FEDERAL RESERVE BANK OF ST. LOUIS

SEPTEMBER 1975

REVIEW

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Vol. 57, No. 9

Grain Exports and Inflation

CLIFTON B. LUTTRELL

PRIVATE grain exporters have notified the United States Department of Agriculture (USDA) of their intentions to sell more than 10 million tons of grain to the Russians in the current marketing year. The sales include 177 million bushels of corn, 154 million bushels of wheat, and 50.5 million bushels of barley.[1] They constitute about 3, 7, and 13 percent, respectively, of the prospective corn, wheat, and barley crops and are equivalent to 13, 18, and 84 percent, respectively, of our average annual exports of these crops to all foreign purchasers for the past five years.

The grain sales to Russia this year are for cash. They carry neither a Government price subsidy nor a Government credit arrangement. Payments for the shipments will be made with funds which can be used immediately to purchase goods and services from abroad.

This is in contrast to the 1972 sales which involved substantial Government subsidies. The U.S. Government at that time maintained a subsidy on all wheat sold in foreign markets. The subsidy kept the international price for U.S. wheat at a lower level than the domestic price. These subsidies were a holdover from the old farm programs which were designed to reduce the domestic grain supply and increase domestic grain prices. In addition to the price subsidies, the Russians received a subsidized credit of $750 million that was made available over a three-year period for purchasing the grain.

This year, however, no export subsidies on wheat are available and no subsidized credit is granted to the purchaser. Consequently, most of the basic economic arguments against the 1972 transactions are missing.

Nevertheless, the recent sales to Russia, like the earlier sales, have received considerable criticism. Some analysts have argued that the exports will contribute to higher food prices and to inflation.[2] The rising prices of grain and soybeans during recent weeks are pointed to as evidence of the inflationary effects of the sales. Higher grain and soybean prices contribute to higher meat and poultry prices which, in turn, are believed to spill over into higher prices for industrial raw materials. Hence, restrictions on grain exports have been proposed in order to halt this asserted inflationary impact.

Basic Issue is Free International Trade

In the controversy over the entry of Russia into the domestic grain market, one major point has been largely overlooked. Restrictions on grain exports to the Russians will not prevent domestic grain prices from rising unless restrictions are placed on *all* grain exports. If, for example, the Russians purchased grain exclusively from Canada, prices there and in other world trading centers would rise and U.S. grain dealers would have the incentive to sell in those markets. Grain markets are international and prices in these markets reflect international supply and demand conditions. Grain will flow to those locations where the price is highest so long as the price differential exceeds transportation costs. Thus, as long as the United States ships grain freely to any other nation, sales to Russia by U.S. dealers will have no more of an impact on domestic grain prices than the same amount of sales by the Canadian Grain Commission or by Australian dealers. Consequently, preventing a rise in domestic grain prices involves the imposition of comprehensive controls on grain exports to all nations.

Total Export Controls Have Short-Run Appeal

Comprehensive export controls could be used *in the short run* to limit the quantity of grain exports, reduce domestic grain prices, and raise world grain prices. The Organization of Petroleum Exporting Countries (OPEC) is an example of an action where a minimum price has been set on petroleum exports. This has led to the accumulation of a surplus of oil in member countries since the rest of the world has not been willing to purchase all the oil produced by the cartel at the prevailing fixed prices. The effect on the quantity and price of goods exported is the same whether the action is initiated by export controls or by artificial price supports.

Some nations, by imposing such controls, are able to increase their wealth since in the short run the gains from higher prices more than offset the decline

[1] *The Wall Street Journal,* July 24, 1975.

[2] For examples of such views, see "Russia Feeds U.S. Inflation," *Business Week,* August 11, 1975, pp. 14-15; "Prices: A Rude Surprise," *Time* Magazine, August 4, 1975, p. 59; and Robert E. Grant, "Mr. Butz and the Grain Sales to Russia," *The Wall Street Journal,* July 28, 1975.

in the quantity of their exports. The OPEC members have received more foreign exchange for a smaller amount of exported oil than formerly.

It does not appear that American wheat farmers are in the same position as OPEC. While it may be true that total world grain consumption does not fall sharply in response to higher prices, the United States faces strong competition from other grain producing nations. If we were to limit, through export controls, the amount of grain we make available in the world market, the effect would certainly be a somewhat higher world price than otherwise would be the case, since the United States supplies a major portion of the world's grain exports. But our restrictions would cause other grain producing countries to increase *their* exports. Our competitors, instead of American grain farmers, would surely gain. Small wonder, then, that grain farmers are objecting vociferously to proposals to restrict grain exports — domestic grain prices will almost certainly be lower than world grain prices.

Historically, popular and political demands for international trade restrictions generally have been for limitations on imports, through the imposition of either tariffs or quotas. These restrictions have penalized consumers who have been forced to pay higher prices for protected goods in order to benefit producers who could not compete effectively in a free market. In contrast, export restrictions initially hurt producers by depriving them of access to free world markets, and help consumers by increasing the domestic supply. However, over the longer run it is not simply a case of helping one group at the expense of another. Accepted economic theory implies that, in general, trade restrictions make this country as well as the entire world less well off.

Classical View of Free Trade Still Persuasive

Despite some occasional short-run gains from international trade restrictions, the classical view of international exchange remains persuasive. In 1776 Adam Smith outlined a system of free trade among nations with arguments which are still held as valid by most economic analysts.[3] He pointed to the gains from the specialization of labor and trade in a small community. Through such specialization and exchange of goods and services the total volume of real product is increased and the costs of goods and services are lower than if each person attempted to be self-sufficient.

[3]Adam Smith, *The Wealth of Nations* (New York: The Modern Library, 1937), pp. 3-4.

Smith postulated that the gains accruing from the specialization of labor and other resources in a local economy are not basically different from those accruing from the specialization of resource use and exchange among nations.[4] He contended that the benefits stem directly from imports rather than from exports. Gains accrue because the imported commodities can be acquired through trade at a lower cost than similar or substitutable commodities can be produced domestically.

The mutual gains from trade can be demonstrated with a simple example using only two countries and two goods. Suppose we consider some hypothetical cost of production figures for the United States and West Germany, as in Table I.

Table I

COST OF PRODUCTION

Product	In the United States	In West Germany
Wheat, per bushel	$2.50	DM 5
Wine, per barrel	$5.00	DM 5

In the United States, we must devote to the production of every barrel of wine resources which could otherwise produce two bushels of wheat, while West Germany gives up only one bushel per barrel of wine. Alternatively, we can say that the United States gets two bushels of wheat for every barrel of wine we give up in production, while West Germany gets only one. Clearly, the U.S. is a more efficient (that is, lower cost) producer of wheat, and West Germany is a more efficient producer of wine.

Suppose with an exchange rate of 1.5 Deutschmarks per dollar, we decide to export 100 bushels of wheat for which we give up potential production of 50 barrels of wine. In order to get the $250 to pay for the wheat, West Germany gives us DM 375 (1.5 x $250) which we in turn can use to buy 75 barrels of wine, surely an improvement over the 50 we gave up. Notice also that Germany's DM 375, which purchased 100 bushels of wheat in the United States, would have yielded only 75 bushels of domestically produced wheat.

This example shows that countries engaging in trade are able to get more goods and services from their endowments of resources than they could by using those resources to produce solely for their own consumption. Each is encouraged to expand the production of those goods which it produces more efficiently and to trade them for goods which others can produce

[4]Ibid, p. 424.

at lower cost. Conversely, any restriction which turns a country back toward greater self-sufficiency attains it at the cost of getting less from its resources — that is, a lower standard of living.

The Case at Hand

Considering the nation as a whole, what might we expect to result from the imposition of restrictions on the amount of grain exported? Given an inelastic demand for grain, a small decline in U.S. grain exports could cause a relatively large increase in the world price of grain in the short run. Total receipts derived from grain exports would then be greater than in the absence of export restrictions. Depending on the extent to which U.S. farmers participate in the higher returns from the world grain market, both farmers and consumers could gain relative to the free market solution. On the other hand, if the world price of grain did not rise sufficiently to offset the reduced volume of grain exports (that is, if demand for grain is elastic), total receipts derived from these sales would be less than without the grain export limitations. The dollar price of foreign currency would then be higher, resulting in higher prices paid for the foreign goods and services we import. In this case the farmer is obviously worse off and the consumer is either better or worse off, depending on one's purchases of domestic food relative to imported goods and services. So even immediately, the restrictions which lead to lower domestic grain prices might not provide an unmixed blessing for American consumers.

In the longer run, however, the effects of export restrictions are more drastic (and we have learned how difficult it is to escape from "temporary" government policies, once they are established). Grain farmers, finding that they are not allowed to garner the profits which they would receive from free trade as a result of their superior efficiency as compared to their foreign competitors, will reduce grain production and turn to alternative forms of employment. In short, resources which were previously used to produce goods which we could sell to other countries in exchange for commodities which they produce more cheaply are now used to produce those commodities for ourselves — at a higher cost.

Will Unrestricted Grain Exports Cause Inflation?

The belief that inflationary pressures arise from the unrestricted export of grain stems from a basic confusion between the forces which cause changes in *relative* prices and those which affect the general price *level*. It is quite true that an increase in foreign demand, if it is allowed to be effective, would raise the price of grain and grain-related products. It is *not* true, however, that this effect would spill over to higher prices for other goods. The increased demand for dollars to buy the grain would make imported goods and services less costly to Americans — if not now, then at some time in the future. This, in turn, would exert a downward pressure on the prices of domestic goods which compete with imports. Further, the higher price of dollars to foreigners would induce them to buy fewer American goods, leaving more available for domestic consumption and making them cheaper to us.

On the other hand, a rise in the price level (that is, a rise in the average of prices of all goods) occurs when we have more money to spend on an unchanged stock of goods and services or if we were to have the same amount of money to spend on a smaller quantity. This would certainly occur if we were to give our grain away, receiving nothing in return. Since this is not the question in the recent grain sales, there is no reason to expect that allowing farmers to sell their output as profitably as they can will contribute to inflation.

It is far more likely that a higher price level will follow from a long-run policy of export restriction on farm products. The resultant shift of resources out of agriculture into other uses implies that we will have fewer of all goods and services than we could otherwise have. Without reduced money supply growth and with a smaller commodity bundle available for domestic purchase, aggravated inflation is to be expected.

Summary

Export controls on grain shipments to Russia have been proposed. It is contended that such exports lead to higher food prices and further inflation. Restrictions on exports to Russia, however, will not prevent domestic grain prices from rising unless comprehensive controls are placed on all grain exports.

Comprehensive export controls have appeal in the short run since they tend to restrict current domestic food prices. In the longer run the effects of export controls are always harmful. They result in a decline in the world value of the dollar, an increase in the price of imported goods, less output from our productive resources, a higher average price level, and a lower standard of living.

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

ALBERT E. BURGER

"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.

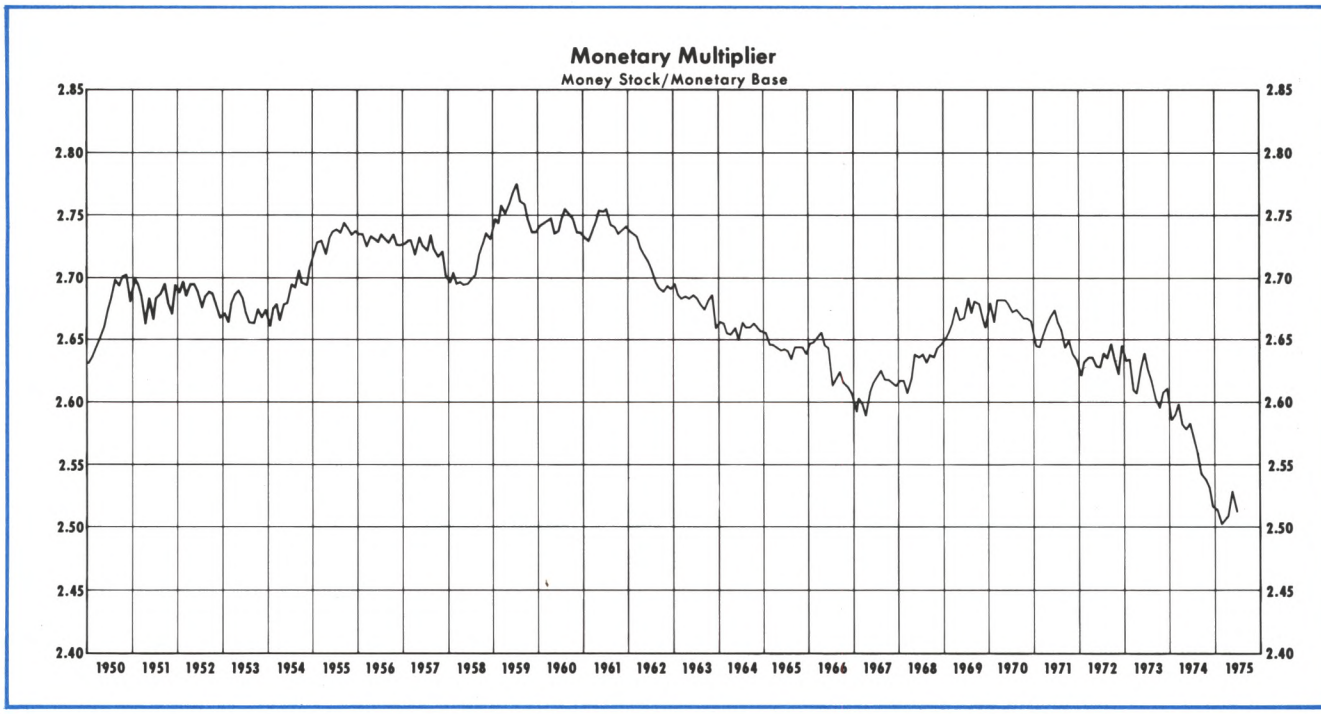
Table I

Annual Growth Rates of Monetary Base and Money: 1974 through early 1975[1]

	Growth Rate of Monetary Base	Growth Rate of Money	Difference Between the Growth Rate of Base and Money[2]
Three-Month Periods			
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

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

[2]An 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 authorities. 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

[1]For 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 Money[1]

	One Month	Three Months	Six Months	Nine Months	Twelve Months
			1954 - 1973		
t-ratio[2]					
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
			1954 - 1973		
k-ratio[3]					
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
			1954 - 1973		
r-ratio[4]					
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
			1954 - 1973		
g-ratio[5]					
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

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

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

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

[4]r-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.

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

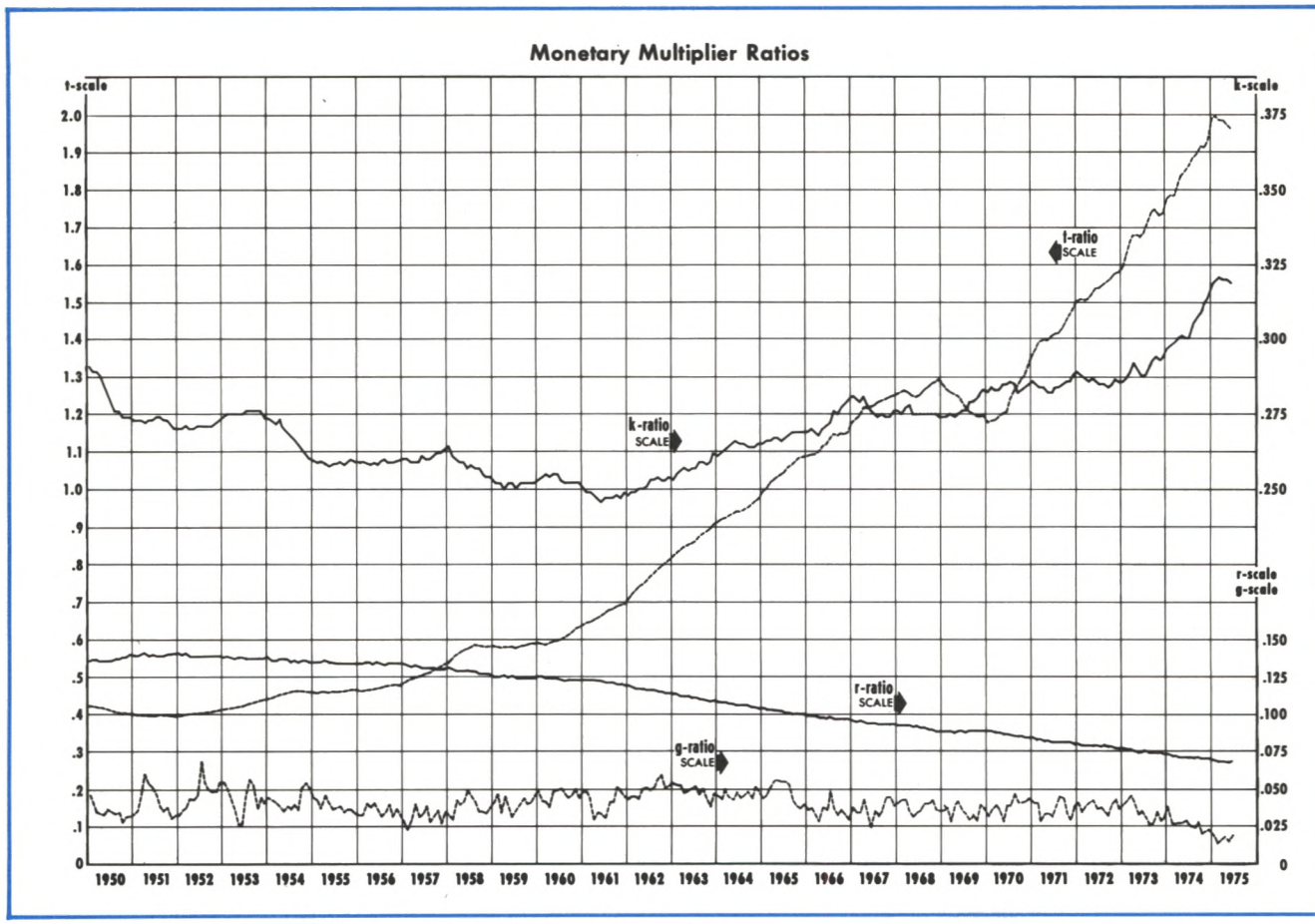
stock in 1974 and early 1975, this formulation of the money multiplier is used to isolate the relative contribution of each of the components of the multiplier to the growth rate of money. The sum of the contributions of the components of the multiplier equals the contribution of the multiplier to the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

[2]A 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 between 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

[3]When 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

[4]For 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.

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

Table III

Growth Rates of Monetary Aggregates: Selected Periods[1]

	I/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

[1]Annual 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.

[2]Adjusted 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.

Real Money Balances: A Good Forecasting Device and A Good Policy Target?

A. B. BALBACH and DENIS S. KARNOSKY

FOR the past two hundred years, economists have debated the issue of the proper goals of monetary policy. In times of strict adherence to the gold standard, the policy aspect of national money management was of secondary importance. With fiat money and loose or nonexistent ties to a commodity standard, monetary policy became the ultimate determinant of the quantity and quality of money stock. In a broad sense, the goal that has emerged is to provide an amount of money consistent with sustainable economic growth and the avoidance of such undesirable economic conditions as inflation or recession.

Conducting monetary policy in such a noninflationary and nonrecessionary manner, however, is somewhat more difficult than a casual investigation might reveal. It is not simply the absolute quantity of money in circulation that affects economic conditions; rather, it is the relationship between the quantity of money supplied and the quantity of money demanded.

The quantity of money supplied is controlled by the Federal Reserve and can be measured, but an acceptable measure of desired money balances is not yet in the economist's tool box. Money balances deflated by some index of the general price level are often used because they are supposed to reflect influences of both money demand and supply. As a result, the concept of *real* money balances has been advocated by some analysts as a leading indicator of economic activity and as an intermediate target of monetary policy. In other words, it has been suggested that a decline in observed real money balances leads to a decline in economic activity and that monetary policy should therefore be conducted so as to prevent such declines in real balances.

Changes in observed real money balances, however, do not necessarily indicate forthcoming changes in the level of economic activity and, even if they frequently have in the past, do not necessarily call for offsetting changes in monetary policy. As a matter of fact, changes in the nominal money stock designed to offset changes in real money balances can easily produce procyclical effects and compound the very economic problems which are supposedly being combatted. In order to illustrate this point, a simplified theoretical construct is described which utilizes real money balances in the decisionmaking process. Issues are raised which pertain to the use of these balances as a target of monetary policy and some evidence is presented for the 1947-74 period.

What are Changes in Observed Real Money Balances Supposed to Indicate?

All decisionmaking units in society hold their wealth in inventories of various assets. Businesses have stocks of raw materials, finished goods, buildings, and machinery. Banks hold inventories of loans, bonds, and real estate. Individual households keep their wealth in the form of land, homes, automobiles, stocks of food, clothing, labor skills, and financial instruments. All of these economic units have inventories of money — cash and/or demand deposits.

Some of these inventories are held because they provide current services (homes, automobiles, food, raw materials), some because they are expected to provide future services (stocks, bonds), but most provide a combination of the two. Since at any given time these inventories are viewed as an investment portfolio, the value of each item depends upon its convertibility into other goods and services, that is, upon its *generalized* purchasing power. Consequently, the value of each asset is perceived as its *nominal* value (its current price multiplied by quantity) divided by a *general* price index. This is the foundation of the assertion that economic decisions are made on the basis of *real* balances.

The size of an individual's portfolio is a measure of an individual's wealth. The distribution among various assets is determined by subjective tastes and preferences, existing relative prices, and expectations as to future relative prices and the price *level.* At any point in time an individual attempts to arrange this portfolio in such a way as to maximize the satisfaction derived from wealth. Any change in wealth, tastes, relative prices, or expectations will pro-

duce a discrepancy between the desired and actual portfolio and a reshuffling of assets will result so as to achieve a new equilibrium.

For example, an unexpectedly bountiful wheat crop would increase the actual wheat balances of some individuals above the desired level. With everything else remaining constant, this would increase the wealth of owners of wheat, and thereby total wealth, and increase their desired balances of most other items. In order to reduce wheat stocks to the desired level and increase other balances to their equilibrium size, economic units will attempt to exchange wheat for money and money for other assets. In the process, both the relative price of wheat and the general price *level* will fall (increased aggregate wealth has caused an increase in desired real money balances and since actual money balances cannot be increased by the private sector, the general price level must fall in order for real money balances to reach their desired level). Changes in the relative prices of existing assets will then induce changes in the rates of production of new assets and corresponding changes in the prices of new output.

Although this analysis applies to any asset in the portfolio, real money balances are especially crucial. Autonomous changes in all sorts of assets *can* affect economic activity, but the nominal stock of money is controlled by monetary authorities. In a money economy any portfolio shuffling will disturb the inventory of money (people seldom barter) and until desired and actual real money balances are equated, changes will continue. Thus, policy tools can be used to control or induce these portfolio changes.

For instance, suppose that an increase in the nominal money stock causes actual real money balances to be larger than desired. In attempting to reduce their balances (relative to other assets in the portfolio), people will try to acquire other assets, whose prices will then be bid up. Exchanges of money for assets will continue until the increase in the general price level reduces real money balances to their desired level.

A crude interpretation of this theory suggests that *any* decline in observed real money balances implies a fall below some desired level. In the process of attempting to restore real money balances to the desired level, economic units sell other assets bidding down their prices. This induces a reduction in output, employment and prices of current output. If the goal of monetary policy is to stabilize output, employment, and prices, a correct policy prescription would be to increase the stock of money in order to reverse the process. Thus, in this situation *observed* real money balances become both a predictor of changes in economic activity and a target of monetary policy.

Such an interpretation, however, is an example of the crudest form of monetarist thought; it assumes that changes in economic activity emanate *solely* from changes in the money stock. Only under such an assumption can decreases in observed real money balances be invariably interpreted as indicative of the process described in the paragraph above. But, as shown in the wheat example, changes in observed real money balances can easily occur when there are unexpected changes in output or changes in expectations, each of which can be a result of many causes.

What Do Changes in Real Money Balances Actually Indicate?

Again, real money balances are defined as the ratio of nominal money balances to some generalized price level. As Illustration I demonstrates, there can be several causes for the decline in this ratio, indicating different forecasts and different policy implications.

Let us start with case I where nominal money balances decline and desired real money balances remain constant. This is a case in which, clearly, an observed reduction in real money balances implies an economic contraction; the correct countercyclical policy would be an expansion in the money stock.

In case II, nominal money balances remain constant while a rising price level causes real money balances to decline. Here, these events would follow from a decline in *desired* real money balances due to an autonomous decline in wealth, the result, perhaps, of a natural catastrophe. Since such a fall in wealth must encompass a reduction in output, the observed decrease in real money balances would correctly predict a recessionary tendency but would *not* call for an expansionary monetary policy. With exogenous events causing the contraction in wealth and output, an increased money stock would only contribute to the rising price level without countering the real market contractive forces.

The third case is identical to II in terms of the cause of falling real money balances except that here *desired* real money balances decline because of an expectation of accelerating inflation. Individual decisionmakers would attempt to protect their real wealth by reducing their holdings of monetary assets, including real money balances, by buying other assets and thus increasing the demand for output. In these cir-

Illustration I

SOURCES AND CONSEQUENCES OF DECLINING REAL MONEY BALANCES

Current Observations	CASE I Current Decline in Nominal Money Stock Growth	CASE II Current Autonomous Decline in Wealth	CASE III Current Increase in Expectations of Inflation	CASE IV Past Autonomous Decline in Wealth	CASE V Past Increase in Expectations of Inflation	CASE VI Past Increase in Nominal Money Stock Growth
Nominal Money Stock Growth	Declines	Unchanged	Unchanged	Unchanged	Unchanged	Unchanged
Price Level	Unchanged	Increases	Increases	Increases	Increases	Increases
Desired Real Money Balances	Unchanged	Declines	Declines	Unchanged	Unchanged	Unchanged
Output Growth	Declines	Declines	Increases	Unchanged	Unchanged or Increases	Unchanged or Increases

cumstances a decline in real money balances is associated with an increase rather than a decrease in output; again, an increase in money stock would only serve to reinforce anticipations of inflation and strengthen the inflationary push.

Of these three cases, a decline in observed real money balances gives a "correct" signal of an impending decline in output in two cases and an "incorrect" signal in the other. In addition, only in case I is an offsetting increase in the money supply appropriate. These are not the only possible situations; consideration of additional cases shows observed real money balances to be an even more unreliable indicator and target for monetary policy.

Empirical evidence strongly suggests that changes in aggregate demand produce changes in output and prices with a lag. Thus there are at least three additional ways in which falling real balances can produce erroneous forecasts and damaging policy prescriptions. Case IV shows a decrease in currently observed real balances resulting from an increase in the price level which, in turn, results not from a *current* decrease in desired real money balances (as in II and III) but from a *past* decrease. This could be caused by an autonomous wealth decrease in previous periods and would not indicate a decrease in output now or in the future. In this case output would fall at the time of the wealth decrease, but observed real money balances would be unchanged initially. Real money balances would fall only later. This case would be expected in a situation where prices are relatively inflexible in the short run — a situation not far from reality. Thus, although this case is analogous to case II, it would produce both a faulty forecast (in that the prior decrease in output was missed) and a faulty policy recommendation.

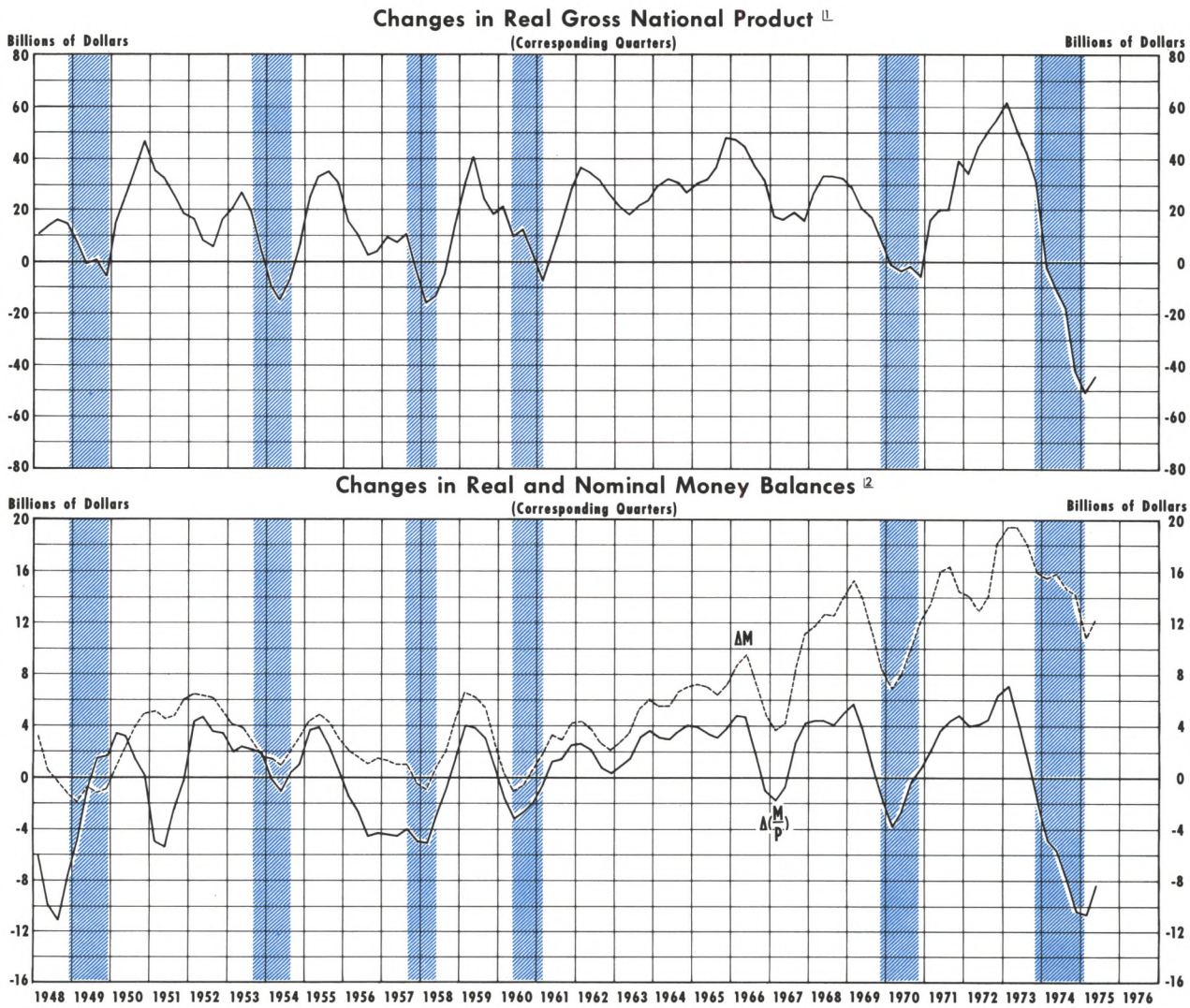
Case V is similar to IV except that a past decline in desired real balances is caused by a past change in expectations regarding the future level of prices. The current price level is rising because of a lagged adjustment to a past disequilibrium and *observed* real money balances are falling. This again does not indicate current or future reductions in output. On the contrary, growth of aggregate demand actually has accelerated. The decline in observed real money balances again emits incorrect signals with respect to forecasts and stabilization policy.

The final alternative VI is one in which the current price level is rising due to a past expansion in the nominal money stock, with current and past desired real money balances remaining constant. The current decrease in real balances represents an adjustment to a past increase in those balances. The implication of this observation is that output has risen already in response to the initial discrepancy between desired and actual real money balances and the current price level is rising with a lag. There is no reason to expect current or future contractions in output. Again, misleading information is provided by the real money measure.

In addition to the above described alternatives, there are numerous situations where different *rates* of change may produce similar results. Their effects are analogous.

In summary, there are three basic causes of declining observed real money balances, each with distinct implications:[1] case I, for which the forecast of declining output and the recommendation for expansive monetary policy would be correct; case II, for which the forecast for declining output would be correct but an expansive monetary policy would only create or intensify inflationary pressures; and cases

[1]There is also the lingering problem of measurement. Observed real money balances are dependent on price indexes and thus suffer all of the problems peculiar to index numbers. Care must be taken lest the price *index* replace actual prices in the analysis.



[1] GNP at 1958 prices.
[2] Nominal money balances are currency plus private demand deposits. Real money balances are the money stock divided by the GNP implicit price deflator (1958=100).
Shaded areas represent periods of business recessions as defined by the National Bureau of Economic Research except the 1973-75 recession which is a preliminary definition.
Latest data plotted: 2nd quarter 1975

III-VI, for which the forecast would be incorrect and expansion of the money stock would be the wrong policy action.

Historical Evaluation

The experience of the past gives several examples of the inherent dangers of using observed real money balances as both a forecasting device and as a target for monetary policy. In most situations real money balances have performed reasonably well as a precursor of declines in economic activity. The exceptions are notable, however, and offer persuasive evidence against the use of observed real money balances in policy discussions.

The accompanying chart depicts corresponding quarterly changes in real GNP, the nominal money stock (M_1), and real money balances (M_1/GNP price deflator).[2] Simple visual inspection clearly indicates that most of the recessions since 1947 have been preceded by declines in real money balances and corresponding decreases in the rate of growth of nominal money stock. These episodes would fall into our case I, where decreases in real money balances resulted from a restriction in the rate of monetary expansion. This observation ostensibly supports changes in real

[2]The chart reports the dollar change in each magnitude from the corresponding quarter one year earlier. This procedure is used in order to smooth the data and thus present a clearer picture of the relationships.

money balances as both a good forecasting device and a good target for stabilization policy.

The 1950-51 period stands out as an exception, and is more like case III. Although real money balances fell precipitously, the growth of nominal money balances remained relatively constant and a recession did not develop. The sudden outbreak of war in Korea in 1950 apparently induced expectations of commodity shortages resulting from anticipated price controls and rationing programs. This mood of speculation caused a shift in the desired portfolio of assets that people held.[3] *Desired* real money balances were reduced, as an attempt was made to shift out of money and into inventories of other assets. The result was a rapid rise in the price level. Thus, while observed real money balances fell sharply, aggregate demand increased rapidly. The decline in real balances incorrectly forecast a recession and increased growth of nominal money to offset the reduction in real money balances would have served only to aggravate the situation.

A second period in which real-balance-watching yields faulty policy prescriptions encompasses 1973 and the first part of 1974, when the behavior of real and nominal balances diverge sharply. It appears that this period illustrates a combination of cases II and VI. Although the decline in real money balances correctly indicated the reduction of output in early 1974, expansionary monetary policy during that period would have been powerless to stem it. The rate of growth of nominal money did slow in 1973; but since most, if not all, of the decline in output in the first three quarters of 1974 was due to the wealth-reducing effects of the energy situation, bad agricultural harvests, and new government regulations, the effect of slower money growth on economic activity is uncertain. This wealth loss would serve to reduce the *domestic* demand for real money balances. The latter part of 1974, of course, exhibited all the attributes of case I.[4]

Summary and Conclusion

There is a significant number of economists and policymakers who assert that all changes in observed real money balances precede corresponding changes in economic activity and that monetary policy should be geared to counter these changes. This article attempts to explain that such a view assumes that all changes in economic activity emanate *solely* from changes in the nominal money stock — an assumption which is warranted by neither existing monetary theory nor empirical observations.

Although it is agreed that real money balances play a crucial role in the determination and prediction of economic activity, the assertion that *observed* real money balances provide us with sufficient information to make accurate predictions and policy decisions is unwarranted. We have enumerated several instances where changes in observed real money balances would produce incorrect predictions and several where, even if predictions were correct, wrong policy proposals would result. Empirical observations indicate that since 1947, blind reliance on observed real money balances would have compounded cyclical functuations on at least two occasions.

Examination of logical constructs and economic history over the past 30 years implies that changes in *nominal* money balances would be a preferable predictor and target of monetary policy. This should not surprise even those who advocate the use of observed real money balances since it limits the changes in these balances to a set where the causal determinant of the change is indeed a change in the nominal money stock. Again, the use of real balances as a pivotal variable in economic decisionmaking is not rejected, but it is suggested that *observed* real money balances have a lower probability of correct prediction of changes in economic activity and correct policy suggestions than nominal money balances.

[3]The mood was, "we had better get it now while we still can." Thus purchases of goods and services that, in normal times, would have taken place over a period of several years were attempted all at once. The sharp rise in the price level in 1950-51 was followed by several years of price controls and price level stability, and there is evidence that the level of prices in 1955 was approximately the same as what would have been achieved without the shock of the Korean war. Instead of rising smoothly through the 1950-55 period, prices rose very rapidly early in the period and then remained stable. See Michael K. Evans, *Macroeconomic Activity* (New York: Harper & Row, 1969), p. 301.

[4]Advocates of the analytical power of real money balances also point to the rate of growth of output in 1973 as offering supporting evidence. Observed real money balances began to decline early in the year, just as the rate of growth of real GNP slowed markedly. There is danger here, however, in that the initial decline in real balances resulted from the not unexpected burst of price increases which followed the removal of most price controls. This was a case where behavior of the price index may have been very different from movements in the actual level of prices. Both theory and evidence suggest that price controls are effective in controlling only the price index but not actual inflation, which is then only suppressed in the data. The *actual* rate of inflation during the period of controls in 1971-72 was probably higher than reported in the indexes and was somewhat lower in 1973. Thus actual real money balances were probably somewhat lower than reported in 1971-72 and somewhat higher in 1973. The decline in *observed* real money balances in 1973 was, therefore, probably overstated.