The FOMC in 1981: Monetary Control in a Changing Financial Environment

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LAST year marked the second full year of the Federal Reserve's implementation of operating procedures introduced on October 6, 1979. Since then, the Federal Reserve has attempted to achieve better control of the growth of the monetary aggregates by placing more emphasis on controlling the growth of bank reserves and less on controlling short-run movements in the federal funds rate.[1]

This past year was a turbulent one for both the economy and the conduct of monetary policy. Real GNP declined markedly in the fourth quarter after increasing rapidly during the first quarter and holding steady during the middle two quarters. The growth rates of the monetary aggregates diverged over the year, with the narrower aggregates growing at a substantially reduced pace compared with the previous year, while the broader aggregates grew somewhat more rapidly than they did the previous year.

The policy of the Federal Open Market Committee (hereafter referred to as Committee or FOMC) in 1981 reflects a commitment to restrain the growth of the monetary aggregates. A number of financial innovations and regulatory changes, however, caused the Committee to change the policy weights placed on the various monetary aggregates. Furthermore, the nationwide introduction of NOW accounts prompted the FOMC to introduce a new monetary aggregate, shift-adjusted M1B, which it used to specify its policy directives.

This article discusses the FOMC's monetary policy decisions during 1981. The organization is as follows: The financial innovations and regulatory changes of 1981 are reviewed, and the impact of these changes on the growth rates of the various monetary aggregates is discussed. Next, the annual policy objectives of the FOMC for the growth of various monetary aggregates are reviewed, and the actual growth rates for the year are compared with the annual targets. Finally, the short-run policy directives of the FOMC are reviewed.

FINANCIAL DEVELOPMENTS OF 1981

Several financial developments affected the direction of monetary policy in 1981. The most important of these were the nationwide introduction of NOW accounts on January 1, the liberalization of interest rate ceilings on small-savers certificates on August 1, the introduction of tax-exempt All-Savers Certificates on October 1, and the rapid, albeit varied, growth in money market mutual funds (MMMFs).

The Measurement and Use of Shift-Adjusted M1B

The first of these developments resulted in the use of shift-adjusted M1B for policy purposes. The FOMC had anticipated that the introduction of NOW accounts would produce a shift in the public's holding of financial assets, from non-demand deposit

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Note: Citations referred to as "Record" are to the "Record of Policy Actions of the Federal Open Market Committee" found in various issues of the *Federal Reserve Bulletin*.

[1] For a description of the current operating procedure, see R. Alton Gilbert and Michael Trebing, "The FOMC in 1980: A Year of Reserve Targeting," this *Review* (August/September 1981), pp. 2-22; and Richard W. Lang, "The FOMC in 1979: Introducing Reserve Targeting," this *Review* (March 1980), pp. 2-25.

assets, such as savings deposits, into NOW accounts (see table 1 for the composition of the monetary aggregates).[2] As a result of this shift, the FOMC anticipated that measured M1B would contain a certain amount of "hidden savings." Furthermore, until complete, this shift would cause the growth rate of measured M1B to overstate the actual growth rate in transactions balances.

Initially, it was estimated that this shift would cause the growth in measured M1B to overstate the growth in transactions balances by 2 to 3 percentage points.[3] In anticipation of this development, the Committee stated both its long-run and short-run policy directives in terms of shift-adjusted M1B. Shift-adjusted M1B was obtained by subtracting from measured M1B, the *estimated* increase in other checkable deposits (above some expected normal growth) that came from sources other than demand deposits.[4]

Furthermore, the FOMC anticipated that nearly all of the shift into NOW accounts from sources other than demand deposits would come from sources in-

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[2] For a more detailed discussion of the composition of the monetary aggregates, see R. W. Hafer, "The New Monetary Aggregates," this *Review* (February 1980), pp. 25-31.

[3] It was assumed that individuals would shift assets primarily out of traditional demand deposits and other interest-earning assets included in M2 into NOW accounts. Thus, the growth rates of M2 and M3 would be unaffected by these shifts. There were two reasons for anticipating shifts out of savings deposits into NOW accounts: First, most NOW accounts had substantial minimum-balance requirements. Thus, it was assumed that individuals would shift part of their savings into NOW accounts to meet these requirements. Second, the New England experience with NOW accounts indicated that about one-third of the flow into ATS and NOW accounts had come from savings deposits. See "Monetary Policy Objectives for 1981" (Board of Governors of the Federal Reserve System, 1981), p. 4-5; and "Monetary Report to the Congress," *Federal Reserve Bulletin* (March 1981), pp. 195-208.

[4] The proportion of the increase in other checkable deposits (OCD) that was estimated to have been shifted from sources other than demand deposits was determined from a number of surveys and a cross-sectional econometric study. It was estimated that the proportion of OCD diverted from sources other than demand deposits was between 20-25 percent in January, and 25-30 percent thereafter. Shift-adjusted M1B was obtained by first estimating the proportion of the *change* in seasonally unadjusted OCD from end of the year 1980, above some trend growth in OCD that came from sources other than demand deposits. The proportion was assumed to be the midpoint of the above ranges. Next, this amount was seasonally adjusted using the seasonal factors for commercial bank savings deposits. This seasonally adjusted amount was then subtracted from seasonally adjusted M1B to obtain seasonally adjusted, shift-adjusted M1B. For more details, see "Recent Revisions in the Money Stock," *Federal Reserve Bulletin* (July 1981), pp. 539-42; and John A. Tatom, "Recent Financial Innovations: Have They Distorted the Meaning of M1?" this *Review* (April 1982), p. 23-35.

Later in the year, it appeared that most of the shift out of

Table 1
Composition of Monetary Aggregates

Component	M1B[1]	M2	M3
Currency	X	X	X
At commercial banks and thrift institutions:			
Demand deposits exclusive of deposits due to foreign commercial banks and official institutions	X	X	X
NOW accounts	X	X	X
ATS accounts	X	X	X
Credit union share draft balances	X	X	X
Overnight RPs		X	X
Savings deposits		X	X
Small time deposits (<$100,000)[2]		X	X
Large time deposits			X
Term RPs			X
Retail RPs (<$100,000)		X	X
Other:			
Travelers checks of nonbank issuers[3]	X	X	X
Overnight Eurodollar deposits of U.S. nonbank residents[4]		X	X
Money market mutual funds shares[5]		X	X
Bankers acceptances			X
Commercial paper			X
U.S. savings bonds			X
Liquid Treasury securities			X
M2 consolidation component[6]		X	X

[1] The M1B series has been renamed M1. The M1 series now contains an M1 consolidation component which represents the estimated portion of thrift institution vault cash used to service their other checkable deposit liabilities.

[2] Includes small-savers certificates and All-Savers certificates.

[3] Travelers checks were included in the monetary aggregates during the June 1981 revisions. See the Board's H.6 release for June 26, 1981.

[4] Overnight Eurodollars issued by Caribbean branches of member banks.

[5] M2 now excludes "institution only" MMMFs (funds which do not offer accounts to individuals). See the Board's H.6 release for February 5, 1982, for details.

[6] Represents the estimated amount of demand deposits and vault cash held by thrift institutions to service time and savings deposits.

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demand and nondemand deposit components of M2 appeared to have taken place during the first four months of the year. As a result of the completion of the major portion of the shift, the Federal Reserve Board discontinued its series on shift-adjusted M1B, effective January 6, 1982. The M1A measure was dropped at the same time.

cluded in M2. This would cause the growth rate of *measured* M1B to increase relative to M2. However, the Committee was uncertain about the extent of the shift and about the ultimate source of the new NOW accounts. Hence, it was uncertain about the appropriate weighting of shift-adjusted M1B and M2 for policy purposes. This uncertainty was exacerbated by the rapid and varied growth of the money market mutual fund component of M2 during the year.[5]

The Elimination of the M1A Target

The shift from non-interest-bearing checking accounts into interest-bearing NOW accounts resulted in a substantial reduction in the growth rate of M1A (currency plus demand deposits at commercial banks). This blurred its meaning, as the proportion of checkable deposits it represented declined markedly after the first of the year. As a result, the Committee eliminated any reference to the M1A measure from its short-run policy objectives and from its tentative long-run policy objectives for 1982.[6]

The Growth in Non-Transactions Balances

It was believed that the liberalization of interest rate ceilings on small-savers certificates and the introduction of tax-exempt All-Savers Certificates would increase the attractiveness of these components of M2 relative to money market assets that are not included in M2. By the middle of 1981, the Committee was concerned that these regulatory changes, especially the introduction of All-Savers Certificates, would produce shifts from money market assets into these components of M2. The Committee believed that these changes might cause a rapid acceleration in the growth rate of M2, especially during the fourth quarter of the year, altering the relative growth rates of M2 and shift-adjusted M1B still further. Thus, these regulatory changes also contributed to the uncertainty about the appropriate weighting of shift-adjusted M1B and M2.

This uncertainty was heightened by the increase in the income velocity of shift-adjusted M1B during

the year.[7] It was argued that high interest rates had induced the use of new cash management techniques that reduced the demand for traditional transactions balances, thus increasing the income velocity of money. For example, it was argued that since many MMMFs have check-writing privileges, they may themselves be considered transactions balances, or at least close substitutes for the transactions balances included in M1B. If this were true, shift-adjusted M1B would understate the growth in transactions balances of the economy.

ANNUAL TARGETS FOR 1981

The Full Employment and Balance Growth Act of 1978 (also called the Humphrey-Hawkins Act) requires the Board of Governors, each February and July, to transmit to Congress reports on the objectives for growth rate ranges for monetary and credit aggregates over the current calendar year and, in the case of the July report, the objectives for the following calendar year as well. The Committee has chosen to establish ranges from the fourth quarter of the previous year to the fourth quarter of the current year.[8] While these ranges must be reported to Congress each February and July, the Act provides that the Board and the Committee may reconsider the annual ranges at any time.[9] The period to which the annual ranges apply, however, may not be changed. The base period (the fourth quarter of the previous year) would remain the same even if the Committee decided to change the desired growth rates of the aggregates for the year.

At its February meeting, the Committee agreed on the desirability of reducing the rate of monetary growth, thereby contributing to reducing the in-

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[5]See "Record" (April 1981), p. 314; and "Record" (June 1981), p. 500-01.

[6]The Committee decided to omit reference to M1A from its statement of the short-run policy objectives for 1981 at the March meeting and from its statement of long-run policy directives for 1981-82 at the July meeting. See "Record" (June 1981), p. 500; and "Record" (September 1981), p. 716.

[7]See "Record" (July 1981), p. 568. The income velocity of money is given by the ratio of nominal GNP to money. It indicates the number of times each unit of nominal money "turns over" in producing this year's final output.

[8]Prior to 1979, the Committee adopted one-year growth rates each quarter, and the base period for the annual targets announced each quarter was brought forward to the most recent quarter. This method resulted in a problem referred to as "base drift." Growth in aggregates above (below) an annual growth range in a quarter would raise (lower) the base level for calculating the next annual growth path. Specification of annual objectives in terms of calendar year growth rates, which eliminates the base drift problem within a calendar year, does not solve this problem from one calendar year to the next, since new ranges are established from the end of each calendar year.

[9]At its midyear review of the annual ranges, the Committee also established tentative ranges for the monetary aggregates for the next year — measured from the fourth quarter of the current year to the fourth quarter of the following year.

flation rate and providing a basis for economic stability and sustainable growth in GNP.[10] The Committee agreed to specify an annual target range for shift-adjusted M1B that was ½ percentage point below the comparable range for 1980.[11] There was less agreement, however, on the specification of the growth rate ranges for the broader monetary aggregates.

Members differed somewhat more in their views concerning the broader monetary aggregates, in part because of uncertainty about the potential effects of interest rate relationships on the behavior of the nontransaction component. Reflecting an expectation that growth of the broader aggregates would increase relative to that of the narrow aggregates adjusted for expansion of NOW accounts, a number of members favored specification of ranges slightly higher than those for 1980. However, most members believed that sufficient allowance for the possibility of relatively stronger growth of the broader aggregates would be made by reiterating the 1980 ranges for them in association with ranges for the narrower aggregates that were 1/2 percentage point lower than those for 1980. In this connection, it was stressed that specification of ranges rather than precise rates for growth over the year inherently provided for some change in relative rates of growth among the monetary aggregates, and that growth of both M2 and M3 might well be in the upper portions of their ranges. Even so, growth of the broader aggregates would be less than actual growth in 1980. One member preferred to focus exclusively on the narrower aggregates, not specifying ranges for the broader aggregates.[12]

At the end of this discussion, the Committee established the same annual target ranges for M2 and M3 as it had established in 1980. Table 2 shows the target growth rates for shift-adjusted M1B, M2 and M3 that the Committee established at its February meeting.[13] The Committee did not establish annual growth rate ranges for measured M1B. However, it was estimated that a range of 6 to 8½ percent for measured M1B would correspond to the Committee's range for shift-adjusted M1B.[14] Growth rates of the monetary aggregates relative to their long-run ranges are presented in charts 1 and 2.

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[10]"Record" (April 1981), p. 315.

[11]There was no shift adjustment to M1B in 1980. Thus, the "comparable range" is the 1980 range for actual M1B.

[12]"Record" (April 1981), p. 315.

[13]"Record" (April 1981), p. 316; and "Monetary Report to Congress," p. 205. An annual target range for M1A was adopted at the February meeting (3-5½ percent). It is not reported here, however, because M1A was dropped for policy considerations later in the year. See footnote 6.

[14]"Monetary Report to Congress," p. 207.

Table 2
Planned Growth of Monetary Aggregates for 1981 (percent changes, fourth quarter to fourth quarter)[1]

Aggregate	Proposed range for 1981	Actual 1980 growth rate	Actual 1981 growth rate
Shift-adjusted M1B	3.5 - 6.0%	6.6%[2]	2.3%
M1B[3]	6.0 - 8.5	7.3	5.0
M2	6.0 - 9.0	9.2	9.4
M3	6.5 - 9.5	10.0	11.4

[1]Data as revised by Board of Governors in February 1982.

[2]This growth rate was taken from Board of Governors of the Federal Reserve System, *Monetary Report to Congress Pursuant to the Full Employment and Balanced Growth Act of 1978* (February 10, 1982), p. 14.

[3]The Committee did not establish an annual growth rate range for measured M1B for 1981. However, it was estimated that a range of 6-8½ percent would correspond to the Committee's range for shift-adjusted M1B.

Actual Money Growth Rates for 1981

As shown in table 2, the broader monetary aggregates grew at rates above their long-run ranges for the year: M2 grew at a 9.4 percent rate, just above the top of its range, while M3 grew at a 11.4 percent rate, 2 percentage points above the top of its annual range.
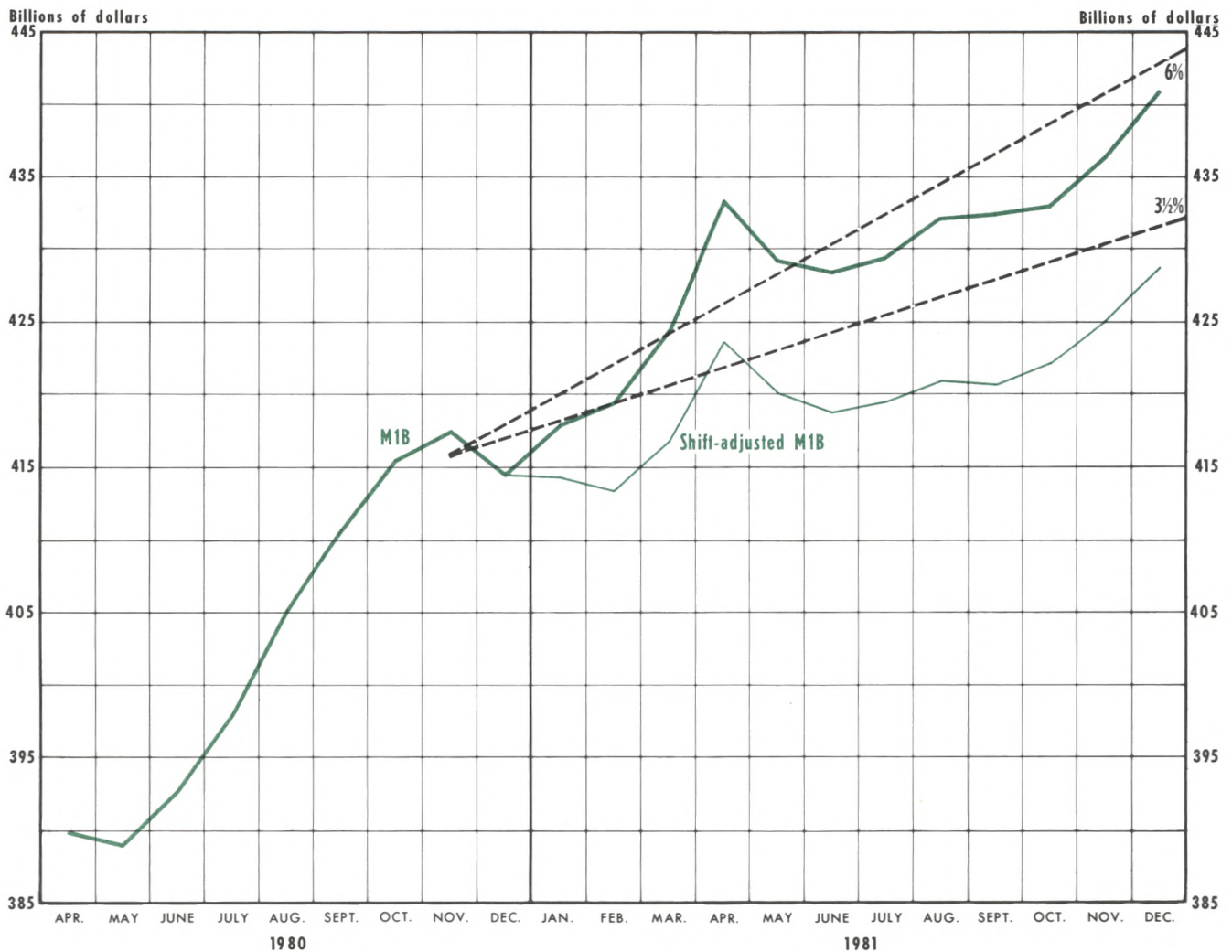
In contrast, the growth rate of shift-adjusted M1B was substantially below its target range for 1981. Shift-adjusted M1B grew at an annual rate of 2.3 percent from the fourth quarter of 1980 to the fourth quarter of 1981, about 1 percentage point below the lower end of its planned growth range.[15]

While this shortfall in the growth of shift-adjusted M1B was somewhat larger than the Committee anticipated by mid-year, financial developments during the year led it to accept a slower growth in shift-adjusted M1B as long as the growth in the broader monetary aggregates remained at the upper ends of their ranges.

> . . . in light of its desire to maintain moderate growth in money over the balance of the year, the Committee wished to affirm that growth in M1B near the lower

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[15]Because there was no shift-adjusted M1B for the fourth quarter of 1980, its growth rate was calculated from the average level of M1B for the fourth quarter of 1980.

Chart 1

M1B, Shift-Adjusted M1B and Growth Objectives for Shift-Adjusted M1B

Billions of dollars

Billions of dollars

M1B

Shift-adjusted M1B

6%

3½%

APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. **1980** JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. **1981**

end of its range would be *acceptable and desirable.* At the same time, the Committee recognized that growth in the broader monetary aggregates might be high in their ranges (italics added).[16]

Much of the willingness to accept a slower rate of growth in shift-adjusted M1B stemmed from uncertainty about the extent to which financial developments were affecting the relative growth rates of various monetary aggregates, and the extent to which these developments in turn were affecting the relationship between the aggregates and economic activity. This is most evident in the Committee's discussion of short-run policy directives for 1981.

SHORT-RUN POLICY DIRECTIVES FOR 1981

The announcement of annual target ranges for the monetary aggregates, mandated by the Full Employment and Balanced Growth Act of 1978, is intended to set public guidelines for the FOMC in choosing short-run policy objectives during the year. Committee decisions that influence the *day-to-day*

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[16]"Record" (September 1981), p. 716. Similar statements appear on numerous occasions in the "Record." For example, "Record" (October 1981), p. 792 and 794; (December 1981), p. 908; and (January 1982), p. 41. Also, see "Statement by Paul A. Volcker, Chairman, Board of Governors of the Federal Reserve System, before the Committee on Banking, Finance and Urban Affairs," *Federal Reserve Bulletin* (August 1981), p. 615.

Chart 2

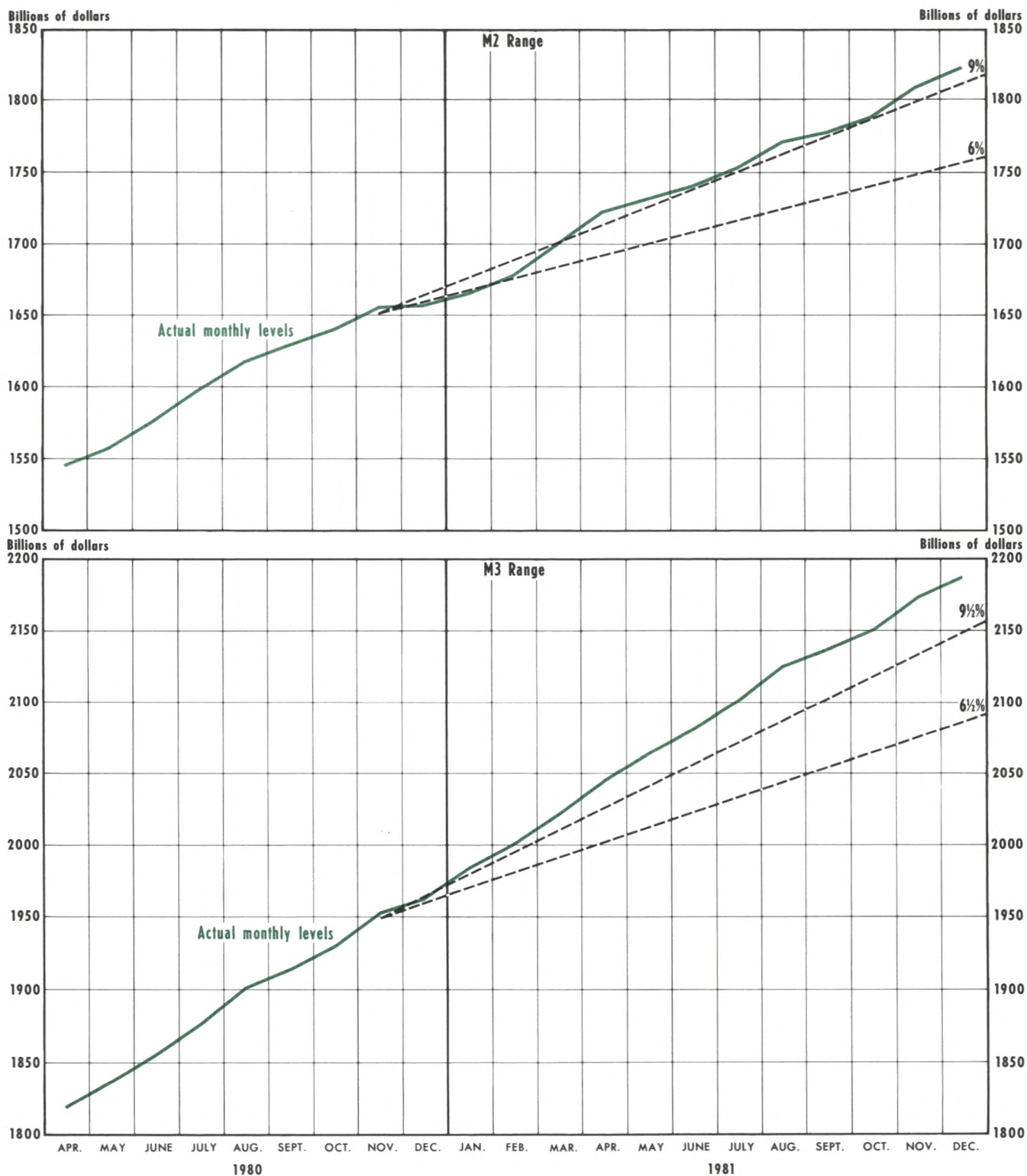# Ranges for M2 and M3 for Period IV/80 to IV/81

Billions of dollars

Billions of dollars

M2 Range

Actual monthly levels

9%

6%

Billions of dollars

Billions of dollars

M3 Range

Actual monthly levels

9½%

6½%

APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
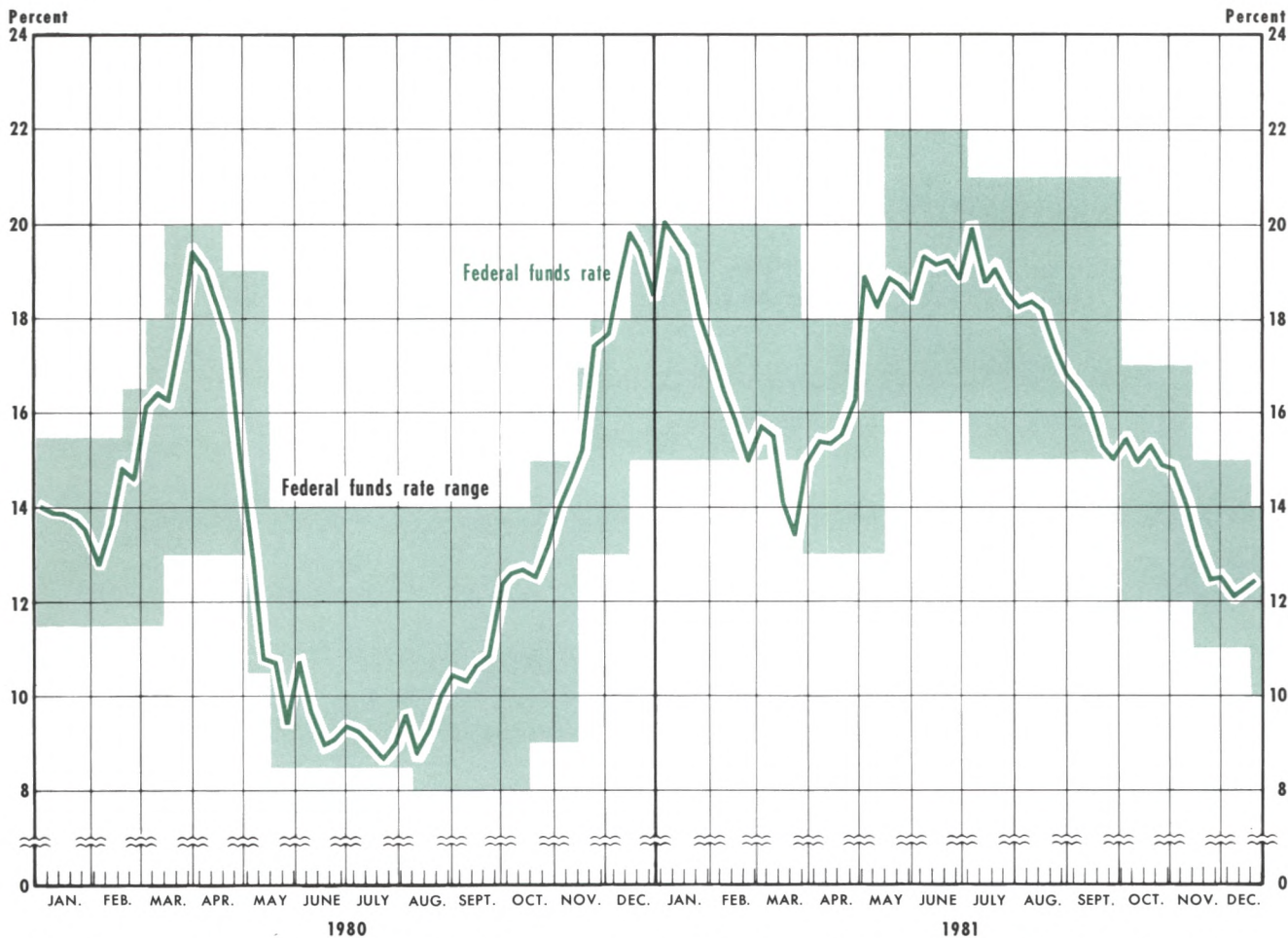
1980

1981

Chart 3
FOMC Ranges for Federal Funds Rate

NOTE: Rates are calculated as weekly averages of effective daily rates. At each meeting the Committee specified a range for the federal funds rate. These ranges are indicated for the first full week during which they were in effect.

implementation of monetary policy, however, are specified in the short-run policy directives. The Committee issues these directives to the Manager of the Open Market Account at the Federal Reserve Bank of New York.

At each meeting in 1981, the Committee specified short-run growth rates for shift-adjusted M1B and M2.[17] It also specified an intermeeting range for the federal funds rate.[18] These ranges and the actual

federal funds rate are presented in chart 3. The growth rates for the monetary aggregates and the ranges for the federal funds rate that the Committee specified during 1981 are presented in table 3. Charts 4 and 5 show the short-run ranges for shift-

[17]A short-run growth rate target for M1A was established at the February meeting; however, M1A was dropped from the Committee's short-run objectives at the March meeting. The short-run target range for M1A set at the February meeting was 5-6 percent.

[18]If movements of the federal funds rate within the range appear

to be inconsistent with short-run objectives for the monetary aggregates and related reserve paths during the intermeeting period, the manager for Domestic Operations at the Federal Reserve Bank of New York is to promptly notify the Chairman, who in turn decides whether the situation calls for supplementary instructions from the Committee. Two such meetings were called during 1981. Meetings were called on February 24 and May 6; see "Record" (April 1981), p. 318 and "Record" (June 1981), pp. 502-03. The federal funds rate range first appeared as a "trigger mechanism" with the change to reserve targeting procedure on October 6, 1979. See "Record" (December 1979), p. 977.

Table 3
FOMC Operating Ranges — 1981

Short-Run Operating Ranges

Date of meeting	Federal funds rate range	Periods to which monetary growth paths apply[1]	M1A	Shift-adjusted M1B	M2
February 2-3, 1981[a]	15-20%	December-March	5-6%	5-6%	about 8%
February 24[b]	(no change)	(intermeeting conference)	reaffirmed February 2-3 ranges		
March 31[c]	13-18	March-June	—	5½ or somewhat less	about 10½
May 6		(intermeeting conference)	reaffirmed March 31 ranges		
May 18	16-22	April-June	—	3 or lower	about 6
July 6-7[d]	15-21	June-September	—	7	remains around the upper limit of its range for the year
August 18[e]	15-21	June-September	—	7	remains around the upper limit of its range for the year
October 5-6[f]	12-17	September-December	—	7	around 10 or slightly higher
November 17	11-15	October-December	—	about 7	about 11
December 21-22[g]	10-14	November-March 82	—	around 4-5[2]	around 9-10

Long-Run Operating Ranges

Date of meeting	Target period	M1A	Shift-adjusted M1B	M2	M3
February 2-3, 1981[h]	IV/1980-IV/1981	3 - 5.5%	3.5 - 6%	6 - 9%	6.5 - 9.5%
July 6-7	(reaffirmed above ranges)				

[1]Growth objectives specified by the Committee over quarterly periods are interpreted in terms of monthly data.

[2]This range is for non-shift-adjusted M1B.

adjusted M1B and M2 based on first-published data. First-published data give a more accurate representation of the Committee's short-run policy decisions based on information available at the time. Revised data for shift-adjusted M1B are lower relative to its annual ranges than first-published data. Revised data for M2 are substantially higher relative to its annual ranges than first-published data.[19]

The Committee's short-run policy directives

followed three phases and are reflected by the general movement of the monetary aggregates during the year. During the first phase, the Committee's objective was to achieve a gradual acceleration in the growth of shift-adjusted M1B within its annual range, after it fell below the lower end of its range in January. During the second phase, the Committee gave greater weight to keeping the growth of M2 around the top of or within its annual range, while permitting growth in shift-adjusted M1B to fall substantially below the lower bound of its range. In the final phase, the Committee once again desired more rapid growth in shift-adjusted M1B, while accepting a somewhat larger departure of M2 above the upper limit of its annual range. Growth rates of shift-adjusted M1B, measured M1B, M2 and the adjusted monetary base corresponding to these phases are presented in table 4.

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[19]To see this, compare charts 1 and 4, and charts 2 and 5. The data for M2 in chart 5 is higher than the M2 data as of the February 1982 revisions. Much of this difference is due to the redefinition of M2 to include retail RPs (those issued in amounts of less than $100,000) and to exclude "institution only" MMMFs (funds which do not offer accounts to individuals). See the Board's H.6 release of February 5, 1982, for details.

Table 3 (continued)

Footnotes — Dissents to FOMC Actions

[a]Mrs. Teeters dissented from this action because she believed that the specifications adopted for monetary growth over the first quarter were unduly restrictive. She preferred specification of higher rates for monetary growth over the first quarter, consistent with the ranges adopted for monetary growth over the whole year, in association with a lower intermeeting range for the federal funds rate.

Mr. Wallich dissented from this action because he preferred to set a higher range for the federal funds rate in order to help avoid a repetition of the sharp drop in interest that had occurred in the second quarter of 1980.

[b]Mr. Roos dissented from this action because he believed that it would tend to prolong unduly the shortfall in growth of M1A and M1B from the Committee's ranges for the year. In the circumstances, he preferred to reduce the lower limit of the intermeeting range for the federal funds rate in order to encourage a more prompt pickup in growth of narrowly defined monetary aggregates.

[c]Mr. Wallich dissented from this action because he favored specification of lower monetary growth rates from the period from March to June than those adopted at this meeting along with a higher intermeeting range for the federal funds rate. In light of the recent strength of economic activity, he believed policy had not been as restrictive as supposed, in part because money market mutual funds and other sources of liquidity had contributed to an increase in the velocity of M1B, and that continuation of excessive strength in activity posed the greater danger for the period ahead.

[d]Mr. Partee dissented from this action because in the light of weakening in economic activity, he preferred to give more emphasis to reducing the risk of a cumulative shortfall in growth of M1B. Accordingly, he favored specification of a somewhat higher objective for growth of M1B over the period of June to September, and without additional weight assigned to the potential for more rapid growth of M2. In his view, the short-run behavior of M2 was subject to great uncertainty because of both the volatile influence of money market mutual funds and the recent DIDC actions authorizing certain deposit instruments to be offered at competitive interest rates beginning August 1.

[e]Mr. Partee dissented from this action because, as at the previous meeting, he preferred to give more emphasis to reducing the risk of a cumulative decline in the growth of M1B in light of the indications of weakening in economic activity. Accordingly, he favored specification of a somewhat higher objective for growth of M1B over the period from June to September, and without the additional weight assigned to the potential for more rapid growth in M2. In his view, the short-run behavior of M2 was subject to great uncertainty because of the volatile influence of money market mutual funds, the liberalization of deposit rate ceilings on small saver certificates beginning August 1, and the introduction of tax-exempt "all savers" certificates beginning October 1.

[f]Mr. Wallich dissented from this action because he favored specification of somewhat lower rates for growth in the monetary aggregates over the last three months of 1981 than those adopted at this meeting and was willing to accept a greater shortfall in growth of M1B from the Committee's range for over the year. In his opinion, much of the shortfall was attributable to a decline in the public's desire to hold transaction balances of the types included in M1B and to the growth of other asset forms, especially money market mutual funds, that to some extent serve as transaction balances. He was also concerned that the public might perceive fairly rapid monetary growth over the balance of the year as a relaxation of the System's policy of restraint, especially if such growth were to be accompanied by sizable decreases in interest rates.

[g]Mr. Solomon dissented from this action because he felt it was particularly important at the beginning of an annual target period that the Committee not formulate its directive in terms that conveyed an unrealistic sense of precision. In his view, the directive language referring to the November-to-March growth rates in M1 and M2 did seem to convey such a sense.

Mr. Boykin dissented from this action because he favored specification of somewhat lower rates for growth in the monetary aggregates from November to March. For M2 in particular, he stressed the desirability of specifying a rate no higher than the range of 6 to 9 percent that had earlier been tentatively adopted for growth over 1982, with a view to avoiding a possible interpretation that the Committee had implicitly raised its objective before completion of the current review of the growth ranges for 1982.

[h]Mr. Wallich dissented from this action because he thought the ranges adopted for growth of M1A and M1B were too high. He believed that somewhat lower ranges would provide adequate monetary growth in 1981, because he expected a further downward shift in money demand and also because growth of the monetary aggregates over the past year generally had exceeded the specified ranges.

## Meetings in February and March

The first phase encompasses the FOMC's first two meetings in February and March. In determining short-run policy objectives at the February meeting, the Committee took special note of the fact that the growth of shift-adjusted M1B, from the fourth quarter of 1980 to January 1981, had fallen below the lower end of its annual range. It was generally agreed that open market operations, before the March meet-

ing, should be directed toward a *gradual* restoration of the growth in shift-adjusted M1B to a rate consistent with its annual range. While there was disagreement over the acceptable amount of growth during the intermeeting period, it was agreed that the gradual approach lessened the danger of misinterpreting policy intentions.

In accepting the gradual approach toward encouraging rates of monetary growth consistent with the ranges adopted for 1981, several members com-

Chart 4
Short-Term and Long-Term Growth Objectives for Shift-Adjusted M1B
Based on First-Published Data
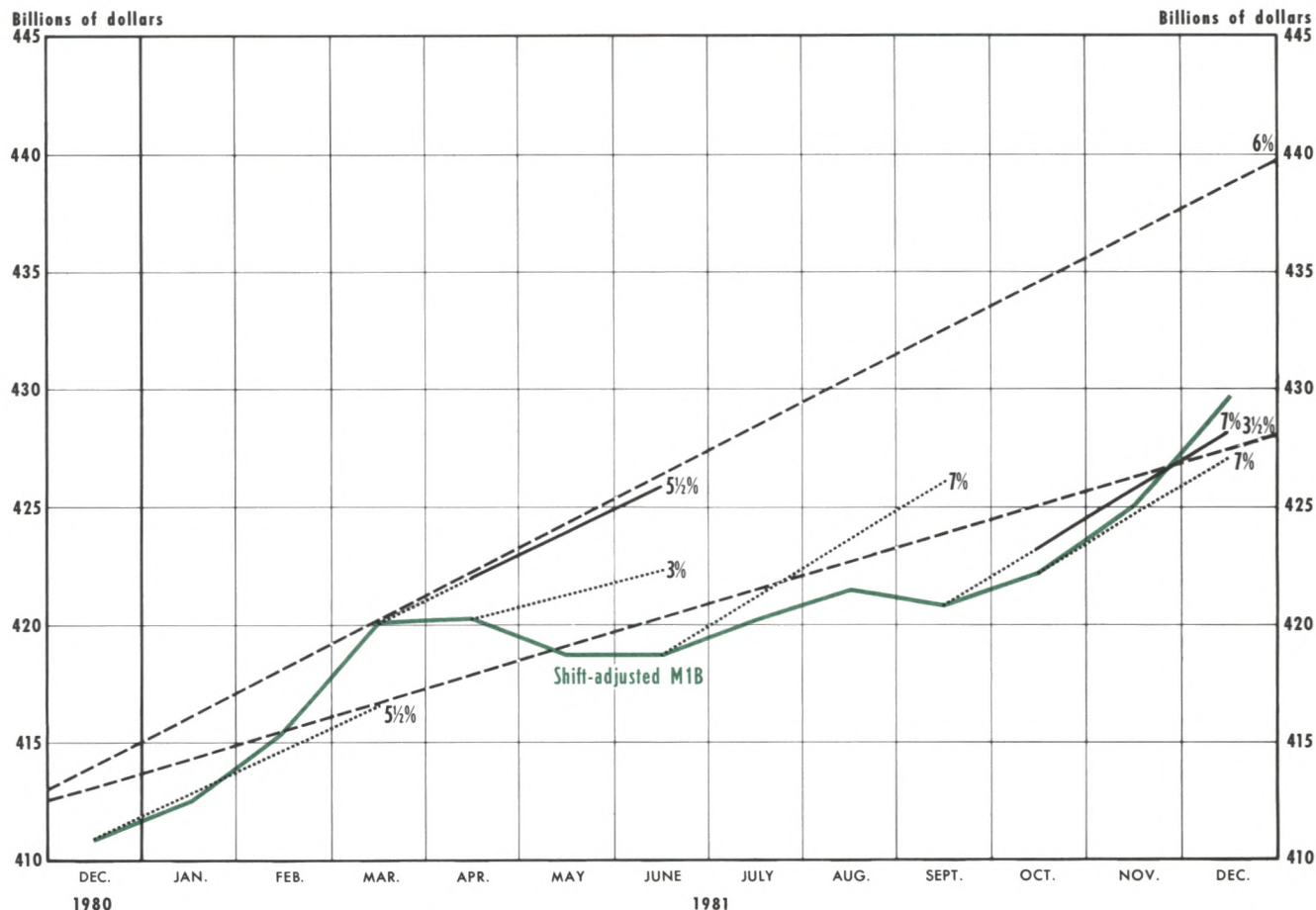
NOTE: Long dashed lines represent the long-term growth objectives for shift-adjusted M1B for the period IV/80-IV/81. Short dashed lines represent the current short-term growth objectives for shift-adjusted M1B. All growth objectives treated as simple annual rates of change. Data are "first-published" numbers from the Board's H-6 release. These data may differ significantly from the data revised as of February 1982.

mented on the danger of potentially confusing interpretations of policy intentions and also of possible instability in financial markets. It was observed, for example, that efforts to raise monetary growth promptly toward the longer-run paths could have the undesirable consequences of encouraging first relatively rapid growth and then an abrupt decleration. A few members also suggested that the gradual approach to making up the shortfall would be acceptable provided that it proved to be compatible with relative stability or some easing in money market pressures.[20]

At the March meeting, it was noted that the growth of shift-adjusted M1B had expanded substantially during the first two weeks in March, but remained at a level below the bottom end of its annual range. It was also reported that the growth of M2 had ap-

parently accelerated considerably in March, spurred on by a record expansion in money market mutual funds that had more than offset the weakness in small savings and time deposits. It was argued that the weakness in the growth of shift-adjusted M1B might be a misleading indicator of the growth of transactions balances, since a part of the rapidly growing money market mutual funds might themselves be considered transactions balances. As a result of this discussion, the Committee decided to give *more weight than before to M2* in interpreting its short-run policy directives.[21]

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[20]"Record" (April 1981), pp. 316-17.

[21]"Record" (June 1981), pp. 500-01. Many MMMFs have check-writing privileges. However, most require checks to be written in amounts of $500 or more. For an analytical argument why MMMF deposits should not be considered money, see R. W. Hafer, "Much Ado about M2," this *Review* (October 1981), pp. 13-18.

Chart 5
Short-Term and Long-Term Growth Objective for M2 Based on First-Published Data

Billions of dollars
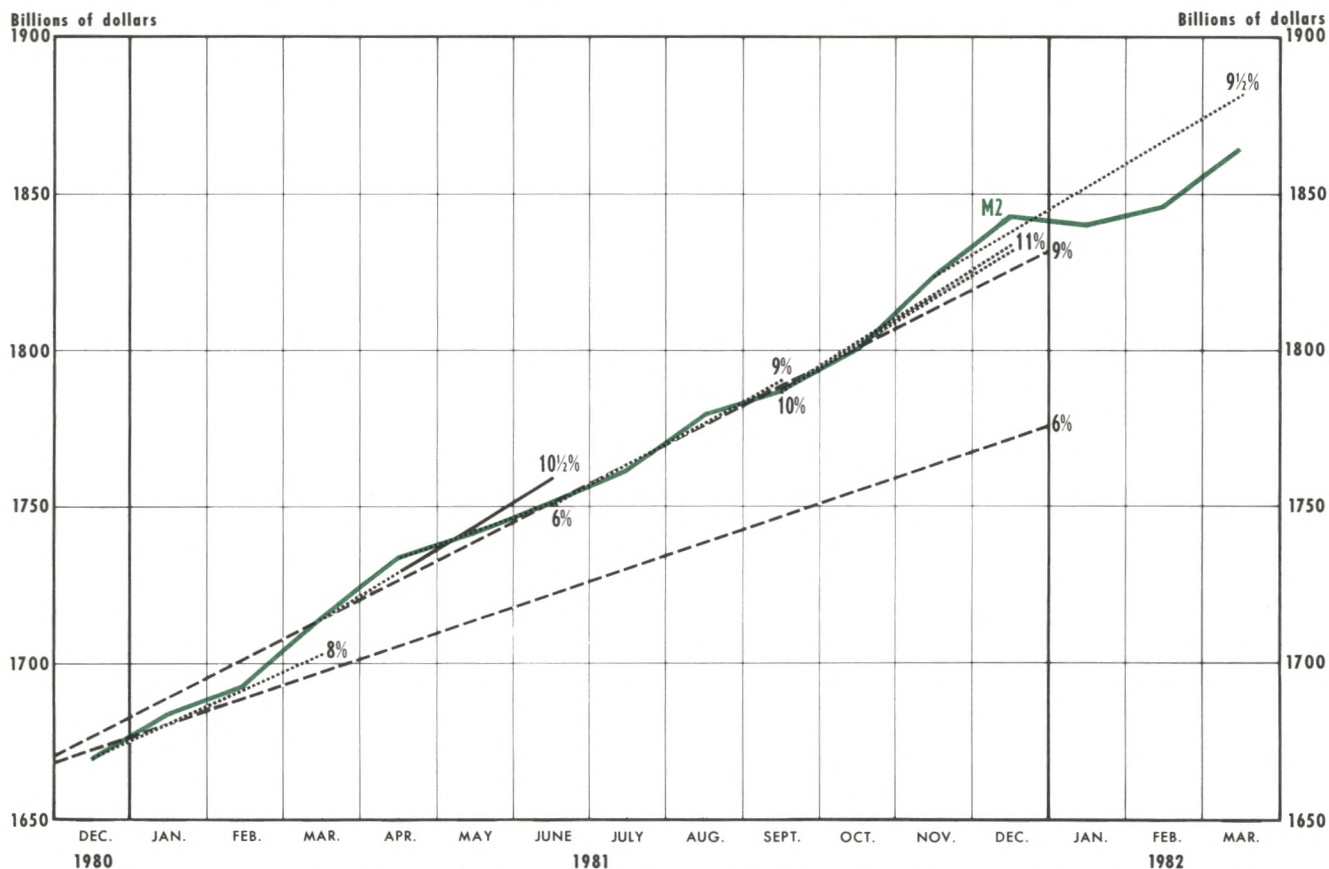
NOTE: Long dashed lines represent the long-term growth objectives for M2 for the period IV/80-IV/81. Short dashed lines represent the current short-term growth objectives for M2. All growth objectives treated as simple annual rates of change. Data are "first-published" numbers from the Board's H-6 release. These data may differ significantly from the data revised as of February 1982.

The Committee established a short-run growth rate for shift-adjusted M1B for the period March to June of "5½ percent or somewhat less," and for M2 of "about 10½ percent," some 2½ percentage points above the range established in February.[22]

If achieved, these short-run growth rates would have resulted in a level of shift-adjusted M1B at the upper bound of its annual target and of M2 above the upper bound of its annual target, as illustrated in charts 4 and 5. Thus, the Committee raised the short-run target growth rate for M2 and simultaneously gave more weight to M2 in evaluating the behavior of the monetary aggregates.

[22]The disparity in the changes in these rate ranges for shift-adjusted M1B and M2 is even more pronounced when "base drift is taken into consideration." On March 31, shift-adjusted M1B was at a level below the lower end of its annual range, while M2 was above the upper end of its annual range.

Table 4

Growth Rates of Monetary Aggregates and Adjusted Monetary Base for 1981[1]

Period	Adjusted monetary base	M1B	Shift-adjusted M1B	M2
1/1981 - 5/1981	7.0%	8.1%	4.1%	12.0%
5/1981 - 9/1981	2.3	1.4	.4	7.9
9/1981 - 12/1981	5.7	9.0	7.6	9.9

[1]Data revised by Board of Governors, February 1982.

Meetings in May through August

The second phase of short-run policy directives encompasses the May through August meetings. Its beginning is marked by a reversal of the policy of gradually accelerating growth of shift-adjusted M1B, which was characteristic of the February and March meetings. At the May meeting, the Committee noted that the growth of the monetary aggregates had been very rapid during March and April. The Board staff told the Committee that the growth of shift-adjusted M1B during May and June would have to be negligible if the growth rates specified in March were to be achieved.[23] However, the staff's analysis indicated that the growth of M2 in the coming months would be less rapid, reflecting a slowing in the growth of savings and small-denomination time deposits and a weakness in the growth of MMMFs. It was reported that the broader monetary aggregates might move back toward the tops of their annual target ranges.

The Committee took particular note of the continuing strength of economic activity in the first quarter, the rise in income velocity of M1B, which it believed posed the risk of pressure for further expansion of money and credit later in the year, and the continuing strength of inflation expectations in deciding to reduce the growth of the monetary aggregates rather quickly.[24] The Committee voted for a substantial deceleration in the growth of the monetary aggregates. The target rates of growth of shift-adjusted M1B and M2 were reduced to "3 percent or lower" and "about 6 percent," respectively, for the two-month period from April to June.

By the July meeting, the Committee noted that the rapid deceleration in the growth rates of the monetary aggregates that it had voted for in May had materialized. It was reported that the growth rate of M2 was reduced to about 5 percent for the May and June periods and that shift-adjusted M1B declined at annual rates of 5 percent in May and 10½ percent in June, following a growth rate of almost 17 percent in April. This brought the growth rate of shift-adjusted M1B to about 2¼ percent from the fourth quarter of 1980 to the second quarter of 1981, over

1 percentage point below the lower end of the annual range.[25] At the same time, it was noted that the shortfall in the rate of growth of shift-adjusted M1B was accompanied by an unusually large increase in its income velocity. The significance of the relative growth of shift-adjusted M1B and M2 was considered once again.

The shortfall in growth of shift-adjusted M1B in the first half of the year followed relatively rapid growth in the latter part of 1980; and it was accompanied by an usually rapid rise in the income velocity of money, as nominal GNP expanded strongly. In partial explanation, extraordinarily high interest rates in combination with the introduction of NOW accounts on a nationwide basis apparently provided a greater stimulus to intensive management of cash balances than that normally associated with an increase in interest rates. In the period ahead, M1B might behave somewhat differently from earlier measures of transaction balances, because of the sizable volume of deposits earning interest and because of the greater weight of household balances in the total. The behavior of M2 was likely to be affected to some extent by two recent decisions of the Depository Institutions Deregulation Committee (DIDC), effective August 1: one removed rate caps on the 2½-year small saver certificate, enabling the rate to fluctuate with the yield on 2½-year Treasury securities at all levels; and the other eliminated ceilings altogether on small time deposits with initial maturities of four years or more. The rapid growth of money market funds appeared to influence the growth of both M1 and M2, in opposite directions, but the magnitude of the effects was difficult to judge.[26]

At the conclusion of this discussion, the Committee decided to foster the growth of shift-adjusted M1B over the third quarter that would be fast enough to push the growth of this aggregate toward the lower end of its annual range. Accordingly, the Committee adopted the following short-run policy directive.

In the short run the Committee seeks behavior of reserve aggregates consistent with growth of M1B from June to September at an annual rate of 7 percent after allowance for the impact of flows into NOW accounts (resulting in growth at an annual rate of about 2 percent from the average in the second quarter to the average in the third quarter), *provided that growth of M2 remains around the upper limit of, or moves within, its range for the year* (italics added).[27]

The Committee established a growth rate for shift-adjusted M1B that, if achieved, would result in a level of shift-adjusted M1B just above the lower end of its annual range. This policy directive was reaf-

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[23]"Record" (July 1981), p. 568.

[24]The Committee anticipated that the large bulge in the income velocity of M1B would reverse itself later in the year, resulting in a significant increase in the demand for M1B and a correspondingly large increase in the level of M1B later. See "Record" (July 1981), p. 568; "Record" (June 1981), p. 500; and "Record" (September 1981), p. 715.

[25]"Record" (September 1981), p. 713.

[26]Ibid., p. 715.

[27]Ibid., p. 718.

firmed at the August meeting.[28] However, even this growth path was conditional on the M2 proviso, that is, on M2 remaining about or moving within its annual growth rate range.

By the August meeting, the Committee was concerned that new legislative and regulatory changes were likely to alter the relative growth paths of shift-adjusted M1B and M2 still further. In particular, it expressed uncertainty about the effect of the liberalization of interest rate ceilings on small-savers certificates and the then-pending introduction of tax-exempt All-Savers Certificates.[29] It was thought that these developments, especially the All-Savers Certificates, might contribute to a marked acceleration in the growth of M2 during the fourth quarter of the year.[30] Several Committee members expressed concern about relying too much on M2 in view of the potential sources of distortion. At the end of this discussion, the Committee reiterated the short-run objectives it had agreed upon at its July meeting.

Meetings in October through December

At the October meeting, the Committee took particular note of the widening divergence in the behavior of shift-adjusted M1B and the broader monetary aggregates. It continued to express uncertainty about the impact of the recent legislative and regulatory changes on the relative growth paths of the monetary aggregates. Moreover, it noted that the public's desire to hold transactions balances in forms included in M1B apparently had declined. This was evidenced by the unusually high level of M1B velocity, given interest rate levels. While the Committee generally agreed to seek more rapid growth in shift-adjusted M1B, it disagreed about how much more growth was appropriate and how the aggregates should be weighted.

> Committee members agreed on the desirability of continuing to seek more rapid growth in M1B over the remaining three months of 1981, while taking account of the relative strength of the broader aggregates. The observation was made that a pickup in

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[28]"Record" (October 1981), p. 794.

[29]See "Record" (October 1981), p. 792. The Depository Institutions Deregulation Committee (DIDC) removed the interest rate "caps" on 30-month small-savers certificates effective August 1, 1981. The interest ate ceilings on small-savers certificates was allowed to fluctuate with the rate on 30-month Treasury securities. Prior to August 1, the caps were 11.75 percent for commercial banks and 12.00 percent for thrift institutions. The DIDC also approved the introduction of tax-exempt All-Savers Certificates effective October 1, 1981.

[30]"Record" (October 1981), pp. 792-93.

growth of M1B now would reduce the risks of cumulative contraction in activity, which could well be followed by an excessively rapid recovery and expansion.

At the same time, many members expressed the view that very rapid growth of M1B over the few remaining months of the year would contribute to instability and would interfere with achievement of longer-term economic goals. Specifically, such growth most likely would dissipate the gains already made in moderating inflation, exacerbate inflationary expectations, and induce a rebound in interest rates after no more than a temporary decline. Moreover, rapid growth in M1B would significantly increase the risk that the broader monetary aggregates would exceed their ranges for growth over the year by sizable margins, which was a source of concern in light of the uncertainties about the interpretation of the various monetary aggregates in the current circumstances.[31]

At the end of this discussion, the Committee decided to give approximately equal weight to shift-adjusted M1B and M2 in developing short-run policy directives, and voted for more rapid growth in M2. This marked the beginning of the third phase in policy. The growth rate for M2 was established at "10 percent or slightly higher," at least 1 percentage point above the rate established by the M2 proviso of the previous two meetings. In contrast, the Committee established a growth rate of 7 percent for shift-adjusted M1B for the fourth quarter of 1981, the same short-run growth rate it had established for the third quarter.

By the November meeting, the Committee acknowledged that the downward drift in economic activity, which it had noted at the previous meeting, had developed into a recession. It also acknowledged that there was a modest shortfall in the growth of shift-adjusted M1B from the 7 percent rate that the Committee had established in October. Committee members continued to agree on the desirability of seeking somewhat more rapid growth in shift-adjusted M1B and reaffirmed their October growth path for the narrower aggregate. The growth path for M2, however, was increased to "around 11 percent," despite the fact that M2 was above the upper end of its annual range. Furthermore, it was understood that a faster growth of shift-adjusted M1B than specified in the short-run objective was acceptable.

It was understood that somewhat more rapid growth of M1B, consistent with the objective for

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[31]"Record" (December 1981), pp. 908-09.

growth over the fourth quarter adopted at the previous meeting, would be accepted in the event that transaction demands for money proved to be stronger than anticipated; it was also understood that moderate shortfalls from the growth path would not be unacceptable, particularly if broader aggregates continued to expand rapidly.[32]

At the December meeting, the Committee noted that the growth of both shift-adjusted M1B and M2 had accelerated during November, reflecting the growth of other checkable deposits and the non-transactions components of M2. The Committee continued to express uncertainty about the interpretation of the monetary aggregates.

> In the near-term pursuit of the fundamental objective of fostering the financial conditions that would help to reduce inflation and promote recovery in economic activity on a sustainable basis, the Committee continued to face considerable uncertainty about the interpretation of the behavior of the monetary aggregates. Growth of other checkable deposits (OCD) had picked up sharply in November and early December. (Such deposits include NOW accounts and ATS accounts at banks and thrift institutions and credit union share draft accounts.) Moreover, the surge in OCD was accompanied by a renewal of flows into savings deposits at commercial banks and continuation of substantial flows into money market mutual funds, which raised growth of M2 in November to the highest rate so far in 1981. Given the volatility of the behavior of the monetary aggregates in the short run, it seemed that the recent spurt might have resulted partly from an expansion of highly liquid precautionary balances at a time of considerable uncertainty about near-term economic and financial conditions, as well as a response to the lower level of market interest rates in earlier weeks.[33]

After considerable discussion over the appropriate growth rates for the aggregates, the Committee decided to set target ranges for the period November 1981 to March 1982 of "4 to 5 percent" for M1 (previously measured M1B) and "around 9 to 10 percent" for M2. If achieved, this growth of M2 would produce a level of M2 in March 1982 above a

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[32]"Record" (January 1982), p. 42.

[33]"Record" (February 1982), p. 108.

projection of the 11 percent growth rate that the FOMC had voted for at the November meeting. Thus, the apparent reduction in the desired growth rate of M2 is really more expansive when "benchmarked" at the November level of M2 (see chart 5).

CONCLUSIONS

During 1981, the Federal Reserve achieved a substantial reduction in the rate of growth of M1B (both shift-adjusted and unadjusted). In fact, shift-adjusted M1B grew at a rate substantially below the lower bound of its target range for the year. In contrast, the growth rates of the broader monetary aggregates were more rapid than a year earlier.

Monetary policy decisions in 1981 reflect the Committee's commitment to restrain the growth of the monetary aggregates. However, uncertainty about the effect of financial developments on the growth rates of shift-adjusted M1B and M2 and on the relationship between these aggregates and economic activity led to uncertainty about which aggregate is most important to control. As a result, the FOMC twice changed its weighting of shift-adjusted M1B and M2 for the purpose of implementing its short-run policy directives. During most of the year, the Committee allowed shift-adjusted M1B to grow below the bottom of its annual target range when M2 grew within or at the top of its range. In the fourth quarter of the year, M2 was permitted to exceed the top of its annual range when the Committee increased the priority for a faster growth of the narrower aggregate in response to declining economic activity.

Thus, it appears that the most significant question for monetary policymakers in 1981 was which monetary aggregate to control in a financial environment marked by innovation and regulatory change. The impact of such developments on the growth rates of the monetary aggregates, and the relationship between the aggregates and economic performance will undoubtedly be significant policy issues in 1982.

Appendix: Summary of Discussion at Committee Meetings

February 2-3 Meeting

In their discussion of the economic outlook and situation during this meeting, Committee members disagreed on the expected path of real output and unemployment for 1981. However, all members anticipated a somewhat higher inflation rate for 1981.

At this meeting, the Committee completed a review of the long-term growth rates of the monetary aggregates for the period from the fourth quarter of 1980 to the fourth quarter of 1981, as mandated by the Full Employment and Balanced Growth Act of 1978. This discussion began at the December 1980 meeting. Members of the Committee agreed that, in light of their long-standing goals of contributing to a reduction in inflation and providing a basis for the restoration of economic stability and growth in real output, a further reduction in the ranges for monetary growth was appropriate. However, there was concern that the impact of the nationwide introduction of NOW accounts on December 31, 1980, as authorized under the Monetary Control Act of 1980, had changed the relationships among the measured growth rates of the monetary aggregates.

It had been anticipated that shifts into NOW accounts would significantly reduce the growth in M1A and enhance the growth of M1B. However, the experience during the first few weeks in January revealed much larger shifts than anticipated. It was generally concluded that estimates of the impact of such shifts on the measured growth rates of the two monetary aggregates could be only tentative due to the size of and uncertainty about the ultimate source of the funds. Nevertheless, the Committee, abstracting from the NOW account effects, specified ranges for M1A and M1B, one-half percentage point below the 1980 ranges. While the members differed somewhat more in their views about the growth rates for the broader monetary aggregates, the Committee ultimately decided to maintain the 1980 long-term growth rates for M2 and M3 and commercial bank credit in 1981.

Considering the objectives for monetary growth for the intermeeting period, the Committee took particular note of the fact that both M1A and M1B had fallen below their 1981 growth paths during the December-January period. It was generally agreed that open market operations should be directed toward a gradual restoration of the growth in M1A and M1B, adjusted for NOW account effects. Almost all members were willing to accept the continuation of relatively slow growth in relation to the ranges for 1981, at least through March, in recognition that it would generally compensate for the rapid growth during the fourth quarter of 1980, which carried growth for the year slightly above the upper bounds of the ranges.

Thus, the Committee decided to seek growth rates in M1A and M1B that would gradually bring these aggregates within their annual target ranges, with the provision that the Chairman would be notified if a range for the federal funds rate of 15 to 20 percent appeared to be inconsistent with the monetary and related reserve paths.

Late in February, data on M1A and M1B, after adjusting for NOW account shifts, indicated these aggregates were growing at rates well below those consistent with the policy directive. Simultaneously, the growth in M2 and M3 was stronger than anticipated. Also, the federal funds rate had declined to around the 15 percent level. As a result of a telephone conference on February 24, the Committee adopted the following modification to its earlier policy directive:

> In light of the relatively strong growth of M2 and M3 and the substantial easing recently in money market conditions, as well as uncertainties about the interpretation of the behavior of M1, the Committee on February 24 agreed to accept some shortfall in growth of M1A and M1B from the specified rates in the domestic policy directive adopted on February 3 as consistent with developments in the aggregates generally and the objectives for the year.[1]

Note: Citations to "Record of Policy Actions of the Federal Open Market Committee" are referred to as "Record." Money growth rates referred to in this appendix are taken from published minutes of the Committee's meetings for 1981 and, therefore, may not correspond to more recent benchmark revisions. The data reflect information available to the Committee at the time of the meetings.

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[1]"Record" (April 1981), p. 318.

Organization of the Committee in 1981

The Federal Open Market Committee (FOMC) consists of 12 members: the seven members of the Federal Reserve Board of Governors and five of the 12 Federal Reserve Bank presidents. The Chairman of the Board of Governors is, by tradition, also chairman of the Committee. The president of the New York Federal Reserve Bank is, also by tradition, its vice chairman. All Federal Reserve Bank presidents attend Committee meetings and present their views, but only those presidents who are members of the Committee may cast votes. Four memberships rotate among Bank presidents and are held for one-year terms beginning March 1 of each year. The president of the New York Federal Reserve Bank is a permanent voting member of the Committee.

Members of the Board of Governors at the beginning of 1981 included Chairman Paul A. Volcker, Frederick H. Schultz, Henry C. Wallich, J. Charles Partee, Nancy H. Teeters, Emmett J. Rice and Lyle E. Gramley. The following presidents served on the Committee during January and February 1981: Roger Guffey (Kansas City), Frank E. Morris (Boston), Lawrence K. Roos (St. Louis) and Willis J. Winn (Cleveland). The Committee was reorganized in March and the four rotating positions were filled by: Edward G. Boehne (Philadelphia), Robert H. Boykin (Dallas), E. Gerald Corrigan (Minneapolis), Silas Keehn (Chicago).[1]

The Committee met eight times during 1981 to discuss, among other things, economic trends and to decide upon the future course of open market operations.[2] As in previous years, however, telephone or telegram consultations were held occasionally between scheduled meetings. During each regularly scheduled meeting, a directive was issued to the Federal Reserve Bank of New York. Each directive contained a short review of economic developments, the general economic goals sought by the Committee, and instructions to the Manager of the System Open Market Account at the New York Bank for the conduct of open market operations. These instructions were stated in terms of short-term rates of growth of M1A, shift-adjusted M1B and M2 that were considered to be consistent with desired longer-run growth rates of the monetary aggregates.[3] The Committee also specified intermeeting ranges for the federal funds rate. These ranges provide a mechanism for initiating consultations between meetings whenever it appears that fluctuations within the specified range is proving inconsistent with the objectives for the behavior of the monetary aggregates.

The Account Manager has the major responsibility for formulating plans regarding the timing, types and amount of daily buying and selling of securities in fulfilling the Committee's directive. Each morning the Manager and his staff plan the open market operations for that day. This plan is developed on the basis of the Committee's directive and the latest developments affecting money and credit market conditions, growth of the monetary aggregates and bank reserve conditions. The Manager then informs staff members of the Board of Governors and one voting president about present market conditions and open market operations that he proposes to execute that day. Other members of the Committee are informed of the daily plan by wire.

The directives issued by the Committee and a summary of the reasons for the Committee actions are published in the "Record of Policy Actions of the Federal Open Market Committee." The "Record" for each meeting is released a few days after the following Committee meeting. Soon after its release, the "Record" appears in the *Federal Reserve Bulletin.* In addition, "Records" for the entire year are published in the *Annual Report of the Board of Governors.* The "Record" for each meeting during 1981 included:

1) A staff summary of recent economic developments — such as changes in prices, employment, industrial production, and components of the national income accounts — and projections of general price, output, and employment developments for the year ahead;

2) A summary of recent international financial developments and the U.S. foreign trade balance;

3) A summary of recent credit market conditions and recent interest rate movements;

4) A summary of open market operations, growth of monetary aggregates and bank reserves, and money market conditions since the previous meeting;

5) A summary of the Committee's discussion of current and prospective economic and financial conditions and of current policy considerations, including money market conditions and the movement of monetary aggregates;

6) Conclusions of the Committee;

7) A policy directive issued by the Committee to the Federal Reserve Bank of New York;

8) A list of the members' voting positions and any dissenting comments;

9) A description of any actions and consultations that may have occurred between the regularly scheduled meetings.

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[1]Mr. Keehn took office as President of the Chicago Bank on July 1, 1981 and subsequently became a voting member of the FOMC. From March to June, Mr. Winn voted as an alternate member.

[2]No formal meetings were held in January, April, June or September of 1981.

[3]At the March 31 meeting of the Committee, short-term growth objectives for M1A were discontinued.

March 31 Meeting

The Committee's discussion of policy for the immediate future focused on two interrelated issues: the desired rate of growth of narrowly defined money, and the appropriate weight for M2 in implementing policy. It was suggested that the slow rate of growth of M1B during the early months of the year might be a misleading indicator of the growth rate of transactions balances over this period. It was argued that some part of money market mutual funds might be regarded as transactions balances. Thus, the rapid growth in these funds might indicate a faster growth in transactions balances than the growth rate of measured M1B would show.

The Committee also noted that shifts into money market accounts would probably continue to distort the growth of M1B to an unpredictable extent. Thus, the Committee agreed to the following change in procedure:

> In evaluating the behavior of the aggregates, it was agreed that greater weight than before would be given to the behavior of M2.[2]

On May 6, the Committee held a telephone conference. Available data showed a sharp increase in the rate of growth of M1B, pushing it to about the midpoint of the 3½ to 6 percent range established for 1981. The growth of M2 had decelerated slightly in April; however, it continued to expand at a relatively rapid rate. Simultaneously, it was reported that the reserves supplied through open market operations declined substantially, putting strong pressure on banks' reserve positions. As a result, borrowings from the Federal Reserve increased sharply in late April and early May, the federal funds rate increased from 13 to 14 percent and the surcharge was increased from 3 to 4 percent, effective May 5. Due to the short time before the next regularly scheduled meeting on May 18, the Committee agreed to maintain the short-run objectives for monetary growth established at the March 31 meeting.

May 18 Meeting

The staff projections presented at this meeting indicated that the sharp upturn in real GNP that occurred in the first quarter of the year would moderate over the rest of 1981. However, a number of Committee members expressed the opinion that the expansion in economic activity over the remainder of the year was likely to exceed earlier expecta-

tions. It was generally agreed that there was a need to reduce the growth rates of the monetary aggregates quickly in order to maintain a posture of monetary restraint.

> In considering objectives for monetary growth over the remainder of the quarter, the members in general agreed that a posture of restraint needed to be maintained. They generally agreed with the view that it was particularly important to reduce growth of the monetary aggregates rather quickly, and initial differences in views concerning the precise specifications for monetary growth were relatively narrow. In the discussion a number of points were emphasized. The indications of continuing strength in economic activity combined with the recent exceptional rise in the income velocity of money posed the risk of pressure for excessive expansion in money and credit as the year developed. Growth of the broader monetary aggregates was already somewhat high relative to the Committee's ranges for the year. The indications of some slowing of the rise in the consumer price index did not appear to reflect as yet any clear relaxation of underlying inflationary pressures, and emphasis was placed on the importance of conveying a clear sense of restraint at a critical time with respect to inflation and inflationary expectations.[3]

Thus, the Committee reduced the short-run growth rate ranges rather sharply from the levels established at the March 31 meeting.

> In the short run the Committee seeks behavior of reserve aggregates consistent with a substantial deceleration of growth in M1B from April to June to an annual rate of 3 percent or lower, after allowance for the impact of flows into NOW accounts, and with growth in M2 at an annual rate of about 6 percent. The shortfall in growth of M1B from the two-month rate specified above would be acceptable, in light of the rapid growth in April and the objective adopted by the Committee on March 31 for growth from March to June at an annual rate of 5½ percent or somewhat less.[4]

July 6-7 Meeting

In accordance with the provisions of the Full Employment and Balanced Growth Act of 1978, the Committee reconsidered its long-term growth ranges for the monetary aggregates from the fourth quarter 1980 to the fourth quarter 1981 and gave preliminary consideration to its long-run ranges for the fourth quarter 1981 to the fourth quarter 1982. It cited the recent unexpected strength in the economy and the need to reduce the rate of inflation as the primary considerations that influenced its choice of long-run ranges.

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[2]"Record" (June 1981), p. 501.

[3]"Record" (July 1981), p. 568.

[4]Ibid., p. 569.

In the Committee's discussion of the longer-run ranges, the members were in agreement on the need to maintain a policy of restraint. However, continuation of the increase in velocity of M1B at the rate of the first half seemed unlikely, and thus the public's demand for narrowly defined money would probably pick up in the second half. Moreover, a significantly more rapid increase in narrowly defined money would be necessary to reach the Committee's objective for the year. At the same time, it was observed that the present situation provided a critical opportunity to sustain the signs of progress in reducing the rate of inflation, an opportunity that could be lost if monetary growth in the months ahead became too rapid. Even if rapid monetary expansion should lower interest rates, which was debatable, such effects would likely be temporary, and latent demands for goods and services would be released at the potential cost of a still more difficult period of high interest rates and financial strains later. The point was made that lasting declines in nominal interest rates and a solid base for sustained growth would depend on convincing progress in reducing inflation.[5]

In reaffirming the fourth quarter 1980 to fourth quarter 1981 growth rate ranges for the monetary aggregates established during the February meeting, the Committee expected that the growth in M1B for the year would be near the lower end of its annual range, while growth in the broader monetary aggregates might be high in their ranges.[6]

In the Committee's discussions of policy for the short run, it argued for faster growth in M1B, that would permit third-quarter growth in this aggregate toward the lower end of its range for the year.

However, the Committee wanted to be cautious, avoiding too rapid a rebound in M1B. It was argued that too rapid expansion in M1B would need to be sharply reduced later and might tend to raise the growth in M2 above the upper end of its target range for the year. Thus, the Committee introduced the following M2 proviso into its domestic policy directive.

In the short run the Committee seeks behavior of reserve aggregates consistent with growth of M1B from June to September at an annual rate of 7 percent after allowance for the impact of flows into NOW accounts (resulting in growth at an annual rate of about 2 percent from the average in the second quarter to the average in the third quarter), *provided that growth of M2 remains around the upper limit of, or moves within, its range for the year* (italics added).[7]

[5]"Record" (September 1981), pp. 715-16.

[6]Ibid., p. 716.

[7]Ibid., p. 718.

August 18 Meeting

In discussion of policy for the immediate future, the Committee engaged in a lengthy discussion of the impact of financial developments on the growth paths of the monetary aggregates. In particular, the impact of recent legislation and regulatory developments on the growth rate of M2 was questioned.

Among the uncertainties in question were the further impact on M2 of the liberalization of interest rate ceilings on small saver certificates, the continuing attractiveness of money market mutual funds, and the extent to which payments to stockholders as a result of recent merger activities were being invested in nontransaction-type accounts included in M2. Even more difficult to assess was the impact of the introduction of tax exempt "all saver" certificates on October 1, 1981; those certificates could well contribute to a marked acceleration in M2 growth during the fourth quarter, but in the interim measured M2 might be artificially lowered to the extent that funds earmarked for investment in these new instruments were being temporarily accumulated in repurchase agreements with October 1 maturities.[8]

The view was expressed that, because of the increasing difficulty in interpreting the performance of the monetary aggregates, one might argue that more weight should be given to interest rates in evaluating monetary policy. However, it was argued that an attempt to stabilize or reduce interest rates might be counterproductive if it forced excessive monetary expansion and then encouraged inflation expectations. Some members of the Committee had expressed the belief that there were signs that inflation expectations were beginning to abate. Several members expressed concern about placing too much emphasis on M2, given the potential sources of distortion of this aggregate. Nevertheless, the Committee's short-run domestic policy directive contained an M2 proviso.

In the short run the Committee continues to seek behavior of reserve aggregates consistent with growth of M1B from June to September at an annual rate of 7 percent after allowance for the impact of flows into NOW accounts (resulting in growth at an annual rate of about 2 percent from the average in the second quarter to the average in the third quarter), *provided that growth of M2 remains around the upper limit of, or moves within its range for the year* (italics added).[9]

[8]"Record" (October 1981), p. 792.

[9]Ibid., p. 794.

Much of the discussion at this meeting centered on concerns over the appropriate weighting of the monetary aggregates given their divergent growth paths. This discussion followed along lines similar to the August meeting. It was decided that equal weight would be given to movements in M1B and M2. The M2 proviso, which had first appeared in July domestic policy directive, did not appear in the policy directive for this meeting.

> The Committee recognized that the behavior of that aggregate would be affected by the recent regulatory and legislative changes, particularly the public's response to the availability of the all savers certificate. In developing related reserve paths, approximately equal weight would be given to the movements in M1B and M2. It was understood that if these objectives were realized, growth of M1B from the fourth quarter of 1980 to the fourth quarter of 1981 would remain below the Committee's range for the year, while growth of M2 would equal or slightly exceed the upper end of its range.[10]

There was a general consensus that real GNP was drifting downward and would likely continue to follow this general path into mid-1982. It was noted that a more rapid expansion of M1B growth would reduce the risk of a cumulative contraction in real economic activity. However, many Committee members expressed concern that too rapid expansion of M1B over the remaining months of the year might exacerbate inflation expectations, thus dissipating gains in moderating inflation made so far during the year. It was feared that this would cause interest rates to rise after no more than a temporary decline.

November 17 Meeting

There was a general consensus among Committee members that the downward drift noted at the October meeting had developed into a recession. The weakness in the economy had begun to spread and intensify. However, it was thought that the scheduled reductions in federal income taxes, the projected increase in expenditures for national defense and falling interest rates would generate an upturn in economic activity sometime in mid-1982.

At the same time, the Committee remained concerned that inflationary tendencies remained strong. It was emphasized that inflation expectations would have a significant impact on long-term interest rates and, thus, the ability of the economy to sustain a recovery. Thus, the Committee decided to pursue a somewhat more rapid growth of M1B provided the broader aggregates did not expand too rapidly.

> Committee members continued to agree on the desirability of seeking somewhat more rapid growth in M1B, while taking account of the relative strength of the broader monetary aggregates. At the same time, however, questions were raised about how aggressively more rapid growth in M1B should be pursued in the short period before the end of the year. The view was expressed that objectives for growth of M1B over that interval should take account of the desirability of a smooth transition to the targets for monetary growth tentatively established for 1982 as well as the relatively rapid growth in the broader aggregates. While recognizing the variability of demands for money over the short run, many members thought that an aggressive effort to stimulate M1B growth over November and December at a pace sufficiently rapid to compensate for the shortfall in October would interfere with achievement of longer-term economic goals and would risk overly rapid expansion of money and credit in later months, particularly if the effort were accompanied by the precipitous decline in short-term interest rates to levels that might not be sustainable. Such a decline in short-term rates could exacerbate inflationary expectations and abort a desirable downtrend in bond yields and mortgage interest rates. . . . It was understood that somewhat more rapid growth of M1B, consistent with the objective for growth over the fourth quarter adopted at the previous meeting, would be accepted in the event that transaction demands for money proved to be stronger than anticipated; it was also understood that moderate shortfalls from the growth path would not be unacceptable, particularly if broader aggregates continued to expand rapidly.[11]

The range for the federal funds rate was narrowed to 4 percentage points, 11 to 15 percent.

December 21-22 Meeting

In the Committee's discussion of the economic situation and outlook, the consensus was that real GNP was declining substantially in the current quarter. It was observed that the risk of further significant contraction in the automobile and housing industries appeared small. Furthermore, it was noted that the already legislated income tax reductions were likely to contribute to an upturn in economic activity by the middle of 1982.

With respect to the monetary aggregates, it was noted that shift-adjusted M1B had expanded in

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[10]"Record" (December 1981), p. 909.

[11]"Record" (January 1982), p. 41-42.

November and early December to levels somewhat above the levels established at the previous meeting. Nevertheless, the growth of shift-adjusted M1B from the fourth quarter of 1980 to the fourth quarter of 1981 was about 2 percent, about 1½ percentage points below the lower end of the annual range. Growth in M2 for November was at the highest rate thus far in 1981, reflecting a surge in its non-transactions component in addition to the recent strength in M1B. Growth over the year was estimated at about 9½ percent, somewhat above the upper bound of its annual range.

In discussing the near-term policy objectives, the Committee noted that its fundamental objective is to foster financial conditions that would help reduce inflation and promote economic recovery on a sustainable basis. However, the Committee continued to face considerable uncertainty about the interpretation of the behavior of monetary aggregates and, therefore, the desired growth rate.

Growth of other checkable deposits (OCD) had picked up sharply in November and early December. (Such deposits include NOW accounts and ATS accounts at banks and thrift institutions and credit union share draft accounts.) Moreover, the surge in OCD was accompanied by a renewal of flows into savings deposits at commercial banks and continuation of substantial flows into money market mutual funds, which raised growth of M2 in November to the highest rate so far in 1981. Given the volatility of the behavior of the monetary aggregates in the short run, it seemed that the recent spurt might have resulted partly from an expansion of highly liquid precautionary balances at a time of considerable uncertainty about near-term economic and financial conditions, as well as a response to the lower level of market interest rates in earlier weeks.

Some members stressed the desirability of specifying growth rates for both M1 and M2 for the four-month period that would be within the ranges that had been tentatively adopted for 1982, partly with a view to avoid any possible misunderstanding of the Committee's objectives in the period before completion of the review of its growth ranges for 1982. Other members stressed the importance of avoiding an abrupt deceleration of monetary growth in the first quarter of 1982, particularly if accompanied by upward interest rate pressures, because such developments might well hamper recovery in economic activity. A number of members were willing to accept relatively rapid growth in the period ahead, to the extent that it reflected a continuation of the recent behavior of other checkable deposits and this might reflect expansion in its sizable savings component.[12]

At the conclusion of this discussion, the Committee established growth rates for M1 and M2 of 4 to 5 percent and "around 9 to 10 percent," respectively.

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[12]"Record" (February 1982), p. 108.

Recent Financial Innovations: Have They Distorted the Meaning of M1?

JOHN A. TATOM

FEDWATCHERS and economic policymakers have been sorely taxed by financial innovations in recent years.[1] Attempts to assess both the appropriate narrow monetary aggregate and its growth have been complicated by the introduction of new types of checkable deposits and new definitions of the narrow aggregate.[2]

In November 1978, automatic transfer services (ATS) were legalized nationwide, allowing checkable deposits to be held in savings accounts. In October 1979, the Fed changed its monetary policy procedures to better control the growth of monetary aggregates and, four months later, redefined the monetary aggregates. In January 1981, negotiable order of withdrawal (NOW) accounts became legal nationwide. The flood of funds to these accounts from demand deposits led to a wide divergence in the growth rates of the newly defined aggregate M1B, which included both demand deposits and other checkable deposits like ATS and NOW balances, and M1A, which excluded the latter balances.

Further complicating the problem of assessing the growth of a narrow aggregate and its implications, the Board of Governors of the Federal Reserve System introduced a shift adjustment of M1B in response to the nationwide introduction of NOW accounts. For monetary control, the narrow aggregate target for 1981 was stated in terms of this new measure by the Federal Open Market Committee. The shift adjustment was intended to remove the distorting effects on M1B growth of shifts of non-

transactions or savings balances into that aggregate. In January 1982, the distinction between M1A and M1B was dropped so that today one aggregate, M1, is used for a narrow aggregate target. The new M1 measure is the same as the M1B measure (not shift-adjusted) used in 1981.

This article examines the effect of the 1981 shift to NOW accounts on the monetary aggregates and its implications. The experience with the introduction of ATS accounts is also reviewed, since some of the issues raised by shifts to NOW accounts applied to ATS.

Whether M1B, shift-adjusted M1B, or M1A is considered the relevant narrow aggregate for monetary policy is important in evaluating the direction of policy. For example, while all three measures slowed in 1981, the extent of the slowing differed widely. Slower growth of the money stock causes slower growth of total spending in the economy and, after a period of time, reduced inflation. Thus, the extent of slowing in spending and inflation that can be expected from monetary actions in 1981 depends on which measure of the narrow aggregate most closely corresponds to narrow aggregate measures that existed prior to the introduction of nationwide NOW accounts.

Clearly, many financial innovations have concerned economic analysts. None, however, have so affected the measurement and assessment of narrow monetary aggregates as the introduction of ATS and NOW. In addition, most other innovations generally have predated the changes mentioned above; these other innovations have had greater effects on credit markets and broader monetary aggregates than on the demand and supply of transactions balances. For example, in 1981 considerable attention was paid to the accelerating and above-target growth of the broad aggregate M2 (M1B plus small time and savings, money market mutual fund shares, overnight repurchase agreements (RPs) at commercial banks, and overnight Eurodollar deposits of U.S.

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[1]See especially, Kenneth H. Bacon, "Fed in a Fix," *Wall Street Journal*, January 22, 1982, for a discussion of recent innovations and some of the confusion felt by policymakers. Also, a general discussion of past financial innovations and the potential problems for measurement and policy can be found in Barbara Bennett and Joseph Bisignano, "Apples, Oranges, and Money: I" and "Apples, Oranges, and Money: II," Federal Reserve Bank of San Francisco *Weekly Letter*, January 22 and 29, 1982.

[2]A narrow aggregate is a measure of the money stock or funds held as media of exchange. A broader aggregate includes, in addition, other highly liquid funds that are held at financial institutions.

nonbank residents at Caribbean branches of member banks).[3] The M2 acceleration is related to the growth of money market mutual funds, an innovation dating back to the early '70s. Neither the growth of M2 nor money market mutual funds is discussed here.[4]

THE ATS EXPERIENCE

Before the automatic transfer service for savings deposits at commercial banks was introduced, the only transaction accounts at commercial banks that were not classified as demand deposits were NOW accounts in New England.[5] The shift to ATS accounts had two important effects on the money supply process. First, as transactions balances were shifted from demand deposit accounts into ATS accounts, a narrow monetary aggregate like the old M1 or M1A, which both exclude ATS balances, tended to fall; a broader measure such as current M1 (M1B) or M2, which include ATS balances, was not affected for definitional reasons.[6]

Second, the introduction of ATS changed the total *required* reserves of commercial banks. Deposits held in ATS accounts at member banks were subject to the required reserve ratio for savings deposits, instead of the higher required reserve ratio for demand deposits. As a result, the movement of funds from demand deposits into ATS accounts tended to reduce the required reserves in the banking system. This reduction in required reserves, as expected, led to increases in M1B and M2, and partially offset the

decline in old M1 and M1A caused by the shift to ATS deposits.[7]

From October 1978 to October 1979, other checkable deposits (largely NOW accounts in New England, New Jersey and New York, and ATS deposits) increased from 2.5 percent to 6.3 percent of total checkable deposits. This shift slowed M1A growth by about 2.4 percentage points and raised M1B growth by about 0.5 percentage points from what otherwise would have occurred.[8] M1A grew only 4.8 percent from October 1978 to October 1979, about the same as the old measure of M1, which grew 5.2 percent but considerably slower than the 7.9 percent growth of old M1 over the prior two years. M1B, however, grew 7.9 percent over the same period, the *same* rate of growth that it and the old measure of M1 registered over the prior two years.

The differing effects of the introduction of ATS accounts on the growth of the monetary aggregates were important in assessing monetary policy as well. The growth of M1B did not slow during the first year of ATS; it continued, instead, at the record pace of expansion of the prior two years. Thus, judged by this measure, the influence of monetary aggregates on total spending and inflation remained unchanged. In fact, inflation continued the upward spiral set in motion by the acceleration of money stock growth that began in mid-1976. Similarly, nominal GNP grew at an 11 percent rate from III/1978 to III/1979, little changed from its 11.9 percent rate over the prior four quarters. If one had focused upon old M1 or M1A developments, however, the direction of monetary actions would have appeared extremely restrictive. Consequently, a sharp reversal of both rapid GNP growth and accelerating inflation would have been expected.[9] Neither, in fact, occurred.

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[3]In 1982 this measure was changed to exclude some money market mutual fund balances. Only general purpose and broker/dealer balances are included.

[4]The primary reason for ignoring the growth of M2 in 1981 is that it is not closely related to spending or inflation. For example, M2 growth slowed steadily from 1976 to 1980, while spending and inflation accelerated. In 1980-81, M2 growth accelerated, while inflation and spending began to slow. The correlation coefficient for the growth of M2 and GNP measured for over four-quarter periods ending in each quarter from I/1978 to IV/1981 is only 0.07, indicating no relationship whatsoever. For more detailed analyses, see Keith M. Carlson and Scott E. Hein, "Monetary Aggregates as Monetary Indicators," this *Review* (November 1980), pp. 12-21; and R. W. Hafer, "Much Ado About M2," this *Review* (October 1981), pp. 13-18.

[5]The legislation permitting nationwide ATS also extended NOW accounts to New York State beginning in November 1978, and New Jersey beginning in late 1979. Previous legislation allowed NOW accounts in Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont.

[6]Both old M1 and M1A include currency in the hands of non-bank public and demand deposits at commercial banks. Old M1 included deposits of foreign official institutions as well. M1B is M1A plus other checkable deposits at all financial institutions including ATS and NOW balances.

[7]When ATS was introduced in November 1978, the monetary aggregate measures M1A and M1B were not in use. The aggregate measure M1A, however, is little different from the old measure M1. The analysis of the effects of ATS on an M1A and M1B aggregate are described more fully by John A. Tatom and Richard W. Lang, "Automatic Transfers and the Money Supply Process," this *Review* (February 1979), pp. 2-10.

[8]See Tatom and Lang, "Automatic Transfers," pp. 7-9.

[9]Shift adjustment of M1B makes little difference in the assessment of monetary policy in 1978-79. If 30 percent of ATS balances were considered idle savings balances, an appropriately adjusted M1B would have grown by 7.0 percent from October 1978 to October 1979, less than 1 percent below actual M1B growth. See Tatom and Lang, "Automatic Transfers," p. 7, especially footnote 14. This difference would have little effect on inflation or spending developments in 1979. The shift to ATS was not large enough to provide even a weak test of whether M1B should be shift-adjusted, but it did raise the issue.

The proportion of checkable deposits held in other checkable deposits continued to rise after the first year of transition to ATS. From October 1979 to October 1980, the ratio rose from 6.3 percent to 8.5 percent; by December 1980, it had reached 9.1 percent. With the introduction of nationwide NOW accounts in January 1981, however, this proportion skyrocketed: by December 1981, it had climbed to 24.6 percent. Such a large shift produced large differences in growth rates between M1B and M1A, and between M1B and a shift-adjusted M1B.

NATIONWIDE NOW ACCOUNTS AND THE MONEY SUPPLY PROCESS

The introduction of nationwide NOW accounts affected the growth of monetary aggregates somewhat differently than did ATS accounts. New NOW accounts at *all* financial institutions were immediately subject to a 3 percent reserve requirement on the first $25 million of these balances (an indexed threshold that changes every January beginning in 1982) and a 12 percent requirement on transactions balances in excess of this. The reserve requirement for new NOW accounts exceeds those for other transaction accounts at non-member financial institutions until the phase-in of reserve requirements on other transactions balances is completed in 1987. Thus, shifts of other transaction accounts or personal savings balances at these institutions to NOW accounts will raise required reserves.

Under the phase-down of reserve requirements on demand deposits at member banks, reserve requirements on demand deposits initially exceeded, at some banks, even the top reserve requirement (12 percent) for NOW balances, so a shift of funds to NOW accounts could have increased reserve requirements. At the same time, the reserve requirement on personal savings at member banks was lower than the minimum on NOW balances, so a shift from these funds raised reserve requirements. The important point, however, is that there was no systematic shift of checkable deposits to lower reserve deposit categories as was the case with ATS when checkable deposits moved into "savings balances" and thereby raised the M1B multiplier.

The principal effect of the transition to nationwide NOW accounts on the growth of specific monetary aggregates is definitional. That is, as NOW accounts are increased by switching funds from balances included in an aggregate like M1A that excludes

NOW balances, the aggregate will decline relative to monetary aggregates such as M1B or M2 that include both the source of the funds and the newly created NOW deposits. The required reserve ratio reduction associated with ATS does not occur with NOW accounts so that no unusual rise in the M1B multiplier occurs as a result. Moreover, most of any reserve requirement increase associated with a shift to NOW accounts is due to new reserve requirements on those funds. Given the source base, the effect of such a reserve requirement increase on monetary aggregates is reflected in a reduction in the adjusted monetary base (the source base adjusted for reserve requirement changes) instead of the money multiplier. Thus, if the level or growth rate of the adjusted monetary base is unchanged, there is no positive effect of a shift to NOW accounts on the level or growth of M1B or M2.

SHIFT-ADJUSTED M1B

The shift-adjusted M1B measure was introduced in Chairman Volcker's report to Congress on monetary policy on February 25, 1981.[10] Shift-adjusted M1B is simply M1B minus an estimate of the other checkable deposit account balances that originate from shifts of non-demand deposit funds. The conceptual rationale for this measure is to achieve a "purer" measure of transactions balances by removing balances that previously had been held for non-transaction motives. It was estimated that 22.5 percent of seasonally unadjusted other checkable deposit increases were associated with shifts from deposits other than demand in January 1981; this figure rose to 27.5 percent in subsequent months.

The estimate of the size of the shift is based on several surveys of depository institutions and households and econometric techniques. The depository institutions sampled included 100 commercial banks which provided data on the sources of new NOW balances in January-April of 1981. In May 1981, 400 banks were sampled. A sample of 100 savings and loan associations was conducted in January, March and May. In addition, a sample of about 700 households provided survey information

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[10]See Paul A. Volcker, "Monetary Policy Report to Congress," *Federal Reserve Bulletin* (March 1981), pp. 195-208. In March the Fed began releasing information on shift-adjusted M1B in footnotes to the Federal Reserve Statistical Release H.6. A fuller discussion of the adjustment was presented in the May 15, 1981, H.6 release and in "Recent Revisions of the Money Stock," *Federal Reserve Bulletin* (July 1981), pp. 539-42. Beginning May 22, 1981, monthly data on M1B shift-adjusted began to appear in table 1 of the H.6 release.

Table 1
Levels of Selected Monetary Aggregate Measures
(billions of dollars)

Month	M1A[1]	M1B[2]	Other checkable deposits	Shift-adjusted M1B	M1B less shift-adjusted M1B
December 1980	$387.6	$414.5	$26.9	$414.5	$0.0
January 1981	374.6	417.9	43.2	414.4	3.5
February	366.2	419.4	53.3	413.4	6.0
March	365.0	424.4	59.5	416.8	7.6
April	366.8	433.3	66.5	423.6	9.7
May	364.0	429.2	65.2	420.1	9.1
June	361.6	428.4	66.7	418.8	9.6
July	361.4	429.4	68.0	419.5	9.9
August	361.6	431.1	69.4	420.9	10.2
September	360.1	431.2	71.2	420.7	10.5
October	361.3	432.9	71.6	422.2	10.7
November	361.8	436.4	74.7	425.0	11.4
December	363.8	440.9	77.0	428.7	12.2

[1]Currency, travelers checks and demand deposit components of M1.
[2]Now called M1.
SOURCE: *Federal Reserve Statistical Release* H.6, February 12 and 19, 1982.

to the Survey Research Center of the University of Michigan in February, March and April. In June, the Center surveyed 5,000 more households. Finally, a statistical estimate of the simple linear relationship of changes in other checkable deposits to changes in demand deposits was conducted using cross-section weekly data for 9,000 weekly reporting banks.

The effect of the shift adjustment of M1B in 1981 is shown in table 1. The difference between M1A and M1B is other checkable deposits. The difference between shift-adjusted M1B and M1B is the imputed increment of other checkable deposits that arose from non-transactions balances (for the purpose of computing shift-adjusted M1B, all other checkable deposits prior to 1981 are treated as transactions balances). Other checkable deposits surged upward by $50.2 billion from December 1980 to December 1981, but $12.2 billion of this increase is estimated to have come from non-transactions balances, according to the Board staff.

The increase in NOW accounts and its subsequent impact on the monetary aggregates were greatest from December 1980 to April 1981. Table 2 shows the annual growth rates of actual and shift-adjusted M1B for each month of 1981. The differences in the growth rates are quite large from January to April,

but the growth rates are similar thereafter. From December 1980 to April 1981, M1B grew at a 14.2 percent average annual rate, 7.5 percentage points faster than shift-adjusted M1B. From April to December 1981, M1B slowed to a 2.6 percent rate of increase and shift-adjusted M1B slowed to a 1.8 percent rate, a difference of only 0.8 percentage points.

THE CONTROVERSY OVER THE SHIFT ADJUSTMENT OF TRANSACTIONS BALANCES

Whether the shift adjustment of M1B is useful in conducting and assessing monetary policy is essentially an empirical issue. Proponents of removing some of the NOW accounts from the narrow monetary aggregate M1B argue that these balances are not transactions balances since they were shifted from savings. These "idle" balances, they argue, are held in NOW accounts simply to satisfy minimum balance requirements.[11] Critics of shift adjustment readily

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[11]Michael Bazdarich, "Has the Fed Been Too Tight?" *American Banker*, May 28, 1981, pp. 4 and 8, argues that the shift adjustment was *understated* by the Board so that "true" money grew even slower than the reported shift-adjusted measures.

Table 2

Growth Rates of Actual and Shift-Adjusted M1B in 1981

Month	M1B	Shift-adjusted M1B	Difference
January	10.3%	−0.3%	10.6%
February	4.4	−2.9	7.3
March	15.3	10.3	5.0
April	28.3	21.4	6.9
May	−10.8	−9.5	−1.3
June	−2.2	−3.7	1.5
July	2.6	2.0	0.6
August	4.9	4.1	0.8
September	0.3	−0.6	0.9
October	4.8	4.4	0.4
November	10.1	8.3	1.8
December	12.8	11.0	1.8

admit that such idle balances exist. They point out, however, that idle balances have always been held in transaction accounts without obvious or perverse effects on the "moneyness" of the total transactions balances.

Moreover, estimates of the proportion of other checkable deposits that shifted from nontransactions balances are flawed. Suppose an individual opens a NOW account by transfering only savings deposits. This would *not* demonstrate that the NOW balance is not a transaction balance. Indeed, the individual could write checks only on the NOW account while maintaining, during some transition period, an existing demand deposit balance to allow outstanding checks to clear before closing the account. The remaining demand deposit funds could then be switched back to savings. Alternatively, an individual could use currency to open a NOW deposit and rebuild currency holdings with funds that would formerly have been deposited in a demand deposit account.

The source of the *initial* funds used to open a NOW account, whether from currency, from demand deposits or from some savings medium at a financial institution, is irrelevant in determining whether the full amount or some fraction thereof should be counted as money. What matters is whether the optimal holdings of financial assets such as currency, checkable deposits, or savings balances are affected by NOW deposits. The *initial* transaction considered alone does not reveal whether holdings of checkable deposits have been artificially inflated by funds held for saving purposes or, equally important, whether holdings of such inflated balances have affected the relationship of spending to measured money holdings.

To correctly assess the extent to which recent financial innovations have affected the quantity or quality of transactions balances, one must examine whether the fundamental relationships that affect the composition and use of money have been altered by the inclusion of all other checkable deposits in a narrow aggregate measure. Three such relationships are examined below: the demand for currency relative to checkable deposits, the ratio of debits against checkable deposits to the average level of checkable deposits (turnover), and the velocity of money.

The Currency Ratio

An important determinant of the money multiplier and, hence, monetary aggregates, is the currency ratio, the holdings of currency relative to checkable deposits. Prior to the financial innovations that allow more explicit interest payments, this ratio was measured as the ratio of currency to demand deposits. Since these financial innovations, the relevant aggregate for assessing currency demand has been the portion of total checkable deposits that is transactions balances.

This ratio is of interest for two reasons. First, currency holdings are part of the monetary base. Given the monetary base, changes in the currency held outside of financial institutions are mirrored in offsetting changes in the base holdings (reserves) of these institutions. Changes in the reserves of financial institutions, in turn, affect their ability to supply the deposit components of monetary aggregates. Thus, movements in currency demand affect the relationship between the monetary base and the stock of monetary aggregates.

Second, currency is a transactions medium. Its ratio to checkable deposits indicates the relative attractiveness of currency as money. The usefulness of currency and transfers of funds through financial institutions in facilitating exchanges are not identical. Further, the types of exchanges for which currency or checkable deposits are superior are not necessarily equally responsive to the growth of overall

economic activity or spending.[12] Thus, economic theory indicates that, given the technology of the payments process and portfolio preferences, the ratio of currency to checkable deposits should depend on the relative cost of holding and using currency in transactions and on movements in real income.

Now if some portion of checkable deposits are suddenly held for reasons *unrelated* to their usefulness in transactions, then the currency ratio that uses total checkable deposits in its denominator should decline relative to one with only transactions balances in the denominator. Thus, if a shift adjustment of M1B is appropriate, one should observe an unusual downward movement of the currency ratio without adjustments for the shift.[13] This, in turn, should result in an unusual rise in the money multiplier, the link between the monetary base and all monetary aggregates (not shift adjusted).[14]

There were, however, no unusual movements in the ratio of currency to total checkable deposits in 1981. The ratio did not decline sharply with the introduction of NOW accounts. At the end of 1980, the ratio stood at 39.02 percent. It rose to 39.12 percent in the first quarter of 1981, fell slightly in the second quarter to 38.93 percent, rose to 39.52 percent in the third quarter and fell to 39.33 percent in the fourth quarter. On an annual average basis, the ratio was 39.23 percent in 1981, little different from the 39.10 percent average in the prior year.

The ratio of total checkable deposits to shift-adjusted total checkable deposits rose from 1.019 in the first quarter of 1981 to 1.032 in the second quarter, 1.035 in the third and 1.038 in the final

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[12]A model of the currency ratio that emphasizes the positive relationship of relative currency demand to interest rates and the inverse relationship with real income growth is presented in the appendix to the article. This model is used to assess whether shifts of non-transactions balances to other checkable deposits have affected currency demand relative to other transactions balances.

[13]To the extent that nationwide NOW accounts offered an opportunity for lower-cost checkable deposits, the ratio of currency to total checkable deposits would be expected to decline somewhat. Thus, a decline in this ratio would not prove that these checkable deposits are inflated by the inclusion of some non-transactions balances. The evidence presented in the appendix suggests that there were no unusual declines in this ratio in 1981 for either reason.

[14]The M1B multiplier rose 0.6 percent from the fourth quarter of 1980 to the fourth quarter of 1981, which is not unusual. Movements in the multiplier are primarily due to currency ratio variation. The money multiplier movements are not explored in detail here since the currency ratio is.

quarter of 1981. If total checkable deposits overstated transactions balances by about 2 percent to 4 percent during the year, the currency ratio (measured relative to total checkable deposits) should have fallen by the same amount. In fact, the ratio rose slightly in 1981.

A shift-adjusted currency ratio can be constructed for 1981 by computing the ratio of currency to adjusted checkable deposits (total checkable deposits less the estimate of non-transactions balances). This shift-adjusted ratio rose sharply in 1981 so that in the fourth quarter of the year, it was 4.6 percent larger than the currency ratio at the end of 1980. Such a sharp rise in the currency ratio has been exceeded in only two periods since 1960: from mid-1973 through 1976, when the currency ratio rose at a 5.2 percent rate, and in mid-1980, when a change in the composition of demand for liquid transactions balances caused the ratio to temporarily surge upward at a 16.6 percent annual rate. Excluding these periods, the mean growth rate of the currency ratio (unadjusted) for four-quarter periods from I/1960 to IV/1980 was 1.4 percent, while the standard deviation of the growth rate was 1.7 percentage points. The surge in the shift-adjusted ratio in 1981 was almost two standard deviations higher than this mean growth rate.

The unusual surge of such a shift-adjusted currency ratio suggests that the adjustment to remove non-transactions balances was too large. Indeed, this conclusion is supported by the statistical analysis in the appendix to this article. The currency ratio movements after the third quarter of 1978 (the quarter before the introduction of ATS accounts) are well explained by a model of currency demand relative to *all* other transactions balances, a model that also explains the currency ratio before that time. The surge in the currency ratio adjusted for the shift to NOW accounts is due to the adjustment procedure itself, artificially pushing up the ratio.

The Turnover Rate

Another ratio that indicates the use of deposits for transactions purposes is the turnover rate, the ratio of deposit account debits to the average level of deposits. If the shift-adjustment argument is valid, the inclusion of a large spurt of non-transactions balances in measures of checkable deposits should reduce the
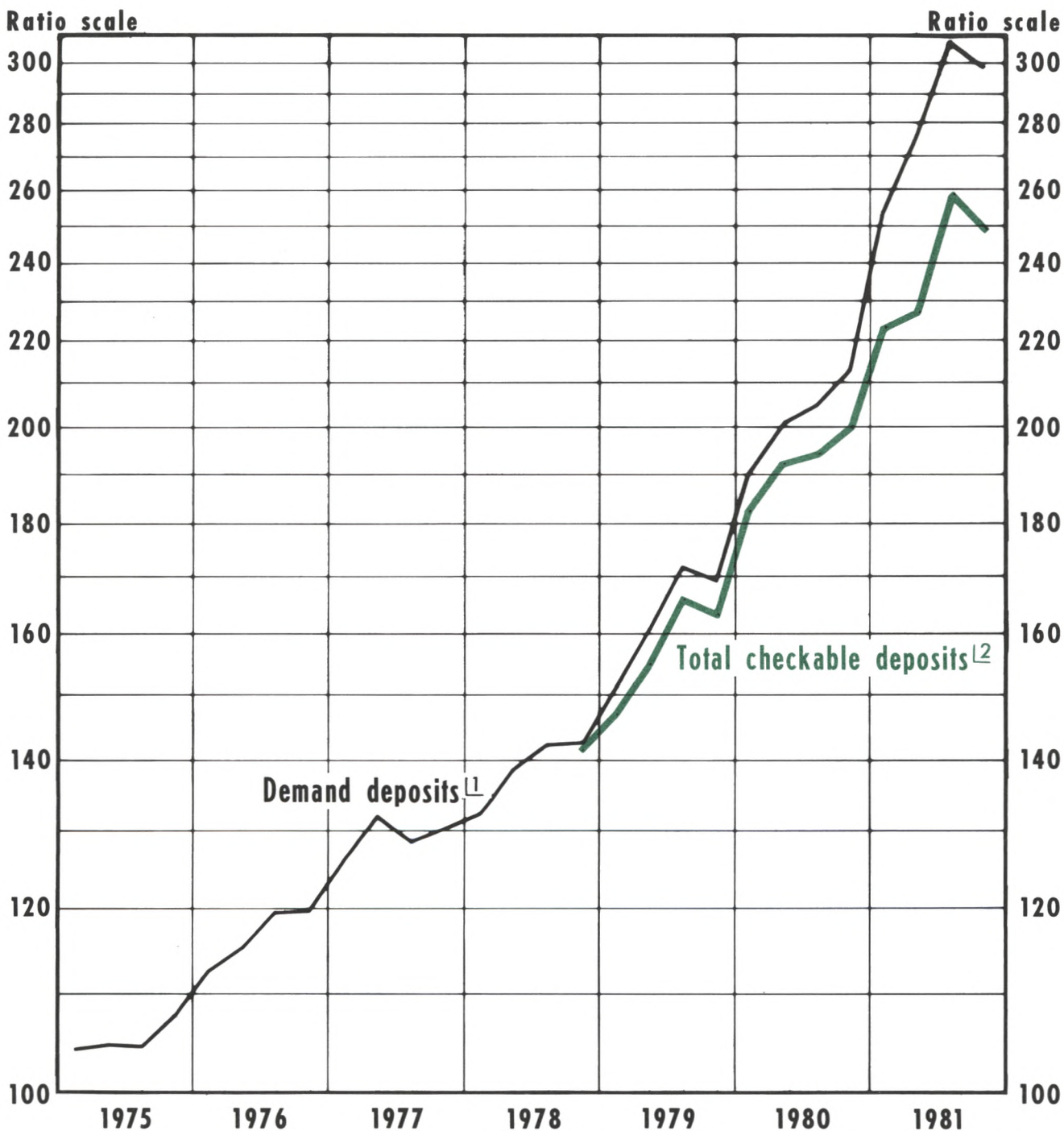
Chart 1
Transactions Account Turnover Ratios

Ratio scale ... **Ratio scale**

Total checkable deposits[2]

Demand deposits[1]

1975 1976 1977 1978 1979 1980 1981

Source: Board of Governors of the Federal Reserve System

[1] The ratio of debits against demand deposits to average demand deposits for all banks.
[2] The ratio of debits against checkable deposits to average total checkable deposits for all banks.

turnover rates of such deposits.[15] Chart 1 shows the quarterly average of the turnover rate at all commercial banks for demand deposits since 1975 and all checkable deposits since 1977. The turnover ratio for total checkable deposits is measured by dividing debits on demand deposits and ATS/NOW accounts by the total of such deposits. On average, this ratio actually accelerated in 1981, rather than declining as the shift-adjustment argument would suggest.

The Velocity of Money

A final piece of evidence on shift adjustment concerns another ratio, the relationship of the nation's nominal gross national product (GNP) to the money stock (M), or velocity ($V = \dfrac{GNP}{M}$). This is perhaps the most important ratio to use in assessing the impact, if any, of financial innovations on the measure of money and the assessment of monetary policy actions. If the money stock were artificially inflated by non-transactions balances, a policy to achieve a given level of M would bring about a lower level of spending (GNP) than desired or predicted by past velocity relationships. Monetary policy in 1981 focused on shift-adjusted M1B, rather than M1B, because the velocity of M1B was expected to decline relative to its prior experience. In particular, existing historical relationships were expected to be more applicable to the adjusted M1B. Actual M1B growth was expected to be 2 to 3 percentage points faster than that targeted for adjusted M1B, reflecting this innovation-induced reduction in the velocity of M1B and its growth rate for the year.

In fact, the opposite occurred. The behavior of M1B velocity was not at all unusual in 1981. For the four quarters of 1981, M1B velocity expanded at a 4.6 percent rate, *faster* than the 2.0 percent rate of increase in the four quarters of 1980 and *faster* than the 3.1 percent average rate of expansion from 1955 through 1980.[16] Thus, the behavior of M1B velocity in 1981 does not support the expectations of the proponents of shift adjustment (see chart 2).

Of course, since shift-adjusted M1B grew slower in 1981 than actual M1B, its velocity behavior *was* unusual. The velocity of adjusted M1B surged upward at a 7.4 percent rate from the fourth quarter of 1980 to the fourth quarter of 1981. This surge exceeds the growth of M1B velocity for every four-quarter period since 1959. From 1960 to the end of 1980, the mean growth rate of velocity for four-quarter periods was 3.1 percent with a standard deviation of 1.58 percent. On this basis, the 1981 rise in the velocity of adjusted M1B was a statistically significant departure from the past behavior of M1B, while the rise in actual M1B velocity was not.[17] This suggests that the shift-adjusted measure of velocity was seriously biased upward by the removal of some transactions balances from M1B.[18]

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[15]One could argue that the observed turnover of ATS and NOW balances is much lower than that of demand deposits, providing evidence that ATS and NOW balances are not money to the same degree as demand deposits. The lower turnover rate is not surprising, however, for two reasons. First, NOW and ATS accounts appeal most to customers that would have low turnover if their transactions balances were in demand deposits. This occurs because a prominent form of implicit interest payments on demand deposits is the remission of service charges. Thus, the introduction of explicit interest on transactions balances would not change the incentives faced by depositors receiving competitive implicit interest. Holders of demand deposits whose implicit interest exceeds the service charges on their balances cannot receive the difference as an explicit interest payment as they can on ATS or NOW balances. These customers tend to be those with relatively low turnover accounts, and they are the customers with the incentive to switch their holdings. The shifting of their funds from demand deposits to NOW accounts should lead the turnover ratio of total checkable deposits to be the same but should force that of demand deposits to surge up. That, in fact, is what appears to occur in chart 1.

[16]The uptick in M1B velocity growth arises from two factors. First, whenever money growth slows, velocity growth temporarily offsets some of its decrease by speeding up and subsequently slowing temporarily so that velocity growth returns to its prior trend. During the four quarters of 1981, M1B growth slowed to 5.0 percent from a 7.3 percent rate of increase over the four quarters of 1980. Second, the 1979-80 energy price increases retarded GNP growth in 1980 and accelerated it in 1981. See John A. Tatom, "Energy Prices and Short-Run Economic Performance," this *Review* (January 1981), pp. 13-17. In contrast, Bennett and Bisignano, "Apples, Oranges, and Money: II," p. 3, apparently believe the velocity of M1B accelerated to an unusual extent in 1981 due to "the public's increasing sophistication in managing idle transactions balances."

[17]The significant surge is especially marked in the first two quarters of 1981 when the shift adjustment affected the growth of M1B most. During those two quarters, shift-adjusted M1B velocity rose at a 9.1 percent rate, significantly above the 3.1 percent mean two-quarter rate of growth of M1B velocity from III/1959 to IV/1980 (standard error = 2.54 percent), while actual M1B velocity rose only half as fast.

[18]Some proponents of a shift adjustment remain undaunted by such aberrations. For example, some observers simply claim that the unusual surge in the velocity of adjusted M1B is evidence that the demand for "money" shifted downward by an amount that, by sheer coincidence, is almost exactly the amount of money taken out by shift adjustment. See, for example, John P. Judd and Brian Motley, "Innovation and Monetary Policy: I," Federal Reserve Bank of San Francisco *Weekly Letter*, September 11, 1981; and David E. Lindsey, "Nonborrowed Reserve Targeting and Monetary Control," in *Improving Money Stock Control: Problems, Solutions, and Consequences*, forthcoming proceedings from a conference cosponsored by The Center for the Study of American Business and this Bank, October 30-31,

Chart 2
The Velocity of Money
GNP/Money Stock

Annual Rates of Turnover   **Annual Rates of Turnover**
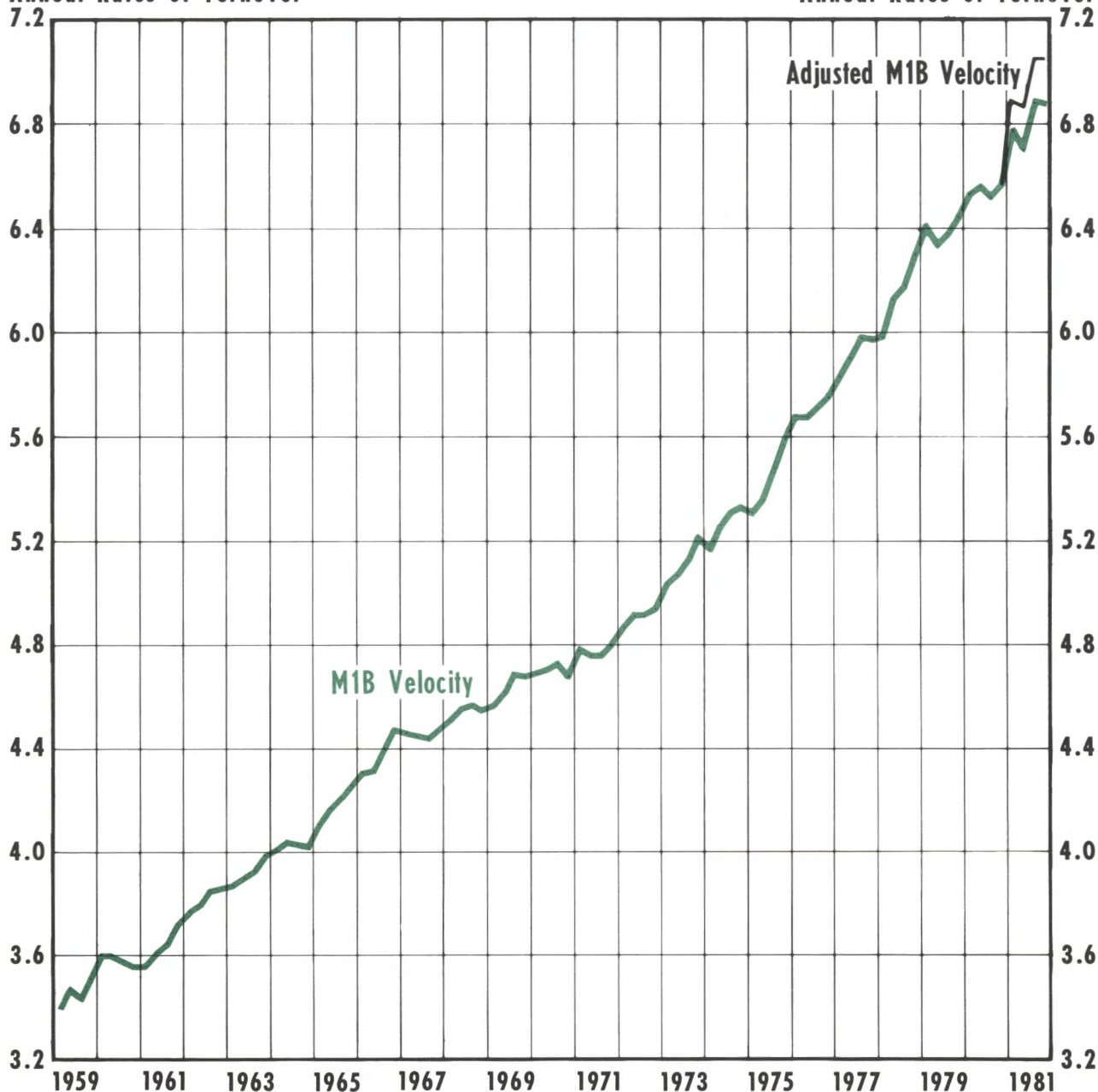
NOTE: Annual rates of turnover computed with quarterly GNP (current dollars) at seasonally
adjusted annual rates, and seasonally adjusted quarterly averages of daily money stock.

1981. Their argument is essentially that M1B adjustment removes X percent from the growth rate of M1B, but that to assess the effects of monetary aggregate growth in 1981, one must add the X percent back; this is because of a mysterious "shift" that reduces the demand for money, not due to the questionable shift adjustment of money. Presumably, the same response could be made to the evidence above for the currency ratio or turnover rate.

CONCLUSION

Analysts interested in determining the stance of monetary policy and assessing the likely response of spending and inflation to policy actions generally have focused on the behavior of a narrow monetary aggregate. The experience last year posed problems for analysts because there were three potential narrow aggregates from which to choose: M1A, M1B and shift-adjusted M1B. It was generally conceded that new financial innovations made M1A virtually obsolete as a useful measure of monetary actions influencing spending and prices. The choice between M1B and shift-adjusted M1B, however, can only be determined by examining whether fundamental relationships affecting the composition and use of money are altered by including *all* other checkable deposits in the measure of money.

Three different fundamental relationships were examined using both M1B and shift-adjusted M1B: the demand for currency relative to checkable deposits, the ratio of debits against checkable deposits to the average level of checkable deposits (turnover), and the velocity of money. All three measures indicate that, in 1981, M1B showed no unusual departure from its normal pattern of behavior. Instead, unusual behavior in the fundamental relationships occurred only when shift adjustments were made to checkable deposits and M1B.

The most important conclusion to be drawn from the above analysis is that spending and inflation reductions in 1981 and beyond cannot reasonably be expected to match the unprecedented decline in money stock growth measured by shift-adjusted M1B.[19] The growth of M1B was reduced from a 7.3 percent rate for the four quarters of 1980 to a shift-adjusted 2.3 percent rate for the four quarters of 1981; moreover, the three-year growth rate for the period ending in the fourth quarter of each year fell from 7.6 percent in 1980 to 5.6 percent in 1981, in shift-adjusted terms. Such a decline in monetary growth would be the sharpest slowing since World War II.

The slowing in spending and inflation are more likely to match the slowing in the growth of actual M1B to a 5.0 percent rate for the four quarters of 1981 and to a trend rate of 6.6 percent. In each case, the restraint is about half as large as indicated by adjusted M1B.

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[19]An analysis that uses adjusted M1B as the appropriate indicator may be found in Congressional Budget Office, *The Prospects For Economic Recovery*, February 1982, pp. 6, 14 and 39-45.

Appendix

NOW Accounts, Shift Adjustment and the Currency Ratio

This appendix examines a currency demand model derived from the FMP quarterly econometric model developed, in part, and used by the staff of the Federal Reserve Board of Governors. This model contains separate equations for currency and demand deposits from which a currency ratio can be derived. The currency ratio model can be used to assess whether shifts of non-transactions balances to other checkable deposits have had significant effects on the demand for currency relative to the other transactions balances included in a narrow monetary aggregate. The results do not support the use of shift-adjusted measures of checkable deposits. Instead, past empirical relationships remain stable when demand deposit measures are broadened to include *all* other checkable deposits.

In the model, the logarithm (log) of currency per dollar of personal consumption expenditures is related to a constant, a lagged dependent variable, the current log of the 3-month Treasury bill rate, a time trend and a zero/one dummy for the period before and after the second quarter of 1960. The log of demand deposits per dollar of GNP is related to: the log of the current federal funds rate; current and three lagged values of the log of the 3-month Treasury bill rate, the log of the commercial bank passbook rate, and real GNP per capita; and a varying time trend that is broken at the third quarter of 1974, the third quarter of 1976, the fourth quarter of 1977, and the fourth quarter of 1978.[1] The implicit model of the currency-demand deposit ratio relates the log of the currency ratio to all of the right-hand-side variables above, and the log of the ratio of GNP

to personal consumption expenditures (with a co-efficient constrained to unity).

This model was estimated using the generalized least-squares method with second-order autocorrelation adjustment for the period I/1961-III/1978 but without the constraints imposed on right-hand-side variables that are used in the FMP model. This period was chosen to avoid the shift in the FMP currency equation in II/1960, and the period when other checkable deposits became a large share of total checkable deposits. The FMP variables that have a t-statistic less than unity were omitted. The resulting currency ratio estimate is (t-statistics in parentheses):

$$(1)\quad \ln (C/DD)_t = -1.776 - 0.134 \ln (X/N)_t + 0.023 \ln r_{t-1}$$
$$ (-4.38)\quad (-2.14) (3.93)$$

$$+ 0.008 \ln r_{t-2} + 0.017 \ln r_{t-3} + 0.155 \ln (C/PCE)_{t-1}$$
$$ (1.44) \phantom{\ln r_{t-2}} (3.00) \phantom{\ln r_{t-3}} (1.87)$$

$$+ 0.004\, T1 + 0.013\, T2 - 0.004\, T3 - 0.010\, T4$$
$$ (7.10) (8.51) (-1.46) (-2.47)$$

$\overline{R}^2 = 0.968$	DW $= 1.98$	$\hat{\rho}_1 = 1.10$
SE $= 0.0045$	h $= 0.15$	$\hat{\rho}_2 = -0.30$

where C is currency, DD is demand deposits, X/N is real GNP per capita, r is the 3-month Treasury bill rate, PCE is personal consumption expenditures, T1 is an unbroken time trend, T2 is a time trend that is zero until II/1974 and increases by one thereafter, and T3 and T4 are time trends that increase by one from zero in II/1976 and IV/1977, respectively.[2]

The introduction of ATS/NOW accounts after III/1978 presumably changes the specification of the demand for currency. In particular, the notion of competing transactions balances must be broadened to account for this innovation. There are two hypotheses tested here. The first is that total checkable deposits adjusted for the estimate of the shift of non-

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[1]One could argue that the broken time trend is not appropriately considered to be a part of the structural specification of the FMP model, but rather is included to keep the demand deposit function on track and preserve efficiency in estimating the structural parameters. Their inclusion here, however, could not bias the tests reported below as the broken trend used here ends before the test period, and the improvement in the fit over the initial sample period obtained by including the broken trend raises the power of structural change tests.

[2]When total checkable deposits are used in the denominator of equation 1, the resulting equation is identical to that reported.

transactions balances to NOW accounts is the relevant measure of transactions balances that compete with currency as a useful medium of exchange. The alternative hypothesis is that all checkable deposits are relevant for measuring transactions balances that serve as a substitute for currency.

If a shift in currency demand behavior has occurred so that the relevant measure of competing transactions balances is adjusted checkable deposits (ACD_t), which equals total checkable deposits less the estimate of non-transactions balances, then the log of $(ACD/DD)_t$ should be added to the right-hand side of equation 1 when the sample period is extended into 1981. When this variable is added, its coefficient should be one, if currency demand relative to checkable deposits has been unchanged but such deposits are shift adjusted in 1981.

To examine the hypothesis that currency demand measured relative to checkable deposits after shift adjustment is the appropriate measure for capturing transactions balances, equation 1 is re-estimated for the period I/1961 - IV/1981 with this added variable and the inclusion of a dummy variable, D6=1 in II/1980 and zero otherwise, to capture the temporary surge in currency demand associated with the credit control program in that quarter.[3] The estimate is:

(2) $\ln (C/DD)_t = -1.390 - 0.098 \ln (X/N)_t + 0.024 \ln r_{t-1}$
         (-3.57) (-1.65) (4.22)

   $+ 0.007 \ln r_{t-2} + 0.017 \ln r_{t-3} + 0.232 \ln (C/PCE)_{t-1}$
     (1.37) (3.15) (2.90)

   $+ 0.004 T1 + 0.013 T2 - 0.006 T3 - 0.008 T4$
     (7.62) (9.18) (-2.35) (-3.07)

   $+ 0.024 D6 + 1.271 \ln (ACD/DD)_t$
     (6.09) (16.87)

$\overline{R}^2$ = 0.991   DW = 1.97 $\hat{\rho}_1$ = 0.98
SE = 0.0048   h   = 0.22 $\hat{\rho}_2$ = −0.23

Both of the added variables are highly significant, and the other coefficients, as well as the summary statistics, are not significantly different from those in equation 1. The last trend variable (T4) mentioned above for the FMP model was also added to the equation; this time trend is zero to III/1978, then increases by one in each subsequent quarter, and

presumably is in the FMP model to account for ATS and NOW shifts. The inclusion of this variable has no effect on the other coefficient estimates (for example, the coefficient on $\ln (ACD/DD)$ is 1.251 with a standard error of 0.083) or summary statistics, and it is not statistically significant (t = 0.54).

The shift-adjustment hypothesis implies that the coefficient for $\ln (ACD/DD)$ should equal one. The standard error of the coefficient estimate is 0.0753, so the t-statistic for the null hypothesis is 3.59, and therefore the shift-adjustment hypothesis that the coefficient equals unity can be rejected. The ratio of currency to adjusted checkable deposits is significantly and positively related to the size of the shift into NOW and ATS accounts (ACD/DD) so that it appears artificially biased upward by the shift adjustment.[4]

At the other extreme, one can hypothesize that all other checkable deposits are transactions balances; that is, all other checkable deposits are competing transactions balances for assessing currency demand. To test this hypothesis, the log of the ratio of total checkable deposits (TCD) to demand deposits is added to equation 1, and the other steps described for equation 2 are followed. The result is:

(3) $\ln (C/DD)_t = -1.313 - 0.092 \ln (X/N)_t + 0.025 \ln r_{t-1}$
         (-3.28) (-1.53) (4.27)

   $+ 0.006 \ln r_{t-2} + 0.018 \ln r_{t-3} + 0.251 \ln (C/PCE)_{t-1}$
     (1.16) (3.12) (3.06)

   $+ 0.004 T1 + 0.013 T2 - 0.006 T3 - 0.007 T4$
     (7.53) (9.09) (-2.28) (-2.57)

   $+ 0.024 D6 + 0.997 \ln (TCD/DD)_t$
     (5.93) (16.51)

$\overline{R}^2$ = 0.992   DW = 1.97 $\hat{\rho}_1$ = 0.97
SE = 0.0049   h   = 0.18 $\hat{\rho}_2$ = −0.22

The fit of this equation is virtually identical to that of equation 2.[5] In this case, however, the null hypothesis that the coefficient on the shift variable equals unity cannot be rejected (the standard error of the coefficient for the shift variable is 0.0604 and the t-statistic for the null hypothesis is t = −0.05). Thus,

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[3] This shift in the composition of the demand for money has been noted in the report by Robert Weintraub, "The Impact of the Federal Reserve System's Monetary Policies on the Nation's Economy," (Second Report), Staff Report of the Subcommittee on Domestic Monetary Policy of the Committee on Banking, Finance and Urban Affairs, House of Representatives, 96 Cong. 2 Sess. (Government Printing Office, December 1980), p. 17.

[4] When equation 2 is estimated with adjusted checkable deposits in the denominator, the elasticity of the currency ratio with respect to the ratio of adjusted checkable deposits to demand deposits is 0.271 (t = 3.59), essentially the percentage of the shifting balances that has been removed.

[5] When the trend shift after III/1978 is included in equation 3 the earlier result holds. In particular, the t-statistic for the shift is 0.90, and the coefficients and summary statistics reported in equation 3 are not affected. The coefficient on the shift variable log (TCD/DD), 0.971 (SE = 0.066), remains essentially unity.

when the left-hand side is written as $\ln(C/TCD)$, a shift variable is not significant (the coefficient on the shift variable is then -0.002 and its standard error is 0.06), the right-hand side variables are the same as in equation 1 and the currency demand equation is stable. The F-test for the stability of equation 1, including controls for the effects of the 1980 credit controls and the broadening of transactions deposits from demand deposits to total checkable deposits, can reject instability. The F-statistic for the additional observations in equation 3 is $F_{11, 72} = 1.93$, below the critical F of 2.50 for a 1 percent level of significance.

According to the currency-deposit relationship in the FMP model, NOW accounts (or other new types of transactions balances) do *not* cause a shift in the currency-checkable deposit ratio when *all* checkable deposit balances are included. When a shift of non-transactions deposits into checkable deposits is taken into account, the shift creates a bias in estimates of currency demand that is directly related to the size of the adjustment. These results indicate, at least for this model, that there is no support for shift adjustments; where shift adjustments are used, offsetting shifts in relationships must be included to "wash out" the adjustment.