

# FEDERAL RESERVE BANK OF ST. LOUIS

JANUARY 1972



# REVIEW



## CONTENTS

Government Debt, Money, and Economic Activity .....	2
Two Critiques of Monetarism	
A Critical Look at Monetarist Economics ...	10
Comments on a Monetarist Approach to Demand Management .....	26

Vol. 54, No. 1

# Government Debt, Money, and Economic Activity<sup>1</sup>

by KENNETH STEWART

**T**HE AMERICAN economy in the last six years has experienced a high rate of inflation. The recent recession, which led to an increase in the rate of unemployment, was not accompanied by a rapid reduction in the rate of inflation. As a result, the effectiveness of traditional stabilization measures was questioned, and the New Economic Program, which includes administrative controls on prices and wages, was initiated as a solution to these problems.

An examination of economic evidence over the past twenty years suggests that the course of monetary expansion can explain both the emergence of inflation in the mid-1960s and the occurrence of a high unemployment rate at the turn of this decade. The pattern of monetary growth has been, in turn, greatly influenced by growth in Federal Government debt.

This article relates trend rates of growth of money and changes in rates of monetary growth during the past two decades to changes in output, employment, and prices. It further analyzes the growth of Government debt and its relationship to the expansion of the money stock.

## Money and Economic Activity

According to the view presented in this article, the economy is considered to be basically stable and in the long run to move along a trend path of output determined by growth in its productive potential. Some variation in output and employment around

the trend path occurs due to disturbances from labor strikes, crop failures, changes in tax rates and other factors, but these disturbances have seldom been the dominant force in causing recessions or inflations.

Evidence indicates that marked and sustained changes in the rate of monetary expansion have been a major factor underlying virtually all cyclical fluctuations and inflations. Changes in the rate of growth of the money stock have been shown to have predictable effects on total spending in the same direction.<sup>2</sup> Changes in total spending have been associated first with changes in output and later with changes in prices.<sup>3</sup> Consequently, the trend rate of growth of the money stock, defined in this article as demand deposits and currency held by the nonbank public, is viewed as having a major influence in determining the trend rate of growth of prices, whereas accelerations and decelerations in the growth rate of money lead mainly to short-run fluctuations in output and employment.<sup>4</sup>

These short- and long-run effects of money stock growth on prices, output, and employment are demon-

<sup>1</sup>This article expands some of the views initially presented in a speech by Darryl R. Francis at the Annual Intermountain Banking Seminar, Utah State University, Logan, Utah, November 18, 1971, as well as in papers presented by Leonall C. Andersen at the Nineteenth Annual Conference on the Economic Outlook, The University of Michigan, Ann Arbor, Michigan, November 18, 1971, and by Jerry L. Jordan at the National Bureau of Economic Research Conference on Secular Inflation, Chicago, Illinois, November 5 and 6, 1971.

<sup>2</sup>In the equation formulated by Leonall C. Andersen and Jerry L. Jordan, a marked and sustained change in monetary growth has its major effect on nominal GNP within five quarters. See Leonall C. Andersen and Jerry L. Jordan, "Monetary and Fiscal Actions: A Test of their Relative Importance in Economic Stabilization," this *Review* (November 1968), pp. 11-24.

<sup>3</sup>Equations formulated by Leonall C. Andersen and Keith M. Carlson indicate that monetary actions generally affect total spending with a two-to-three quarter lag. A change in the rate of growth of total spending was accompanied by a simultaneous change in the rate of growth of output. Prices changed more slowly following a change in total spending. See Leonall C. Andersen and Keith M. Carlson, "A Monetarist Model for Economic Stabilization," this *Review* (April 1970), pp. 7-25.

<sup>4</sup>In "Money Supply and Time Deposits, 1914-69," this *Review* (March 1970), pp. 6-10, changes in money growth rates and cyclical movements in economic activity were compared.

strated on Chart I.<sup>5</sup> The trend rate of growth of the money stock, as shown in the top tier, increased from a 1.7 percent annual rate through most of the 1950s and early 1960s, to 3.7 percent in the first half of the 1960s, and to 5.8 percent in the second half of the 1960s and early 1970s. The trend rate of growth of prices, as shown by the General Price Index panel, rose in a similar pattern from the 1950s through the 1960s, reflecting, after about a three year lag, changes in the trend growth of the money stock.

Relationships between output and employment and the growth of the money stock relative to its underlying trend rates can be observed in the top and bottom tiers of Chart I. During the two decades covered, six periods of money stock growth occurred at rates significantly greater than the underlying trend.<sup>6</sup> Each of these periods was accompanied (with a lag of one or two quarters) by an upward movement in real output toward or above potential real output as estimated by the President's Council of Economic Advisers.

During this same twenty year interval the economy experienced four recessions (as defined by the National Bureau of Economic Research) and two periods of brief economic slowdown. Each of the four recessions (shaded areas in Charts I and II) was preceded by a marked slowdown or an absolute decline in the rate of growth of the money stock. The recessions occurred in the periods 1953-54, 1957-58, 1960-61, and 1969-70. When the rate of growth of the money stock slowed in 1962 and 1966, the growth rate of real output slowed, and a rise in the rate of unemployment followed. The 1962-63 and 1966-67 periods of slowdown were not of significant magnitude and duration to be labeled recessions.

Chart I does not offer conclusive evidence that monetary growth affects economic activity. However, the relationships shown on the chart are consistent with the view that the trend growth of money is a major influence on long-run price movements, and that accelerations and decelerations of monetary growth about the trend have predictable effects on output and employment in the short run.<sup>7</sup> Price movements, on

<sup>5</sup>For econometric evidence supporting the interpretation of these charts, see Andersen and Carlson, "A Monetarist Model."

<sup>6</sup>As used in this context, a period is a time interval of at least six months duration. These periods of accelerating money growth began in late 1951, 1954, 1958, 1961, 1965, and 1968.

<sup>7</sup>For an elaboration of a theoretical foundation underlying these relationships, see Karl Brunner, "A Survey of Selected Issues in Monetary Theory," *Schweizerische Zeitschrift für Volkswirtschaft und Statistik* (No. 1, 1971), pp. 1-146.

the other hand, have been little affected by short-run variations in monetary growth.

The experience of the last two decades also suggests that monetary growth has little lasting influence on the rate of unemployment and the growth rate of real output.<sup>8</sup> Despite variations in the rate of monetary growth about its trend as well as changes in the trend in the 1950s and 1960s, growth of real output tended to move towards or along its potential growth path.<sup>9</sup> The unemployment rate averaged 4.9 percent from 1952 to 1962 and averaged 4.6 percent since then. The lasting effect of monetary actions is on the trend of prices, whereas output and employment growth depend on real factors—labor force trends and productivity.

### Determinants of the Money Stock

In view of these observed relationships between money and economic activity, it is important to consider the factors which affect movements in the money stock. The money stock ( $M$ ), defined in this article as demand deposits and currency held by the nonbank public, can be expressed as a function of the monetary base ( $B$ ) and a money multiplier ( $m$ ) such that:

$$M = mB.$$

Using this relationship, factors which cause the money stock to change can be summarized by changes in the monetary base and the multiplier.

The multiplier over the past twenty years has been fairly stable.<sup>10</sup> It has fluctuated over a narrow range and has been shown to be predictable.<sup>11</sup> Consequently, the trend rate of growth of the money stock has been dominated by the trend rate of growth of the monetary base. The close association between

<sup>8</sup>For an explanation of this observation see Milton Friedman, "The Role of Monetary Policy," *The American Economic Review* (March 1968), pp. 1-17, and in *The Optimum Quantity of Money and Other Essays* (Chicago: Aldine Publishing Company, 1969), pp. 95-110.

<sup>9</sup>After the 1960-61 recession, the movement back toward potential real output was relatively slow. This period followed two recessions only two years apart which provided a basis for the growing belief in the early 1960s that the economy was becoming subject to relatively short business cycles. Such a belief was probably a contributing factor to the slow recovery to full employment in the early 1960s. In addition, the economy received a minor additional shock shortly after the 1960-61 recession when money declined relative to the trend in 1962.

<sup>10</sup>The money multiplier summarizes the decisions of commercial banks to hold excess reserves, of the Government to hold demand deposits, and of the public to hold currency, demand deposits, and time deposits. A discussion of factors affecting the money multiplier is presented by Jerry L. Jordan, "Elements of Money Stock Determination," this *Review* (October 1969), pp. 10-19.

<sup>11</sup>See Albert E. Burger, Lionel Kalish III, and Christopher T. Babb, "Money Stock Control and Its Implications for Monetary Policy," this *Review* (October 1971), pp. 6-22.

### Chart I Influence of Money on Prices, Output and Unemployment

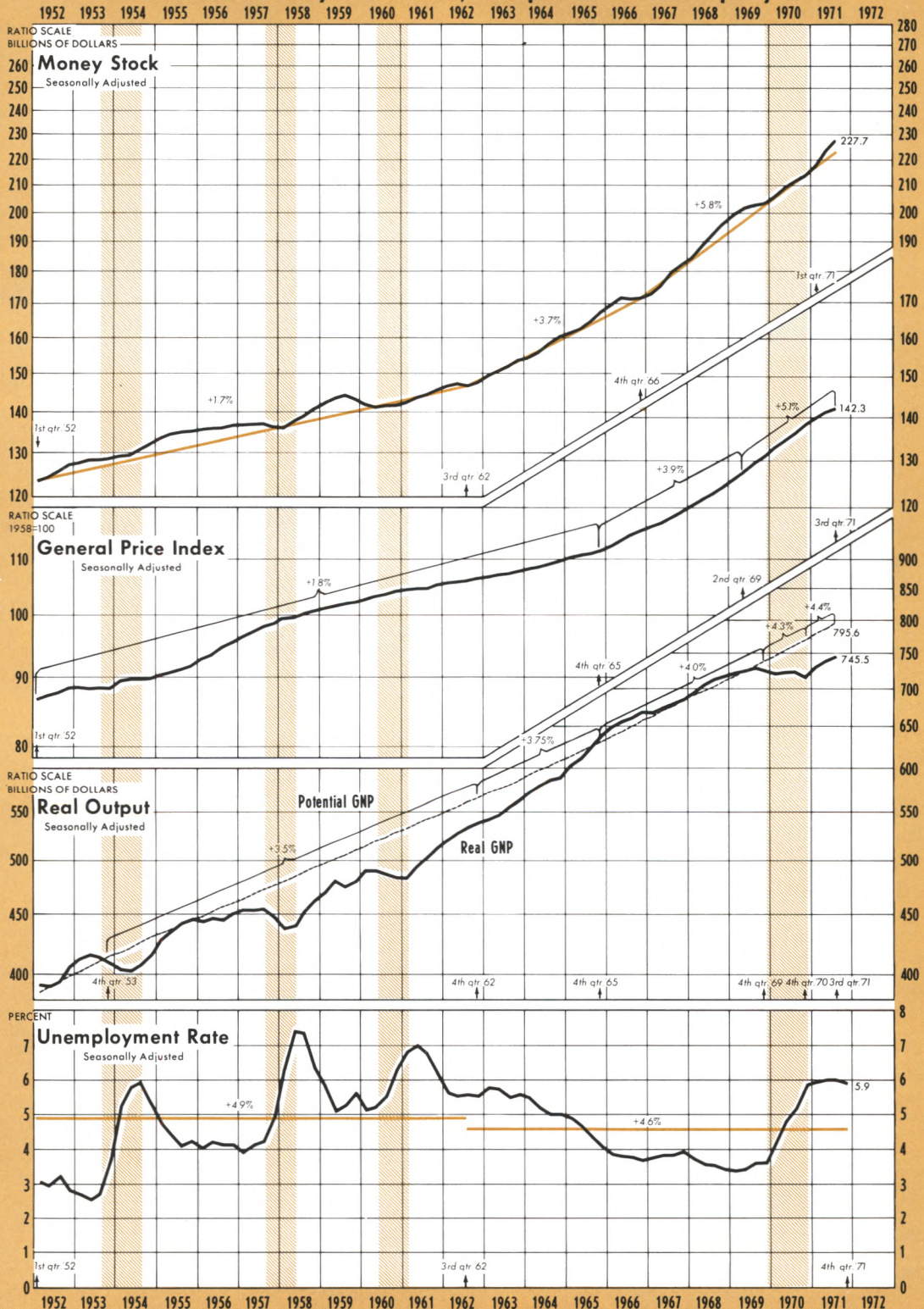
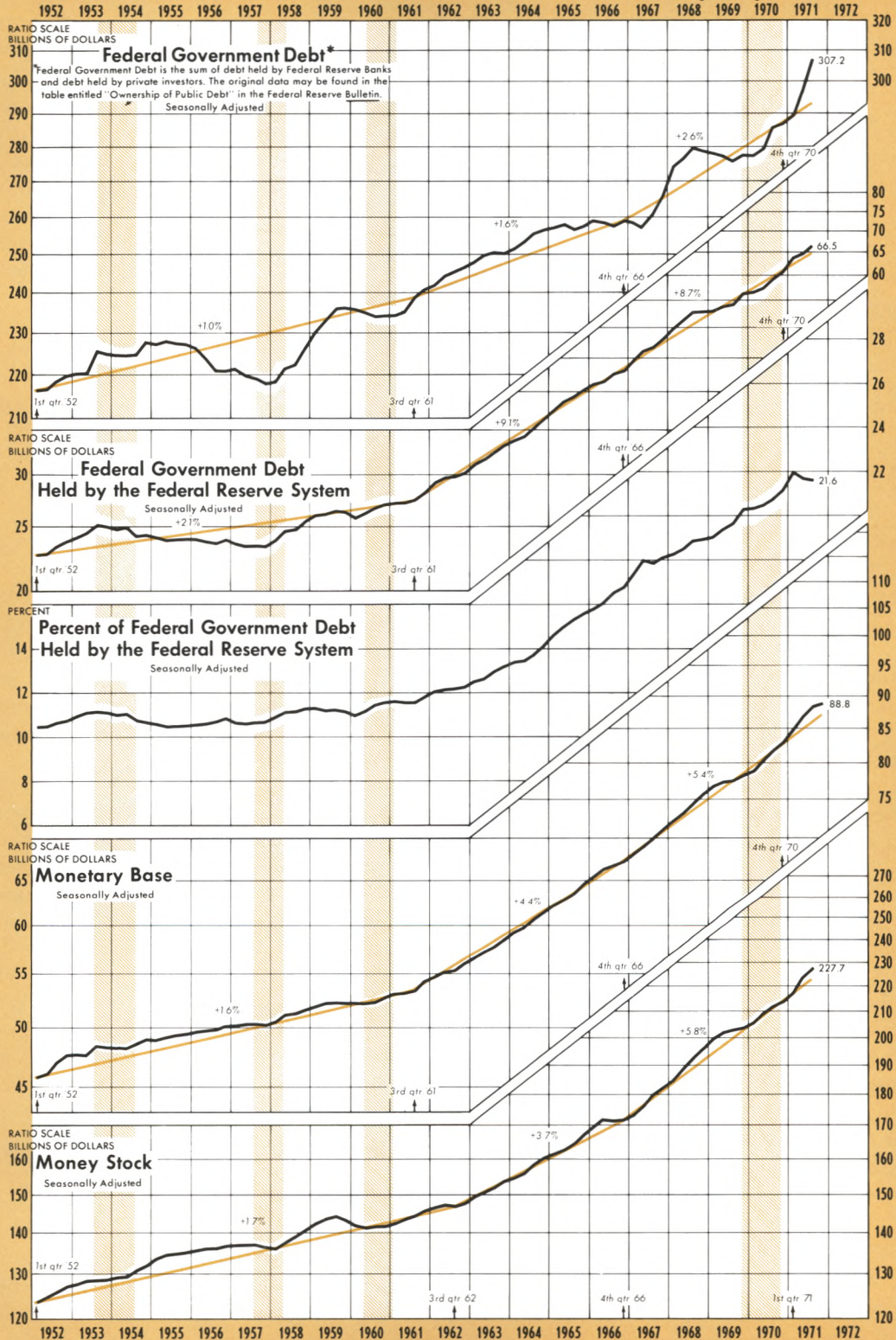


Chart II  
**Influence of Federal Government Debt on Monetary Expansion**



Shaded areas represent periods of business expansion as defined by the National Bureau of Economic Research.  
 Latest data plotted: Federal Government debt, money stock, III/1971; monetary base, IV/1971

Table I

**Sources of the Base**  
 Monthly Averages of Daily Figures  
 (Dollar Amounts in Millions, Not Seasonally Adjusted)

	Percent of Base			
	Sept. 1949	Dec. 1971	Sept. 1949	Dec. 1971
<b>Federal Reserve Credit</b>				
Holdings of Government Securities	\$17,441	\$69,262	40.9%	76.4%
Discounts and Advances	164	108	.4	.1
Float	352	3,915	.8	4.3
<b>Gold Stock</b>	24,637	10,132	57.8	11.2
<b>Special Drawing Rights</b>		400		.4
<b>Treasury Currency Outstanding</b>	4,592	7,612	10.8	8.4
<b>Treasury Cash Holdings</b>	— 1,310	— 454	— 3.1	— .5
<b>Treasury Deposits at Federal Reserve</b>	— 649	— 1,926	— 1.5	— 2.1
<b>Other Deposits and Other Federal Reserve Accounts</b>	— 1,693	— 2,324	— 4.0	— 2.6
<b>Source Base</b>	\$43,534	\$86,725	102.2%	95.7%
<b>Reserve Adjustment Magnitude</b>	— 938	3,930	— 2.2	4.3
<b>Monetary Base</b>	\$42,596	\$90,655	100.0%	100.0%

Totals may not add due to rounding.

these two rates is indicated by the trend lines in the bottom two panels of Chart II.

The monetary base represents the net monetary liabilities of the Government (U.S. Treasury and Federal Reserve System) held by the public (commercial banks and nonbank public). The monetary base has been referred to as "high powered" money because it can be used as reserves of commercial banks to expand demand deposits by more than the amount of reserves.<sup>12</sup>

Given that changes in the monetary base are the major determinant of changes in the rate of monetary expansion, it is important to ascertain the factors which have led to changes in the base. Table I presents the sources of the monetary base. Growth of the monetary base during the past twenty years has been determined primarily by two sources — Federal Reserve Credit and the gold stock. An increase in the dollar amount of either of these sources, other things equal, increases the monetary base by an equal amount.

In September 1949, when the gold stock source of the base was at its peak, it comprised 57.8 percent of

the monetary base (Table I). Since 1949, the amount of gold held has declined almost continuously. The decline in gold stock has contributed a negative influence to growth of the base, while increases in Federal Reserve holdings of U.S. Government securities, the dominant component of Federal Reserve credit, has contributed a positive influence. Other sources, though their net influence has been positive, have contributed relatively little to movements in the base during the past twenty years.

From 1952 to the middle of 1961, increases in securities held by the Federal Reserve System almost offset decreases in the gold stock. The monetary base grew slowly in this period. Beginning in the 1960s, increases in Federal Reserve holdings of Government securities more than offset reductions in the gold stock, and the

monetary base grew more rapidly. A two-tiered gold system, established in March 1968, separated the gold market into private and official sectors, each with its own price. Since April 1968, the gold stock has remained roughly constant and has contributed little to growth of the monetary base. Gold now represents only 11.2 percent of the base.

Holdings of Government securities by the Federal Reserve represent the System's acquisitions of Federal Government debt through its open market operations. These security holdings presently comprise 76.4 percent of the monetary base, and since the early 1960s changes in security holdings have been the dominant influence on growth of the base. Through purchases and sales of securities, called open market operations, the Federal Reserve can control the growth of the monetary base by offsetting or complementing any movements in other sources.

### Influence of the Federal Government Debt on Monetary Expansion

Growth of Government securities held by the Federal Reserve System depends on the growth of Government debt and the percent of this debt the System decides to purchase. This section traces the growth of Government debt over the last twenty years, the acquisition of debt by the Federal Reserve System and the reasons for debt acquisition by the System.

<sup>12</sup>A discussion of the monetary base is presented by Leonall C. Andersen and Jerry L. Jordan, "The Monetary Base — Explanation and Analytical Use," this *Review* (August 1968), pp. 7-11.

## *Growth in Federal Government Debt Outstanding*

Growth of Government debt is shown in the top tier of Chart II.<sup>13</sup> Government debt outstanding oscillated around a one percent annual trend rate of growth from the first quarter of 1952 to the third quarter of 1961. Unified budget deficits of \$3.4 billion and \$7.1 in fiscal years 1961 and 1962, respectively, initiated an increase in the trend rate in the early 1960s. From the third quarter of 1961 to the fourth quarter of 1966, Government debt rose by \$20.2 billion, or at an annual trend rate of 1.6 percent.

Large unified budget deficits of \$8.7 billion and \$25.2 billion were incurred in fiscal years 1967 and 1968, respectively. These deficits further increased the trend growth rate of Government debt. From the fourth quarter of 1966 to the fourth quarter of 1970 Government debt grew by \$27.8 billion, or at a 2.6 percent annual rate.

Government debt grew in the early 1960s mainly because of deficits incurred in fiscal years 1961 through 1965. During this period outlays for domestic civilian programs increased at about an 8 percent annual rate and tax receipts rose at a 5 percent rate. The slower growth in tax receipts reflected tax cuts in 1962, 1964, and 1965. In the second half of the 1960s, defense expenditures rose sharply, while at the same time nondefense expenditures accelerated further. These rapid expenditure increases were not accompanied by increased tax rates, except in fiscal 1969, and as a result, large deficits were incurred in fiscal years 1967, 1968, 1970, and 1971.

## *Federal Reserve Acquisition of Debt and Growth of the Monetary Base*

Federal Government debt held by the Federal Reserve System changed little in the 1950s, but then grew rapidly in the 1960s. Changes in the monetary base during the 1960s roughly paralleled that of the System's holding of debt. Debt acquisition by the Federal Reserve System and the percent of debt held by the System are shown on Chart II (second and third panels from the top).

Between the first quarter of 1952 and the third quarter of 1961, the proportion of Government debt held by the Federal Reserve System remained roughly constant at around 11 percent. As Government debt increased, securities held by the Federal Reserve System increased proportionally, and as the debt de-

creased, securities held decreased proportionally. Variations in Government debt outstanding in the 1950s, especially late in the decade, tended to accelerate and decelerate growth in the monetary base. Variations in the base, in turn, were a major cause of fluctuations in the money stock.

When the trend rate of growth of Government debt increased in the first half of the 1960s, the percent of the debt held by the Federal Reserve also increased, as the rate of acquisition of debt by the Federal Reserve was more rapid than the expansion of the Government debt itself. Increased purchases of Government securities by the Federal Reserve directly increased the monetary base, increasing its trend rate of growth, which in turn increased growth of the money stock and economic activity. As resource utilization approached its upper limit, as defined by potential output, the rate of inflation increased.

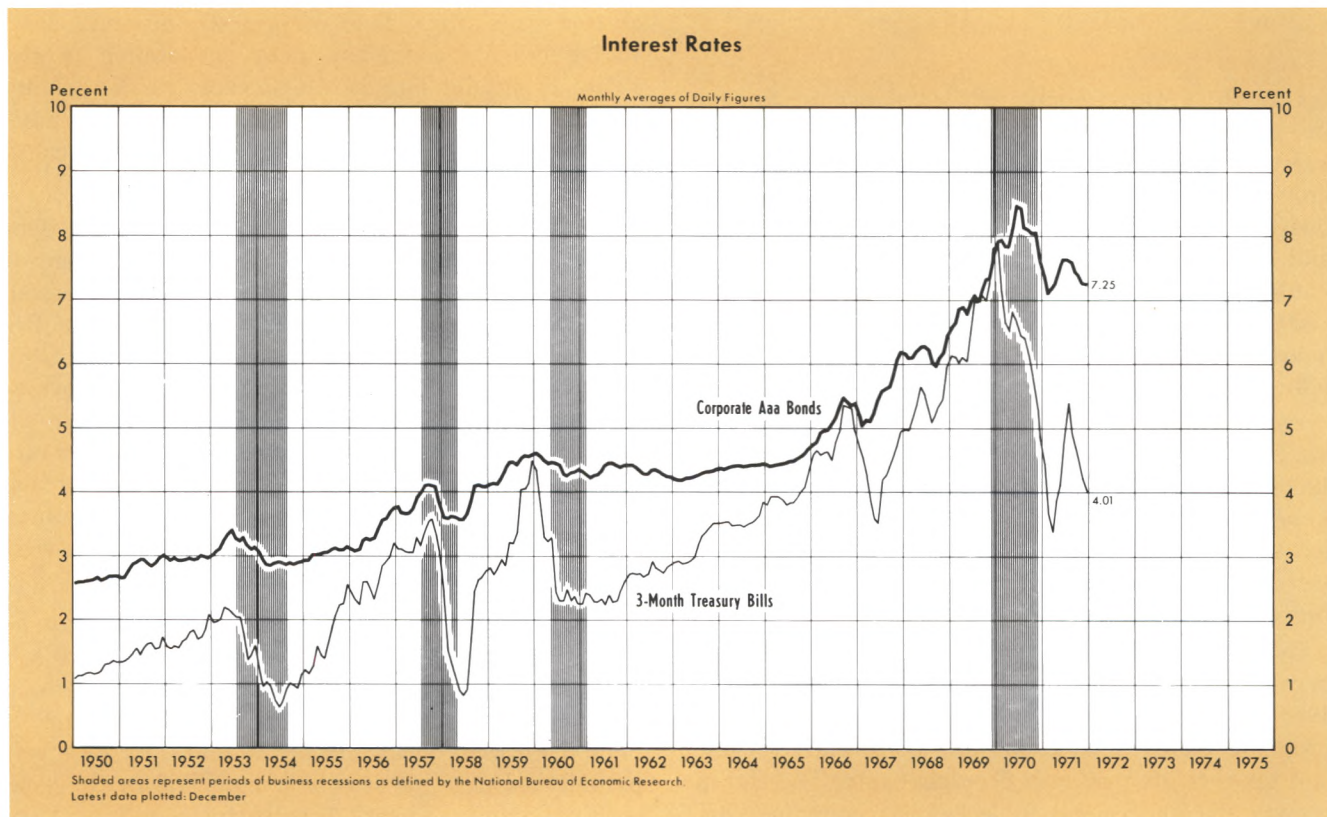
From the third quarter of 1961 to the fourth quarter of 1966, the Federal Reserve purchased \$15.9 billion of Government securities adding to its portfolio at a 9.1 percent average annual rate. The effect of debt acquisition on growth of the monetary base was partially offset by a \$4.3 billion decline in the gold stock, and the monetary base grew by \$13.7 billion. This increase accelerated growth of the base to a 4.4 percent annual rate, and growth of the money stock began to accelerate in the third quarter of 1962. Real output grew with little effect on prices until 1965 when a high level of resource utilization was reached and price increases began to accelerate.

The Federal Reserve continued to rapidly increase its security holdings in the second half of the 1960s, when growth of the debt accelerated further. As a result, growth of the monetary base, money stock, and prices accelerated. From the fourth quarter of 1966 to the fourth quarter of 1970, Government debt held by the Federal Reserve grew by \$17.2 billion, or at an 8.7 percent annual rate. As a consequence, the portion of debt held by the Federal Reserve increased from 16.8 percent in late 1966 to 21.1 percent in late 1970. The base increased by \$16 billion, accelerating to a 5.4 percent annual rate of growth. Money stock growth accelerated to a 5.8 percent annual rate during this period and the rate of increase in prices climbed to a 5.1 percent rate beginning in the second quarter of 1969.

## *Major Factors Influencing Acquisition of Debt by the Federal Reserve*

The Federal Reserve System purchases Government securities for several purposes. However, con-

<sup>13</sup>Federal Government debt is defined in this article as the sum of debt held by Federal Reserve Banks and debt held by private investors. The original data may be found in the table entitled "Ownership of Public Debt" in the Federal Reserve *Bulletin*.



cern over market interest rate movements has been a major factor influencing Federal Reserve acquisition of Government debt over the last two decades.<sup>14</sup> Debt issues by the Federal Government put upward pressure on interest rates. When the Federal Reserve System buys Federal Government debt in the open market, both the supply of credit and the money stock are increased. Greater availability of funds in the credit markets initially puts downward pressure on interest rates. System actions are thereby capable of preventing interest rates from rising during times of Treasury borrowing.

Purchases of securities also increase the monetary base which produces an expansion in the money stock. If growth of the money stock is greater than increases in the demand for money balances, then the difference will tend to be reflected in an increase in aggregate demand. An increase in aggregate demand stimulates economic activity and tends to increase the demand for credit placing upward pressure on market

interest rates. If prolonged price increases accompany an acceleration in total spending, expectations of future price increases develop. Borrowers are then willing to pay and lenders demand an inflation premium which raises market interest rates. Thus, sustained increases in the money stock usually exert upward pressure on interest rates.

The initial, short-run impact of its security purchases on interest rates generally has received the greatest attention in the day-to-day operations of the Federal Reserve System. Large debt acquisition by the System has resulted from attempts to maintain existing money market conditions during times of Treasury borrowing. The positive longer-run impact of monetary expansion on interest rates has been a factor leading to an accelerating trend rate of growth of the money stock in the 1960s.

Variability around trend movements of the monetary base may be attributed in considerable measure to alternating concern between reducing inflation and facilitating a relatively rapid economic expansion to lower the rate of unemployment. When the rate of inflation intensified monetary authorities sought higher interest rates; consequently, the rate of growth of the base (and money stock) slowed markedly for a period. Shortly thereafter economic activity slowed and unem-

<sup>14</sup>Michael W. Keran and Christopher T. Babb, using regression analysis, found that changes in Federal Reserve holdings of Government securities and changes in the monetary base were influenced, in descending order of importance, by market interest rates, changes in the amount of United States Government debt outstanding, and economic stabilization objectives. See Michael W. Keran and Christopher T. Babb, "An Explanation of Federal Reserve Actions (1933-68)," this *Review* (July 1969), pp. 7-20.



ployment rose. Monetary authorities then shifted objectives and attempted to lower market interest rates to stimulate economic activity; consequently, the base increased more rapidly. This rapid monetary expansion, after a lag, placed further upward pressure on prices, setting the basis for a future round of monetary restraint.<sup>15</sup>

### Conclusions

This article emphasizes a number of propositions which may be summarized as follows:

1. The trend rate of growth of the money stock plays a major role in determining the trend rate of growth of prices. Marked and sustained changes in the growth rate of the money stock are followed by short-run variations in output and employment.

<sup>15</sup>Examples of such short-run destabilizing monetary actions have been noted in this Bank's *Review*. See Reprints 17, 22, 28, 39, 57, and 68, for annual reviews of monetary actions for the years 1965 through 1970, respectively. A study of the released "Minutes of the Federal Open Market Committee" for the years prior to 1965 indicates that monetary developments were similar in earlier years.

2. Growth of the money stock is dominated by growth of the monetary base.
3. Even though monetary authorities can independently control movements in the monetary base, growth of the base has been greatly influenced by growth of Government debt and concern about movements in market interest rates.

A steady, moderate rate of monetary expansion can help foster noninflationary growth and promote stability. Such a course of monetary expansion may be difficult to achieve at the present time, unless impediments to such expansion are reduced. The Federal Government deficit during fiscal year 1972 is expected to be extremely large, representing a substantial demand for credit, which in turn, would be expected to exert upward pressure on market interest rates. Public sentiment against high or rising interest rates is deeply imbedded in traditional American thought. A step towards lessening the influence of these impediments would be for market interest rates to receive less emphasis in the determination of monetary actions.



# A Critical Look at Monetarist Economics

by RONALD L. TEIGEN

Ronald L. Teigen is an Associate Professor of Economics at the University of Michigan. He received a PhD degree in Economics from Massachusetts Institute of Technology. Professor Teigen is the author of several articles in monetary economics, and is co-author with Warren L. Smith of READINGS IN MONEY, NATIONAL INCOME, AND STABILIZATION POLICY. This paper was presented at the Annual Conference of College and University Professors of the Federal Reserve Bank of St. Louis on November 12, 1971.

UNTIL JUST a few years ago, the viewpoint which lately has come to be known as "monetarist" was not taken very seriously by anyone except a few dedicated disciples. Its central postulate — that changes in the level of aggregate money income were due essentially to prior money stock changes — was viewed as a totally inadequate oversimplification, especially since the proponents of this approach failed to provide an adequately detailed explanation of the theoretical structure upon which this tenet was based.<sup>1</sup> The empirical evidence presented in support of this "quantity theory" viewpoint was subjected to criticism so severe that the evidence has never been taken very seriously.<sup>2</sup>

<sup>1</sup>In particular, Milton Friedman's well-known article, "The Quantity Theory of Money — A Restatement," in M. Friedman, ed., *Studies in the Quantity Theory of Money* (Chicago: University of Chicago Press, 1956), pp. 3-21, which has been cited as the basis for much monetarist work, has been shown by Don Patinkin to be a sophisticated version of Keynes' liquidity preference theory rather than the up-to-date statement of an alleged Chicago oral tradition that monetarists take it to be. See Don Patinkin, "The Chicago Tradition, the Quantity Theory, and Friedman," *Journal of Money, Credit and Banking* (February 1969), pp. 46-70.

<sup>2</sup>I am referring chiefly to the controversy triggered by the work of Milton Friedman and his associates in the late 1950s and early 1960s, especially Friedman's evidence on lags observed between changes in the rate of change of the money stock and changes in GNP, as presented in his paper, "The Supply of Money and Changes in Prices and Output," Joint Economic Committee, U.S. Congress, 1958, and elsewhere, and in the Milton Friedman and David Meiselman paper on, "The Relative Stability of Monetary Velocity and the Investment Multiplier in the United States, 1897-1958," in Commission on Money and Credit, *Stabilization Policies* (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1963). The regression results reported in the latter paper were severely criticized by Donald Hester in the November 1964 *Review of Economics and Statistics* and by Albert Ando-Franco Modigliani and Michael DePrano-Thomas Mayer in the September 1965 *American Economic Review*. The lead-lag observations discussed in the former paper were criticized by John M. Culbertson in the December 1960 *Journal of Political Economy*, and by James Tobin in the May 1970 *Quarterly Journal of Economics*.

However, recent years have witnessed something of a turnaround. The conventional wisdom as embodied in modern Keynesian theory has been cast into doubt, while monetarist thinking has increased greatly in popularity, to the point where its proponents, and even some of its critics, speak of a "monetarist revolution."<sup>3</sup> The reasons for this rather sudden change are no doubt related in part to the apparent inconsistency of the Keynesian analysis (or at least an elementary version of it) with economic events in the United States during the late 1960s,<sup>4</sup> in some

<sup>3</sup>See Karl Brunner, "The 'Monetarist Revolution' in Monetary Theory," *Weltwirtschaftliches Archiv* (No. 1, 1970), pp. 1-30, and Harry G. Johnson, "The Keynesian Revolution and the Monetarist Counter-Revolution," *American Economic Review*, Papers and Proceedings (May 1971), pp. 1-14.

<sup>4</sup>The apparent failure of the income tax surcharge of June 1968 to reduce aggregate demand rapidly has been interpreted by some to be evidence of the failure of the "new" economics. However, it is not at all clear that the surtax was ineffective. In a recently-published study by Arthur Okun, evidence is provided that, at least in some categories of spending (nondurable goods and services in particular), the surcharge seems to have reduced demand substantially. But in other categories (especially demand for new automobiles) no reduction is apparent. See Arthur M. Okun, "The Personal Tax Surcharge and Consumer Demand, 1968-70," *Brookings Papers on Economic Activity* (No. 1, 1971), pp. 167-204. More generally, the notion that demand should have been observed to fall after the surtax was imposed is based on simplistic and partial analysis. When the surtax is analyzed within the context of a complete model (in which government spending is taken into account), and one which incorporates the sophisticated theories of consumption behavior recently developed — the "permanent income" hypothesis of Milton Friedman or the "life-cycle" hypothesis of Albert Ando and Franco Modigliani — there appear a number of considerations which suggest that no substantial diminution of total demand could be anticipated. This point of view is argued persuasively by Robert Eisner in his paper, "Fiscal and Monetary Policy Reconsidered," *American Economic Review* (December 1969), pp. 897-905. Eisner reasons that rising Government expenditure had been expanding demand rapidly at the time when the surtax was enacted; furthermore, under the Friedman and Ando-Modigliani theories, which postulate that it is some long-run measure of income or wealth rather than current-period income which determines

degree to monetarist criticism of Keynesian analysis (mostly directed at a *very* elementary version of it), and in part to other causes, including substantial development by the monetarists of their own theoretical position, as well as the appearance of new and more convincing empirical findings.<sup>5</sup>

While the increase in popularity of monetarism has been rapid, and the rate of growth of the monetarist literature impressive, a critical literature has also appeared, charging that monetarist theory has turned out largely to consist of old concepts clothed in new names, and that the empirical evidence purportedly supporting the monetarist position is biased and undependable.<sup>6</sup> The purpose of the present paper is to attempt to summarize in a general way the main features of the present monetarist theoretical stance, and to examine the monetarist view of modern Keynesianism. Since much of the debate bears directly on the stabilization policy process and the relative usefulness of different instruments of policy, particular attention will be given to the nature of the transmission mechanism under the two approaches. The empirical evidence will not be discussed in a systematic way in this paper, although reference will be made to it, where appropriate, in the discussion of the theories. In conducting this comparison, I shall attempt to identify issues between the two camps which are real, and those which seem to be false.

### The Structure of Monetarist Thought

Although the roots of modern monetarist thought extend far back in time (the writings of classical economists are often cited, Irving Fisher being particularly popular), it is only lately that detailed expositions of this theory have begun to appear. In this paper, no systematic discussion of the entire literature

a household's living standard, a temporary tax change (such as the 1968 surcharge) would be expected to have only minor effects on spending because it does not change long-run expected income significantly. See Milton Friedman, *A Theory of the Consumption Function* (Princeton, N.J.: Princeton University Press, 1957), and Albert Ando and Franco Modigliani, "The 'Life-Cycle' Hypothesis of Saving: Aggregate Implications and Tests," *American Economic Review* (March 1963), pp. 55-84.

<sup>5</sup>Harry Johnson, "The Keynesian Revolution and the Monetarist Counter-Revolution," suggests that the successful monetarist upsurge may also be due to the factors related to the conversion of the "Keynesian revolution" of the 1930s into the economic orthodoxy of the 1960s.

<sup>6</sup>*Ibid.*, for a general discussion of monetarist theory and its relationship to Keynesian orthodoxy. There have been published a large number of papers critical of the recent monetarist empirical studies; references to some are given in footnote 2, and a summary of the criticism of more recent monetarist empirical work is contained in Ronald L. Teigen, "The Keynesian-Monetarist Debate in the U.S.; A Summary and Evaluation," *Statsökonomisk Tidskrift* (January 1970), pp. 1-27.

will be undertaken. Instead, important summary statements which recently have become available in articles by Andersen, Brunner, Fand, Friedman, and others will be taken to be representative of present-day monetarist thought.<sup>7</sup>

### Models, Assertions and Themes

As a useful starting point in establishing a general framework for the discussion to follow, we may refer to recent articles by Brunner and Friedman containing inclusive statements of the monetarist position.<sup>8</sup> Friedman provides an explicit statement of the static-equilibrium structure which he views as being consistent with both the monetarist and Keynesian schools of thought. The theme he stresses—that it is the particular features of or assumptions about particular characteristics of the general analytic structure, rather than the fundamental nature of the structure itself, which differentiate monetarists and Keynesians—also appears in the writings of Brunner and others. In summary form, the model set out by Friedman is as follows:

$$(1) \frac{Y}{p} = C\left(\frac{Y}{p}, r\right) + I(r)$$

$$(2) M_0 = p \cdot L\left(\frac{Y}{p}, r\right)$$

$$(3) Y = py$$

where  $Y$  is money income,  $p$  is the general price level,  $r$  is the rate of interest,  $M_0$  is the nominal exogenously-set money stock,<sup>9</sup>  $y$  is real income or output, and  $C$ ,

<sup>7</sup>Some of the important articles include Leonall C. Andersen, "A Monetarist View of Demand Management: The United States Experience," this *Review* (September 1971), pp. 1-11; Leonall C. Andersen and Keith M. Carlson, "A Monetarist Model for Economic Stabilization," this *Review* (April 1970), pp. 7-25; Leonall C. Andersen and Jerry L. Jordan, "Monetary and Fiscal Actions: A Test of Their Relative Importance in Economic Stabilization," this *Review* (November 1968), pp. 11-24; Karl Brunner, "The Role of Money and Monetary Policy," this *Review* (July 1968), pp. 9-24; *idem*, "The 'Monetarist Revolution' in Monetary Theory," *idem*, "A Survey of Selected Issues in Monetary Theory," *Schweizerische Zeitschrift für Volkswirtschaft und Statistik* (No. 1, 1971), pp. 1-146; *idem*, "The Monetarist View of Keynesian Ideas," *Lloyds Bank Review* (October 1971), pp. 35-49; David I. Fand, "Keynesian Monetary Theories, Stabilization Policy, and the Recent Inflation," *Journal of Money, Credit, and Banking* (August 1969), pp. 556-87; *idem*, "Monetarism and Fiscalism," *Banca Nazionale del Lavoro Quarterly Review* (September 1970), pp. 275-89; *idem*, "A Monetarist Model of the Monetary Process," *Journal of Finance* (May 1970), pp. 275-89; Milton Friedman, "A Theoretical Framework for Monetary Analysis," *Journal of Political Economy* (March/April 1970), pp. 193-238; *idem*, "A Monetarist Theory of National Income," *Journal of Political Economy* (March/April 1971), pp. 323-37.

<sup>8</sup>Friedman, "A Theoretical Framework," and Brunner, "The 'Monetarist Revolution'."

<sup>9</sup>In one version of Friedman's statement, the money supply is made a function of the interest rate rather than being assumed to be exogenous. However, this makes no essential difference to the present discussion, as Friedman points out.

I, and L stand for the consumption, investment, and demand-for-money functions, respectively.

Equation (1) is of course the familiar IS curve, from which can be obtained all combinations of real income and the interest rate which will make the flow of planned spending equal to available output, and hence will result in equilibrium in the market for goods and services. Equation (2) is the LM curve, which yields all combinations of real income, the interest rate, and the price level which will equate the demand for real balances with the real value of the nominal money stock. Equation (3) is a definition relating nominal income and real income or output through the price level. There are of course other markets which could be considered, but which are not explicitly accounted for in equations (1) or (2); in particular, the bond and labor markets are not made explicit. Friedman argues that the assumptions made by the two camps in order to accommodate these markets and simultaneously close the system of equations constitute a fundamental point of difference between monetarists and Keynesians. As written in equations (1)-(3), the model posited by Friedman contains four endogenous variables —  $Y$ ,  $p$ ,  $r$ , and  $y$  — and therefore is underdetermined. Monetarism is said by Friedman to include with the above equations a vast number of additional relationships; specifically, a whole Walrasian system of demand equations, supply equations, equilibrium conditions, etc., which in and of themselves determine  $y$ , the level of real output. The inclusion of a Walrasian system of course implies that the equilibrium position of the model is one of full employment. (There is no such implication for the short-run dynamics of the system, however.) With real output predetermined from the standpoint of equations (1)-(3), equation (1) can be solved for the equilibrium value of the interest rate, and (2) yields the equilibrium price level. Elementary manipulation of this system gives the result that only the price level (and the money wage rate, which is not made explicit in equations (1)-(3)) will change in response to a money stock change; the equilibrium value of the interest rate is not shifted, and therefore is said to be determined only by “real” variables.<sup>10</sup> In other words, this version of the model displays the well known “classical dichotomy.”

According to Friedman, the Keynesian approach utilizes a much different and less satisfactory procedure

<sup>10</sup>This statement is not accurate if the system contains a government sector which issues money-fixed claims against itself, and if real wealth is an argument in the expenditure functions, and/or if the government establishes a tax-expenditure system based on nominal variables.

by assuming that the *price level*, rather than real income, is determined outside of the postulated structure (Friedman refers to “. . . a *deus ex machina* with no underpinning in economic theory.”).<sup>11</sup> By taking the price level to be exogenous with respect to this structure, the number of variables again is reduced to three ( $Y$ ,  $y$ , and  $r$  in this case). However, the system no longer is dichotomized, and all of the variables now are determined jointly rather than recursively. In particular, the static equilibrium levels of both real income and the interest rate can now be changed by both money stock and expenditure changes.<sup>12</sup>

It would be a mistake to conclude from the foregoing discussion that monetarists view themselves as differing from Keynesians only in terms of the assumptions utilized to provide a unique equilibrium solution to the static IS-LM model. There are several other typically monetarist assumptions about the static and dynamic dimensions of this system. Recently, Karl Brunner has introduced four propositions which he asserts are “defining characteristics of the monetarist position.” These are: (1) the transmission mechanism for monetary impulses involves a very general kind of portfolio adjustment process ultimately affecting the relationship between the market price of physical assets and their production cost, rather than only the relationship between borrowing costs and the internal rates of return on potential acquisitions of new physical capital, as is asserted to be the mechanism characteristic of modern Keynesian analysis; (2) most of

<sup>11</sup>Friedman, “A Theoretical Framework,” p. 222.

<sup>12</sup>In a more recent article, Friedman has proposed another means of closing this system of equations, which he labels a “third way” to distinguish it from the two procedures outlined in the body of the present paper. He views this approach as intermediate in respect to its theoretical position vis-à-vis the others. However, since it reduces to a relationship between income and the past history of the money stock, as Friedman demonstrates, it seems clearly to fit in with the monetarist point of view. In this approach, it is assumed that the current market rate of interest and the expected market rate are kept equal by the actions of asset holders. The expected market rate, in turn, is set by the expected real rate plus the expected rate of price change (which by definition is the difference between the expected rate of change of nominal income and of real output). By assuming the expected real rate of interest, the expected rate of growth of real output, and the expected rate of growth of nominal income all to be determined outside the system, the market rate of interest is made into a variable determined outside the system also. Assuming further that the income elasticity of demand for money is unity, Friedman establishes a direct link between nominal income and the money stock (because under his assumptions, velocity becomes a predetermined variable); this, in turn, enables the “real” sector to be solved. One of the features of this procedure is that it provides an alternative to the assumption of full employment. However, it entails some disadvantages of its own, which are noted in the section of the present paper entitled “Stabilization Policy.” See Friedman, “A Monetary Theory of Nominal Income.”

the destabilizing shocks experienced by the system arise from decisions of the government with respect to tax, expenditure, and monetary policy, rather than from the instability of private investment or of some other aspect of private-sector behavior, as the Keynesian view is said to assume. A related belief is that the demand-for-money function is very stable, while the policy-determined supply of money balances is unstable; (3) monetary impulses are the dominant factor in explaining changes in the pace of economic activity, in contrast to the Keynesian position which assertedly takes real impulses as primary; (4) in analyzing the determinants of change in the level of aggregate activity, detailed knowledge of "allocative detail" about the working of financial markets and institutions is of secondary importance and can be disregarded. This implies that the relationship between policy instruments and economic activity can be captured in a very small-scale model — perhaps even in one equation — while the Keynesian position is that knowledge of allocative detail (e.g., substitution relationships between various financial assets) is necessary for the proper understanding of policy processes, implying a need for complex structural models.<sup>13</sup>

The statements by Brunner and Friedman are attempts to sketch the fundamental structure of monetarism. As such, they do not emphasize or even identify explicitly some of the specific characteristic themes which permeate monetarist writing, including their own. Several such themes can be identified.

(1) Great importance is attached to the demand-for-money function, and it is in fact the central behavioral relationship in the monetarist model.<sup>14</sup> Particular stress is laid on its stability, by which is meant not only that the variance of its error term is small, but much more importantly, that it contains very few arguments. Friedman has written that:

<sup>13</sup>These "defining characteristics" are discussed at some length in Brunner, "The 'Monetarist Revolution,'" Section II.

<sup>14</sup>Thus, for example, David Fand states, "The quantity theory, in its post-Keynesian reformulation, is a theory of the demand for money and a theory of money income," "Keynesian Monetary Theories," p. 561. Also, he writes, ". . . the modern quantity theory uses the money demand function to predict the level of money income and prices if output is given, or changes in money income if output varies with changes in [the money stock]," "Monetarism and Fiscalism," p. 228. Friedman has written, "The Quantity theorist not only regards the demand function for money as stable; he also regards it as playing a vital role in determining variables that he regards as of great importance for the analysis of the economy as a whole, such as the level of money income or of prices. It is this that leads him to put greater emphasis on the demand for money than on, let us say, the demand for pins, even though the latter might be as stable as the former," "The Quantity Theory of Money — A Restatement," p. 16.

The quantity theorist accepts the empirical hypothesis that the demand for money is highly stable — more stable than functions such as the consumption function that are offered as alternative key relations. . . . [T]he stability he expects is in the functional relation between the quantity of money demanded and the variables that determine it . . . [and] he must sharply limit, and be prepared to specify explicitly, the variables that it is empirically important to include in the function. For to expand the number of variables regarded as significant is to empty the hypothesis of its empirical content; there is indeed little if any difference between asserting that the demand for money is highly unstable and asserting that it is a perfectly stable function of an indefinitely large number of variables.<sup>15</sup>

(2) A particular aspect of the demand for money emphasized by monetarists is that, in their analysis, the stable *demand* for money is concerned with real, not nominal, balances, while the authorities control the nominal *supply*, which tends to be quite variable relative to demand.<sup>16</sup> This state of affairs is usually contrasted with the Keynesian case, in which the demand for money is said to be a demand for nominal balances, either because it is (incorrectly) specified that way,<sup>17</sup> or because, as in Friedman's discussion summarized above, the price level is fixed so that real and nominal balances are the same. Monetarists use this distinction as part of a rationalization for their contention that their analysis implies a much broader concept of the transmission mechanism for monetary impulses than does the Keynesian model, being based on a very general portfolio adjustment process working through changes in a broad spectrum of asset yields and price level changes, in contrast to the narrow cost of credit channel which is implied by the Keynesian demand-for-money function. This point is developed further in the section entitled "The Transmission Mechanism for Monetary Impulses" below.

(3) Further, monetarists believe the interest elasticity of demand for money balances to be quite low.

<sup>15</sup>Friedman, "The Quantity Theory of Money — A Restatement," p. 16.

<sup>16</sup>On this point Fand writes, "The sharp distinction drawn between the supply determined nominal money stock and the demand determined real stock — a key feature of monetarism — endows the authorities with effective control over the nominal money stock, while severely limiting the extent, and the circumstances, in which they may hope to influence the real value of this stock. If the former assumption extends their control over nominal variables, the latter assumption severely limits their influence and control on endogenous variables such as the real money stock." See "Monetarism and Fiscalism," pp. 280-81.

<sup>17</sup>This view is taken by David I. Fand in, "Some Issues in Monetary Economics," *Banca Nazionale del Lavoro Quarterly Review* (September 1969), pp. 228-9 and footnote 24, p. 229.

Until recently, it was generally thought that they viewed this elasticity to be zero so that the demand for money was linked directly to income as implied by the naive quantity theory. However, such a view has been rejected outright by Friedman and others;<sup>18</sup> if it ever was held, the accumulation of empirical evidence to the contrary has made it untenable now.<sup>19</sup>

Presently, monetarists take the reputedly different views held by themselves and Keynesians on the size of this elasticity as a basis for contrasting inferences about the expected behavior of velocity in response to a monetary shift. A substantial interest elasticity of demand for money, said to be the Keynesian position, is viewed as implying unstable velocity; Keynesians are viewed by monetarists as not being able to "depend" on the stability of velocity, for as the money stock rises and falls, offsetting velocity changes insulate the rest of the system to a great extent. On the other hand, while not believing velocity to be perfectly constant, monetarists take the position that "... although marginal and average velocity differ, the velocity function is sufficiently stable to provide a relation between changes in money and changes in money income."<sup>20</sup> In other words, some, but not much, short-run variation in velocity may be expected.<sup>21</sup> To some monetarists, the essential difference between the two positions is summed up in the demand for money-velocity nexus. Fand writes:

The post-Keynesian quantity and income theories thus differ sharply in their analysis of the money demand function. In the modern quantity theory it serves as a velocity function relating either money and money income or marginal *changes* in money and money income . . . ; in the income theory, it serves as a liquidity preference theory of interest rates, or of *changes* in interest rates (if the price level is given and determined independently of the monetary sector).<sup>22</sup>

Although it has become fairly common practice to discuss the behavior of velocity in terms of the properties of the demand-for-money function, it is improper to do so because observed velocity depends on all of the behavior — real and monetary — in the macroeco-

nomie system. This point will be discussed in greater detail below.

(4) The final monetarist theme which I shall mention is concerned with the nature of the response of interest rates to a monetary shift. Monetarists distinguish three components in the observed movement of interest rates: a "liquidity" effect, which is the immediate response before income or other variables have changed, and thus is expected to be in the opposite direction of the monetary shift; an "income" effect, which is the induced reaction of interest rates to the change in income brought about by the monetary impulse, and hence is expected to be in the same direction as the money stock change; and a "price expectations" effect, which comes about because monetary changes cause lenders and borrowers to anticipate a changing price level and lead lenders to protect themselves against the expected depreciation in the value of their funds by charging higher rates. This last effect would cause market interest rates to change in the same direction as the monetary change.<sup>23</sup>

In looking back over this summary of monetarist thought, it becomes quite apparent that there is a good deal of truth to Friedman's contention that the differences between Keynesians and monetarists are essentially empirical rather than theoretical, having to do with the assumptions made about specific aspects of the commonly-accepted structure, the relative stability and importance in the analysis of different functional relationships, the sizes of various elasticities, etc.<sup>24</sup> There appears to be little disagreement between the two camps over the specification of Friedman's basic model.<sup>25</sup> And of Brunner's four

<sup>23</sup>For a discussion of these distinctions, see e.g. William Gibson, "Interest Rates and Monetary Policy," *Journal of Political Economy* (May/June 1970), pp. 431-55.

<sup>24</sup>This position is expressed in several of Friedman's writings; for example, see Milton Friedman and David Meiselman, "The Relative Stability," p. 168, and Milton Friedman, "Post-War Trends in Monetary Theory and Policy," *National Banking Review* (September 1964), reprinted in M. Friedman, *The Optimum Quantity of Money and Other Essays* (London: Macmillan and Co., Ltd., 1969), p. 73.

<sup>25</sup>Not all monetarists view this particular model as an appropriate description on which to build an analysis, however. Brunner recently wrote, "It is useful to emphasize . . . that the logic of the monetarist analysis based on the relative price theory approach requires that attention be directed to the interaction between output market, credit market and Walrasian money market. This requirement cannot be satisfied by the general framework used by Friedman. This framework is the standard IS-LM analysis offered in an essentially Keynesian spirit. And this very choice of basic framework actually creates the analytical problems clearly recognized by Friedman in his subsequent discussion. . . . Our analysis . . . established however that the standard IS-LM diagram is not a very useful device for the analysis of monetary processes." Karl Brunner, "A Survey of Selected Issues in Monetary Theory," p. 82.

<sup>18</sup>Milton Friedman, "Interest Rates and the Demand for Money," *Journal of Law and Economics* (October 1966), pp. 71-86.

<sup>19</sup>Some of this evidence is summarized in David Laidler, *The Demand for Money: Theories and Evidence* (Scranton, Pa.: International Textbook Company, 1969).

<sup>20</sup>Fand, "Keynesian Monetary Theories," pp. 563-4.

<sup>21</sup>Monetarists do not necessarily expect velocity to change inversely with changes in the money stock. Friedman recently has written that "... the effect on [velocity] is empirically not to absorb the change in M, as Keynesian analysis implies, but often to reinforce it. . . ." "A Theoretical Framework," p. 217.

<sup>22</sup>See Fand, "Some Issues," p. 228.

points, at least two are essentially empirical (points numbered (2) and (3) above), while one of the remaining two (point (1) above) makes a distinction between monetarist and Keynesian views of the transmission mechanism which I believe is false with respect to current post-Keynesian income-expenditure analysis. Only his last point — that it is appropriate to study the relationship between policy instruments and economic activity without depending on knowledge of “allocative detail” — appears to be one about which there are genuine differences at the theoretical (or perhaps more properly, the methodological) level. Finally, among the four monetarist themes mentioned above, the third one is clearly empirical in nature, and monetarists and Keynesians both in fact hold that this elasticity is nonzero but small in absolute value. In the next section, it is demonstrated that modern Keynesians take the price level to be endogenous, which suggests that the monetarist-Keynesian distinctions summarized above as the second theme are not valid. I shall try to show below that monetarist emphasis on the importance of the demand-for-money relationship (the first theme) is unwarranted, at least in so far as this relationship is viewed as the basis for predicting velocity. I shall also show that the two components of interest rate change in response to a monetary impulse identified in theme four as monetarist are either clearly present in or at least consistent with Keynesian analysis and assumption.

### *Monetarism, Keynesianism and the Price Level*

As already noted above, monetarists see one of the essential differences between the two sides to be the question of the determinants of the price level in comparative static equilibrium analysis. Keynesians are said to take prices to be fixed so that monetary shifts are reflected in output changes, while quantity theorists believe that monetary changes affect only the price level in this sort of analysis, with real output being determined by a separate subsector of the system.

There is no doubt whatsoever that many practitioners of the Keynesian viewpoint have assumed that prices could conveniently be taken as given for some problems — especially those associated with substantial unemployment — and that it has often been convenient for simplicity of exposition in undergraduate classroom exercises or for other purposes to make the assumption of rigid prices. It is quite dubious, however, that this assumption, or the liquidity trap assumption which also has been an important element

in the monetarist view of Keynesianism, reflects the thinking of most Keynesian economists today.<sup>26</sup> Rather, the standard static “complete Keynesian system” is widely recognized to be one in which the general price level is one of the variables determined by the interaction of the system, and hence is free to move, but to be one in which there are imperfections in the labor market — most typically, a money wage rate which is inflexible downwards. In other words, rather than assuming that prices are fixed as a means of making the simple static model determinate, modern Keynesians introduce an aggregated labor market and production function into the analysis.<sup>27</sup> This could be viewed as the Keynesian equivalent of the “Walrasian system of equations” asserted by Friedman to be the hallmark of the adherents to the modern quantity theory approach. It is of course much less satisfactory in that all labor market activity and all kinds of production are aggregated into perhaps as few as two equations (i.e., a reduced-form labor market equation and an aggregate production function) rather than having each market and each activity represented by specific equations. It is more satisfactory on two counts: first, the equations at least are explicitly specified, and second, these equations do not yield the full employment outcome, as is typically the case when depending on a Walrasian system.<sup>28</sup>

<sup>26</sup>The liquidity trap is rejected by most economists today because little support for it has been found in the many empirical studies of the demand for money which have recently been made. For a summary of some of this evidence, see Ronald L. Teigen, “The Demand for and Supply of Money,” W. L. Smith and R. L. Teigen, eds., *Readings in Money, National Income, and Stabilization Policy*, rev. ed. (Homewood, Ill.: Richard D. Irwin, Inc., 1970), Table 2, p. 98, or “The Importance of Money,” *Bank of England Quarterly Bulletin* (June 1970), pp. 159-198.

<sup>27</sup>As evidence for the assertion that modern post-Keynesian static analysis in its most general form typically assumes the price level to be an endogenous variable, and that the system of equations usually is made determinate by introducing a supply subsector consisting of a labor market and aggregate production function, the following standard works are cited: Gardner Ackley, *Macroeconomic Theory* (New York: Macmillan, 1961), Chap. IX; R.G.D. Allen, *Macro-Economic Theory* (London: Macmillan, 1967), Chap. 7, esp. sections 7.6-7.8; Martin J. Bailey, *National Income and the Price Level*, 2nd. ed. (New York: McGraw-Hill, 1971), Chap. 3, esp. section 2; Robert S. Holbrook, “The Interest Rate, the Price Level, and Aggregate Output,” in W.L. Smith and R.L. Teigen, eds., *Readings in Money, National Income, and Stabilization Policy*, rev. ed.; Franco Modigliani, “The Monetary Mechanism and its Interaction with Real Phenomena,” *Review of Economics and Statistics* (February 1963 Supplement); and Warren L. Smith, “A Graphical Exposition of the Complete Keynesian System,” *Southern Economic Journal* (October 1956), reprinted in W. Smith and R. Teigen, eds., *Readings in Money, National Income, and Stabilization Policy*, rev. ed., as well as in several other standard collections of readings in macroeconomics.

<sup>28</sup>This discussion is not meant to imply that the simple static Keynesian system contains an adequate description of the processes which determine the price level. It states simply that the price level is an endogenous variable in the model.

The essential difference in this regard between Keynesians and monetarists therefore would appear to be that the former view *all* prices (including wages) as flexible, while the latter consider all prices *except* the money wage rate to be flexible (money wages are viewed as inflexible, at least in a downward direction, due to such structural phenomena as minimum wage laws, union contracts, and the like). This distinction has significant implications for the analysis.

In the first place, the Keynesian treatment now cannot be said to be fundamentally less satisfactory than the monetarist one in terms of methodology, except perhaps on grounds having to do with problems of aggregation (Friedman, it will be recalled, used the pejorative term "deus ex machina" to describe what he understood to be the Keynesian approach). Rather, the difference now lies in the analytic usefulness of the assumptions themselves. Is it more appropriate to assume that wages and prices are flexible, or that money wages are sticky while prices can adjust? The answer to this question depends on the nature of the problem being studied in any particular case, and this suggests that an important difference between the two schools of thought may be that Keynesians are more concerned with short-run analysis (for instance, that related to countercyclical stabilization) while monetarist assumptions are more consistent with long-run analysis.

Second, dropping the rigid-price assumption tends to reduce the basis for the heavy emphasis placed by monetarists on the demand-for-money function and its properties. One place where such emphasis is evident is in the discussion of velocity. We turn next to an inquiry into the factors affecting velocity, with particular emphasis on the relationship of velocity to the demand-for-money function.

### *The Demand-for-Money Function and Velocity*

Monetarists, as we have already noted, tend to think of the demand-for-money function as a "stable velocity function" while holding that Keynesians view velocity as unstable, justifying this position by appeal to contrasting assumptions about the price level and the interest elasticity of demand for money (see e.g. the quotes from Fand and others above). The fact of the matter is that the behavior of velocity under the two approaches in response to a monetary shift depends basically on the assumptions made about the *labor market*, not about the demand for money or about prices, since, as we have seen, both approaches take prices as flexible and, if that is the case, the same

general demand-for-money function ( $\frac{M}{P} = L(y,r)$ ) would be characteristic of both. This point can be demonstrated quite easily. First we note that the definition of velocity implies the following relationship:

$$(4) E_{v \cdot M_0} = E_{y \cdot M_0} + E_{p \cdot M_0} - 1,$$

where  $E$  stands for elasticities calculated on the basis of the interaction of the entire structure, so that (for instance)  $E_{y \cdot M_0}$  represents the elasticity of real output with respect to changes in the nominal money stock when the response of the entire economic system to the money stock change is taken into account. To distinguish such "systemic" elasticities from "partial" elasticities — those calculated along one function only — the symbol  $\eta$  will be used to represent partial elasticities. Thus, for instance,  $\eta_{L,r}$  will stand for the interest elasticity of the demand for real balances, holding income and other variables constant.

Under the monetarist assumption of flexible wages and prices, real output is determined uniquely by Friedman's "Walrasian system" and, as he points out, is to be considered as predetermined from the standpoint of equations (1) - (3). This means that a monetary shift cannot change real output (i.e., the multiplier  $\frac{dy}{dM_0} = 0$ ), so that  $E_{y \cdot M_0}$ , which is defined to be  $\frac{M_0}{y} \frac{dy}{dM_0}$ , also is zero. By differentiating equations (1) - (3) with respect to  $M_0$  while holding  $y$  constant, it is easy to show that the elasticity  $E_{p \cdot M_0}$ , which is equal to  $\frac{M_0}{P} \frac{dp}{dM_0}$ , has a value of unity. Inserting these results into (4) gives the quantity theory result that  $E_{v \cdot M_0} = 0$ , the "stable velocity" result referred to previously. It is important to note that no particular assumptions unique to the monetarist position were made about the demand for money *per se*; the assumption which yielded this result was that the demand for labor and the supply of labor both were functions of the real wage rate, and that the market was always cleared.

On the other hand, let us consider the Keynesian case, which we now define as one in which *money wages* are sticky (i.e., there exists money illusion in the supply of labor), but in which the price level is an endogenous variable. To analyze this case, we must add three equations to the basic model: an aggregate production function (equation (5) below); a labor market summary equation which states that the supply of labor services per unit time ( $N$ ) is infinitely elastic over a wide range of employment at whatever money wage rate prevails, and that the demand for labor ( $N^D$ ) is determined by the real wage ( $w$ ) (equation (6)); and a definition which states that the



real wage is the ratio of the money wage rate ( $W$ ) and the price level (equation (7)). The bar over the money wage rate indicates that it is being held constant here.<sup>29</sup> This gives:

$$(5) y = y(N)$$

$$(6) N = N^D(w)$$

$$(7) w = \frac{\bar{W}}{P}$$

By differentiating the system defined by equations (1) - (3) and (5) - (7) totally with respect to  $M_o$ , expressions for the systemic elasticities  $E_{y \cdot M_o}$  and  $E_{P \cdot M_o}$  can be found. They are as follows (see the appendix for their derivation):

$$(8) E_{y \cdot M_o} = \frac{1}{\frac{\eta_{S \cdot y} \eta_{L \cdot r}}{\eta_{I \cdot r} - \eta_{S \cdot r}} + \eta_{L \cdot y} - \frac{1}{\eta_{y \cdot N} \eta_{N \cdot D \cdot w}}}$$

$$(9) E_{P \cdot M_o} = - \frac{1}{\eta_{y \cdot N} \eta_{N \cdot D \cdot w} \left[ \frac{\eta_{S \cdot y} \eta_{L \cdot r}}{\eta_{I \cdot r} - \eta_{S \cdot r}} + \eta_{L \cdot y} \right] - 1}$$

Here  $S$  stands for the savings function; otherwise all of the notation has already been defined. The usual slope assumptions are made, and on the basis of these assumptions, both of these systemic elasticities will be positive.<sup>30</sup> Whether velocity will rise, fall, or remain constant in the face of a monetary shift depends on the sizes of all of the partial elasticities and their relationships to one another as given by these expressions. The demand-for-money elasticities play a role, but are by no means the only relevant elasticities. In general, we would not expect the elasticity of velocity with respect to nominal money balances to be minus unity in value, as the "liquidity trap" assumption implies. It will approach that value if  $\eta_{L \cdot r}$  or  $\eta_{S \cdot y}$  are very large, or if the term  $(\eta_{I \cdot r} - \eta_{S \cdot r})$  is very close to zero.<sup>31</sup>

<sup>29</sup>This is the simplest method of introducing a Keynesian-type assumption into the analysis; it is by no means the only possible way of doing so. The nature of and reasons for the existence of money illusion in the labor market is the subject of a considerable amount of literature. See, for example, Axel Leijonhufvud, *On Keynesian Economics and the Economics of Keynes* (London: Oxford University Press, 1968).

<sup>30</sup>It is assumed that  $\eta_{S \cdot r}$  is either positive or, if negative, that it is smaller in size than the absolute value of  $\eta_{I \cdot r}$ . A listing of all the slope assumptions is given in the appendix.

<sup>31</sup>Since the numerator of the expression for  $\eta_{S \cdot y}$  is one minus the MPC,  $\eta_{S \cdot y}$  is not expected to be large. As noted in footnote 26, belief in a very large interest elasticity of demand for money ( $\eta_{L \cdot r}$ ) is not a characteristic Keynesian stance. Reference to the summaries of available empirical evidence mentioned in that footnote will show that this elasticity actually appears to be rather small (almost certainly less than unity in absolute value, and in many studies smaller in absolute value than 0.2).

To summarize, the main point of this exercise was to show that, using a common model with no special assumptions about the properties of the demand for money, it has been possible to derive "monetarist" and "Keynesian" results for the response of velocity to a monetary shift. It is improper to speak of the demand for money as a "velocity function", especially in the monetarist case where it is assumed that money wages are flexible so that the system equilibrates at full employment. In that case, the velocity elasticity will be zero no matter what the sizes of the demand-for-money elasticities.

Eliminating the rigid-price assumption as a basic point of difference between the two schools reduces the basis for monetarist emphasis on the demand for money for other reasons besides its implications for velocity. It also is important for monetarist views on differences in the nature of the transmission mechanism for monetary policy. It is to this subject that we turn next.

### The Transmission Mechanism for Monetary Impulses

One of the most characteristic themes of monetarism is the heavy emphasis which is placed on differences between the quantities of money demanded and supplied as the prime factor motivating spending and, hence, changes in income and prices. Friedman and others have explained again and again how the authorities can change the nominal money stock, but how it is money holders who determine the velocity with which that stock is used, and ultimately who determine the stock of real balances through the effects of spending decisions on the price level. As Friedman puts it, "The key insight of the quantity-theory approach is that such a discrepancy [between the demand for and supply of money] will be manifested primarily in attempted spending, thence in the rate of change in nominal income."<sup>32</sup> In other words, when households and firms are holding more cash balances than are desired at current levels of income and interest rates, they convert these excess balances into other assets, both financial and physical; the market value of physical assets ultimately changes, making the production of new assets more attractive. The change in the general price level which occurs as a result of this process, and the change in output, both work toward a re-equating of the real value of the nominal money stock and the demand for real balances. Thus the monetarists clearly embrace a very

<sup>32</sup>Friedman, "A Theoretical Framework," p. 225.

general kind of portfolio adjustment view of the transmission mechanism in which the relevant portfolio contains financial and physical assets of all kinds.<sup>33</sup> It will be recalled that this is the first of Brunner's four "defining characteristics." At the same time, monetarists have been taking Keynesian analysis to task for focusing almost exclusively on interest rates representing the "cost of finance" as the channel through which monetary impulses are felt. The following quotation makes these distinctions very clear:

The Income-Expenditure theory of the Fiscalists adopts a particular transmission mechanism to analyze the effects of a change in the money stock (or its growth rate) on the real economy. It assumes that money changes will affect output or prices only through its effect on a set of conventional yields — on the market interest rate of a small group of financial assets, such as government or corporate bonds. A given change in the money stock will have a calculable effect on these interest rates . . . given by the liquidity preference analysis, and the interest rate changes are then used to derive the change in investment spending, the induced effects on income and consumption, etc.

Monetarists, following the Quantity theory, do not accept this transmission mechanism and this liquidity preference theory of interest rates for several reasons: First, they suggest that an increase in money may directly affect expenditures, prices, and a wide variety of implicit yields on physical assets, and need not be restricted to a small set of conventional yields on financial assets. Second, they view the demand for money as determining the desired quantity of real balances, and not the level of interest rates. Third, and most fundamentally, they reject the notion that the authorities can change the stock of real balances — an endogenous variable — and thereby bring about a permanent change in interest rates. . . .

Monetarists reject the liquidity preference interest rate theory because it applies only as long as we can equate an increase in nominal money with a permanent increase in real balances. This suggests that the liquidity preference theory may be useful as a theory of the short run interest rate changes — the liquidity effect — associated with the impact effects of nominal money changes.<sup>34</sup>

Statements like this, and the quotation from Friedman in footnote 14 indicate that monetarists believe their view of the transmission mechanism to differ from the position they impute to the Keynesian camp most essentially in differences in assumptions about characteristics of the demand-for-money function. The interpretation of the interest rate term in this function plays a role; so does the question of price flexibility.

<sup>33</sup>A description of the classes of assets involved and the nature of their yields is given in Milton Friedman, "The Quantity Theory of Money — A Restatement."

<sup>34</sup>Fand, "A Monetarist Model," pp. 280-81.

As the preceding discussion and quotation indicate, monetarists think of their own view as an extremely general one. The interest rate term in their model really stands for a vector of yields on many assets, some of them financial yields determined in the money and capital markets, and some of them implicit yields on real assets. A monetary impulse sooner or later affects all of these yields, and hence adjusts the demand for real balances directly as well as indirectly through the effects of yield changes on income. At the same time, changes in the price level which result will adjust the real value of the nominal money supply. Therefore the adjustment process is seen as being summarized in the characteristics of the demand-for-real balances function and its relationship to the nominal money supply. Keynesians are said to include only a few market-determined yields on financial assets in their liquidity-preference function; furthermore, the price level is exogenously determined. Therefore the process of adjustment to a monetary impulse is supposedly seen by them in much narrower terms — the entire process takes place through adjustment of the *demand* for money, and basically is said to focus on the cost of credit as reflected in market interest rates. Furthermore, the belief in a substantial interest elasticity of demand for money, often attributed to Keynesians, means that a monetary impulse will have a relatively small effect even on these rates.

These distinctions must be regarded as artificial. First, there is nothing inherent in the Keynesian system which is inconsistent with the introduction of a general portfolio adjustment transmission mechanism; and, indeed, there has been a substantial development in this direction in Keynesian thinking and practice during the last several years. On the theoretical side, the work of Tobin and others may be cited, while at the operational level, the developers of the Federal Reserve Board-MIT econometric model of the U. S. economy have attempted to incorporate such a mechanism into their model.<sup>35</sup> While all of the problems involved in this attempt have not yet been solved, work is continuing and improvements will be made. Second, as we have already shown, Keynesians take the price level to be endogenous, and thus recognize

<sup>35</sup>For a non-monetarist example of the development of portfolio theory, see James Tobin, "An Essay on Principles of Debt Management," in Commission on Money and Credit, *Fiscal and Debt Management Policies* (Englewood Cliffs, N.J.: Prentice-Hall Inc., 1963), pp. 143-218, esp. Part II. Features of the Federal Reserve Board-MIT model are discussed in Frank de Leeuw and Edward M. Gramlich, "The Channels of Monetary Policy," *Federal Reserve Bulletin* (June 1969), pp. 472-91.

the same process of adjustment of the nominal money supply through price level changes as the monetarists.<sup>36</sup>

There remain certain problems with monetarist thought on two subjects related to the transmission mechanism. One is a misunderstanding, in my opinion, of the relationship between money and interest rates implied by Keynesian theory. The other has to do with the monetarist position on the money stock as a force driving income through the portfolio process mentioned above.

**Liquidity preference theory, money, and the rate of interest** – Monetarists view themselves as holding a “monetary theory of the price level” under which monetary shifts are reflected (in the longer run, at least) primarily in price level changes. They take the stance that Keynesians hold a “monetary theory of the interest rate.” Under this phrase, at least two positions are subsumed. Some monetarists seem to think that Keynesians see the money supply together with the demand-for-money function (specified in nominal terms) as determining the level of interest rates. Others recognize that the interest rate in Keynesian analysis is determined jointly as one of the outcomes of an interacting system of relationships rather than just by one behavioral relationship (i.e., by some version of an IS-LM system like Friedman’s summary model). Whichever view is held, however, it is asserted that Keynesian analysis leads to the conclusion that monetary shifts result in interest rate changes in the *opposite* direction, while monetarist analysis suggests that movements of  $M$  and  $r$  in the *same* direction will be observed.<sup>37</sup>

Neither version of the “monetary theory of the interest rate” is an accurate representation of Keynes-

<sup>36</sup>Semantic as well as real issues are involved in discussions of this subject. For example, Brunner labels anyone who subscribes to a portfolio adjustment view of the monetary transmission mechanism a “weak monetarist”. See Karl Brunner, “The Role of Monetary Policy,” this *Review* (July 1968), pp. 9-24.

<sup>37</sup>As an example of the first of these positions, the following quotation from a recent article by Fand is offered: “In the Keynesian theory the exogenously given quantity of money, together with the liquidity preference function, determines the interest rate.” Fand, “Keynesian Monetary Theories,” p. 564. The second is illustrated by a quotation from Zwick: “The alternative concepts of Keynes and Fisher concerning the adjustment of the economy to monetary changes are mirrored in their different notions concerning interest rate determination and the response of interest rates to monetary changes. The IS-LM framework suggests that, so long as the IS and LM schedules represent independent relations, a monetary expansion causes interest rates to fall because of the outward shift of the LM schedule. In the Fisherian model, a monetary increase raises the level of expenditures; the upward response of loan demand due to the increased expenditures causes interest rates to rise.” Burton Zwick, “The Adjustment of the Economy to Monetary Changes,” *Journal of Political Economy* (January/February 1971), p. 78.

ian thought, for both imply that an expansionary monetary impulse (for example) can *only* result in a lower interest rate in the new equilibrium. In other words, it appears that of the two monetary effects on interest rates often mentioned by monetarists which are relevant for static analysis – the liquidity effect and the income effect – Keynesians are supposed to recognize only the liquidity effect, or more generally, are supposed to be basing their analysis on assumptions which can only result in an inverse relationship between monetary impulses and interest rate changes.

This is certainly not the case. When the entire structure is taken into account, rather than only the liquidity preference function, the level of interest rates in the new equilibrium relative to the initial position is determined by a number of elasticities, most importantly those which are the determinants of the slope of the IS curve. If its slope is positive – which is the case if all of the propensities to spend with respect to total income sum to more than unity – then both income and interest rates will be higher in the new equilibrium than in the old.<sup>38</sup> This is such a well-known case as to require no further comment.

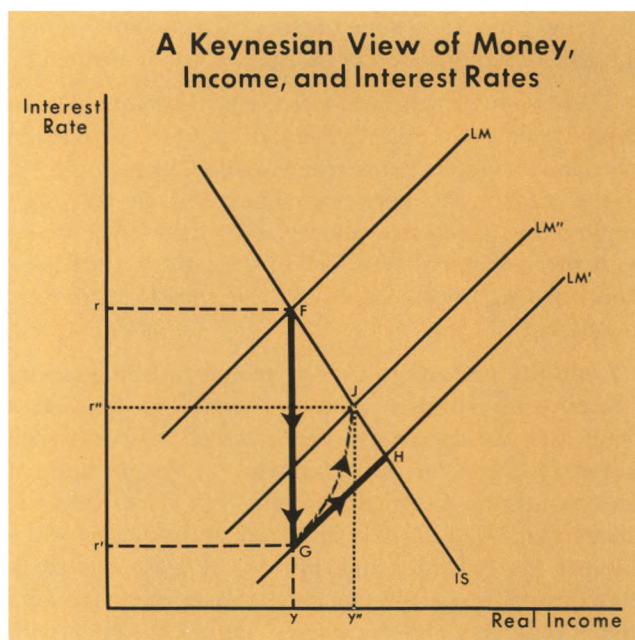
Of course, equilibrium positions are not observed in the real world; instead, the economy is always in transition, moving toward resting points, which themselves are repeatedly being disturbed. It may be inferred from some monetarist writings that it is the *observed* tendency of interest rates and money to move in the same direction which is thought to be inconsistent with Keynesianism, rather than the possibility that money and interest rates can move together in terms of comparative equilibrium points. In other words, the discussion may refer to the dynamics of the system, rather than the comparative statics. In this area, the monetarists have done us all a service by stressing the possible importance of price-expectation effects on interest rates, a phenomenon which typically has not been incorporated into dynamic Keynesian models. I will argue that observed parallel movements between money and interest rates are quite consistent with the basic IS-LM structure (no matter which way the IS curve slopes), given the reasonable and widely-accepted premise that the monetary sector adjusts much more rapidly than the real sector to ex-

<sup>38</sup>An upward-sloping IS curve cannot be obtained from Friedman’s summary model, because only consumption spending is related to income in that model, and the notion that the MPC is less than unity is a fundamental postulate of macroeconomic analysis. However, the level of income might well appear in other expenditure functions, such as the investment relationship (where the rationalization would be that investment depends on profits, which in turn are a function of the level of income).

ternal shocks. Under this premise, observed values of income and the rate of interest may be supposed, at least approximately, to be such that the LM equation is always satisfied during the process of adjustment from one equilibrium to another, while the IS equation is not. I will argue further that price-expectation effects are readily accommodated by this analysis.

The implications of these differing speeds of adjustment are illustrated on the accompanying figure, which happens to be drawn with a downward-sloping IS curve. Assume the system to be initially in equilibrium at point F, so that the equilibrium values of the interest rate and income levels are  $r$  and  $y$ . Now let there occur an expansion of the money supply, so that the LM curve shifts outward to a new position,  $LM'$ . According to the assumption made above concerning the relative speeds of adjustment of the monetary and real sectors, this shift will result first in a fall in the interest rate from its initial equilibrium level to a new level,  $r'$ . It should be noted that this is the "liquidity effect" which is recognized by monetarists as being present both in their own and in Keynesian thinking. It represents a movement along the liquidity preference function in response to a change in the money supply, holding income constant. Next, income will begin to respond, and income and the rate of interest both will rise along the segment  $GH$  of  $LM'$  to point H, the final equilibrium position. This movement, of course, reflects the "income effect." If rising income is accompanied by rising prices, there will also be an induced shift of the LM curve during the transition. For example, it might move to a position like  $LM''$  as shown. Alternatively, it could move to a position to the right of  $LM'$ .

Such LM shifts reflect the operation of two forces. First, rising prices reduce the real value of the new nominal money stock and "tighten the money market" after the initial expansionary pulse. This has the effect of moving the LM curve leftward. Second, rising prices may engender expectations of future price increases. If, as has been suggested, the demand for money depends on nominal interest rates while real expenditures are determined by real rates, then the "price expectations effect" mentioned previously would cause a rightward LM shift, resulting in a lesser leftward overall shift in the LM curve than that brought about due only to the drop in the real value of the nominal money stock, or perhaps even a net rightward movement (in this discussion, the vertical axis is interpreted as measuring the real rate of interest). If these effects are present, the adjustment path followed from point G might be the dotted one instead of the solidly-drawn one, and the system would end



up at a point like J instead of H, so that the new equilibrium income level would be  $y''$ , and the equilibrium real interest rate  $r''$ . Incidentally, if price-expectation effects are present, a value of  $r''$  for the real rate is quite consistent with a market rate above  $r$ .

We may conclude from this discussion that there is no reason to be surprised by the fact that during much of the time following an increase in the money supply, interest rates are observed to rise. A standard assumption about relative speeds of adjustment, much used by Keynesians, directly reflects both the "liquidity effect" and the "monetary effect" often discussed by monetarists, and is perfectly consistent with the presence of price expectation effects. Second, it is appropriate to point out that this entire discussion has been carried out in the context of a pure multiplier model. If accelerator effects are present, they may accentuate the pure multiplier effects of a monetary shift on interest rates, at least during parts of the adjustment period. Finally, there is the likelihood that in many cases in which interest rates and the money stock move together, the monetary authorities are reacting to shifts in spending. For instance, if total spending rises, interest rates will go up and the monetary authorities will often try to moderate the interest rate increase by expansionary open market operations, resulting in a rise in the money stock.

*The monetarist view of money as a force driving income* – It is self-evident that monetarists typically have assigned great importance to changes in the money stock as the prime moving force behind income changes. For instance, one of Brunner's "de-

fining characteristics of monetarism" is that ". . . the monetarist analysis assigns the monetary forces a dominant position among all the impulses working on the economic process."<sup>39</sup> And, of course, Friedman's investigations into the lead-lag relationship between changes in the rate of change of the money stock and changes in income are too well-known to require further comment.<sup>40</sup> At the same time, monetarist writings often seem to suggest that Keynesians view monetary policy as ineffective.

Keynesians view monetary policy as effective and useful, and to suggest the opposite is to raise false issues. But this does not mean that they necessarily consider changes in the money stock to have particular causal significance. Monetary policy is carried out through the traditional instruments — open market operations, discount rate changes, and variations in reserve requirements — and not by direct manipulation of the money stock. It is true that in simplified versions of the Keynesian model, monetary policy is represented by the money stock, which is assumed to be controlled by the authorities and which replaces the instruments named above. It is also possible that the authorities could control the nominal money stock to almost any desired degree of precision. But in the real world, or in the more sophisticated models of it, the nominal money stock is not exogenous, nor has it been controlled as an objective of policy by the central bank in the United States; it, or its components, are determined jointly by the central bank, the commercial banks, and the public, and it is basically a passive outcome of the interaction of the economic system, not a driving force.

The doubt that Keynesians feel concerning monetarist assertions about the potency of money stock changes reflects the fact that monetarist descriptions of the adjustment process themselves seem to give no particular reason for regarding money stock changes as causal. These descriptions typically run as follows, using an open market purchase of Treasury bills as an example:<sup>41</sup> at the outset, there is an exchange of assets between the central bank and a Government securities dealer, with the central bank giving the dealer its check drawn on itself in exchange for bills.

This exchange results in the following: (1) a reduction in the yield on bills, with consequent disequilibrium among holders of securities; (2) an increase of bank reserves of an equivalent amount (disregarding drains into currency holdings, etc.); (3) an initial increase in the money supply of the same amount as the transaction; and (4) a decrease in bill holdings by the private sector, with a concomitant increase in the central bank's portfolio. In a process described in some detail by Friedman and Schwartz, the next step will involve action to readjust portfolios in response to yield and wealth changes; meanwhile, banks will be interested in expanding loans on the basis of their newly-acquired reserves (and incidentally in creating new deposits). Eventually the adjustment affects the yield on equities and therefore the market value of the existing stock of physical capital. The existing capital stock will rise in value, stimulating the production of new capital and thus causing income to rise. There may also be other effects, such as direct effects on spending of changes in wealth.

The question would seem to be whether it is the initial increase in the money stock, the full increase (including the new deposits generated as a consequence of loan decisions), the increase in bank reserves, the reduction in private bill holdings, the fall in yields, the increase in the central bank's portfolio, or some other factor which is responsible for the income change. Rather than arbitrarily selecting some one factor from this list, it would seem preferable to take the more general view that the initiating force was the disturbance of a portfolio equilibrium, effected in this case through open market operations. (Such a disturbance, with similar effects, could arise for other reasons: e.g., if there were a change in wealth-holders' preferences for holding a particular security category at existing yields.) The change in the money stock is properly viewed as one of the several results (along with changes in income, interest rates, prices, etc.) of this disturbance. Such a position of course implies that monetary policy is effective, but does not assign the starring role in the drama to changes in the money stock.

### Stabilization Policy

Modern Keynesian static analysis, based on the complete Keynesian system with flexible prices and inflexible money wages, yields the result that both monetary and fiscal policy are able to effect changes in income, interest rates, prices, employment, and other variables. Monetarist analysis, however, takes the position that only monetary policy has significant effects on the pace of economic activity, at least in

<sup>39</sup>Brunner, "The 'Monetarist Revolution,'" p. 7.

<sup>40</sup>Milton Friedman, "The Supply of Money and Changes in Prices and Output," in *The Relationship of Prices to Economic Stability and Growth*, Compendium of Papers Submitted by Panelists Appearing Before the Joint Economic Committee, 85th Congress, 2nd sess., 1958, pp. 241-56.

<sup>41</sup>See, for instance, Milton Friedman and David Meiselman, "The Relative Stability," Sec. VII, and Milton Friedman and Anna J. Schwartz, "Money and Business Cycles," *Review of Economics and Statistics* (February 1963 Supplement), esp. pp. 60-61.

the short run. This suggests that the two schools of thought disagree not in their views about monetary policy, but rather on the effectiveness of fiscal policy.

Until recently, monetarists were interpreted as basing their belief that fiscal policy is ineffective directly on the presumed existence of a stable demand-for-money function with zero interest elasticity, together with the assumption of an exogenously-set money stock. Such a demand-for-money function links money and income directly together, so that income cannot change unless the money stock changes. Shifts in government spending financed by bond issue, for instance, were said to result in interest rate changes of sufficient magnitude to reduce private spending to the degree required to keep total demand at a constant level.

However, given the many research studies which show otherwise, it has become impossible to maintain that the interest elasticity of the demand for money is zero. This development has had a considerable effect on the tone of monetarist discussions. Thus Fand, in discussing stabilization policy, refers to “. . . the *exceptional* case of a completely (interest) inelastic demand for money.”<sup>42</sup> Furthermore, a relevant recent finding is that the *supply* of money is interest-elastic, and that this is sufficient to loosen the tight link between the money stock and income even if the interest elasticity of demand is zero.

Therefore monetarists have had to rationalize their dismissal of fiscal policy in other ways. Some have tried to find other means of solidifying the money-income link and of segregating the monetary sector from the remainder of the system by neutralizing the connection provided by the interest rate. One way of doing so is by considering the interest rate to be determined exogenously. This, in effect, is the procedure followed by Friedman in his paper entitled, “A Monetary Theory of National Income.”<sup>43</sup> If interest rates do not respond to changes in real and financial variables, the rigid money-income connection is preserved. This may be considered the most extreme approach, because under it fiscal policy does not even affect the rate of interest and the division of output among the various sectors.

Another way is to make the standard quantity-theory assumption of flexible wages and prices, and hence full employment, while accepting the fact that the demand for and supply of money balances are interest-elastic. In such a world, fiscal policy cannot

affect the levels of real variables like output or employment, which are entirely determined by the labor market and the production technology of the system – but then, neither can monetary policy.

Assumptions are not a matter of logic, assuming that they are internally consistent. In weighing these various approaches to the analysis of stabilization policy, the most important questions probably should be: Which of the alternative approaches is the most realistic and the most relevant for the real-world question of fiscal policy's effectiveness? Is it the case of flexible wages and prices, so that full employment is the rule and not the exception, and neither monetary policy nor fiscal policy can affect the level of real activity? Is it the case involving exogenously-determined interest rates, so that fiscal policy cannot even affect the division of output, let alone the level of activity? Or is it the case of flexible prices but a sticky wage level, in which case monetary and fiscal policy both are capable of affecting the level of real activity?

Brunner has taken a somewhat different approach to the analysis of fiscal policy than have most other monetarists. He asserts that fiscal policy is ineffective or perverse because the effects on asset values due to interest-rate changes of the cumulation or decumulation of claims against the Government held by the public, resulting from a fiscal policy deficit or surplus, outweigh the direct effects on the flow of output and income of new spending and taxing and of the changes in the stock of financial claims held by the private sector which result.<sup>44</sup> This position implies the view that the disturbance of portfolio equilibrium from *any* source (not only money stock changes) has powerful repercussions, and thus paradoxically tends to downgrade the importance of changes in the money stock. As far as is known, this position is not supported directly by empirical evidence.

## Summary

In this paper, I have attempted to sketch the main outlines of monetarist thought and to examine some aspects of the monetarist view of Keynesian analysis. In doing so, I have paid particular attention to the roles of the instruments of stabilization policy under the two views.

My examination of the monetarist-Keynesian debate has indicated that the version of Keynesianism which the monetarists use to establish a contrast for their own point of view is out of date and inadequate –

<sup>42</sup>Fand, “Monetarism and Fiscalism,” p. 289 (italics added).

<sup>43</sup>See the discussion of this approach in footnote 12.

<sup>44</sup>Karl Brunner, “The ‘Monetarist Revolution’.”

“vulgar” version of post-Keynesian thinking, to use Professor Johnson’s term. When it is recognized that Keynesianism implies sticky wages and money illusion in the labor market rather than rigid prices, and that portfolio adjustment as the basis for the transmission of monetary impulses is not only consistent with the Keynesian approach but indeed is being built into Keynesian models, it is seen that there is very little if anything in monetarist theory which is new and different. Rather, the two approaches diverge in ways which basically are methodological and operational. The monetarists are willing to commit themselves to the use of very simple, very small (even one-equation) models for policy analysis; Keynesians typically are not. On this point, the monetarist stance seems to be a matter of faith rather than logic; the common theoretical basis on which both positions rest certainly implies the use of a structural approach.<sup>45</sup> There certainly are substantial differences in the kinds of operational assumptions that are made about particular dimensions of the theoretical structure, and these have implications of various kinds for policy. The typical Keynesian assumption of money wage inflexibility is consistent with a shorter-run analysis; it leads to the conclusion that both monetary policy and fiscal policy can affect the level of activity. The typical monetarist assumption of wage and price flexibility (i.e., of full employment) is more relevant for the analysis of secular changes.

This assumption essentially bypasses the whole question of short-run policy effects. For the long run, paradoxically, it suggests that fiscal policy is more important and interesting than monetary policy, for fiscal policy at least changes the rate of interest (unless the rate of interest is exogenously determined), and therefore the division of output, and presumably affects growth; whereas monetary policy affects only prices, money wages, and the like.<sup>46</sup> There appear to

<sup>45</sup>Karl Brunner has written, “The monetarist disregards . . . the allocative detail of credit markets when examining patterns of allocation behavior. . . . Such detail is simply asserted . . . to be irrelevant for aggregative explanation.” *Ibid.*, p. 15.

<sup>46</sup>The reservations expressed in footnote 10 apply to this statement also.

be some analytic confusions in many monetarist discussions. I have tried to show above that it is incorrect to view the demand-for-money function as a velocity relationship from either point of view. In the monetarist case, this is especially true because the stability of velocity in the face of monetary changes depends on assumptions about the labor market and is unrelated to the characteristics of the demand-for-money relationship. It also appears that monetarist fascination with the money stock is unwarranted by monetarist logic, which seems to me to place great emphasis on portfolio disequilibrium as a potent driving force in the economy. It does not follow from this view, as a matter of logic, that observed changes in the money stock have any particular significance as a causative force.

On the positive side, monetarists have contributed to the development of macroeconomic thought by stressing that the links relied upon for years by most Keynesians to connect the real and monetary sectors overlook entirely the important substitution and wealth effects which are the concomitants of portfolio adjustment. They also have called our attention to the distinction, apparently first made by Irving Fisher many years ago, between market and real interest rates, and therefore to the potentially important role of price expectations in dynamic macroeconomics. These phenomena are extraordinarily difficult to capture in empirical models, but work is proceeding along these lines. It is to be hoped that during the next few years, they will be made standard features of Keynesian (that is, structural) theoretical and empirical models, and that dependable evidence will be gathered so that the *real* questions which divide us — chiefly, in my opinion, the question raised by Brunner and others concerning the need for large-scale structural models for aggregative analysis — can be answered satisfactorily.

*This article and the accompanying one by Robert H. Rasche are available as Reprint No. 74*

*Appendix begins on following page.*

## APPENDIX

Following are the derivations which underlie equations (4), (8), and (9) in the text. They are based on equations (1)-(3) and (5)-(7), which are reproduced here for convenience:

$$(1) \quad y = C(y,r) + I(r)$$

$$(2) \quad \frac{M_0}{p} = L(y,r)$$

$$(3) \quad Y = py$$

$$(5) \quad y = y(N)$$

$$(6) \quad N = N^D(w)$$

$$(7) \quad w = \frac{\bar{W}}{p}$$

The following slope assumptions are used throughout:  $0 < C_y < 1$ ;  $C_r < 0$  or, if positive,  $C_r < |I_r|$ ;  $I_r < 0$ ;  $L_y > 0$ ;  $L_r < 0$ ;  $y_N > 0$ ;  $N_w^D < 0$ .

### A. The Elasticity of Velocity

Equation (4) in the text is an expression for the elasticity of velocity with respect to a monetary shift, and is reproduced for convenience:

$$(4) \quad E_{V \cdot M_0} = E_{y \cdot M_0} + E_{p \cdot M_0} - 1.$$

It is derived by differentiating the expression for velocity ( $V = \frac{Y}{M_0}$ ) with respect to the money stock, and converting the result into elasticity form.

Thus we have:

$$(A.1) \quad \frac{dV}{dM_0} = \frac{1}{M_0} \frac{dY}{dM_0} - \frac{Y}{M_0^2}$$

From (3), we have

$$(A.2) \quad \frac{dY}{dM_0} = p \frac{dy}{dM_0} + y \frac{dp}{dM_0}$$

Substituting (A.2) into (A.1) and multiplying the resulting equation by  $\frac{M_0}{V}$  yields

$$(A.3) \quad E_{V \cdot M_0} = E_{y \cdot M_0} + E_{p \cdot M_0} - 1, \text{ which is equation (4).}$$

This result is derived only from definitions. Next we investigate the values of  $E_{y \cdot M_0}$  and  $E_{p \cdot M_0}$ , and therefore of  $E_{V \cdot M_0}$ , which are implied by monetarist and Keynesian assumptions respectively.

### B. The Monetarist Case

Monetarists assume that wages and prices are flexible so that real output,  $y$ , may be considered exogenous for the purpose of static analysis, and only equations (1) and (2) are relevant. Differentiating (1), which is the IS curve, yields:

$$(B.1) \quad C_y \frac{dy}{dM_0} + (C_r + I_r) \frac{dr}{dM_0} = \frac{dy}{dM_0}$$

However, if  $y$  is exogenous to this system,  $\frac{dy}{dM_0} = 0$  so that we get:

$$(B.2) \quad (C_r + I_r) \frac{dr}{dM_0} = 0, \text{ which implies that } \frac{dr}{dM_0} = 0.$$

Differentiating the LM curve (2) yields:

$$(B.3) \quad L_y \frac{dy}{dM_0} + L_r \frac{dr}{dM_0} = \frac{1}{p} - \frac{M_0}{p^2} \frac{dp}{dM_0}. \text{ Since we have}$$

found that, in this case,  $\frac{dy}{dM_0} = \frac{dr}{dM_0} = 0$ , (B.3) reduces to:

$$(B.4) \quad \frac{M_0}{p} \frac{dp}{dM_0} = E_{p \cdot M_0} = 1.$$

Substituting these findings into (A.3), we find that  $E_{V \cdot M_0} = 0$  using static analysis under monetarist assumptions.

### C. The Keynesian Case

Keynesians take money wages to be inflexible while prices are an endogenous variable. This means that real income or output may no longer be considered exogenous; instead, it becomes endogenous, and equations (5)-(7) are added to the IS-LM system as represented by (1) and (2) in order to close the set of equations.

To derive expressions for the elasticities  $E_{y \cdot M_0}$  and  $E_{p \cdot M_0}$ , we must again differentiate the system totally with respect to  $M_0$ , now treating  $y$  as a variable. In addition to equations (B.1) and (B.3), this differentiation yields

$$(C.1) \quad \frac{dy}{dM_0} = -y_N N_w^D \frac{\bar{W}}{p^2} \frac{dp}{dM_0}$$

which is derived by differentiating equations (5)-(7) and substituting where possible.

It will be convenient to make some further substitutions. First, since the MPC with respect to income is one minus the MPS with respect to income, and since the



MPC with respect to the interest rate is the negative of the MPS with respect to the interest rate, we make the substitutions  $(1-C_y) = S_y$  and  $C_r = -S_r$ , where  $S$  stands for the saving function (the model implies  $S = S(y,r)$ ). Second, (C.1) can be used to eliminate the term involving  $\frac{dp}{dM_0}$  in (B.3). Making these substitutions and collecting terms yields the following pair of equations in the two variables  $\frac{dy}{dM_0}$  and  $\frac{dr}{dM_0}$ :

$$(C.2) \quad S_y \frac{dy}{dM_0} - (I_r - S_r) \frac{dr}{dM_0} = 0$$

$$(C.3) \quad (L_y - \frac{M_0}{W_{yN} N_w^D}) \frac{dy}{dM_0} + L_r \frac{dr}{dM_0} = \frac{1}{p}$$

Solving these equations for  $\frac{dy}{dM_0}$  gives:

$$(C.4) \quad \frac{dy}{dM_0} = \frac{\frac{1}{p}}{\frac{S_y L_r}{I_r - S_r} + L_y - \frac{M_0}{W_{yN} N_w^D}}$$

To convert this into elasticity form, two steps are needed:

(a) each of the propensities (or partial derivatives) shown in the denominator may be converted into a partial elasticity by using the relationship between any two variables  $x$  and  $z$  given by the definition of a partial elasticity; i.e., if  $z = f(x)$ , then  $\eta_{z,x} = f_x \cdot \frac{x}{z}$  and thus  $f_x = \frac{z}{x} \eta_{z,x}$ ;

(b) to find the systemic elasticity  $E_{y \cdot M_0}$ , both sides of (C.4) must be multiplied by  $\frac{M_0}{y}$ . Carrying out these operations and cancelling terms where possible, we get

$$(C.5) \quad E_{y \cdot M_0} = \frac{1}{\frac{\eta_{S \cdot y}}{I_r} \frac{\eta_{L \cdot r}}{S_r} + \eta_{L \cdot y} - \frac{1}{\eta_{y \cdot N} \eta_{N^D \cdot w}}}$$

To find an expression for the systemic elasticity  $E_{p \cdot M_0}$ , equation (C.4) is substituted into (C.1) and a systemic expression for  $\frac{dp}{dM_0}$  is derived. When this expression is multiplied by  $\frac{M_0}{p}$ , the partial derivatives are converted to elasticities, and the necessary algebra is carried out, the following expression results:

$$(C.6) \quad E_{p \cdot M_0} = - \frac{1}{\eta_{y \cdot N} \eta_{N^D \cdot w} \left[ \frac{\eta_{S \cdot y} \eta_{L \cdot r}}{\eta_{I \cdot r} - \eta_{S \cdot r}} + \eta_{L \cdot y} \right] - 1}$$

From (C.5) and (C.6), it can be seen that the behavior of velocity now depends on all of the partial elasticities in the system. First, if either  $\eta_{y \cdot N}$  or  $\eta_{N^D \cdot w}$  are zero, output will not change in response to a real wage change brought about by a monetary shift, so that  $E_{y \cdot M_0} = 0$  and  $E_{p \cdot M_0} = 1$ , resulting in stable velocity. Second, if either  $\eta_{y \cdot N}$  or  $\eta_{N^D \cdot w}$  are extremely large,  $E_{p \cdot M_0}$  approaches zero and the response of velocity to a monetary shift depends on a special case of equation (C.5) in which the last denominator term approaches zero. Whether  $E_{v \cdot M_0}$  is positive or negative in this case depends on whether  $E_{y \cdot M_0}$  is greater or smaller than unity. The condition for  $E_{v \cdot M_0} < 0$  is that

$$|\eta_{I \cdot r} - \eta_{S \cdot r}| < \eta_{S \cdot y} (|\eta_{L \cdot r}|) + \eta_{L \cdot y} (|\eta_{I \cdot r} - \eta_{S \cdot r}|).$$

Thus the larger in value are  $\eta_{S \cdot y}$ ,  $\eta_{L \cdot y}$ , and  $|\eta_{L \cdot r}|$ , the more likely it is that  $E_{v \cdot M_0} < 0$ . Finally, for nonzero but finite values of  $\eta_{y \cdot N}$  and  $\eta_{N^D \cdot w}$ ,  $E_{y \cdot M_0}$  and  $E_{p \cdot M_0}$  will tend toward zero (and  $E_{v \cdot M_0}$  toward  $-1$ ) if  $\eta_{S \cdot y}$  or  $|\eta_{L \cdot r}|$  are very large, or if  $(\eta_{I \cdot r} - \eta_{S \cdot r})$  is very close to zero in value. A large value for  $\eta_{L \cdot y}$  would also give this result.

# Comments on a Monetarist Approach to Demand Management

by ROBERT H. RASCHE

*Robert H. Rasche is Assistant Professor of Economics at the Wharton School of Finance and Commerce, University of Pennsylvania. He received a PhD degree in Economics from the University of Michigan. Professor Rasche has been closely involved in the development of the FRB-MIT econometric model of the United States economy. The author is on leave during the 1971-72 academic year and is a visiting scholar at the Federal Reserve Bank of St. Louis. This paper was presented at the Annual Conference of College and University Professors of the Federal Reserve Bank of St. Louis on November 12, 1971.*

A CASUAL reading of the popular discussion of stabilization policy over the past four or five years would suggest that the definition of a monetarist was firmly established. In the monetarist camp are Milton Friedman, Karl Brunner, Allan Meltzer, and the model of the St. Louis Federal Reserve Bank. Among the nonmonetarists are Walter Heller, Gardner Ackley, Arthur Okun, James Tobin, and the large econometric models such as the Wharton model and the FRB-MIT model. Sometimes the distinction between the two groups has been summarized in the allegation that a monetarist is one who not only believes that money matters, but also believes that money is the only thing which matters.<sup>1</sup>

A close reading of the writings of those associated with both points of view, suggests that distinctions are not completely clear at the level of monetary theory. Leonall C. Andersen has characterized the monetarist position on stabilization policy as holding that "the major impact of monetary actions is . . . on long-run movements in nominal economic variables such as nominal GNP, the general price level, and market interest rates. Long-run movements in real economic variables such as output and employment are considered to be little influenced, if at all, by monetary actions."<sup>2</sup> On the other hand he admits a clear role for fiscal policy, if not the conventional stabilization policy role: "their [fiscal actions] main impact is on long-run movements of real output. . . . In the short run, fiscal actions . . . exert some but little lasting influence on nominal GNP expansion and, therefore, have little effect on short-run movements of output and employment."<sup>3</sup>

<sup>1</sup>Walter W. Heller, "Is Monetary Policy Being Oversold?", in Milton Friedman and Walter W. Heller, *Monetary vs. Fiscal Policy* (New York: W.W. Norton & Co., Inc., 1969), p. 16.

<sup>2</sup>Leonall C. Andersen, "A Monetarist View of Demand Management: The United States Experience," this *Review* (September 1971), p. 4.

<sup>3</sup>*Ibid.*, p. 4.

The question is what theoretical framework can produce these types of conclusions, and can it be tested? Again quoting the Andersen paper, "monetary actions . . . are considered a disturbance which influences the acquisition of financial and real assets. Rates of return on real and financial assets and market prices adjust to create a *new equilibrium position of the economy*; therefore these changes are considered the main channels of monetary influence on aggregate demand."<sup>4</sup>

Thus the monetarist conception of what has been called the transmission mechanism is one of monetary disturbances which change interest rates and the relative prices of real and financial assets. Such changes induce a reallocation of asset portfolios which can include changes in the demand for real assets. Finally, the portfolio adjustments and relative price changes can change the demand for consumables. In an earlier article in this *Review*, Karl Brunner characterizes a similar position as the "weak monetarist thesis."<sup>5</sup>

This construct of the world is apparently one which is widely accepted among monetary economists today and thus does not discriminate among the monetarist and nonmonetarist positions. Certainly a whole succession of writings by James Tobin suggests an explanation quite consistent with this view of the transmission mechanism of monetary policy.<sup>6</sup> In fact, Andersen admits that he would view his mechanism as "close to the Tobin view, except that it takes into consideration many more rates of return and market prices of goods and services."<sup>7</sup> An examination of the

<sup>4</sup>*Ibid.*, p. 3 (italics are added).

<sup>5</sup>Karl Brunner, "The Role of Money and Monetary Policy," this *Review* (July 1968), pp. 18-19.

<sup>6</sup>James Tobin, "An Essay on Principles of Debt Management," in Commission on Money and Credit, *Fiscal and Debt Management Policies* (Englewood Cliff, N.J.: Prentice-Hall Inc., 1963) pp. 143-218; and, "A General Equilibrium Approach to Monetary Theory," *Journal of Money, Credit and Banking* (February 1969) pp. 15-29.

<sup>7</sup>Andersen, "A Monetarist View," p. 3.

writings of other nonmonetarist economists will show similar consistencies with this view of the transmission mechanism. Therefore "weak monetarism," as a theoretical position, does not appear to be a monopoly of the monetarists.

Given this apparent agreement on the theoretical basis of the mechanism through which monetary policy actions affect the economy, one can question whether the "monetarist counterrevolution" is more than an attempt at product differentiation, such as economists usually associate with monopolistic competition. A pragmatic view of the discussion suggests that at least four substantive issues are involved: (1) the usefulness of the IS-LM aggregate demand framework for policy formulation; (2) the dynamic adjustment of the economy to a new equilibrium after a policy shock; (3) the mode of conduct of monetary policy; and (4) an econometric issue of large versus small models.

### Limitations of Policy Prescriptions from the IS-LM Framework

A major source of monetarist criticism has been the use of the IS-LM framework for aggregative policy analysis. In this *Review*, Ronald Teigen has attempted to defend the IS-LM framework from one monetarist accusation that this framework holds that an increase in the stock of money lowers the interest rate and raises output.<sup>8</sup> He demonstrates that with certain assumptions about the relative speeds of adjustment of various markets, it is possible to show that interest rates over time will first fall and then rise again as the system returns to a new equilibrium.

At the same time Teigen admits that this framework has ignored price expectations, and in addition, that it is not easy to incorporate price expectations, a dynamic phenomenon, into the static framework. This appears to sidestep the crux of the monetarist complaints. Not only does the conventional IS-LM analysis ignore price expectations, but it usually ignores effects from changes in the level of prices. The omission of such price level effects is possible only when the macroeconomic model is specified totally in terms of real flow variables. In sophisticated analysis, such as that of Martin Bailey, price level effects of various kinds are introduced, and it can be shown that the position of either the IS or the LM curve (in the interest rate - real income plane) is dependent upon the current price level.<sup>9</sup>

<sup>8</sup>Ronald L. Teigen, "A Critical Look at Monetarist Economics," this issue of the *Review*, pp. 19-20.

<sup>9</sup>Martin Bailey, *National Income and the Price Level* (New York: McGraw-Hill, 1962).

Most macro-economists will acknowledge the validity of the price level effect on the LM curve arising from the specification of the demand for money as a demand for real balances. Similarly, a specification of the consumption function in terms of income and wealth as implied by a permanent income or "life-cycle" hypothesis will generate a family of IS curves, one for each level of real wealth.<sup>10</sup> Once both are constructed as functions of the price level, any policy action which generates a change in the price level will not only have a direct impact on the IS (fiscal policy) or the LM (monetary policy) curve, but also will cause additional shifts in both curves through the changes in the price level. Under these circumstances, simple multiplier calculations do not adequately represent the reaction of the economy to the policy action. Accurate policy conclusions cannot be derived without estimates of the parameters of the system.

The situation is further complicated when it is assumed that monetary policy can affect the market value of assets, such as corporate equities, through induced changes in the rate of return on these assets. Then the specification of a consumption-wealth relationship implies that any change in interest rates will induce a shift in the IS curve.

Teigen has already indicated that it is difficult, if not impossible, to incorporate dynamic phenomenon such as price expectations into the static framework of this construct.<sup>11</sup> Yet, as the monetarists have rightly pointed out, adjustments in specified behavioral relationships have to be made for such expectations under conditions of anticipated inflation (and particularly when the rate of inflation is anticipated to be changing).

It appears that the monetarists have justifiable complaints with the policy analysis derived from this framework, which is common to popular macroeconomic textbooks and past annual reports of the Council of Economic Advisers, even if one is prepared to accept the proposition that there are no deep theoretical differences in the transmission mechanism for monetary and fiscal policy.

In many respects the monetarist attack on the IS-LM framework is fighting a "straw man." Many of the limitations of this highly aggregative framework, such as those indicated above, have been attacked in

<sup>10</sup>It is not necessary to assume this kind of consumption function to generate such a family of curves. Price elasticities of imports and exports with respect to domestic and foreign prices, or income tax functions which have nominal income elasticity greater than one, will generate the same effect.

<sup>11</sup>Teigen, "A Critical Look," p. 19.

larger econometric models of income determination. This is not to say that these models have captured the various effects with a high degree of precision. In particular, the econometric problem of estimating distributed lags has proven particularly difficult, thus the timing of responses to policy actions as implied by large statistical models is a major area of uncertainty at the present time.

### The Process of Adjustment to Policy Actions

A close reading of the monetarist evaluation of the relative strengths of monetary and fiscal policy leaves the impression that they are not quite talking about the same thing as the nonmonetarists. This can be illustrated by the first quote from Andersen, above, which sets out the transmission of monetary policy on the economy as the adjustment of rates of return and *prices* to a new equilibrium (in the absence of further exogenous shocks). A similar characterization has been made in a recent analysis by Friedman in which he distinguishes "Keynesian" analysis as a framework in which prices are assumed exogenously constant.<sup>12</sup>

Most empirical models of income determination today regard the price level as endogenously determined, with the independent variables in the price level equation specified as money wage rates and productivity separately or in a composite form as unit labor costs.<sup>13</sup> In addition, money wage rates are usually assumed to be endogenous variables in such models. The behavior of wage rates in such models is usually specified to follow a modified version of the "Phillips Curve."<sup>14</sup> This specification is a disequilibrium mechanism which holds that, in the presence of an excess demand or supply in the labor market (usually measured by the unemployment rate), money wage rates will change. However, it says nothing about the nature of the equilibrium toward which the market is presumably adjusting. This is a modification of the early post-Keynesian models in which the money wage rate was taken theoretically, if not empirically, as fixed in the short run.

<sup>12</sup>Milton Friedman, "A Theoretical Framework for Monetary Analysis," *Journal of Political Economy* (March/April 1970), pp. 193-238.

<sup>13</sup>See Lawrence R. Klein and Michael K. Evans, *The Wharton Economic Forecasting Model*, 2nd ed., (Philadelphia: University of Pennsylvania, 1968); Robert Rasche and Harold T. Shapiro, "The F.R.B.-M.I.T. Econometric Model: Its Special Features," *American Economic Review*, Papers and Proceedings (May 1968), pp. 123-149; and Otto Eckstein and Gary Fromm, "The Price Equation," *American Economic Review* (December 1968) pp. 1159-1183.

<sup>14</sup>A. W. Phillips, "The Relationship Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-1957," *Economica* (November 1958), pp. 283-299.

It seems appropriate to conclude that the monetarists and their opponents are discussing policy effects on the economy over two different time spans. The nonmonetarists have implicitly concerned themselves with models in which the labor market, at least, remained in disequilibrium. The monetarists on the other hand, in discussing policy impacts when the "new equilibrium position of the economy" has been achieved, implicitly appear to be concerned with the period of time in which all markets, including the labor market, have adjusted themselves to the policy shock. The recent reinterpretation of the *General Theory* by Leijonhufvud offers an explanation of this debate in terms of the dynamics of the labor market. He argues:

The revolutionary impact of Keynesian Economics on contemporary thought stemmed in the main, we have argued, from Keynes' reversal of the conventional ranking of price and quantity velocities. In the Keynesian models price velocities are not infinite; it is sometimes said that the implications of the model result from the assumption that money wages are "rigid". This usage can be misleading. Income-constrained processes result not only when price-level velocity is zero, *but whenever it is short of infinite*.<sup>15</sup>

He further argues that this is an appropriate assumption if there are substantial information costs associated with trading in the labor market, as recent theories of labor market behavior have postulated:<sup>16</sup>

In the absence of perfect knowledge on the part of transacting units or of any mechanism *unrelated to the trading process itself* that would supply the needed information *costlessly*, the presumption of infinite price velocity disappears.<sup>17</sup>

Unfortunately, little attention has been given to empirical investigation of the process by which labor markets adjust to equilibrium. This adjustment process has significant implications for the reaction of an economic system to pure fiscal policy changes such as increased government expenditures on goods and services and increased real disposable income of consumers through tax reductions unaccompanied by increases in the money stock.

Acceptance of the Keynesian concepts of a consumption function and an interest elasticity of the

<sup>15</sup>Axel Leijonhufvud, *On Keynesian Economics and The Economics of Keynes* (New York: Oxford, 1968), p. 67.

<sup>16</sup>Armen A. Alchian, "Information Costs, Pricing, and Resource Unemployment," pp. 27-52, and Charles C. Holt, "Job Search, Phillips' Wage Relations and Union Influence: Theory and Evidence," p. 53-123, both in E.S. Phelps et al. *Microeconomic Foundations of Unemployment and Inflation* (New York: W.W. Norton & Co., 1970).

<sup>17</sup>Leijonhufvud, *On Keynesian Economics*, p. 69.

demand for real cash balances, does not imply increases in output and employment from the above types of fiscal policy actions if the labor market is allowed to adjust to the equilibrium supply and demand functions which prevailed before the policy shock.<sup>18</sup> The restoration of such an equilibrium implies the same real output and employment which prevailed before the policy action, that is complete "crowding out" of the fiscal stimulus in real terms. Which elements of real private demand are displaced by the fiscal stimulus will depend on the specifications of the sector demand functions.

If the money demand function is completely interest inelastic then, when the new equilibrium is achieved, velocity must be unchanged in the absence of an accommodating monetary expansion, and complete "crowding out" must also occur in nominal terms. With an interest elastic money demand function, higher prices can occur in the new equilibrium as a result of higher nominal interest rates. In this case complete "crowding out" will not occur in nominal terms.

The results of this model are consistent with the monetarist position on the role of fiscal policy as outlined by Andersen and others. Therefore, if the adjustment process in the labor market is relatively rapid, then the weight would seem to be with the monetarist contention that fiscal policy is a relatively weak tool for short-run stabilization. On the other hand, if the adjustment is very slow, "transitory impacts" of fiscal policy actions of the type usually derived from income determination models exist, and may have an important role in stabilization policy.<sup>19</sup>

### The Conduct of Monetary Policy

A consistent characteristic of the monetarist position is the insistence that monetary policy should be conducted in terms of controlling the rate of growth of monetary aggregates rather than controlling interest rates or money market conditions. This position can be traced back at least as far as early post-war proposals of Friedman during the period when the Federal Reserve was still supporting the price of Government debt.<sup>20</sup>

In support of this position, the monetarists have developed a number of valid objections to the money market approach. First, they would hold that the view

<sup>18</sup>Gardner Ackley, *Macroeconomic Theory* (New York: Macmillan, 1961), pp. 382-387.

<sup>19</sup>It is noteworthy in this respect that Friedman seems to always be careful to acknowledge that there are short-run "transitory" effects of fiscal policy actions on real output and employment.

<sup>20</sup>Milton Friedman, *A Program for Monetary Stability* (New York: Fordham University Press, 1959).

that monetary influences are channeled to aggregate demand only through impacts of interest rates on investment demand is too narrow a view of the role of monetary policy. It has been argued above that there exists fairly widespread support for this argument today, at least as a theoretical position. Second, they would argue that observed market rates of interest are nominal rates, and that in times of changing expectations of future inflation rates, the relevant interest rates for economic decisionmaking are *ex-ante* real rates of interest — nominal rates less the anticipated rate of future inflation. Under these circumstances it is possible that changes in nominal interest rates may give a completely wrong impression of what is really happening in terms of real rates of return.

As an example of this, the St. Louis Federal Reserve Bank has published from time to time over the past several years, estimates of a real interest rate series which proposes to measure long-term yield such as the corporate bond rate adjusted for inflationary anticipations. The contrast in the behavior of this series and the corresponding nominal series is quite striking. It is well known that the nominal series has achieved historically high levels in the past several years. On the other hand, the proxy for the real rate has remained remarkably steady over the latter part of the decade. One can object, of course, to the techniques used to approximate this series. Nevertheless, the monetarists have made a valuable contribution in emphasizing this distinction, because the existence of "inflation premiums" in market interest rates, particularly long-term rates, over the past several years is now widely acknowledged.<sup>21</sup>

An additional argument which has not been advanced by the monetarists to my knowledge, can be derived from recent work in investment theory. Considerable empirical testing has now been done on the neoclassical theory of investment which is most closely associated with the work of Jorgenson.<sup>22</sup> This theory indicates that interest rates are but one component of the quasi rent on new capital, which is a postu-

<sup>21</sup>For example, "Financial Developments in the Third Quarter of 1971," Federal Reserve *Bulletin* (November 1971), p. 871, states:

The key factor contributing to interest rate declines, however, was the marked change in market expectations triggered by the President's new economic program. Expectations of inflation, and hence the inflationary premium on interest rates, appear to have been reduced by the temporary freeze on wages and prices and by the indication that a program of strong continuing controls would follow.

<sup>22</sup>Robert E. Hall and Dale W. Jorgenson, "Application of the Theory of Optimum Capital Accumulation," pp. 9-60, and Charles W. Bischoff, "The Effect of Alternative Lag Distributions," pp. 61-130, both in Gary Fromm, ed., *Tax Incentives and Capital Spending* (Washington: the Brookings Institution, 1971).

lated determinant of investment activity. Various tax policy actions can also affect the rate of return on capital, and it is the net effect of the changes in interest rates and these tax policy actions which is the relevant influence on investment behavior. In particular, in discussions of monetary policy in late 1971, arguments that interest rates must be brought down to stimulate investment may be overly emotional. With the resumption of permanent tax credits on equipment, and the reduction of useful lives allowed for tax purposes earlier in the year through the revision of Treasury regulations, it is likely that the net effect on investment demand through the so called "cost of capital" channel would be expansionary, even if interest rates were to rise significantly over the first part of next year.

If these arguments are valid in minimizing the importance of money market conditions as the target of monetary policy, then the question which remains to be answered is why concentrate on the rate of growth of monetary aggregates. It would seem that there is nothing in the "weak monetarist thesis," as outlined above, which is sufficient to call for the conduct of monetary policy in terms of controlling the rate of growth of monetary aggregates. The theory must be supplemented by additional hypotheses about the short-run behavior of velocity.

Brunner establishes a necessary condition for this policy orientation in what he calls the "strong monetarist thesis," which maintains that the variability of monetary impulses is also large relative to the speed at which the economy absorbs the impact of environmental changes.<sup>23</sup> It does not seem totally appropriate to interpret this statement as holding that velocity is (or must be) constant in the short run, as some recent commentators seem to imply.<sup>24</sup> All that appears necessary is that if velocity changes, it must change in a manner which is predictable from the time path of past or predicted future behavior of the money supply. It can be demonstrated with currently popular formulations of the money demand function that the lower the short-run interest elasticity of the demand for money, the more likely this condition will be met. We shall return to this point in the next section where some comments are presented on the St. Louis equation.

Several remarks on the current state of empirical research on the money demand function are appro-

priate at this point.<sup>25</sup> It appears inappropriate to argue about the stability of the demand for money function, in the sense that the aggregate demand for real cash balances can be thought of as a stable function of a few parameters.<sup>26</sup> This proposition has been implicitly accepted by all empirical research into the nature of this function.<sup>27</sup> It is also true that most of these studies have concluded that statistically significant interest elasticities of money demand do exist. On the other hand the studies which have attempted to distinguish between short-run and long-run interest elasticities have consistently found that the short-run elasticities are quite small relative to the long-run elasticities because of a relatively slow speed of adjustment back to the long-run function after a disturbance from an initial portfolio equilibrium position.

It should be noted that these propositions say nothing about the control of the money stock through open market operations aimed at money market conditions versus control through open market operations aimed at reserve aggregate targets. This issue involves the elasticity of the supply function for money, rather than the demand function, and goes beyond the scope of the present discussion.

### The St. Louis Equation

The discussion up to this point has centered on monetarism as monetary theory and its prescriptions for monetary policy. It seems appropriate to conclude with some remarks on the St. Louis equation.

This regression has been the subject of varied interpretation since it first appeared. In their original article Andersen and Jordan state:

This article does not attempt to test rival economic theories of the mechanism by which monetary and fiscal actions influence economic activity. Neither is it intended to develop evidence bearing directly on any causal relationships implied by such theories. More elaborate procedures than those used here would be required in order to test any theories underlying the familiar statements regarding results expected from monetary and fiscal actions. However, empirical relationships are developed between frequently used measures of stabilization actions and economic activity. These relationships are consistent

<sup>25</sup>A useful summary of research on the money demand function is provided in David Laidler, *The Demand for Money: Theories and Evidence* (Scranton, Pa.: International Textbook Co., 1969).

<sup>26</sup>Milton Friedman, "The Quantity Theory of Money — A Restatement," in *Studies in the Quantity Theory of Money* (Chicago: University of Chicago Press, 1956), pp. 3-21.

<sup>27</sup>The derivation of regression estimates of any function presupposes stability of that function, in the Friedman sense, over the sample period.

<sup>23</sup>Brunner, "The Role of Money and Monetary Policy," p. 19.  
<sup>24</sup>Paul A. Samuelson, "Reflections on the Merits and Demerits of Monetarism," in James J. Diamond, ed., *Issues in Fiscal and Monetary Policy: The Eclectic Economist Views The Controversy* (DePaul University, 1971), pp. 7-21.

with the implications of some theories of stabilization policy and are inconsistent with others. . . .<sup>28</sup>

A later article states:

This general specification represents the reduced form for that class of structures which has  $\Delta M$  [changes in money stock] and  $\Delta E$  [changes in Federal expenditures] as exogenous variables. In this form the total spending equation remains uncommitted as to structure; it is potentially consistent with both Keynesian and quantity theory models.<sup>29</sup>

In the latter article, it was also noted that equations had been constructed using percentage changes, rather than first differences, and that the results were basically unaffected by the change in specification.

These equations and their established forecasting properties have remained somewhat a mystery to economists associated with the nonmonetarist position and the tradition of large econometric models. It has been subjected to numerous attacks on the choice of independent variables and problems of statistical bias.<sup>30</sup> In general it would appear that the equation has withstood these attacks surprisingly (or disturbingly) well.

We shall offer yet another interpretation of the St. Louis equation which suggests that it is not a "reduced form" of an unspecified system, but rather only one component of the structural system. This interpretation of the St. Louis results is not sympathetic to the view that the St. Louis equations are a competitive econometric model of the United States economy. Judged in this perspective, it is possible to rationalize its forecasting performance.

Recognizing that percentage changes are approximately equal to changes in logarithms for small changes, the St. Louis equation can be rewritten as:

$$(1) \Delta \ln Y = \alpha + \sum_{i=0}^5 \beta_i \Delta \ln M_{-i} + \sum_{i=0}^5 \gamma_i \Delta \ln E_{-i}$$

where  $Y$  = GNP in current dollars

$M$  = money stock

$E$  = high-employment Government expenditures.

<sup>28</sup>Leonall C. Andersen and Jerry L. Jordan, "Monetary and Fiscal Actions: A Test of Their Relative Importance in Economic Stabilization," this *Review* (November 1968), p. 11.

<sup>29</sup>Leonall C. Andersen and Keith M. Carlson, "A Monetarist Model for Economic Stabilization," this *Review* (April 1970), p. 9.

<sup>30</sup>Frank de Leeuw and John Kalchbrenner, "Monetary and Fiscal Actions: A Test of their Relative Importance in Economic Stabilization—Comment," this *Review* (April 1969), pp. 6-11; and Edward M. Gramlich, "The Usefulness of Monetary and Fiscal Policy as Discretionary Stabilization Tools," *Journal of Money, Credit, and Banking* (May 1971), pp. 506-532.

This can in turn be conveniently transformed into a velocity ( $V$ ) equation:

$$(2) \Delta \ln V = (\Delta \ln Y - \Delta \ln M) = \alpha + (\beta_0 - 1) \Delta \ln M + \sum_{i=1}^5 \beta_i \Delta \ln M_{-i} + \sum_{i=0}^5 \gamma_i \Delta \ln E_{-i}$$

Recent empirical formulations of the demand for money function specify that in the long run velocity is a function of interest rates, and assume that private economic units adjust to their long-run equilibrium cash balances with a lag. Such models can be transformed into a specification:<sup>31</sup>

$$(3) \Delta \ln V = \gamma_0 \Delta \ln g(r) + \gamma_1 \Delta \ln M_t + \sum_{i=1}^n \gamma_i \Delta \ln M_{t-i}$$

where  $r$  = interest rate.

If for the moment the interest rate term is ignored, this equation appears quite similar to the transformed Andersen-Jordan equation (1) above. It can be clearly seen from this equation that such specifications of the money demand function relate changes in velocity to current and lagged changes in the money stock (all in logarithms). It further suggests that changes in interest rates will induce additional changes in velocity.

Most economists would hold that changes in interest rates and money stock are jointly determined, and consequently, forecasts from equation (1), ignoring the induced changes on interest rates from changes in the money stock, will cause forecasting errors. However, if the *short-run* interest elasticity of the money demand function is very small, then an estimated equation omitting this term would most likely produce a credible forecasting record. In addition, it is likely that the distributed lag on high-employment Government expenditures used by Andersen and Jordan is correlated with interest rates in both the sample and post sample periods, and serves as an effective proxy variable for forecasting purposes.<sup>32</sup>

## Summary

Monetarism and the monetarist approach to demand management has raised many issues in the past several years which have significantly influenced the attitudes of professional economists on the question of

<sup>31</sup>See Appendix for the derivation.

<sup>32</sup>Equations of the form of (3) have been estimated using the data of the current St. Louis forecasting equations, both with and without the high-employment expenditure variables. Space constraints permit only the comment that the interest rate variable, either a short-term rate such as the Treasury bill rate, or a long-term rate such as the Corporate Aaa rate, show up as highly significant variables, though with very low *short-run elasticities*. Even with the interest rate variable in the specification, some of the coefficients in the distributed lag on high-employment expenditures remain significant.

how to pursue stabilization policy. Monetarist models have to date established a forecasting record which is credible when compared to the more entrenched income determination approach.

Recently, considerable work has been done to elaborate an extensive theoretical framework which purportedly underlies the policy prescriptions and the "reduced form" monetarist models of aggregate economic activity. The comments above suggest that much of this theoretical framework is shared with economists of nonmonetarist persuasion, but that there are a number of areas in which substantially different views of the world exist. Unfortunately, few attempts have been made by the monetarists and nonmonetarists to identify the common and contrasting elements of their theoretical constructs. Even less work has been done to attempt to disprove the specific hypotheses of market behavior in the areas of conflict, most of which, I believe, involve the dynamics of price adjustments.<sup>33</sup> Only as such analysis becomes available will we be able to resolve important policy issues such as the relative strengths of fiscal and monetary actions under various conditions of the economy, and the speed at which policy actions affect aggregate demand, employment, and prices.

<sup>33</sup>For example, Milton Friedman in, "A Theoretical Framework," argues that a major unresolved issue in his analysis (as well as that of others) is the response of real output and prices individually to policy shocks.

## APPENDIX

The purpose of this appendix is to demonstrate the derivation of equation (3) in the text from a money demand specification.

Assume that in the long run velocity is a function of interest rates:

$$(1) V = F(r) \frac{dF}{dr} > 0$$

or

$$(2) M^e = \left[ \frac{1}{V} \right] Y = Yg(r) \frac{dg}{dr} < 0$$

In addition private economic units are assumed to adjust to their long run equilibrium cash balance positions with a lag, which is usually specified as:

$$(3) \frac{M}{M_{-1}} = \left[ \frac{M^e}{M_{-1}} \right]^\delta$$

When this is expressed in logarithms it becomes:

$$(4) \Delta \ln M = \delta \ln M^e - \delta \ln M_{-1}$$

A more general form<sup>1</sup> of the distributed lag adjustment mechanism can be specified as:

$$\ln M = \beta_0 \ln M^e + \beta_1 \ln M_{-1} + \dots + \beta_n \ln M_{-n}$$

Substituting for  $M^e$  gives:

$$(5) \ln M = \beta_0 \ln [g(r)] + \beta_0 \ln Y + \sum_{i=1}^n \beta_i \ln M_{-i}$$

which can be rewritten as a velocity equation:

$$(6) \ln V = (\ln Y - \ln M) = -\beta_0 \ln [g(r)] + (1 - \beta_0) \ln Y - \sum_{i=1}^n \beta_i \ln M_{-i}$$

Taking first differences in the logs:

$$(7) \Delta \ln V = -\beta_0 \Delta \ln [g(r)] + (1 - \beta_0) \Delta \ln Y - \sum_{i=1}^n \beta_i \Delta \ln M_{-i}$$

which can be transformed to:

$$(8) \Delta \ln V = -\beta_0 \Delta \ln [g(r)] + (1 - \beta_0) \Delta \ln V + (1 - \beta_0) \Delta \ln M - \sum_{i=1}^n \beta_i \Delta \ln M_{-1}$$

or:

$$(9) \Delta \ln V = \frac{1}{\beta_0} \left[ -\beta_0 \Delta \ln [g(r)] + (1 - \beta_0) \Delta \ln M - \sum_{i=1}^n \beta_i \Delta \ln M_{-1} \right]$$

<sup>1</sup>Robert M. Solow, "On a Family of Lag Distributions," *Econometrica* (April 1960), pp. 393-406.

*This article and the accompanying one by Ronald L. Teigen are available as Reprint No. 74*