-2

MONETARY AND CREDIT AGGREGATES, 1987
(quarterly changes, seasonally adjusted unless noted otherwise)

Growth rates or flows (annual rates)	1987 Q1	Q2	Q3	Q4[1]
Growth rates (percent)				
M2	6.4	2 3	3 1	4 9
M3	6 5	4 3	4 9	6 3
M1	13 1	6 4	0	4 3
M1-A	5 5	2 7	-2.2	4 8
Domestic nonfinancial debt[2]	10 4	9 1	8 2	9 2
Bank credit	10.1	7.0	5 6	7 4
Thrift credit	6 6	8 9	8 1	10 4
Flows ($ billions)				
M1-A	6 7	3 3	-2 8	5 9
Currency	4 6	3 1	3 2	4 8
Demand deposits	1 9	0	-6 1	1 1
M1	23 4	11 8	.0	8 0
Other checkable deposits	16.8	8.5	2 9	2 0
M2	44 7	16 3	22 2	35 3
Nontransactions M2	21 2	4 5	22.3	27 1
MMDAs (NSA)	3 7	-13 2	-15 0	-15 8
Savings deposits	28 3	24 3	7.6	-5 2
Small time deposits	-9.7	-3.0	19.5	34 4
M2-type MMMFs (NSA)	3.2	-0 6	3 2	8.3
Overnight RPs and Eurodollars (NSA)	2.6	-4.9	3 4	3 3
M3	56.2	37.5	43.4	56 9
Non-M2 component	11 4	21 2	21.2	21 7
MMMFs (NSA)	0 2	-2 4	.4	3 8
Large time deposits	3.2	10 5	7 1	17 4
Term RPs (NSA)	3.8	15 7	6 7	2
Term Eurodollars (NSA)	6.4	- 5	3 4	9
Memo				
Velocities of:				
M1-A	2 8	3 5	9.1	.6
M1	-4.6	- 2	6.8	1 0
M2	1.9	3 8	3.6	.4
M3	1.8	1.9	1.9	-1 0
Domestic nonfinancial debt	-2.0	-2 9	-1.4	-3.9

1 Data for the fourth quarter incorporate staff projections for December for monetary aggregates, bank credit, and domestic nonfinancial debt, and for November and December for thrift credit.
2. Based on month-average data

prepayments, which for institutional reasons tend to be lodged for a time in demand accounts OCD growth after the first quarter was far below that of the previous two years [3] Currency growth also slowed after the first quarter, but by much less than the deposit components of M1, before picking up in late October and early November, apparently temporarily boosted by uncertainties emanating from the stock market crash With M1 about unchanged in the third quarter and GNP expanding moderately, M1 velocity--shown in the memo on table 2--rose sharply, ending 2-1/2 years of declines M1 velocity is projected to increase again in the fourth quarter.

M2 M2 growth weakened appreciably this year, and its velocity rebounded, as rising market interest rates increased the average opportunity cost of holding M2 balances (chart A-1) A decline in the personal savings rate as well as the phased elimination of the tax deduction for consumer interest also may have contributed to a sluggish pace of financial asset accumulation Velocity of M2 increased 2-1/2 percent in 1987, following more than two years of declines

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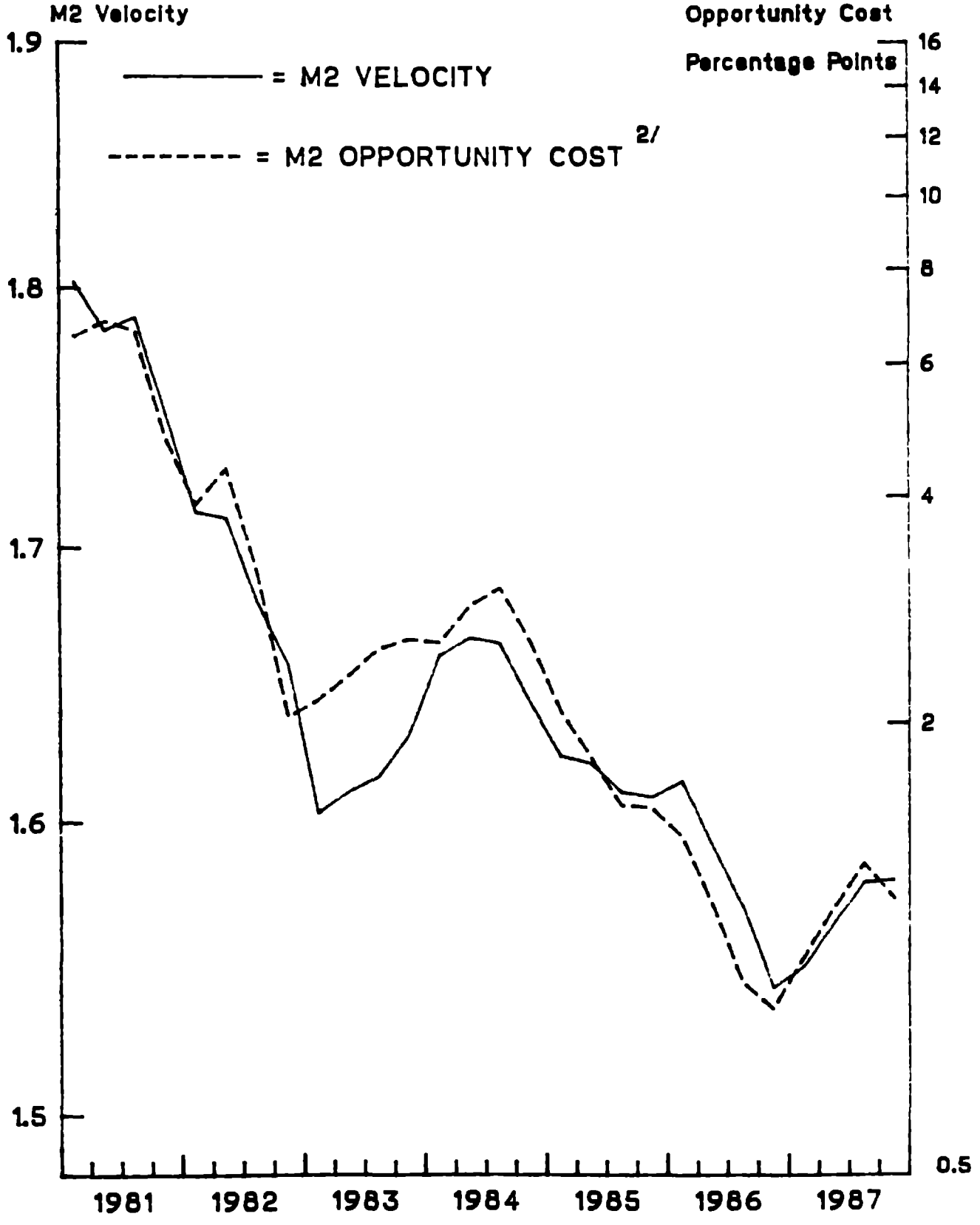
3. The general weakness in the deposit components of M1 in 1987 was punctuated by several instances of rapid growth associated with periods of unusually heavy financial activity As the year began, M1 was boosted by rapid expansion of its OCD component, apparently reflecting in part some carry-over of a buildup in balances in late 1986 to support financial transactions associated with changes in rules under the Tax Reform Act which became effective in 1987. Strong OCD growth in January also may have reflected a lagged response to declines in its opportunity cost, which bottomed out in October 1986 after falling for about a year In April, demand deposits and OCDs were boosted by transactions related to much heavier-than-usual tax payments Transactions balances again surged in October, in connection with financial activity associated with the stock market crash

Chart A-1

M2 VELOCITY AND OPPORTUNITY COST [1/]

(Ratio Scales)



1/ Data for 1987:Q4 incorporate staff projections.
2/ Two-quarter moving average.

Rising interest rates also caused the composition of retail-type M2 deposits to change considerably over the course of the year (table A-2), as the public increasingly shifted balances toward small time deposits and away from OCDs, savings deposits, and MMDAs, yields on small time deposits again adjusted to changes in market rates much more rapidly than yields on more liquid retail deposits (chart A-2) This shift from liquid to less liquid deposits persisted even in the wake of the stock market crash

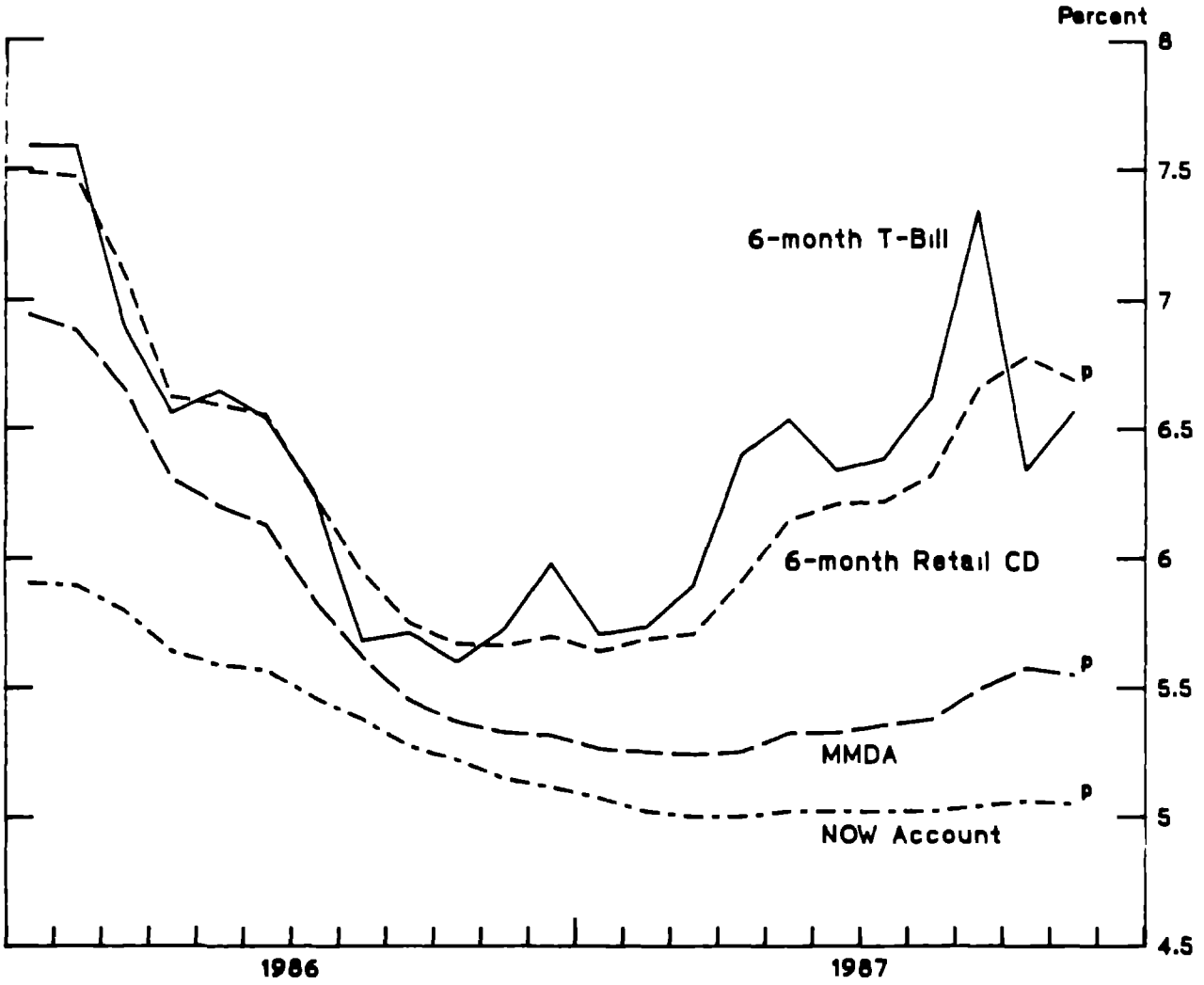
MMDAs exhibited particular weakness over the year, as their yields became less attractive relative to other liquid household monetary assets As a result, MMDAs will decline in 1987 by around 7 percent, the first year of negative growth since this account was first offered in late 1982 Savings deposits decelerated steadily over the year and contracted in the final quarter Nevertheless, reflecting robust growth early in 1987, when their opportunity cost was low, expansion since the fourth quarter of 1986 is estimated at a 15 percent rate, down from an 18-3/4 percent pace in 1986.

The steady deceleration in OCDs, MMDAs, and savings deposits over the year was mirrored in a persistent strengthening of small time deposits, as runoffs from these accounts in the first half of the year gave way to substantial inflows Small time deposit growth surged in the month after the stock market crash as their yields dominated plunging market rates while remaining high relative to liquid retail deposit rates. Through the fourth quarter, small time deposits expanded

Chart A-2

Market and Retail Deposit Rates

(effective annual yield)



p - Preliminary data for November.

1. Commercial bank deposit rates. Last observation plotted is Nov. 1987.

at a 5 percent rate this year, after declining on balance over the previous two years.

M2-type MMMF growth of 14-1/2 percent for the year as a whole was less than half its 1986 pace, as inflows were weak on balance over the first three quarters of 1987 when yields on these instruments tended to lag rising market rates. Some strengthening occurred later in the year as their rates became more attractive relative to those on MMDAs and market instruments MMMFs were also boosted somewhat in October and November by shifts from equity and bond mutual funds In general, shifts by the public between various household monetary instruments and bond and equity mutual funds may have had a small positive influence on net on M2 growth in 1987 Some of the rapid growth in these funds early in the year probably was financed out of M2 balances, while various M2 accounts likely were boosted to a lesser degree by outflows from these funds following the stock market crash in October

The wholesale components of nontransactions M2, overnight RPs and Eurodollars, expanded moderately over the year, considerably slower than the substantial advance of 1985 and 1986. This deceleration reflected a lengthening of the maturity of RPs and Eurodollars, as overall issuance of these instruments picked up smartly during 1987.

M3 M3 growth exceeded that of M2 in 1987 as its large time deposit and term RP and Eurodollar components all expanded rapidly The pickup in large time deposit growth was basically a commercial bank phenomenon, as large time growth at thrift institutions rose only slightly By contrast, an increase in the expansion of term RPs, to

above the already strong pace of 1986, entirely reflected stronger thrift issuance--likely linked to the financing of securitized mortgage holdings Term Eurodollar deposits also surged in 1987, as a strong pickup in overall issuance of Eurodollar deposits occurred entirely within the term component. The acceleration in Eurodollar deposits is consistent with a shift in the position of domestic banking offices vis-a-vis their foreign offices from a $22 billion "due from" position in November of 1986 to a $6 7 billion "due to" position in November of 1987 Overall, the funding needs of depository institutions grew less rapidly Bank credit growth slowed from 9-3/4 to 7-3/4 percent and thrift asset growth moderated from 9-3/4 to 8-3/4 percent (table A-1)

M3-type MMMFs grew slightly on balance over most of the year as these instruments tended to be less attractive in a rising rate environment Even though a surge in this component following the stock market crash turned the year's growth positive, this expansion was well below the 1986 rate.

Over the year, M3 is estimated to have grown about 5-1/2 percent, at the lower bound of its target growth range. The velocity of M3 also rose in 1987, following almost three years of declines

Debt

Growth of total domestic nonfinancial debt slowed in 1987 as both the federal government and other sectors reduced their credit demands Private credit demands were strong early in the year Mortgage demands were robust early in the year, partly reflecting the substitution of mortgage for consumer credit through home equity lines

Rising interest rates tended to damp mortgage demand later in the year, but consumer lending picked up along with spending in the third quarter Business credit demands moderated considerably, although the gap between expenditures and internally generated funds was higher on average than in 1986. The pace of net equity retirements at nonfinancial corporations edged down to an estimated $73 billion in 1987 from $80 billion in 1986 Reflecting the effects of tax reform and a slowing in refunding issues caused by the backup in interest rates, borrowing by the state and local sector dropped by nearly a third in 1987