

Explanation of the Growth of the Money Stock: 1974-Early 1975

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"THE GROWTH OF THE MONEY STOCK DECELERATED SHARPLY IN 1974 AND EARLY 1975." To many readers such a headline would be regarded as something less than spectacular, being greeted by muffled yawns. But this development is undeserving of such a ho-hum response; the event is actually noteworthy on several counts. For one, the deceleration in money growth accompanied one of the worst periods of economic attainment since World War II. Second, the slowdown in monetary expansion occurred in spite of a continued expansion in the monetary base—a measure which historically has been a precursor for movements in the money stock. This second point is the focus of discussion in this article.

Framework of Analysis

This article analyzes the growth of the money stock in 1974 and early 1975 using the framework of a money supply hypothesis in which the money stock (M) is expressed as the product of the monetary base (B) and a multiplier (m). In the expression $M = mB$, the term " m " incorporates the effects of all factors which operate to change the stock of money other than those summarized in the monetary base.

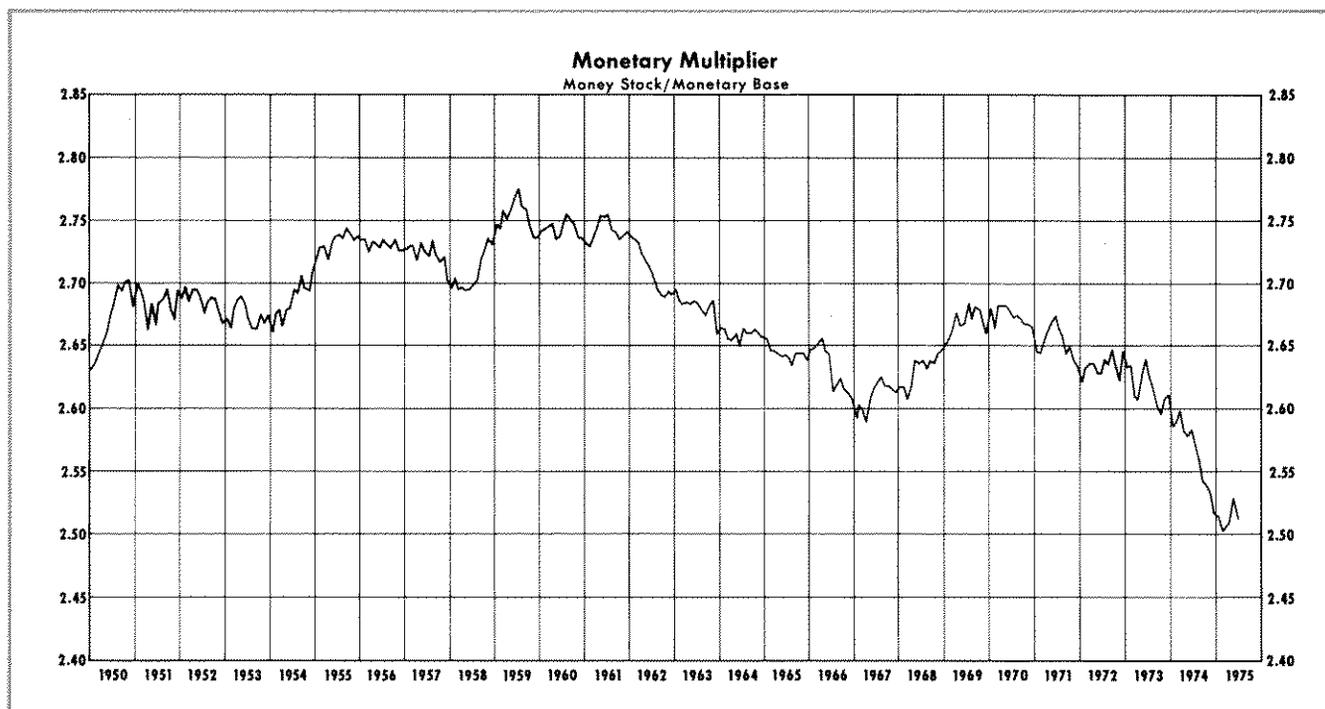
Table I

Annual Growth Rates of Monetary Base and Money: 1974 through early 1975¹

	Three-Month Periods		Difference Between the Growth Rate of Base and Money ²
	Growth Rate of Monetary Base	Growth Rate of Money	
12/73 - 3/74	7.7%	5.6%	2.1%
1/74 - 4/74	9.3	8.7	0.6
2/74 - 5/74	8.8	6.8	2.0
3/74 - 6/74	9.6	7.2	2.4
4/74 - 7/74	7.5	5.6	1.9
5/74 - 8/74	7.3	4.2	3.1
6/74 - 9/74	7.5	1.0	6.5*
7/74 - 10/74	7.2	1.7	5.5*
8/74 - 11/74	9.3	4.5	4.8*
9/74 - 12/74	9.8	5.4	4.4
10/74 - 1/75	4.9	0.9	4.0
11/74 - 2/75	4.4	-0.1	4.5*
12/74 - 3/75	4.3	2.4	1.9
		Mean	3.36
		Standard Deviation	1.72
	Six-Month Periods		
12/73 - 6/74	8.6%	6.4%	2.2%
1/74 - 7/74	8.4	7.1	1.3
2/74 - 8/74	8.1	5.5	2.6
3/74 - 9/74	8.5	4.0	4.5*
4/74 - 10/74	7.3	3.6	3.7*
5/74 - 11/74	8.3	4.4	3.9*
6/74 - 12/74	8.7	3.2	5.5*
7/74 - 1/75	6.0	1.3	4.7*
8/74 - 2/75	6.8	2.2	4.6*
9/74 - 3/75	7.0	3.9	3.1
		Mean	3.61
		Standard Deviation	1.30
	Twelve-Month Periods		
12/73 - 12/74	8.6%	4.8%	3.8%*
1/74 - 1/75	7.2	4.2	3.0*
2/74 - 2/75	7.5	3.8	3.7*
3/74 - 3/75	7.8	4.0	3.8*
		Mean	3.58
		Standard Deviation	0.39

¹All data are seasonally adjusted. The results are based upon money stock and related data as available in late August 1975.

²An asterisk indicates that the difference exceeds two standard deviations, based on the sample period 1954-1973.



The monetary base summarizes the effects of actions by the monetary authorities on the money stock and is the basic factor limiting the growth of the stock of money. Movements of the monetary base are dominated by changes in Federal Reserve open market purchases of Government securities, lending to member banks, and changes in required reserve ratios. These Federal Reserve actions determine the total of bank reserves and currency in circulation, which comprises the "base" upon which the money stock rests. The Federal Reserve, if it is willing to accept the corresponding movement of interest rates, can set the monetary base at any value it desires over a period of as short as a month.

Historically, the growth rates of money and monetary base have been, on average, about the same. However, from about mid-1974 into early 1975 there was a progressive widening between the growth rates of base and money, as shown in Table I on p. 5. By the end of 1974 this divergence had increased to almost 4 percentage points, which is very unusual by historical standards. The sharply reduced growth rate of money, while the growth of the monetary base was little changed, reflected a substantial decline in the money multiplier. As shown in the accompanying chart, the fall in the multiplier from early 1974 to early 1975 was the sharpest of any one-year period in the past 25 years.

The money multiplier is affected by a number of factors not under the control of the monetary authori-

ties. Among these are the following: decisions of the public as to the amount of currency it wishes to hold relative to the amount of demand deposits it holds, summarized in the k-ratio; decisions of the public as to the amount of time deposits it wishes to hold relative to demand deposits, summarized in the t-ratio; the amount of U. S. Government demand deposits relative to private demand deposits, summarized in the g-ratio; and the amount of reserves relative to total deposits, summarized in the r-ratio.

These ratios are the "proximate" determinants of the multiplier. Combined with the monetary base, they constitute the proximate determinants of the money stock. They describe the actual behavior of the public, banks, and the Treasury. This behavior, in turn, reflects responses to basic economic factors such as interest rates, growth of income, wealth, price expectations, and regulatory actions such as Regulation Q ceiling rates on time deposits. This article does not examine the factors influencing changes in the proximate determinants of money growth.¹ In terms of its proximate determinants, the multiplier (m) may be expressed in the following manner:

$$m = \frac{1+k}{r(1+t+g)+k}$$

Since factors other than the growth of the monetary base substantially affected the growth of the money

¹For an explanation of the dependence of the multiplier ratios on these ultimate determinants, see Albert E. Burger, *The Money Supply Process* (Belmont, California: Wadsworth Publishing Co., 1971), pp. 45-111.

Table II

Relative Contributions of the Components of
the Money Multiplier to the Growth Rate of Money¹

	1954 - 1973				
	One Month	Three Months	Six Months	Nine Months	Twelve Months
t-ratio²					
Mean	-1.338%	-1.349%	-1.348%	-1.344%	-1.337%
Standard Deviation	1.694	1.388	1.213	1.130	1.058
	December 1973 - March 1975				
Mean	-2.690%	-2.799%	-2.680%	-2.647%	-2.712%
Standard Deviation	2.560	0.723	0.380	0.257	0.071
k-ratio³					
Mean	-0.107%	-0.120%	-0.121%	-0.132%	-0.143%
Standard Deviation	1.803	1.132	0.914	0.805	0.715
	December 1973 - March 1975				
Mean	-2.554%	-2.594%	-2.513%	-2.578%	-2.630%
Standard Deviation	2.153	1.301	1.010	0.467	0.095
r-ratio⁴					
Mean	1.395%	1.373%	1.373%	1.377%	1.373%
Standard Deviation	2.381	1.166	0.897	0.777	0.708
	December 1973 - March 1975				
Mean	2.013%	2.106%	1.681%	1.578%	1.873%
Standard Deviation	3.705	1.455	0.843	0.375	0.367
g-ratio⁵					
Mean	0.034%	0.019%	0.012%	0.008%	0.008%
Standard Deviation	1.556	0.662	0.370	0.255	0.207
	December 1973 - March 1975				
Mean	0.097%	0.174%	0.165%	0.158%	0.167%
Standard Deviation	0.708	0.150	0.112	0.080	0.057

¹All the ratios are computed using seasonally adjusted data. These results are based upon money stock and related data as available in late August 1975.

²t-ratio = Time deposits/private demand deposits.

³k-ratio = Currency held by the public/private demand deposits.

⁴r-ratio = Bank reserves/private demand deposits + time deposits + government demand deposits. Bank reserves are defined as member bank deposits at the F. R. Banks in the current period plus vault cash of all commercial banks in the current period, and the ratio is adjusted for reserve requirement ratio changes and shifts in the same type of deposits between banks where different reserve requirement ratios apply.

⁵g-ratio = Government demand deposits/private demand deposits.

stock in 1974 and early 1975, this formulation of the money multiplier is used to isolate the relative contribution of each of the components of the multiplier to the growth rate of money. The sum of the contributions of the components of the multiplier equals the contribution of the multiplier to the growth of the money stock.

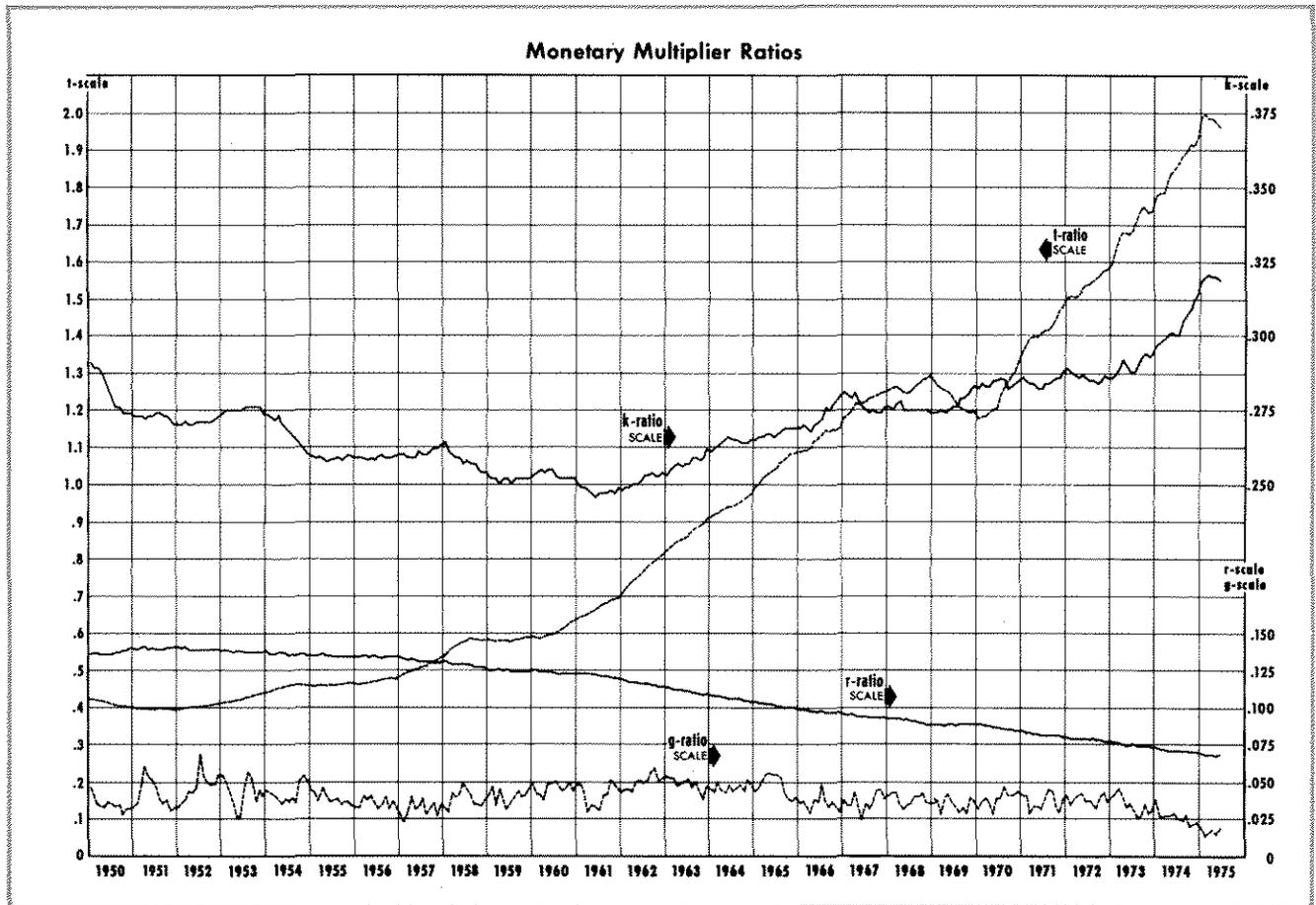
Historical Perspective on the Money Multiplier

Table II presents the contribution of each of the proximate determinants in the multiplier to the growth of money for different length time periods from 1954 to 1973. For each of the ratios included in the mul-

tiplier, the mean value and standard deviation of its contribution to the growth of the money stock are given. The standard deviation is a measure of the variability of the contribution of each of the ratios. In general, the larger the standard deviation, the more the contribution of the ratio has fluctuated away from its mean value.²

Table II yields some interesting implications about the relative importance of these different ratios appearing in the money multiplier for the growth rate

²A useful statistical criterion for assessing the variability of a set of data is that approximately 68 percent of the observations lie within plus or minus one standard deviation, and 95 percent of the observations lie within plus or minus two standard deviations of the mean value.



of money over different length time periods. For example, the mean contribution of the Government deposit ratio (g-ratio) was very small for all time periods. This indicates that shifts between U. S. Government demand deposits and private demand deposits at commercial banks had very little influence, on average, on the growth of the money stock.

However, the standard deviation of the relative contribution of the g-ratio declines markedly as the time period is lengthened. For one-month periods the standard deviation is quite large — about 1.6 percentage points. This is reflected in the very jagged pattern of the g-ratio shown in the accompanying chart. The standard deviation falls to about 0.4 percentage points for consecutive six-month periods, and then falls to about 0.2 percentage points for twelve-month periods.

These statistical results indicate that, on a very short-run basis, variations in U. S. Government demand deposits at commercial banks exerted a substantial influence on the growth of the money stock. Over periods of six months or longer these effects cancelled out, and the relative contribution was negligible. This extreme *short-run* variability of the g-ratio explains a substantial part of the observed large divergence be-

tween the growth rates of money and base on a very short-run basis.

The reserve ratio (r-ratio) has, on average, exerted a positive influence on the growth of money equal to about 1.4 percentage points per year. This ratio decreased from 0.137 in early 1954 to 0.073 in late 1973. The decline in the reserve ratio primarily reflects the effects of the rising proportion of time deposits in total deposits. Average reserve requirement ratios are substantially lower on time deposits than on demand deposits.³ Consequently, a given volume of reserves can support a larger volume of time deposits than demand deposits.

Beginning in the early 1960s commercial banks began to bid aggressively for time deposits, primarily through issuing certificates of deposit. Consequently, there has been a major rise in the proportion of bank deposits held in the form of time deposits. The t-ratio has risen from about 0.6 in the late 1950s to about 2.0

³When the monetary base is used in a multiplier-base framework for analyzing movements in the money stock, the reserve ratio which appears in the multiplier is adjusted for changes in reserve requirement ratios. Therefore, changes in reserve requirement ratios do not affect the multiplier.

by the end of 1974 (see chart). The major variations in the upward trend of the t-ratio have been related to movements of market interest rates relative to Regulation Q ceiling rates. As shown in the chart, the t-ratio declined during 1969. During this period market interest rates rose very rapidly while the rates banks could pay to attract and hold time deposits were held fixed at Regulation Q ceilings which were set in April 1968.⁴

A movement from demand deposits to time deposits, after all portfolio adjustments are completed, does not result in a one-for-one decrease in demand deposits. Initially, demand deposits decrease by the amount of the increase in time deposits. However, because required reserve ratios are lower for time deposits than for demand deposits, the result of this action is that commercial banks' excess reserves rise above the amount they desire to hold, given their structure of deposits. In the process by which banks attempt to reduce excess reserves, demand deposits rise. At the end of the process, time deposits are greater, demand deposits somewhat lower, total deposits higher, and the reserve ratio lower than before the process began. As shown by the historical data (Table II), the rise in the t-ratio, which has exerted a negative effect on the growth of money, has been partly offset by the positive effect on the growth of money resulting from the fall in the reserve ratio.

The mean of the relative contribution of the currency ratio (k-ratio) for all periods was less than -0.15 percentage points. This indicates that, on average, the growth of currency relative to demand deposits exercised only a very minor influence on the growth of the money stock. The standard deviation of the contribution of the k-ratio, however, is fairly large for all time periods. This indicates that, at times, the currency behavior of the public has exerted a substantial influence on the growth rate of the money stock.

In summary, the historical evidence indicates that fluctuations in Treasury deposits at commercial banks have not had any significant effect on the growth rate of the money stock over periods of six months or longer. The decision of the public to hold a substantially larger amount of time deposits relative to their holdings of demand deposits has imparted a substantial downward trend to the level of the multiplier

since the early 1960s. Shifts between demand deposits and time deposits have resulted in divergences between the growth rates of money and base. However, a large part of these divergences have been offset by an opposite movement in the average reserve requirement ratio. The remaining factor, and the one which appears to have been quite important in periods when substantial divergences between the growth rates of money and base occurred, is the currency ratio.

Factors Influencing Money Growth: 1974 to Early 1975

Let us now compare the contribution of the key ratios of the multiplier to the growth of money in 1974 and early 1975 to their behavior over the 1954-73 period. For each of the ratios, the 1974-75 results are given below those for the 1954-73 period in Table II.⁵

The t-ratio, by itself, exerted a substantial negative influence of about 2.7 percentage points on the growth of the money stock over the 1974-75 period. However, this impact was partially offset by a positive influence from the reserve ratio which ranged between about 1.5 and 2.0 percentage points. As discussed earlier, the time deposit ratio and reserve ratio tend to move together, but in opposite directions. This reflects the fact that a rise in the ratio of time deposits to demand deposits lowers the average reserve ratio.

The combined influence of the public's decision to hold more time deposits relative to demand deposits (summarized in the t-ratio and the r-ratio) would have resulted in about a one percent rate of decrease in the money stock, holding other factors constant. For example, an 8.6 percent growth of the monetary base for December 1973 to December 1974 would have resulted in about a 7.6 percent rate of growth of money. If the growth in time deposits had been the only other factor affecting the longer-run growth of money, the growth of money and base would have remained relatively close together.

Throughout much of the period from late 1973 to early 1975, the currency behavior of the public was the major factor restraining the growth rate of money below the growth rate of the monetary base. As shown in Table II, movements in the currency ratio contributed about a 2.6 percent rate of decrease to the money stock. The size of this effect was very large by historical standards. For example, it was more than

⁴For example, the market yield on Treasury bills rose from 5.45 percent in November 1968 to 6.43 percent by June 1969, and then rose to 7.81 percent in December. During this period the Regulation Q rate on passbook savings deposits was held at 4 percent. In 1970 market interest rates fell sharply, with the yield on Treasury bills reaching an average of 4.87 percent in December 1970.

⁵All empirical results are based upon money stock and related data as reported in late August 1975.

Table III

Growth Rates of Monetary Aggregates:
Selected Periods¹

	1/72-IV/73	IV/73-I/75
Money Stock	7.2%	4.4%
Monetary Base	7.8	7.6
Currency Held by the Public	8.1	10.1
Adjusted Bank Reserves ²	7.4	4.0
Demand Deposits	7.0	2.7
Change in Currency/Change in Monetary Base	60.9	78.8

¹Annual rates of change were computed using quarterly averages of seasonally adjusted monthly data. These results are based upon money stock and related data as available in late August 1975.

²Adjusted bank reserves consist of member bank deposits at Federal Reserve Banks in the current period, plus vault cash of all commercial banks in the current period, plus an adjustment for reserve requirement ratio changes and shifts in the same type of deposits between banks where different reserve requirement ratios apply.

two standard deviations away from the mean effect over all consecutive periods of 12, 9, 6, or 3 months between 1954 and 1973. Under this criterion the decision by the public to add to its holdings of currency, relative to the growth of its holdings of demand deposits, was very unusual. Since the growth of the monetary base was not much changed until the end of the period, the growth of bank reserves fell sharply and, consequently, the growth of demand deposits also fell sharply.

As shown in Table III the growth rate of the monetary base, on a quarterly basis, was about the same over the period from the fourth quarter of 1973 to the first quarter of 1975 as over the previous seven quarters. During the earlier period the money stock, on a quarterly basis, grew at a 7.2 percent annual rate, about the same as the monetary base. In the 1974-early 1975 period the growth of money dropped to a 4.4 percent rate, while the monetary base grew at a 7.6 percent rate.

In this recent period the growth of currency held by the public increased to an average rate of 10 percent, compared to an 8 percent rate in the earlier period. Consequently, even though the growth rate of the monetary base remained essentially unchanged, the proportion of the change in the base being used as currency rose from about 61 percent in the earlier period to about 79 percent in the 1974-early 1975 period. If an additional dollar of monetary base is used as currency, then the money stock rises by one dollar. However, if the additional dollar of base is used as bank reserves, then a "multiple" expansion of demand deposits results and the money stock expands by more than one dollar. Hence, the result of an increased amount of each new dollar of base flowing into currency was that member bank reserves, even after being adjusted for a series of reductions in reserve requirement ratios, grew at a much slower rate than in the previous period. The growth of demand deposits was sharply reduced, and the growth of money fell substantially below the growth of the monetary base.

Conclusions

Changes in the money stock can be analyzed in terms of the movements in its proximate determinants. The monetary base is the major proximate determinant of the money stock. Usually the growth rate of money is closely aligned to the growth rate of the monetary base, especially over twelve-month periods. There are times, however, as in the last half of 1974 and early 1975, when changes in the factors that influence the money multiplier exert a substantial influence on money growth. This paper has shown that this recent experience can be explained primarily by a surge in the growth of currency which markedly reduced the growth of bank reserves, given the growth in the monetary base.

