Monetary Growth and Business Cycles

Part II: The Relationship Between Monetary Decelerations and Recessions

By Bryon Higgins

A major policy issue confronting the Federal Reserve in recent years has been how to reduce the rate of monetary growth, and thereby ease inflationary pressures, without incurring undue risk of recession. In this regard, G. William Miller, Chairman of the Board of Governors of the Federal Reserve System, has pointed out that "any deceleration in monetary growth rates has to be undertaken with caution" if a recession is to be averted.'

Such caution is warranted because of the historical relationship between monetary growth and business cycles. Based on this historical relationship, some analysts have concluded that the recent slowdown in monetary growth is similar to the monetary decelerations that typically accompany recessions. This conclusion appears to be consistent with the monetary theory of business cycles, which implies that there is a one-to-one relationship between "significant" decelerations in monetary growth and recessions.' However, while monetary decelerations have been associated with recessions in the United States for over a century, there has been considerable variation in the magnitude and timing of declines in the rate of monetary growth in the vicinity of recessions. Analysis of

the implication of monetary deceleration for recession, therefore, requires detailed examination of the characteristics of the current and past decelerations.

This article examines the historical relationship between monetary growth and business cycles since 1952 and develops a method for measuring the degree of monetary deceleration that has been associated with recessions. The first section presents a preliminary overview of the linkage between monetary decelerations and recessions since 1952. A method for determining the degree of monetary deceleration is presented in the second section. In the third section, this method is used to evaluate the extent to which historical evidence since 1952 is consistent with the view that there is a one-to-one relationship between monetary deceleration and recessions. The final section analyzes the degree of monetary deceleration in recent months and the possibility of recession

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[1] Statement before the Committee on Banking, Housing and Urban Affairs, U.S. Senate, April 25, 1978.

[2] The meaning of "significant" decelerations in this context is intended to indicate in a general way that the monetary decelerations under consideration are major, meaningful declines in the rate of monetary growth likely to have a substantial impact on other economic variables. Thus, the term "significant" deceleration is merely used for expositional convenience in this article to distinguish between alternative magnitudes of declines in monetary growth rather than to indicate that the classification of monetary decelerations is based on formal rules of statistical inference.

under alternative assumptions about the rate of monetary growth over the next year.

THE RELATIONSHIP BETWEEN MONETARY DECELERATIONS AND RECESSIONS: 1952-77

The monetary theory of business cycles implies that there is a one-to-one relationship between recessions and "significant" decelerations in monetary growth. This theory implies, in other words, that historical experience is consistent with the following two propositions:'

> 1) recessions are always accompanied by a "significant" deceleration in monetary growth; and

> 2) "significant" decelerations in monetary growth are always accompanied by recessions.

The first proposition states that recessions never occur in the absence of "significant" deceleration in monetary growth, while the second proposition states that "significant" decelerations never occur in the absence of recessions.

The pattern of monetary growth since 1952 is generally consistent with the view that recessions are always accompanied by "significant" decelerations in monetary **growth.**[4] The relationship between monetary deceleration and recession is depicted in Charts 1 and 2 for the period from 1952 to the present. Chart 1 shows the quarterly growth rate of nominal and real, or price-adjusted, values of the narrowly defined money supply, **M1,** which is composed . of currency and demand deposits held by the nonbank **public.**[5] Chart 2 shows the quarterly growth rate of nominal and real values of the more broadly defined money supply, M2, which includes **M1** plus most time and savings deposits at commercial banks. The charts show that each of the five recessions since 1952, which are shown on the charts by shaded areas, have been accompanied by a substantial decline in the quarterly growth rates of each of the monetary measures.[6]
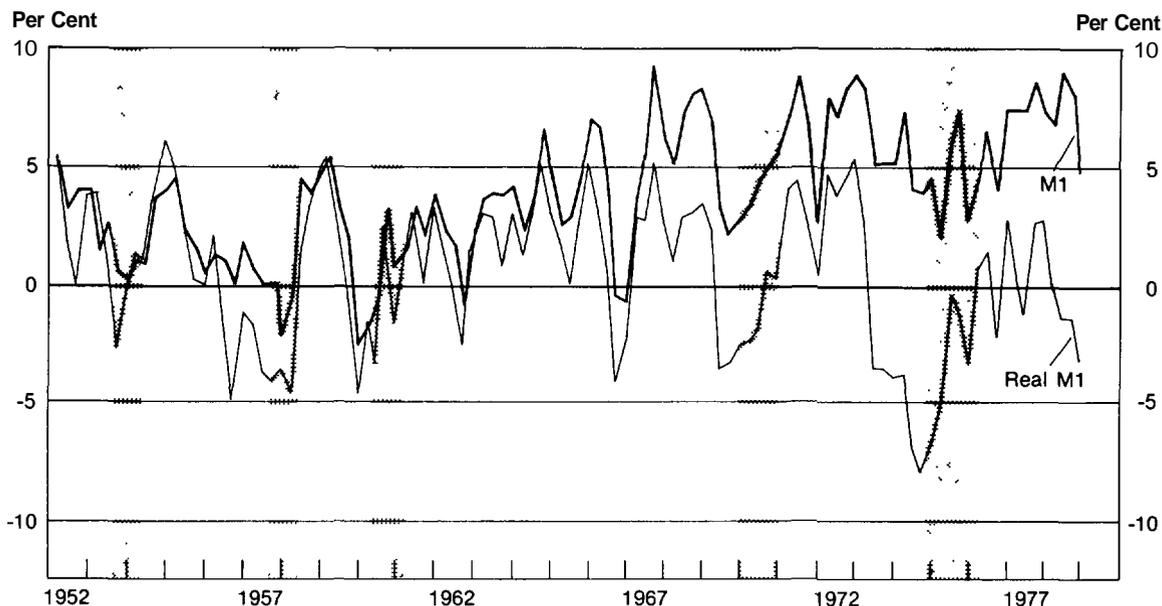
The historical evidence since 1952, however, does not seem to support the view that

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[3] Historical experience consistent with these two propositions can be considered verification of the monetary theory of business cycles only in the sense that one cannot reject this theory on the basis of empirical evidence. It is possible that the same historical evidence could be consistent with alternative theories in which money has little or no independent influence on the economy. See, for example, James **Tobin,** "Money and Income: Post **Hoc** Ergo Propter **Hoc?"** *Quarterly Journal of Economics,* **Vol.** 27, No, 2, May 1970.

[4] The year 1952 was chosen as the beginning of the period to be analyzed primarily because it appears that the Federal Reserve–Treasury Accord in 1951 changed the cyclical pattern of monetary growth. See "Monetary Growth and Business Cycles, Part I: . . . ."

[5] Growth rates were computed by taking the percentage changes in the quarterly averages of monthly data on the various monetary aggregates. The real values of **M1** and **M2** were found by dividing **M1** and **M2** values by the consumer price index. Reported values of **M1** since November 1978 were adjusted to include a portion of the funds in automatic transfer accounts. This adjustment was made so that the recent **M1** data would be more nearly comparable with **M1** data before the introduction of automatic transfers.

The behavior of real **M1** and real **M2** are included in the analysis primarily because of the important role assigned to the real money supply in some economic theories. In addition, growth in real M2 is one of the components of the index of leading economic indicators constructed by the National Bureau of Economic Research.

[6] The definition and timing of recessions provided by the National Bureau of Economic Research (NBER) is adopted in this study. The NBER identifies a recession when the behavior of a variety of economic variables indicates a prolonged and pervasive decline in aggregate economic activity. There have been several instances in the period since 1952 when there were pronounced reductions in economic growth not severe enough to be classified as recessions by the NBER. The economic slowdown in 1966-67 is classified by some analysts as a "mini recession." There is no attempt in this study to analyze the relationship between monetary decelerations and economic slowdowns other than those classified as recessions by the NBER.

Chart 1
GROWTH OF NOMINAL AND REAL M1: 1952-PRESENT
(Seasonally Adjusted Annual Rates)

Per Cent   Per Cent

M1

Real M1

1952   1957   1962   1967   1972   1977

"significant" monetary deceleration is always accompanied by a recession. There were several instances between **1952** and **1978** when declines in the quarterly growth rates of the various monetary measures were not associated with a recession. Moreover, the characteristics of at least one of these decelerations, that in **1966-67,** were similar in many respects to the decelerations that were associated with recessions—i.e., the growth rates of all four monetary measures declined substantially and the declines persisted for several quarters.
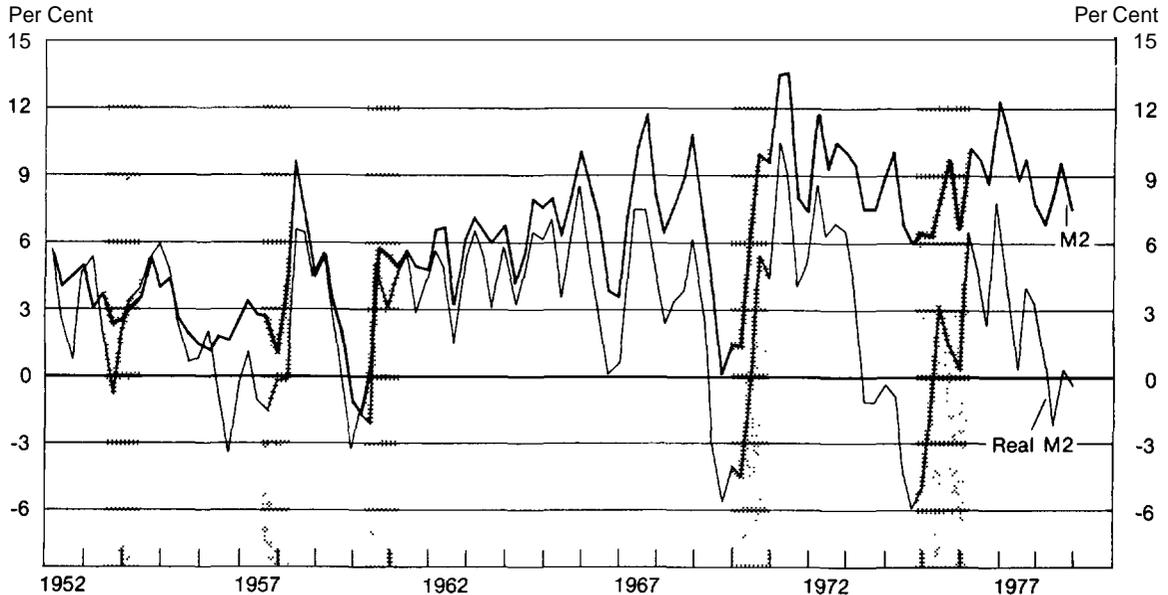
The occurrence of monetary decelerations that are not accompanied by recessions casts doubt on the validity of the proposition that "significant" monetary decelerations are always accompanied by recessions. However, conclusions regarding the validity of this proposition require a precise measure of the degree of monetary deceleration. The quarterly growth

rates shown in Charts 1 and **2** are inadequate for this purpose because the variability in the magnitude and timing of declines in these rates makes it difficult to determine which monetary decelerations should be classified as significant. A better measure of the degree of monetary deceleration is developed in the following section.

MEASURING THE DEGREE OF MONETARY DECELERATION

A useful measure of the degree of monetary deceleration should have several characteristics. First, it should be insensitive to temporary aberrations in monetary growth rates.' Second, it should incorporate the effects of both the duration and the sharpness of declining monetary growth rates. This is because the

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Per Cent

Per Cent

impact of monetary deceleration on the economy may depend both on the sharpness and the duration of decelerating monetary growth. Finally, a measure of the degree of monetary deceleration should provide useful information for monetary policy analysis and decisions.

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[7] The volatility of short-run growth rates may be less important than longer run trends when analyzing the impact of monetary growth on the economy for two reasons. First, some of the short-run variability in monetary growth rates may be spurious in the sense that it results from errors in measuring and seasonally adjusting the underlying data. Second, independent evidence suggests that short-run variability in monetary growth has little impact on the course of the economy. See, for example, E. Gerald Corrigan, "Income Stabilization and Short-Run Variability of Money," Federal Reserve Bank of New York *Monthly Review.* April 1973.

Poole's Procedure for Measuring the Degree of Monetary Deceleration

A procedure developed by William Poole for measuring the degree of monetary deceleration fulfills two of the three desirable criteria listed above.[8] Poole's procedure is based on comparison of the actual level of the money supply with the level that would have resulted if monetary growth had continued at an established trend rate. Because the comparison is based on levels of the money supply, it allows for the cumulative impact of declining monetary growth. The trend rate of monetary

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[8] William Poole, "The Relationship of Monetary Decelerations to Business Cycle Peaks: Another Look at the Evidence," *Journal of Finance.* **Vol. 30,** No. 3, June 1975.

growth was estimated over a two-year period and extrapolated several months ahead, thereby minimizing the effects of temporary variations in monetary growth on the estimated degree of monetary deceleration.[9]

Poole's procedure does not provide useful information for the conduct of monetary policy, however. Poole used the peak rate of monetary growth in the economic expansion preceding a recession to define the trend rate that serves as the basis of comparison for the subsequent deceleration. This method for defining trends implies that monetary growth cannot fall below the highest growth rate previously attained, except for a brief period, without being associated with a recession. Thus, Poole's procedure for identifying the degree of monetary deceleration implies that any attempt by the Federal Reserve to lower the rate of monetary growth below the peak trend rate will inevitably result in a recession.

An Alternative for Measuring the Degree of Monetary Deceleration

The procedure proposed by Poole for determining the degree of monetary deceleration can be amended to fulfill all three of the desirable criteria outlined above. The method used in this study for defining monetary deceleration is, like Poole's, based on

comparison of the actual level of the money supply to the level that would have resulted if monetary growth had continued at an established trend rate.[10] However, in this study, unlike the Poole study, the trend rate is defined as the annualized growth rate over the two-year period ending one year before the date in question.[11] This trend growth rate is then extrapolated 12 months ahead to determine the hypothetical level of the money supply that would have resulted from continuation of the two-year trend growth rate for an additional year.[12]

The ratio of the actual level of the money supply, symbolized by (A), to the level, (E), corresponding to the extrapolated trend growth rate is the measure of monetary deceleration used in this study. This A/E ratio for a given month measures the degree to which monetary growth over the year ending in that month exceeded or fell short of monetary growth in the preceding two-year period.[13] For example, the A/E ratio for M2 in December 1978 was .980.

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[9] Poole inferred the two-year trend growth rates of M1 and M2 in a given month from regressions of the logarithms of M1 and M2 on time over the current and preceding 24 months. The trend growth rate estimated in this way was extrapolated from the average level of the money supply over the period defining the maximum trend growth rate. Comparison of the actual levels of the money supply in subsequent months to the levels corresponding to the extrapolated peak trend growth rate led Poole to conclude that there was nearly a one-to-one relationship between the timing of business cycle peaks and significant monetary decelerations, which were defined as the money stock falling below its maximum 24-month growth trend by 3 to 4 per cent.

[10] Unlike Poole's study, the consistency of timing relationships between monetary decelerations and business cycle peaks was not used in this study as a criterion for judging alternative methods of measuring the degree of monetary decelerations. It has been shown that evidence on the timing relationship between monetary decelerations and recessions does not indicate conclusively whether money has a significant independent influence on the economy. See James Tobin, "Money and Income: . . . ."

[11] Growth rates were computed by taking the changes in the logarithms of three-month moving averages centered on the month in auestion.

[12] A/E ratios, defined subsequently, were also computed for five-year trend growth rates extrapolated 6, 12, and 24 months ahead and for two-year trend growth rates extrapolated 6 and 24 months ahead. The two-year trend extrapolated 12 months ahead was chosen because it produced the most consistent results.

[13] The A/E ratios computed in this way are equal to $(1 + R_A)/(1 + R_T)$, where R_A is the rate of monetary growth in the year preceding the month in question and R_T is the corresponding two-year trend growth rate. Indeed, any analysis based on alternative levels of the money supply can be recast in terms of the corresponding growth rates.

The value of A used to compute this ratio is $875.3 billion, which was the actual level of the money supply in December 1978.[14] The corresponding value of E is $893.4 billion, which is the hypothetical level of M2 in December 1978 that would have resulted if the 9.8 per cent M2 growth rate from December 1975 to December 1977 had continued for an additional year. Thus, the A/E ratio of .980 is equal to $875.3 billion/$893.4 billion.

Deceleration of monetary growth always yields an A/E ratio less than one. In other words, the actual level, A, of the money supply is only a fraction of what it would have been, E, if the two-year trend rate had continued for an additional year. Moreover, the A/E ratio is below one by an amount that is proportional to the degree of the associated decline in monetary growth. Thus, it is possible to rank the degree of monetary deceleration by the numerical value of the corresponding A/E ratios.

The use of A/E ratios to analyze the relationship between monetary growth and business cycles is similar in many respects to the procedures employed by Friedman and Schwartz and by Poole.[15] One of the weak-

nesses of this approach is the inherent difficulty in formulating empirical tests to validate the results, which are based solely on observed historical relationships between two variables and do not reflect any formal theory of the linkage between those variables. Because of this lack of statistical basis, the degree of confidence in the results cannot be precisely specified. Thus, the inferences based on this type of analysis must be interpreted with care. Nevertheless, the A/E ratios employed in this study do serve as a useful measure of the degree of monetary deceleration and thereby allow analysis of the relationship between monetary growth and business cycles.

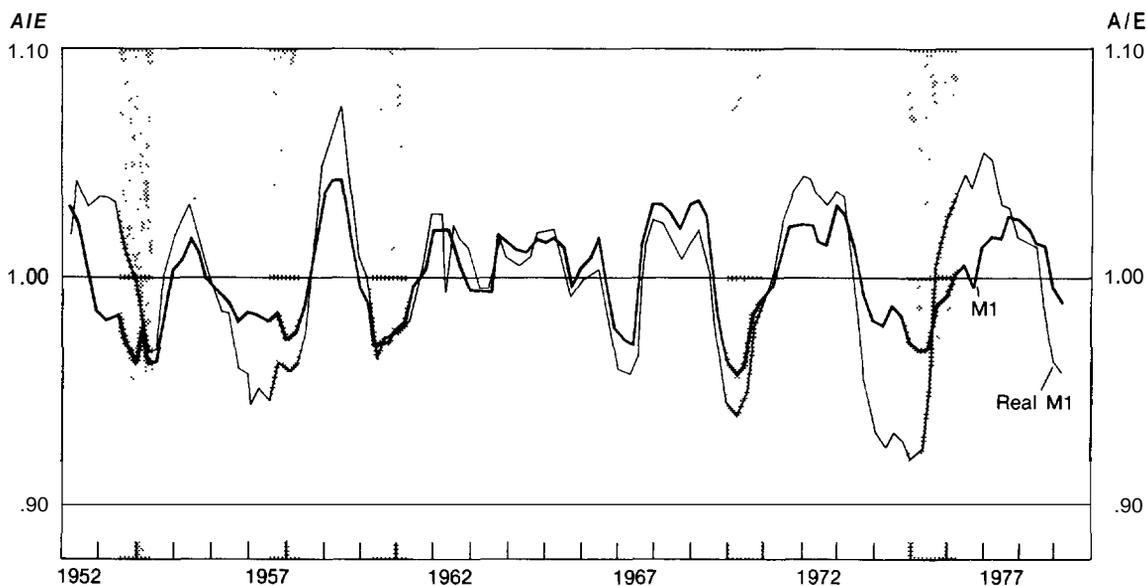## THE RELATIONSHIP BETWEEN MONETARY DECELERATIONS AND RECESSION: 1952-77

Charts 3 and 4 show the A/E ratios for real and nominal values of M1 and M2 for the period since 1952. The general cyclical pattern of the A/E ratios conforms closely to the cyclical pattern of quarterly rates of monetary growth, rising during economic expansions and declining in the vicinity of recessions. The A/E ratios for all four monetary measures fell below one in the vicinity of each of the five recessions since 1952, which are shown in the charts by shaded areas.

The A/E ratios can be used to determine whether there is a one-to-one relationship between "significant" monetary decelerations and recessions. Such a one-to-one relationship would hold if there is some degree of monetary deceleration — which may be defined as a "significant" deceleration — that always accompanies recessions and if this same "significant" degree of monetary deceleration is always accompanied by a recession. The degree of monetary deceleration can be measured by the values of the corresponding A/E ratios — the lower are the A/E ratios, the more pronounced

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[14] **This is an average of the M2 levels in November, December, and January. All of the A/E ratios were computed using three-month centered moving averages for the A values.**

[15] **Milton Friedman and Anna Jacobson Schwartz, "Money and Business Cycles,"** *Review of Economics and Statistics.* **February** *1963;* **and William Poole, "The Relationship . . .,"** *loc. cit.* **There are, of course, numerous other procedures that could be employed to analyze the relationship between monetary deceleration and recessions. For example, a structural or single-equation econometric model of the economy could be employed to infer the effects of monetary deceleration on other economic variables. See Bryon Higgins and V. Vance Roley, "Monetary Policy and Economic Performance: Evidence from Single Equation Models," Federal Reserve Bank of Kansas City** *Economic Review,* **January** *1979,* **for a discussion of the potential usefulness of various types of econometric models to evaluate the effects of monetary growth on the economy.**

Chart 3
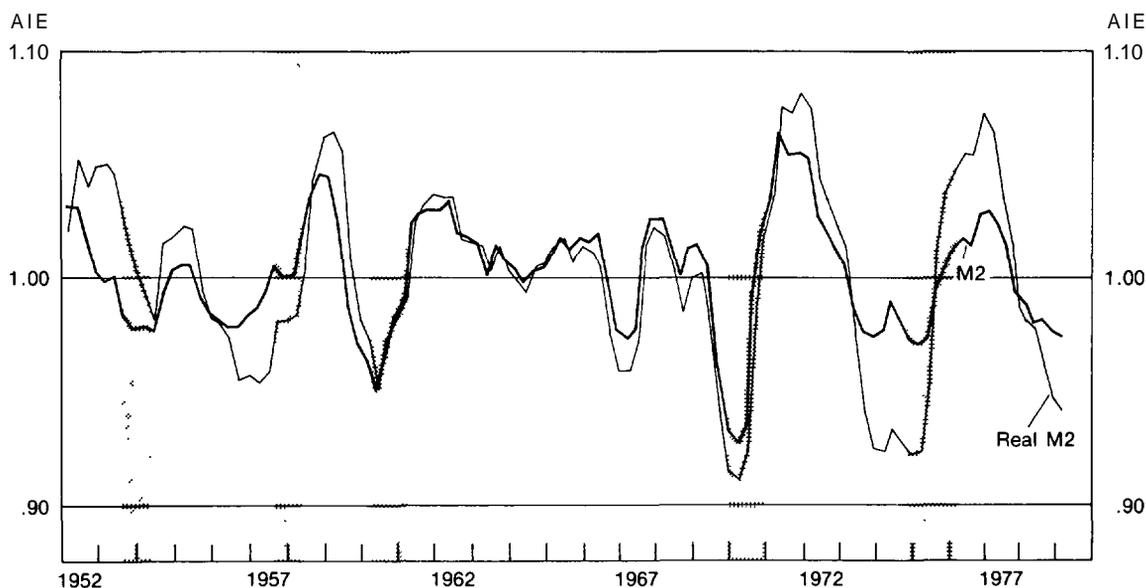**A/E RATIOS FOR REAL AND NOMINAL M1: 1952-PRESENT**

is the associated monetary deceleration. Thus, the degree of monetary deceleration in various periods can be ranked according to the minimum values of the A/E ratios that occurred in those periods. For example, Charts 3 and 4 show that the most pronounced monetary deceleration since 1952 occurred in 1969-70. In the 1969-70 period, the A/E ratio for M1 fell to .960 and the A/E ratio for M2 fell to .930, both of which were lower than in any other period of monetary deceleration from 1952 to 1977.

Analysis of the A/E ratios from 1952 to 1977 does not support the proposition that there is a one-to-one relationship between "significant" monetary decelerations and recessions. Since 1952, no particular degree of monetary deceleration has always accompanied and been accompanied by a recession. As measured by the minimum A/E ratios for M1 and M2, for example, the degree of monetary deceleration

was more pronounced in 1966-67 than in 1956-58, although the 1966-67 deceleration was not accompanied by a recession and the 1956-58 deceleration was accompanied by a recession. The historical evidence indicates, therefore, that the same degree of monetary deceleration that is accompanied by a recession in one instance may not be accompanied by a recession in another instance. As a consequence, there is not a one-to-one correspondence between recessions and any particular degree of monetary deceleration.

Although there is not a perfect correspondence between recessions and the degree of monetary deceleration, historical evidence indicates that a fairly close relationship has existed between recessions and the degree of monetary deceleration since 1952. This relationship can be analyzed by identifying the characteristics of different degrees of monetary

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Chart 4
A/E RATIOS FOR REAL AND NOMINAL M2: 1952-PRESENT

deceleration. Monetary deceleration may be characterized as mild, appreciable, or severe, depending on the minimum value of the corresponding A/E ratios.[16]

Mild deceleration in monetary growth is characterized by minimum A/E ratios between **.99** and **1.00** for one or more of the monetary measures. The four mild decelerations in

monetary growth between **1952** and **1977** occurred in **1962-63, 1964, 1965,** and **1976.** (See Table **1.**) Since recessions did not occur in any of these periods, mild monetary deceleration has never been accompanied by a recession.

Appreciable deceleration in monetary growth is characterized by minimum A/E ratios that fall predominantly in the following ranges:[17]

1) .962 to .990 for **M1,**
2) .964 to .990 for M2,
3) .944 to .990 for real **M1,** and
4) .942 to .990 for real **M2.**

The four appreciable decelerations in monetary growth in the period from **1952** to **1977**

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[16] The classification scheme used to distinguish alternative degrees of monetary deceleration is used only for expositional convenience in describing the relationship between monetary deceleration and recessions. Economic theory and more formal empirical tests indicate that the relationship between monetary growth and other economic variables is "continuous" in the sense that slightly greater declines in monetary growth have slightly larger effects on the economy. To some extent, therefore, the discreet cutoff points used to classify alternative degrees of monetary deceleration are artificial. For descriptive purposes, however, it is useful to categorize the different degrees of monetary deceleration by the minimum A/E ratios.

[17] The basis for these ranges is explained in footnote 18.

occurred in 1953-54, 1956-58, 1960-61, and 1966-67. The first three of these decelerations were associated with recessions but the deceleration in 1966-67 was not. Thus, appreciable deceleration in monetary growth has sometimes, although not always, been accompanied by recessions.

Severe deceleration in monetary growth is characterized by two or more of the A/E ratios below the following critical values—.962 for M1, .964 for M2, .944 for real M1, and .942 for real M2.[18] Because the two severe monetary decelerations since 1952, which occurred in 1969-70 and 1973-75, were both associated with recessions, severe deceleration and monetary growth has always been accompanied by a recession.

In summary, the historical evidence since 1952 does not indicate that there is a one-to-one relationship between recessions and any particular degree of monetary deceleration. There is no degree of monetary deceleration

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[18] The definition of severe monetary deceleration is intended to reflect only those declines in monetary growth that were significantly more severe than that in 1966-67. Since the deceleration in 1966-67 was not accompanied by a recession, it is important to differentiate clearly the degree of deceleration in 1966-67 from the degree that is consistent with the view that some degree of monetary deceleration is always associated with a recession. In determining the differential between A/E ratios that is significant enough to justify a distinction between alternative degrees of monetary deceleration, it is important to take account of the magnitude of variability in the A/E ratios over time, which is an indication of the statistical error likely to be associated with calculations based on the A/E ratios. For this purpose, the standard deviation of the A/E ratios from 1952-78 was used to distinguish monetary decelerations that are significantly different in degree from the 1966-67 deceleration. Specifically the cutoff values (SD_i) of the A/E ratios that distinguish appreciable from severe monetary decelerations were computed for each monetary measure as:

$$SD_i = (A/E)_i^* - .5(\sigma_i)$$

where $(A/E)_i^*$ is the minimum value of the A/E ratio for the i-th monetary measure in the 1966-67 period, and σ_i is the standard deviation in the A/E ratio for the i-th monetary measure in the period since 1952.

Table 1
MEASURES OF THE DEGREE OF MONETARY DECELERATION

Periods of Monetary Deceleration	Minimum AIE Ratios For:			
	M1	M2	Real M1	Real M2
1953-54"	.965	.979	.970	.984
1956-58"	.978	.980†	.984	.958
1960-61*	.965	.952	.966	.953
1962-63	.996	—‡	.996	—
1964	—	.999	—	.996
1965	.998	—	.993	—
1966-67	.971	.976	.960	.961
1969-70"	.960	.930	.940	.912
1973-75*	.968	.972	.923	.924
1976	.995		—	—

'Monetary decelerations that were associated with a recession.
†The period of deceleration in M2 growth ended before the beginning of the recession in September 1957, and the minimum AIE ratio for M2 occurred in June 1956. Because deceleration in the growth of all of the other monetary measures continued into the recession, however, it is reasonable to interpret the deceleration of M2 growth in 1956 as being associated with the subsequent recession.
‡Minimum AIE ratios are reported only for monetary measures whose growth rates decelerated in the period.

that has always both accompanied and been accompanied by recessions. In this sense, historical evidence does not support the monetary theory of business cycles. Historical evidence does indicate, however, that the likelihood of recession increases with the degree of monetary deceleration. In the period from 1952 to 1977, mild decelerations in monetary growth were never accompanied by recessions, appreciable decelerations were sometimes accompanied by recessions, and severe decelerations were always accompanied by recessions. Thus, historical evidence supports the view that there is a definite relationship between monetary deceleration and recession.

THE CURRENT DECELERATION IN MONETARY GROWTH

Monetary growth has slowed substantially in recent months, leading some analysts to question whether the current economic expansion will continue through the end of the year. The annualized growth rate of **M1** in the six months ending in February 1979 was 1.0 per cent, compared with a high of 8.7 per cent in the six months ending in September 1978. Part of the rapid decline in **M1** growth in the past few months reflects shifts out of demand deposits into automatic transfer accounts, which were introduced in November 1978.[19] These shifts make comparisons of the current deceleration of **M1** growth with previous decelerations somewhat misleading. In the analysis that follows, therefore, the **M1** growth rates used for the period since November 1978 were computed by estimating the path of **M1** that would have occurred in the absence of automatic transfer accounts.[20] On this basis, **M1** has grown at an annual rate of 2.3 per cent in the last six months, still down substantially from the relatively high growth rates of 1978. Similarly, the growth rate of M2 in the past six months, which is assumed not to have been influenced by the existence of automatic transfer accounts,

was 4.6 per cent, compared with a peak rate of 11.7 per cent for the six months ending in January 1977. The deceleration in **M1** and M2 growth rates, combined with continued high inflation, has resulted in absolute declines in real **M1** and real M2.

Several observers have argued that the recent deceleration in monetary growth is similar to decelerations that have been associated with recessions in the past. To determine whether this conclusion is warranted, the characteristics of the current decline in monetary growth are analyzed within the framework developed in preceding sections.

Analysis of the A/E ratios for real and nominal values of **M1** and M2 indicates that the current degree of monetary deceleration should be characterized as appreciable. The current values of the A/E ratios are well below the level characterizing mild monetary deceleration, which has never been associated with a recession since 1952, although not yet low enough to indicate a severe monetary deceleration, which has always been accompanied by a recession.[21] Thus, the current degree of monetary deceleration is in the intermediate range that has sometimes, although not always, been accompanied by a recession.

Continued sluggishness in monetary growth, however, would result in further declines in the A/E ratios and would place the current monetary deceleration in the severe category that has always been accompanied by recessions in the period since 1952. Table 2 shows the minimum A/E ratios in the upcoming year — from February 1979 to February 1980 — that would result from alter-

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[19] For an analysis of the impact of automatic transfer accounts on monetary growth, see Scott Winningham, "Automatic Transfers and Monetary Policy," Federal Reserve Bank of Kansas City *Economic Review,* November 1978.

[20] It was assumed that one-half of all funds in automatic transfer accounts were transferred from demand deposits. On this basis the following amounts were added to the monthly levels of **M1** to adjust for the impact of automatic transfers: (adjustment in billions of dollars) Nov. 1978, 0.7; Dec. 1978, 1.5; Jan. 1979, 2.1; Feb. 1979, 2.5; Mar. 1979, 2.9. For a more complete analysis of the sources of funds in automatic transfer accounts, see Bank Administration Institute, *Automatic Transfer Service, Nov. 1, 1978-Dec. 15, 1978 — A Research Summary.* February 1979.

[21] The values of the A/E ratios in February 1979 were: .986 for **M1**, .975 for M2, .953 for real **M1**, and .942 for real M2.

Table 2
THE PROSPECTIVE DEGREE
OF MONETARY DECELERATION

Alternative M1 and M2 Growth Rates in Per Cent	Minimum A/E Ratios From February 1979 to February 1980 for:			
	M1*	M2	Real M1*	Real M2
4	.951	.945	.938	.932
5	.957	.951	.943	.937
6	.963	.957	.948	.942†
7	.968	.962	.953	.942†
8	.973	.967	.953†	.942†
9	.978	.972	.953†	.942†

'The AIE ratios do not reflect any adjustment to growth rates of real and nominal M1 to take account of the effects of automatic transfer accounts.
†Indicates that the minimum occurs before April 1979.

native M1 and M2 growth rates.[22] The figures in the table suggest that an M1 growth rate of more than 5 per cent—less an adjustment to account for the effects of automatic transfer accounts on the growth of M1—and an M2 growth rate of more than 7 per cent over the period from February 1979 to February 1980 would be required to prevent the current decline in monetary growth from becoming a severe monetary deceleration."[23] Lower monetary growth rates would lead to A/E ratios

below the critical values that have always been associated with recessions in the 1952-77 period.

Inferences based on comparison of the current degree of monetary deceleration with past decelerations must be interpreted with caution, however. First, it is difficult to determine from the observed relationship between monetary decelerations and recessions which were the causes and which were the effects. There is no consensus among economists regarding the degree to which the historical relationship between monetary growth and business cycles results from the independent influence of monetary growth on the economy. Most observers believe, however, that monetary growth does have some independent influence on the course of the economy.

Caution also must be exercised when interpreting the implication of historical experience for the future association between monetary decelerations and recessions. Economic relationships that held in the past may not continue to hold in the future if the economic environment changes substantially. The behavior of monetary growth in recent years seems to have departed from the behavior that would have been expected from past relationships, indicating that a change in the economic environment may have occurred.[24] The anomalous behavior of monetary growth in the current economic expansion may be due in part to the accelerated pace of financial innovation. If so, the recent introduction of money market CD's, automatic transfer accounts, and other new financial assets may cause a departure from past relationships that makes it difficult to

[22] The hypothetical levels of real M1 and real M2 were computed under the assumption that the consumer price index increases at a steady annual rate of 8.4 per cent from February 1979 to March 1980.

[23] It is estimated that the growth rate of M1 may be reduced by as much as 3 percentage points over the next year as a result of the shift out of demand deposits into automatic transfer accounts. If so, measured M1 growth well under 5 per cent over the next year may not indicate that monetary deceleration is severe. The behavior of M2 may, therefore, be a better measure of the degree of monetary deceleration in the upcoming year.

[24] See Bryon Higgins, "Velocity: Money's Second Dimension," Federal Reserve Bank of Kansas City *Economic* Review, June 1978, for a more detailed discussion of the anomalous behavior of monetary growth in the current economic expansion.

interpret the economic significance of declines in monetary growth rates. Moreover, the anomalous behavior of monetary growth in recent years can only be partly explained by the introduction of new types of financial assets. To some extent, the reason for this behavior remains a mystery. Any analysis of the relationship between monetary decelerations and recessions, therefore, is subject to considerable uncertainty.

CONCLUSIONS

There has been a fairly close relationship between declines in monetary growth and recessions. The historical evidence since 1952 indicates that recessions have always been accompanied by deceleration in monetary growth but that monetary deceleration has not always been associated with a recession. A procedure was developed in this study for determining the relationship between recessions and alternative degrees of monetary deceleration. The rules developed by using this procedure to analyze monetary decelerations since

1952 indicate that the recent declines in monetary growth rates have already resulted in an appreciable monetary deceleration of the type that has sometimes, although not always, been associated with recessions. An acceleration in monetary growth would be required in upcoming months to prevent the recent declines in monetary growth from becoming a severe monetary deceleration of the type that has always been accompanied by recession since 1952.

The usefulness of analyzing the past association between monetary decelerations and recessions is limited somewhat by the difficulty in determining causal relationships and by the potential effects of financial innovation on the association in the future. Despite these limitations, however, comparison of the relative degrees of monetary deceleration associated with recessions in the past does provide useful information on the relationship between monetary growth and business cycles. This information may be useful to policymakers in assessing the implications for the economy of the recent and prospective behavior of the monetary aggregates.