

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

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THE 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

<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.

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>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

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>5</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>6</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>7</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>8</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.

<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.

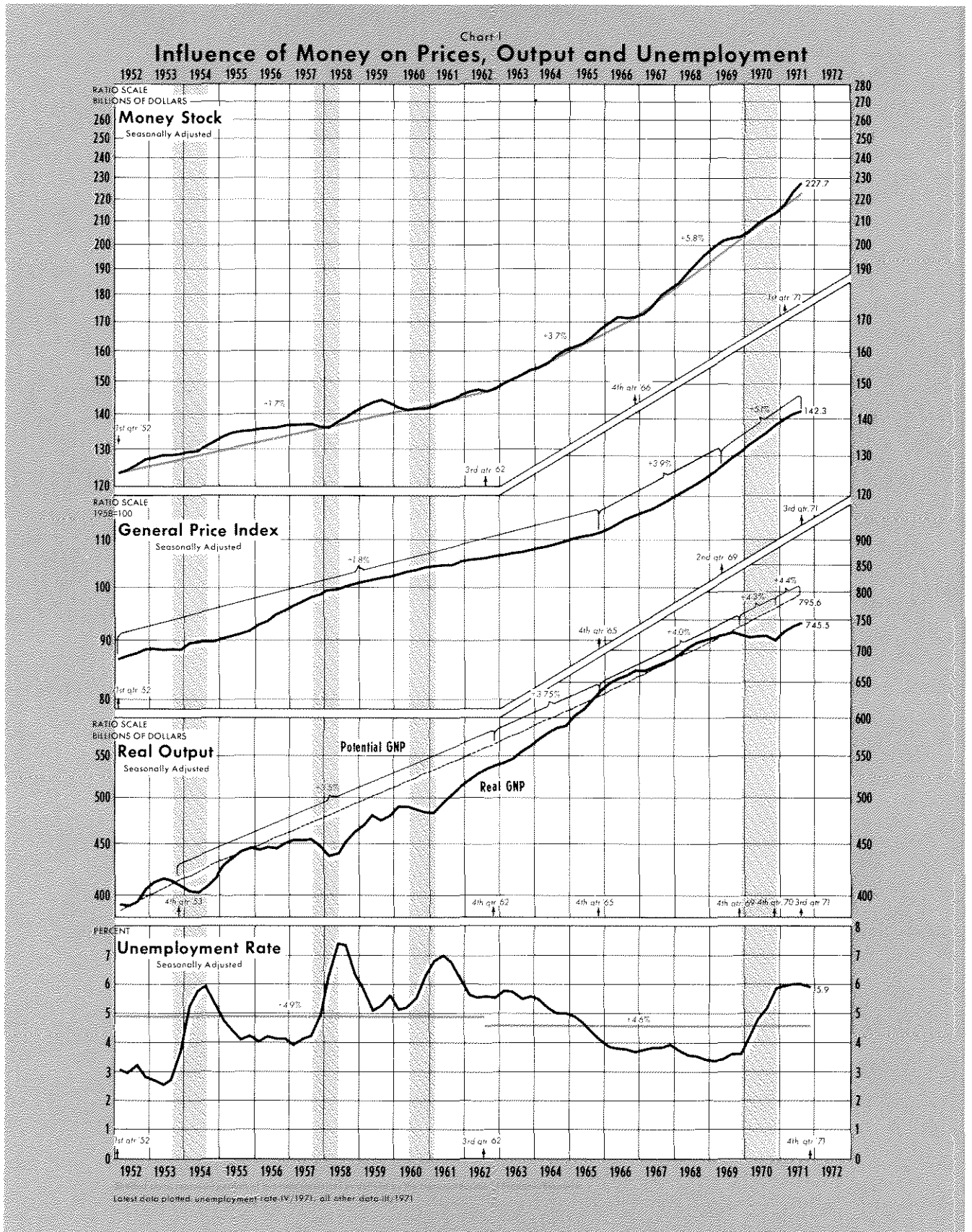
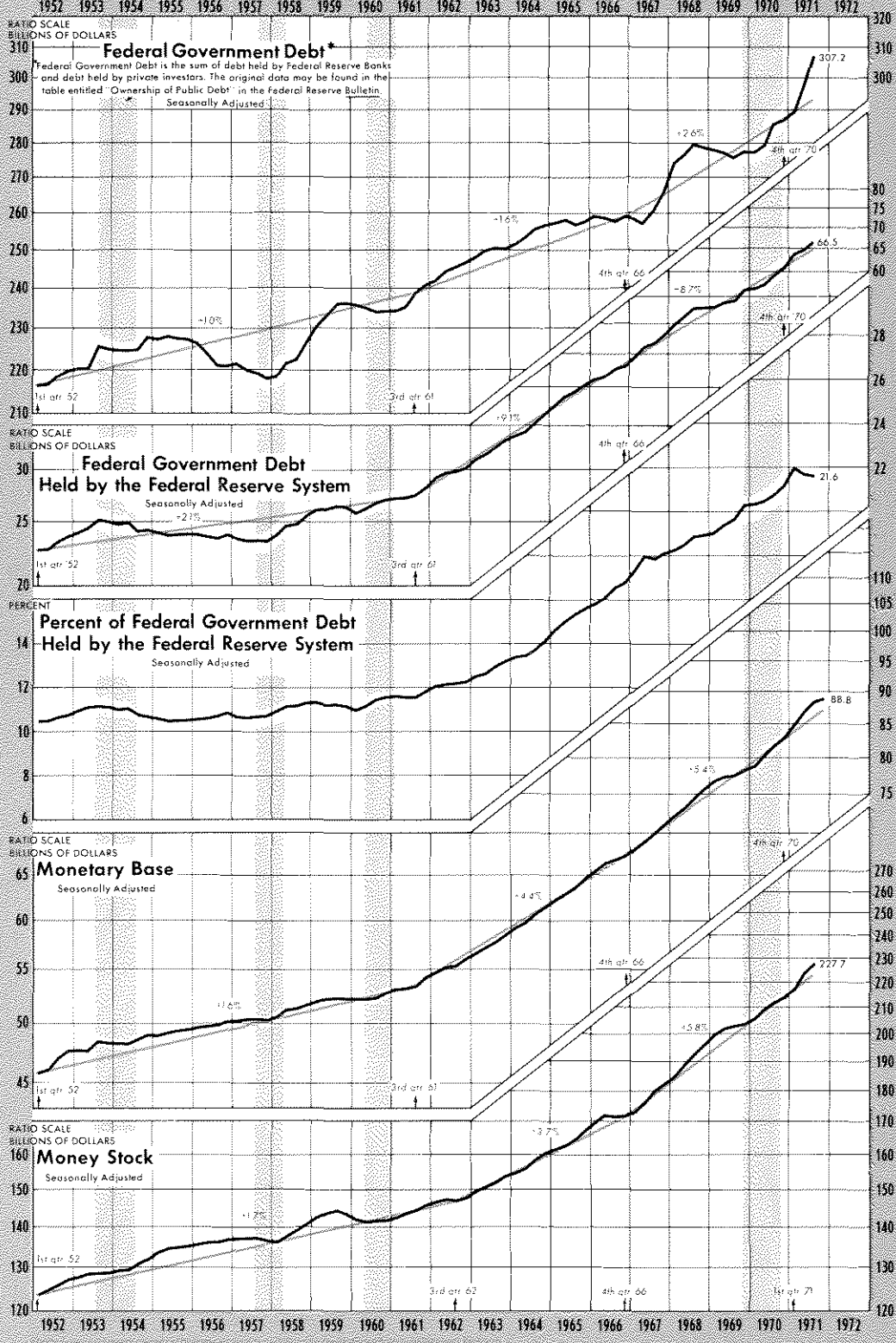


Chart II  
**Influence of Federal Government Debt on Monetary Expansion**



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>	<u>\$43,534</u>	<u>\$86,725</u>	<u>102.2%</u>	<u>95.7%</u>
<b>Reserve Adjustment Magnitude</b>	— 938	3,930	— 2.2	4.3
<b>Monetary Base</b>	<u>\$42,596</u>	<u>\$90,655</u>	<u>100.0%</u>	<u>100.0%</u>

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

<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.

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.

### *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.

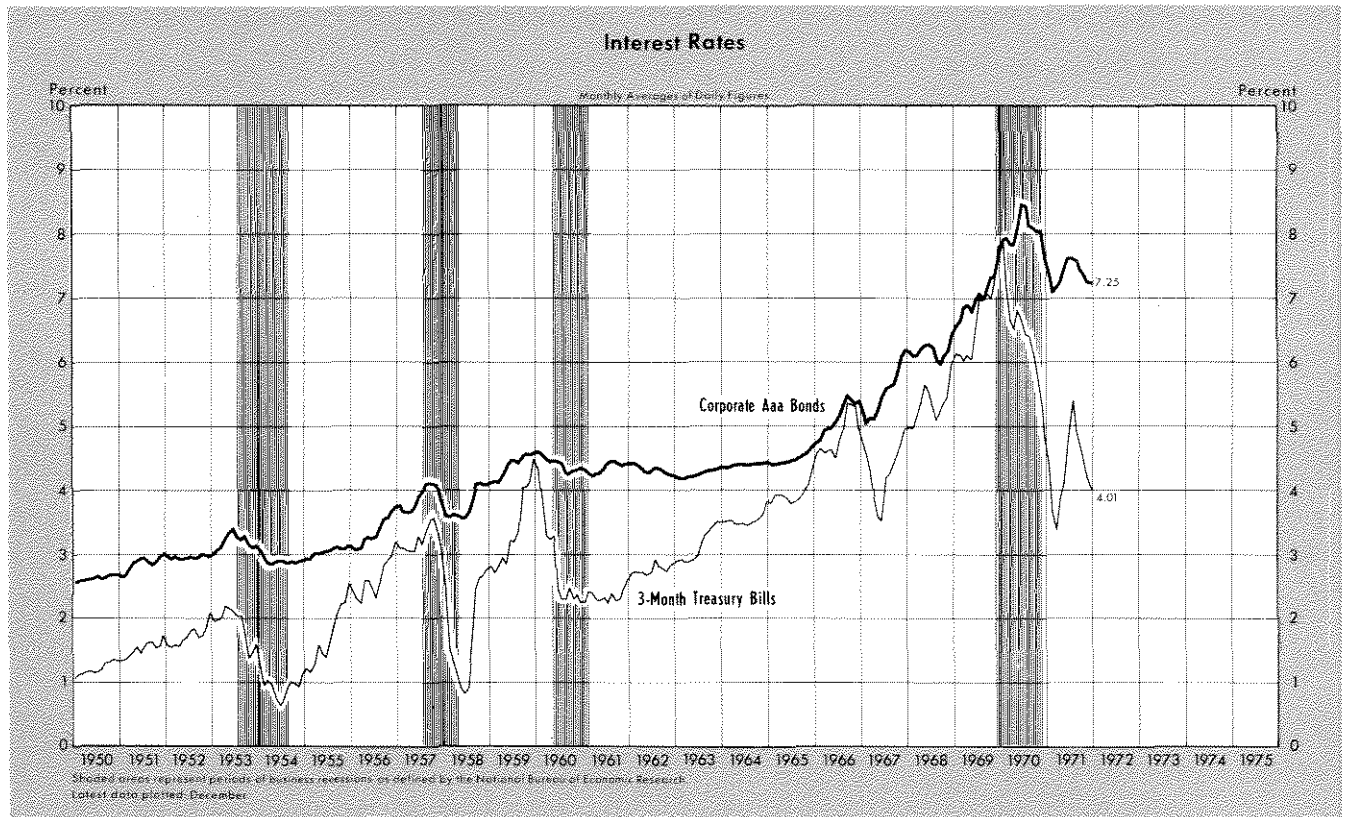
From the third quarter of 1961 to the fourth quarter of 1966, the Federal Reserve purchased \$15.9 billion of Government securities adding to its portfolio at a 9.1 percent average annual rate. The effect of debt acquisition on growth of the monetary base was partially offset by a \$4.3 billion decline 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.

