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CONTENTS

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The Monetary-Fiscal Mix Through Mid-1976

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DURING recessions Government deficits are regarded by some as desirable, and maybe even necessary, to foster economic recovery. The standard argument is, the more severe the recession, the larger the dose of fiscal stimulus that is required. The largest Government deficit in the postwar period — $44.2 billion — was recorded in fiscal 1975, and an even larger deficit is projected for fiscal 1976. Fiscal activists contend that such unusually large doses of fiscal stimulus are required given the unusual severity of the current recession.

Monetary policy also takes on a unique character in the current economic environment. This year, for the first time in history, the Federal Reserve System has made public its intentions for monetary growth a year in advance. To achieve its broad economic objectives, the Federal Open Market Committee (FOMC) has adopted a 5 to 7.5 percent target rate of growth for the narrowly defined money stock (M_1) for the period from the second quarter of 1975 to the second quarter of 1976.[1]

Thus, monetary and fiscal policies which are intended to foster a turnaround in economic activity have been put into effect or announced. But given past relationships between Government deficits and money supply growth, there is a question regarding the compatibility of these policies. In practice, monetary and fiscal policy actions do not evolve independently of each other. In the past, deficits have created pressures for increased money supply growth — the greater the deficit, the greater have been the pressures on the monetary authorities for monetary expansion.

Interest rates provide the link in the decision-making process between monetary and fiscal actions. Large Government deficits, which have to be financed in private credit markets, have a tendency to depress prices of Government securities, raise the yields on these securities, and raise interest rates in general. This upward pressure on interest rates can be resisted temporarily through Federal Reserve purchases of Government securities, which inject reserves into the banking system and expand both the money stock and the supply of credit. In other words, increases in deficits put upward pressure on interest rates which, when resisted by the Federal Reserve, become a source of monetary expansion.

The current situation does not seem to be an exception to this historical experience. In the first half of 1975, large sales of Treasury securities were more than offset by declining private demand for credit, and interest rates declined over this period. As economic recovery progresses, however, it is reasonable to expect that total credit demands will start to increase. Since June 1975 interest rates have begun to show signs of upward movement.

In testimony before the House Banking and Currency Committee on July 24, Arthur F. Burns, Chairman of the Board of Governors of the Federal Reserve System, announced the long-run money stock target adopted by the Federal Open Market Committee.[2] Congressman Henry Reuss expressed a strong preference for the maintenance of the current level of interest rates over the target period. Since attainment of the money stock target might imply higher interest rates in the short run than would otherwise be the case, these two views may be in conflict.

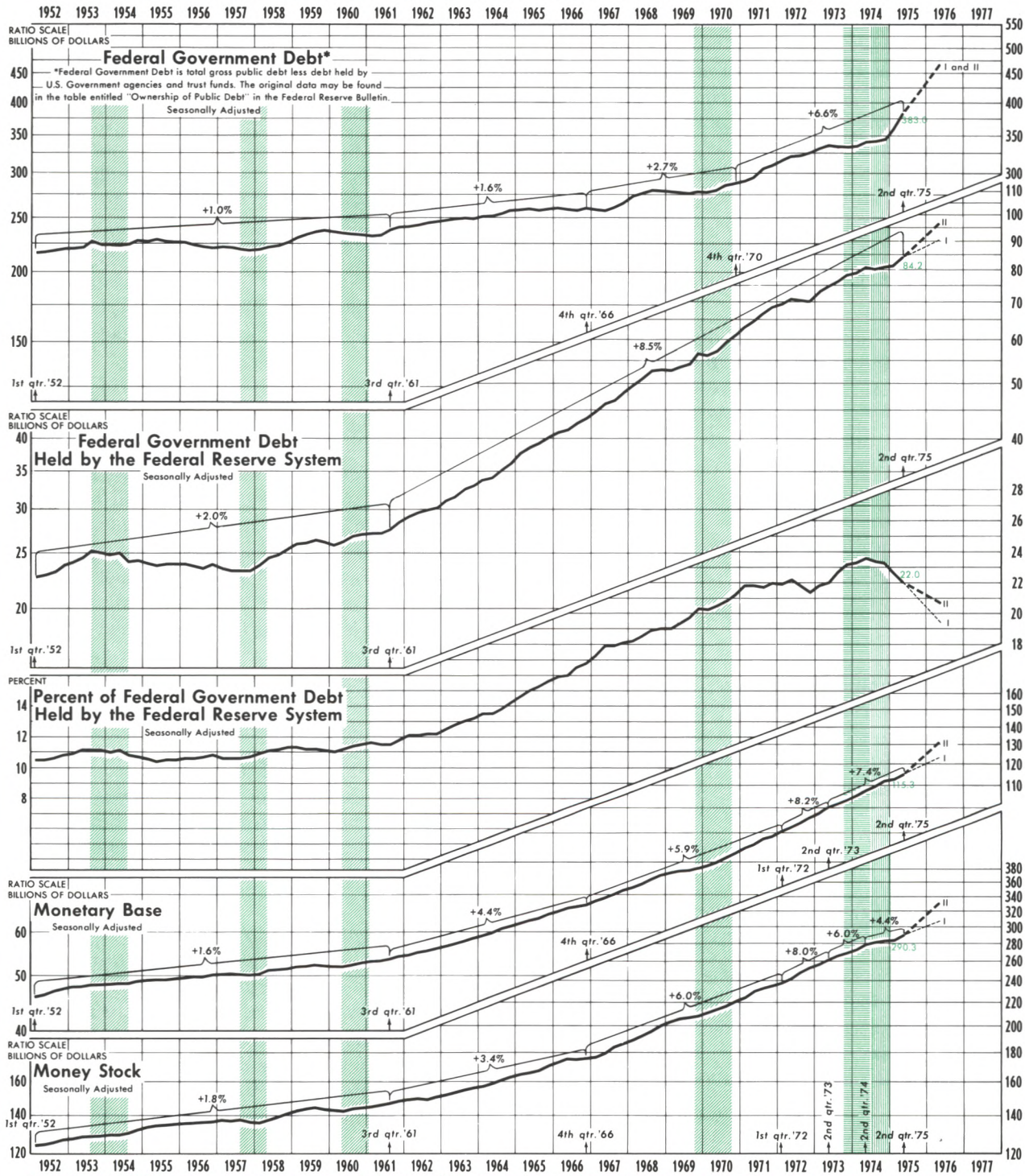
This article attempts to trace through the implications of large Government deficits by presenting two hypothetical scenarios. The first case is one in which the money stock is permitted to grow at the announced target of 5 to 7.5 percent from the second quarter of 1975 to the second quarter of 1976 and interest rates are permitted to seek their market-determined level. The second case depicts a situation where interest rate stabilization would be the target of the Federal Reserve. In this hypothetical example, it is assumed for illustrative purposes that purchasing twice the amount of Government debt as in Case I would attain the interest rate stabilization objective.

[1]The M1 target originally announced by Arthur Burns on May 1, 1975, before the Committee on Banking, Housing and Urban Affairs of the U. S. Senate was for a 5 to 7.5 percent growth for the period March 1975 to March 1976.

[2]Chairman Burns announced the following targets for the period from the second quarter of 1975 to the second quarter of 1976: M1, 5 to 7.5 percent; M2, 8.5 to 10.5 percent; M3, 10 to 12 percent; credit proxy, 6.5 to 9.5 percent.

Chart I

Influence of Federal Government Debt on Monetary Expansion



The shaded area in 1973-75 represents the current economic contraction. The first section (1973-74) represents the period of constraints on aggregate supply, while the portion since late 1974 was induced by restriction of aggregate demand. The remaining shaded areas represent periods of business recessions as defined by the National Bureau of Economic Research.

Latest data plotted: MB and MS-2nd quarter; Others-2nd quarter estimated by this Bank; dashed lines indicate forecasts estimated by this bank.

GOVERNMENT DEBT AND MONEY

Historical Relationships

As illustrated in Chart I, the amount of Government debt outstanding increased at a very slow 1 percent annual rate from the early 1950s to the early 1960s.[3] At the same time the amount of debt held by the Federal Reserve System increased at a 2 percent rate and, as can be seen in the bottom two tiers in Chart I, both the monetary base and the money stock increased at less than a 2 percent average annual rate.[4] From late 1961 to mid-1975, net Federal Government debt increased at a 3.5 percent annual rate. During this period, however, the Federal Reserve increased its holdings of debt at an 8.5 percent annual rate.

As the Federal Reserve was increasing its holdings of debt outstanding at an accelerated rate, growth of the monetary base and the money stock also increased. In the early 1960s, money and base grew at average annual rates of 3.4 and 4.4 percent, respectively. From the mid-1960s to the present, growth rates of money and base have averaged between 6 and 8 percent over extended periods. On balance, the monetary base and the money stock increased at rates of 5.7 and 5.1 percent, respectively, from late 1961 to mid-1975.

Case I

The FOMC established a 5 to 7.5 percent target rate of growth for the money stock for the period from the second quarter of 1975 to the second quarter of 1976. If the money stock increased at a 6.25 percent rate (mid-point of the range) during this period, the level of M_1 for the second quarter of 1976 would be $308.4 billion — an increase of $18.1 billion, as indicated by line I on the bottom tier of Chart I. The crucial question regarding attainment of this level of M_1 is what dollar volume of securities would have to be acquired by the Federal Reserve System?

In order to illustrate a procedure for making such a determination, the growth of money stock must be related to growth of the monetary base. Assuming that reserve requirements, deposit distribution among various classes of banks, and the public's preference for utilization of reserves remain unchanged, one can derive the growth of the monetary base which would correspond to the targeted money stock growth (see Appendix for a more detailed derivation). If 80 percent of this increase in the base results from purchases of Government securities by the System,[5] the change in the holdings of securities by the System associated with the 6.25 percent target money growth can be determined.

This procedure indicates that the monetary base would have to increase by about $8 billion in order for the money stock to increase $18.1 billion from the second quarter of 1975 to the second quarter of 1976. This would mean that the System's holdings of securities would increase by about $6.4 billion through the second quarter of 1976, about 7.5 percent of the estimated sales of net Government debt during this period.[6]

Case II

In this hypothetical example, the primary assumption is that in order to stabilize interest rates at prevailing levels, the Federal Reserve will have to purchase more of the increased Government debt than is necessary to attain the announced M_1 target growth. The exact amount of such purchases is not known with any degree of certainty; however, for illustrative purposes only, it is assumed that the System would have to purchase twice the amount of Government debt indicated in Case I, or 15 percent. The Federal Reserve currently owns about 22 percent of the Federal debt outstanding.

Purchasing 15 percent of the projected Government funding requirements for fiscal 1976 would result in a $13 billion increase in the Federal Reserve's holdings of Government securities. An increase of this magnitude implies a 14 percent increase in both the monetary base and the money stock.

If the monetary multiplier does not exceed its historical variations, these two Cases illustrate that maintenance of the announced targets of monetary growth and current levels of interest rates may not be compatible. If an attempt is made to maintain current levels of interest rates and private credit demands increase, then the money stock would have to rise at a more rapid rate than that targeted by the FOMC.

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[3]The outstanding Government debt referred to in this article is total gross public debt minus debt held by U. S. Government agencies and trust funds.

[4]The monetary base is defined as the net monetary liabilities of the Federal Reserve and Treasury. For further explanation, see both the Appendix to this article and Leonall C. Andersen and Jerry L. Jordan, "The Monetary Base – Explanation and Analytical Use," this *Review* (August 1968), pp. 7-11.

[5]Currently, the holdings of securities by the Federal Reserve System constitute approximately 80 percent of total monetary base.

[6]The debt figures for the second quarter of 1976 are estimated by this Bank using the revised budget figures released May 30, 1975 by the Office of Management and Budget.

There are, of course, analysts who believe that growth of money stock in the range of 14 percent for the period under consideration (one year) is of no consequence.[7] They argue that recovery would be stifled if interest rates were permitted to rise, and money stock growth could be reduced as the economy approaches its capacity. The subsequent section presents some evidence on the relationships between money growth and economic activity.

THE SHORT- AND LONG-RUN IMPACT OF MONEY GROWTH

History has shown that economic conditions are affected by movements in the money stock and, hence, by Federal Reserve purchases of Government securities. Since the above two Cases differ considerably in the rate of money growth and the amount of securities purchased by the Federal Reserve System, each Case would have different implications for output, prices, and, as already discussed, interest rates.

Chart II depicts historical relationships between changes in the money stock and changes in output, prices, and unemployment. The first tier of this Chart depicts the short-run fluctuations and long-run (trend) growth in the money stock. Since about 1961, the trend growth of the money stock has been rising. Historically, the trend growth rate of the money stock has been associated with a similar rate of change in the price level (Chart II, second tier).

Short-run fluctuations in growth of the money stock have been associated with temporary corresponding changes in the rate of real output growth. The first four shaded areas on Chart II are periods of business recessions as defined by the National Bureau of Economic Research. Prior to each of the recessions, the rate of growth of the money stock declined relative to its trend.

The Implications for Prices and Output

Case I assumes an average rate of growth of the money stock of about 6.25 percent through the second quarter of 1976. Such a rate of money growth would continue the trend growth that has prevailed since late 1971. On the basis of historical relationships, this money stock growth would result in about a 6 percent rate of increase in prices. Since this rate of money growth represents a marked increase from the rate which prevailed in late 1974 and early 1975, historical relationships also imply a short-run stimulus to real output.

Case II is associated with a much more rapid rate of money stock growth. The relationships presented in Chart II indicate that rapid monetary growth probably would provide a strong stimulus to expansion of real output *in the short run.* To the extent that this very rapid growth in the money stock were maintained long enough to increase the trend growth of money, however, the rate of inflation would also gradually increase. If, in an attempt to prevent the re-emergence of inflationary pressures at a later time, the sharp increase in the rate of growth of the money stock were followed by a correspondingly sharp contraction in money growth, historical evidence indicates that a sharp decline could occur in the growth of real output and employment.

Implications for Interest Rates

It is generally accepted that the supply of and demand for funds determine the level of interest rates. In each Case the increase in the supply of securities (demand for credit) by the Treasury is assumed to be the same.[8] The implications for interest rates in each Case depends, therefore, on the relative amount of Government securities taken by the Federal Reserve, and the differential influence of each Case on the growth of output and expectations regarding the rate of inflation. These latter two influences affect growth of private credit demand.

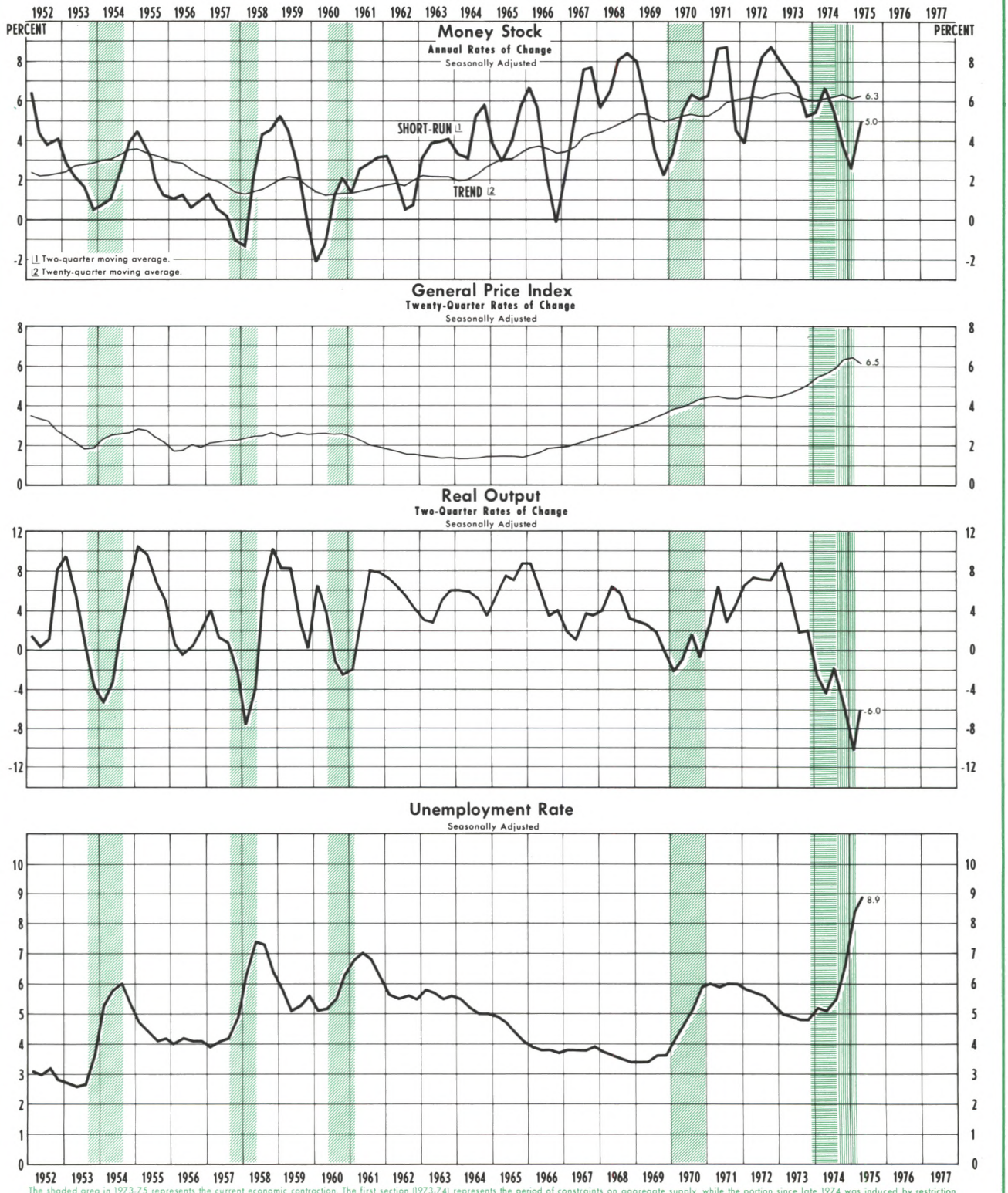
Case I, it may be recalled, implied that the System would purchase about $6.4 billion of the increase in debt outstanding through the second quarter of 1976. In Case II it was assumed that the System would purchase a much larger amount of securities than in Case I. For this reason, upward pressure on interest rates would not be expected to be *initially* as strong for Case II as for Case I. The larger the volume of Government debt demanded by the Federal Reserve System, the higher the price, and the lower that interest rates would be in the short run. On the other hand, Case II indicates faster growth of output in the short run and re-emergence of more rapid inflation and inflationary expectations. These increases in expectations of inflation would tend to suggest sharply higher market interest rates in the long run than would occur in Case I.

[7]For example, see Franco Modigliani and Lucas Papademos, "Targets for Monetary Policy in the Coming Year," *Brookings Papers on Economic Activity* (1, 1975), pp. 141-163.

[8]This assumption is made only for the sake of simplicity. It is recognized that Government deficits are affected by the rate of money supply growth in such a way that the supply of Government debt obligations would be somewhat less in Case II than in Case I.

Chart II

Trends and Fluctuations of Money, Prices, Output, and Unemployment



The shaded area in 1973-75 represents the current economic contraction. The first section (1973-74) represents the period of constraints on aggregate supply, while the portion since late 1974 was induced by restriction of aggregate demand. The remaining shaded areas represent periods of business recessions as defined by the National Bureau of Economic Research.

Latest data plotted: 2nd quarter preliminary

CONCLUSIONS

This article relates the projected huge increase in the amount of debt outstanding to two sets of increases in purchases of Government securities by the Federal Reserve System. Case I assumed that the System purchased an amount of Government securities which was based on the attainment of the money stock growth rate target of the FOMC announced in July. Case II was based on hypothetical estimates of Federal Reserve purchases of Government debt which might be necessary to resist short-run rises in interest rates.

The monetary growth target established by the Federal Open Market Committee may imply somewhat higher interest rates temporarily and somewhat slower recovery from the current recession than the interest rate levels and recovery growth advocated by some economists and some policymakers. If total credit demands increase with improved economic activity, interest rates will be subjected to upward pressure. An attempt to maintain market rates at current levels could produce an undesirable choice of alternatives: either the acceptance of a high rate of inflation or the re-occurrence of recession when money growth is sharply curtailed to check inflation.

APPENDIX

This Appendix illustrates the derivation of the amount of securities which the Federal Reserve would purchase in order to produce the announced target rate of growth of the money stock. The step-by-step procedure described here is an explanation of the figures used in Case I of the accompanying article.

The monetary base is derived from the consolidated balance sheets of the Federal Reserve and Treasury. The monetary base is defined as the monetary assets of the private sector; therefore, the account is rearranged so that only the liabilities of the Treasury and the Federal Reserve System, which are held by the private sector, are shown on the liabilities side of the balance sheet. An increase in the monetary base increases the money supply through a multiplier effect. A given amount of monetary base generally supports about 2.5 times this amount in money stock.

Table I

Monetary Base — Case I
II/75 — II/76
(Billions of Dollars)

1) ΔFloat	$ 0	6) ΔCurrency	$5.6
2) ΔBorrowings	1.0	7) ΔRR on Demand Deposits	1.2
3) ΔTreasury Deposits at Fed	0	8) ΔRR on Net Time Deposits	.8
4) ΔSecurities	6.4	9) ΔRR on CDs	.3
5) ΔAll Other	.6	10) ΔVault Cash of Non-Member Banks	.1
ΔMonetary Base	$8.0	ΔMonetary Base	$8.0

Money stock is defined as the sum of currency and demand deposits in the hands of the public. The target rate of money growth of 5 to 7.5 percent for the period from the second quarter of 1975 to the second quarter of 1976 implies an increase of $18.1 billion in the money stock. Currency was assumed to grow about as rapidly as personal income, or about 8 percent during this period — a $5.6 billion increase. Every dollar increase in currency requires a dollar increase in monetary base, therefore Item 6 in the accompanying Table is derived. The remaining portion of the money stock is comprised of demand deposits. By multiplying the estimated portion of member bank demand deposits by the average reserve requirement ratio on demand deposits, Item 7 is found.

Using the other announced aggregate targets,[1] the increase in net time deposits can be derived. Multiplying this amount by the reserve requirement on these deposits, Item 8 is estimated. An increase in credit demand would imply an increase in CDs over this period. Again the change would be multiplied by the reserve requirement on these deposits. Historical extrapolation indicates an approximate increase in nonmember bank vault cash that would be expected over this period (Item 10). These items are then totaled to derive the change in the "required" reserves and currency over the period — $8 billion.

Recently, holdings of securities by the Federal Reserve System account for 80 percent of the monetary base. For this reason, 80 percent of the increase in monetary base is assumed to be in the form of System holdings of securities (Item 4). Because float and Treasury deposits at the Federal Reserve are highly volatile and have no trend over time, these items are assumed to be unchanged, on balance, over the period (Items 1 and 3).

The level of member bank borrowings from Federal Reserve Banks recently has been very low. If credit demands increase, member banks borrowings would also increase, possibly to the level that existed last year, excluding the borrowing of one large New York bank (Item 2). The "all other" item comprises the remainder of the increase in the monetary base.

[1] In testimony before the House of Representatives, Committee on Banking and Currency, on July 24, 1975, Chairman Burns announced the following targets for the second quarter of 1975 to the second quarter of 1976 period: M1, 5 to 7.5 percent; M2, 8.5 to 10.5 percent; M3, 10 to 12 percent; credit proxy, 6.5 to 9.5 percent.

Observed Income Velocity of Money: A Misunderstood Issue in Monetary Policy

LEONALL C. ANDERSEN

IN recent years there has been considerable debate in the literature on economic stabilization and in policy discussions regarding the ability of monetary authorities to achieve a desired growth of nominal income by controlling the growth of the money stock. This debate concerns the predictability of the response of the growth of income to a change in the growth of money. A frequently cited piece of evidence in support of the view that this response is not very predictable has been observed movements in the income velocity of money — nominal income divided by the money stock.

This use of income velocity is based on a common postulate in monetary theory that holders of money balances desire, at a given point in time, a certain ratio of money to income and equilibrium income velocity is the inverse of this desired ratio. As such, velocity changes are postulated to depend on those economic and other factors influencing desired money balances. A common practice is to use observed velocity as a proxy for the demand for money. A change in observed velocity is interpreted as an opposite change in desired money balances relative to income.

Many analysts make monetary policy recommendations to achieve desired growth in income in terms of a planned growth of money relative to predicted movements in velocity. In simple form, a percent change in nominal income ($\%\Delta Y_t$) is defined as the percent change in the nominal money stock ($\%\Delta M_t$) plus the percent change in velocity ($\%\Delta V_t$).

$$\%\Delta Y_t = \%\Delta M_t + \%\Delta V_t.$$

According to this identity, there is a predictable response of income to a change in money if the percent change in velocity is constant, or if the percent change in velocity is variable, but predictable.

Based on observed movements in velocity, economists have reached vastly different conclusions regarding the predictability of the response of income to a change in the money stock. For example, Milton Friedman and Anna Schwartz, in their study of the monetary history of the United States from 1867 to 1960, concluded that[1]

> The velocity of money, which reflects the money-holding propensities of the community, offers another example of the stability of basic monetary relations.

They also concluded that

> Changes in the behavior of the money stock have been closely associated with changes in economic activity, money income, and prices.[2]

Other analysts have argued that the income velocity of money is so variable and unpredictable that changes in the money stock are not useful as an indicator of the thrust of monetary policy actions. Still others have emphasized the observed procyclical behavior of velocity and have argued that both the changes in the stock of money and its velocity must be watched. In reviewing the observed movements of velocity following the recession of 1969-70, Arthur Burns pointed out that they first appeared to have offset and then to have reinforced the influence of money on income. He concluded that

> Occurrences such as this are very common because the willingness to use the existing stock of money, expressed in its rate of turnover, is a highly dynamic force in economic life.[3]

He further concluded that

> In short, what growth rate of the money supply is appropriate at any given time cannot be determined simply by extrapolating past trends or by some preconceived arithmetical standard.[4]

The purpose of this article is to identify the major factors which influenced observed movements in velocity in the United States during the period from 1955 to 1973. Identification of these factors and the nature of their influence on observed movements in velocity, provides a partial basis for evaluating the evidence offered by some analysts that the response of income to a change in the money stock is not predictable.

First, observed movements in velocity in the period 1955 to 1973 are briefly discussed. Second, a model of

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[1] Milton Friedman and Anna Jacobson Schwartz, *A Monetary History of the United States, 1867-1960* (Princeton, New Jersey: Princeton University Press), 1963, p. 679.

[2] *Ibid.*, p. 676.

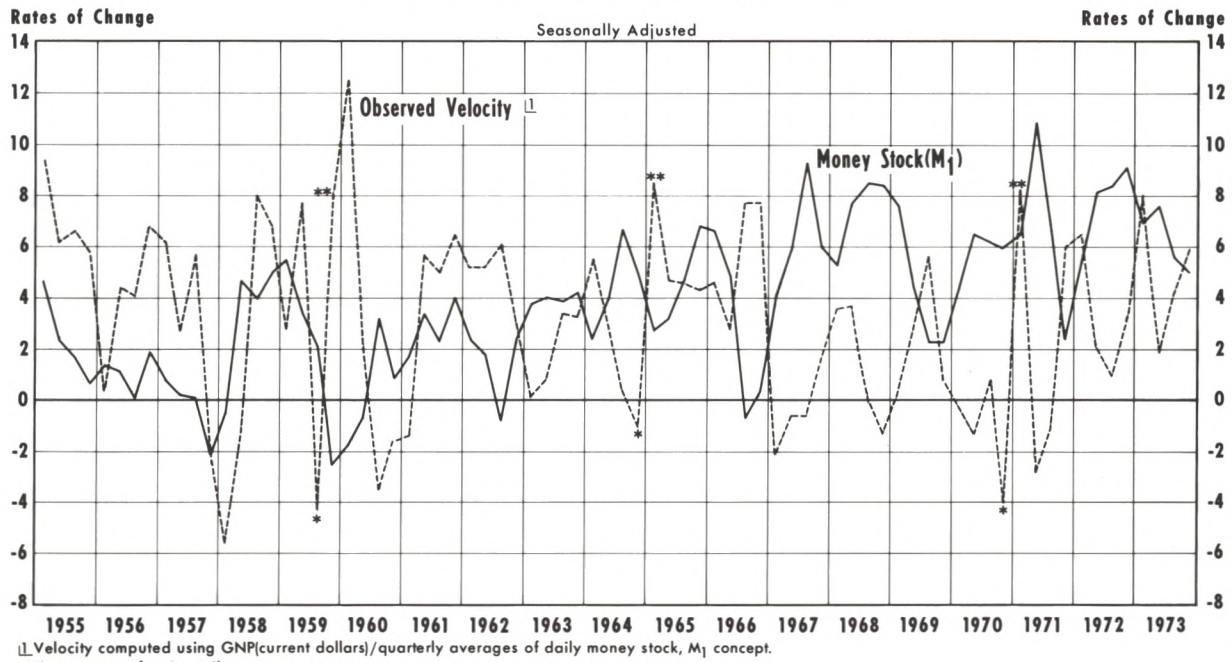
[3] Arthur F. Burns, "Letter on Monetary Policy," this *Review* (November 1973), p. 17.

[4] *Ibid.*, p. 18. His view is further elaborated in prepared testimony presented before the Senate Banking Committee, May 1, 1975.

Chart I

Changes in Observed Income Velocity and Money

Quarter-to-Quarter Compound Annual Rates of Change



[1] Velocity computed using GNP(current dollars)/quarterly averages of daily money stock, M_1 concept.
*First quarter of major strike.
**First quarter following major strike.

nominal income determination, which is used to identify the various influences on observed velocity, is summarized. Third, implications of the model for observed movements in velocity are given. The model is then used to explain various observed movements in velocity in the period under examination.

The results of this study lead to the conclusion that observed movements in velocity, taken alone, provide little useful evidence in the debate regarding the predictability of the response of income to a change in money. Another conclusion is that misunderstanding of the factors causing changes in observed velocity, and the inability to observe changes in desired money balances, could result in monetary policy actions which are unintentionally procyclical. In other words, the lack of reliable information regarding the utilization of money balances suggests that the growth in the stock of money should not be sharply expanded or contracted as a result of observations or expectations regarding short-run fluctuations in the income velocity of money.

OBSERVED MOVEMENTS IN VELOCITY

There are three general kinds of observed movements in velocity which have been cited as evidence that the response of income to a change in the money stock is not very predictable.[5] These are (1) quarter-to-quarter movements, (2) movements lasting a few quarters which appear to offset or reinforce the influence of a change in money on income, and (3) the trend growth of velocity.

The most frequently employed measure of velocity uses nominal GNP as the measure of nominal income and defines money as currency and demand deposits held by the nonbank public (M_1). Illustrations of observed movements in this measure of velocity are taken from the period 1955 to 1973.

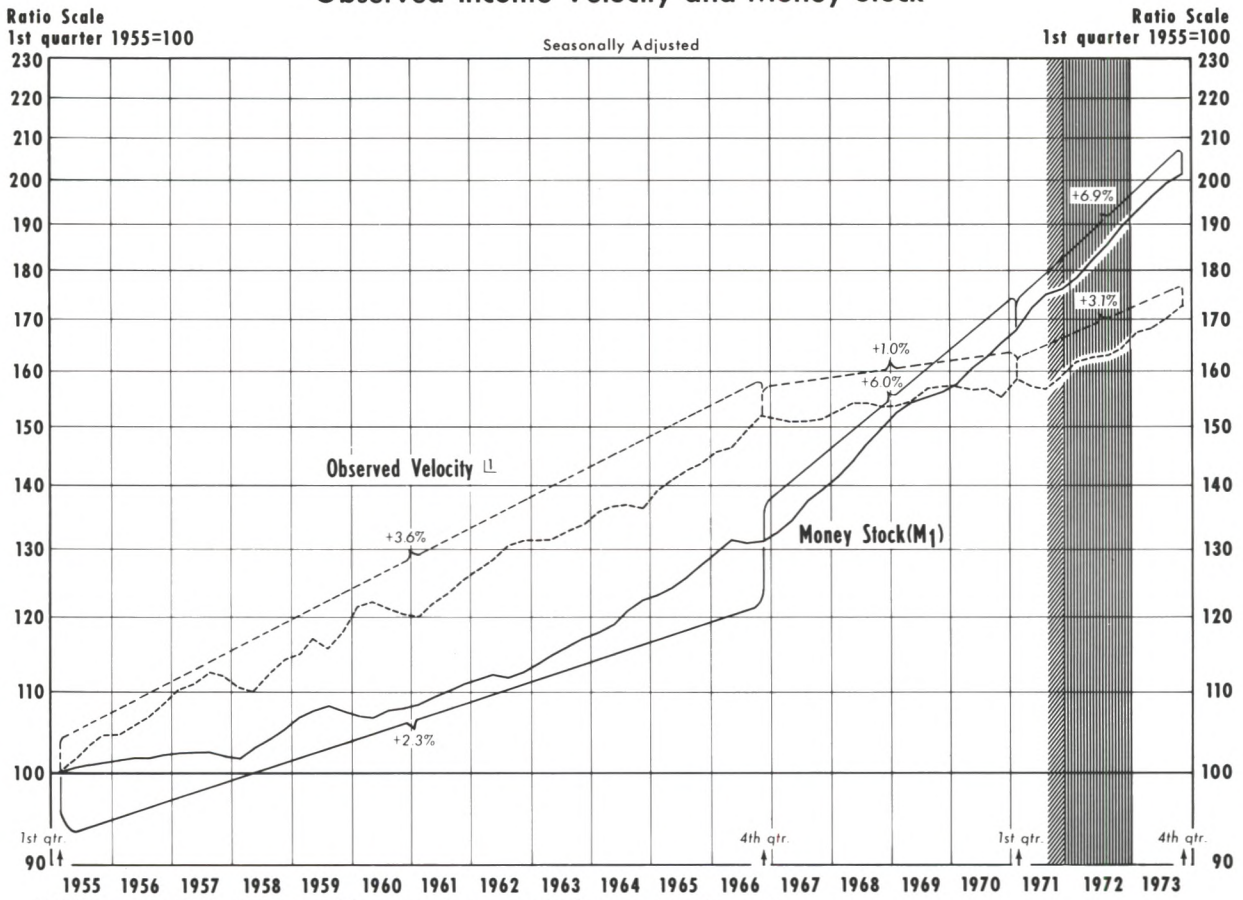
Quarterly Movements

On a quarterly basis, observed movements in velocity have been very volatile. For example, from 1955 to 1973 quarterly changes in observed velocity, omiting quarters influenced by a major strike, varied be-

[5] For a discussion of these movements in velocity and their implications for monetary policy, see George Garvy and Martin R. Blyn, *The Velocity of Money* (New York: Federal Reserve Bank of New York, 1969), pp. 78-94. Also, see Sherman J. Maisel, *Managing the Dollar* (New York: W. W. Norton & Company, Inc., 1973), pp. 273-276. For a more recent view, see R.E.D. Chase, "Velocity: Can It Be Ignored as a Monetary Variable," *The Money Manager* (June 30, 1975).

Chart II

Observed Income Velocity and Money Stock



[1] Velocity computed using GNP(current dollars)/quarterly averages of daily money stock, M_1 concept.
Shaded area represents the first two phases of the wage-price control period.

tween +12.5 and —5.6 percent, at annual rates (Chart I). Over this span of years the average of these changes in velocity, without regard to sign, was 3.9 percent.

Offsetting and Reinforcing Movements

Frequently, changes in the growth of observed velocity have been in the opposite direction of changes in money growth for a few quarters. At other times, changes in the growth of observed velocity have been in the same direction as changes in money growth. The first case gives the appearance of offsetting the influence of the change in money on income; the second case gives the appearance of reinforcing this influence.

Arthur Burns cited the recovery experience from the recession of 1969-1970 as a case in point:

For example, the narrowly-defined money stock — that is, demand deposits plus currency in public circulation — grew by 5.7 percent between the fourth quarter of 1969 and the fourth quarter of 1970. But the turnover of money declined during that year, and the dollar value of GNP rose only 4.5 percent. In the following year, the growth rate of the money supply increased to 6.9 percent, but the turnover of money picked up briskly and the dollar value of GNP accelerated to 9.3 percent. The movement out of recession in 1970 into recovery in 1971 was thus closely related to the greater intensity in the use of money.[6]

Trend Movements

Observed velocity also exhibits trend movements lasting over a period of many years. Abrupt changes in the trend growth of observed velocity, however,

[6]Burns, p. 17.

have occurred. For example, observed velocity grew at a 3.6 percent average annual rate from I/1955 to IV/1966, at a one percent annual rate to I/1971, and then at a 3.1 percent rate to IV/1973 (Chart II).[7]

NOMINAL INCOME DETERMINATION AND VELOCITY

A monetary model of nominal income determination provides a basis for identifying the factors influencing observed movements in income velocity. The theoretical model is first summarized and then its empirical form is presented. The model of nominal income determination was developed in detail elsewhere.[8] Empirical tests did not reject the theoretical model as an explanation of nominal income determination in the period I/1955 to IV/1973.

Summary of Theoretical Model

The model postulates that the *change* in the rate of change in spending by households and business firms for newly produced final goods and services from both domestic and foreign sources responds over time to the discrepancy between the rates of change in actual and desired money balances. Also, the rate of change in desired money balances is postulated to be positively related to the rate of change in perceived nominal income, and negatively related to the rates of change in the technical efficiency of the payments system (defined as the average amount of money balances technically required to conduct a given volume of nominal money payments) and in the short-term nominal interest rate.

Combining these postulates, the *change* in the rate of change in spending by households and business firms is positively related to the rates of change in money balances, in the technical efficiency of the payments system, and in the nominal short-term interest rate; it is negatively related to the rate of change in perceived income. The rate of change in nominal income is equal to the weighted sum of the rates of change in spending by households and business firms, in spending by all units of government for product, and in foreign spending for domestic product.

Velocity is introduced into the model by an identity. The rate of change in observed velocity is equal to the rate of change in nominal income minus the

Exhibit I

EMPIRICAL FORM OF THE MODEL

(1) $\Delta 1n\ Y^d_t - \Delta 1n\ Y^d_{t-1} = b_0 + b_1\ \Delta 1n\ M_t + b_2 \sum_{i=1}^{4} w_i\ \Delta 1n\ Y_{t-i} + b_3\ \Delta 1n\ r_t + b_4\ D_1 + b_5\ D_2 + \varepsilon_t$

(2) $\Delta 1n\ Y_t = W(t)\ \Delta 1n\ Y^d_t + [1 - W(t)]\ \Delta 1n\ Z_t$

(3) $W_t = (1-\delta)\frac{Y^d_{t-1}}{Y_{t-1}}$, in which δ is the average ratio of imports to $Y^d + Z$ in sample period.

(4) $\Delta 1n\ V_t = \Delta 1n\ Y_t - \Delta 1n\ M_t$

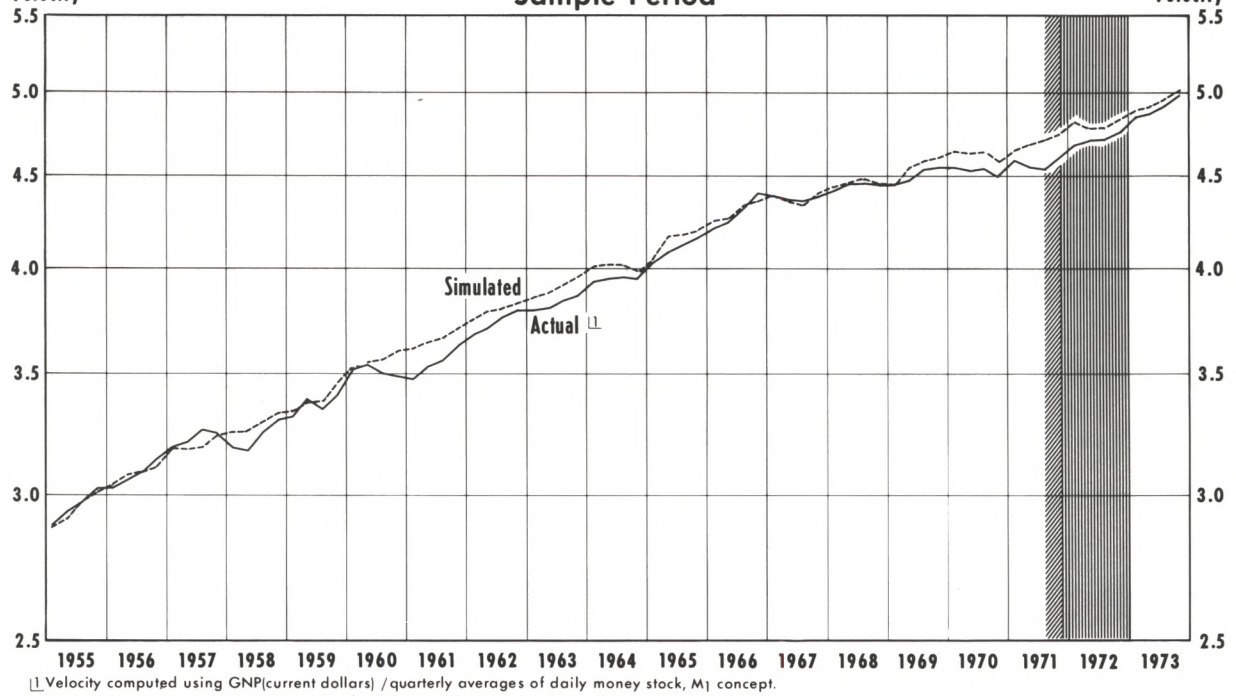
$\Delta 1n\ Y^d_t - \Delta Y^d_{t-1}$	= change in the rate of change in spending by households and business firms for product (measured by consumption plus investment).
b_0	= response of spending by households and business firms to average rate of change in technical efficiency of the payments system.
$\Delta 1n\ M_t$	rate of change in nominal money balances (measured by demand deposits and currency held by the nonbank public).
$\sum_{i=1}^{4} w_i\ \Delta 1n\ Y_{t-i}$	= weighted sum of past rates of change in nominal income (measured by nominal GNP). The weights sum to unity.
$\Delta 1n\ r_t$	= rate of change in nominal short-term interest rate (measured by the 4-6 months commercial paper rate).
$\Delta 1n\ Y_t$	= rate of change in nominal income (measured by nominal GNP).
D_1	= zero-one dummy variable for major strikes. One in 1959-II, 1964-IV and 1970-IV.
D_2	= zero-one dummy variable. One in quarter following a major strike.
ε_t	= a random error term.
$\Delta 1n\ Z_t$	= rate of change in government spending plus foreign spending on domestic product (measured by National Income accounts for total government purchases of goods and services plus exports).
$\Delta 1n\ V_t$	= rate of change in observed income velocity (measured by nominal GNP divided by nominal money balances).

[7]For a discussion regarding their inability to explain by conventional monetary theory the IV/1966 break in the trend of observed velocity, see Phillip Cagan and Anna J. Schwartz, "Has Growth of Money Substitutes Hindered Monetary Policy?", *Journal of Money, Credit, and Banking* (May 1975), pp. 142-143.

[8]Leonall C. Andersen, "A Monetary Model of Nominal Income Determination," this *Review* (June 1975), pp. 9-19. For a study of income velocity using a Keynesian type model, see John M. Mason, "A Structural Study of Income Velocity of Circulation," *Journal of Finance* (September 1974), pp. 1077-86. Mason's study yields results similar to many of those in this article.

Chart III

Model Simulation of Observed Income Velocity
Sample Period



[1] Velocity computed using GNP(current dollars) /quarterly averages of daily money stock, M_1 concept.
Shaded area represents the first two phases of the wage-price control period.

Table I

Regression Results
Equation (1), Exhibit I

Independent Variable	Estimated Coefficient*
D_1	−1.930 (−3.744)
D_2	2.380 (4.326)
$\Delta \ln M_t$	.701 (4.527)
$\Delta \ln r_t$	.020 (2.183)
$\Delta \ln Y_{t-1}$	− .782 (−5.242)
$\Delta \ln Y_{t-2}$	− .274 (−2.164)
$\Delta \ln Y_{t-3}$	.226 (1.846)
$\Delta \ln Y_{t-4}$	− .309 (−2.739)
Constant	1.152 (3.785)
R^2	.580
SEE	.864
DW	2.036

*Numbers within parentheses are "t" coefficients.

rate of change in nominal money balances. Observed income velocity is thus a residual.

Empirical Model

The parameters of the relationship which combines the two postulates regarding behavior of households and business firms are estimated by ordinary least-squares, using quarterly data for the period I/1955 to IV/1973.[9] It is assumed that the technical efficiency of the payments system increases, on average, at a constant rate. The rate of change in perceived income is treated as a weighted sum of past rates of change in nominal income. The equations of the empirical model are presented in Exhibit I, and the estimated coefficients of equation (1) are listed in Table I.

Dynamic simulations of the model indicate the degree to which it tracks observed velocity in the sample period (Chart III). The root mean squared error of the quarterly levels of simulated velocity is 1.57 percent.

[9] See Andersen, "A Monetary Model of Nominal Income Determination," pp. 13-16, for specific details of development of the empirical form of the model. Rates of change are approximated by first differences of natural logarithms of the variables.

Table II

Elasticities of Response of Rate of Change in Observed Velocity (Partial Equilibrium)

Change In The Rate Of Change In	Impact Elasticity of Response[1]	Equilibrium Elasticity of Response[2]
Money	—.38	—.38
Government Spending Plus Exports	.33	-0-
Short-term Interest Rate	.07	.07

[1]Change in contemporaneous quarter rate of change in observed velocity divided by change in contemporaneous quarter rate of change in exogenous variable.

[2]Change in equilibrium rate of change in observed velocity divided by the maintained change in the rate of change in each exogenous variable.

IMPLICATIONS OF MODEL FOR OBSERVED MOVEMENTS IN VELOCITY

The implications of the model for observed movements in velocity are ascertained by dynamic simulations. In these simulations, the partial equilibrium response of the rate of change in income to changes in the various exogenous variables is determined first.[10] Then, the velocity identity is used to determine the partial equilibrium response of the rate of change in observed velocity. Of special interest are the impact and equilibrium elasticities of response, the time path, and the length of time to achieve equilibrium.

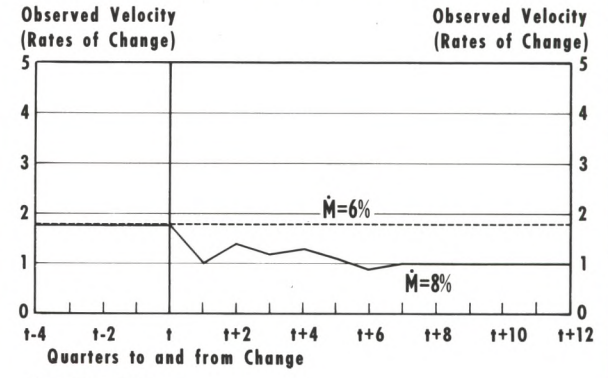
Four simulation exercises are conducted. First, the rate of change in observed velocity resulting *only* from the average rate of change in the technical efficiency of the payments system in the sample period is simulated. The other three simulations measure the partial equilibrium response of the rate of change in observed velocity to maintained changes in the rate of change in money, in government expenditures plus exports, and in the short-term rate of interest. The magnitudes of changes in these three variables are drawn from the sample period. The elasticities of response are reported in Table II, and the time paths to equilibrium are shown in Charts IV-VI.

The simulation results are subject to two qualifications. No feed-back influences on the rate of change in velocity through induced interest rate changes are considered. Therefore, the following simulation results are only for the direct (partial equilibrium) responses of the rates of change in nominal income and observed velocity to changes in the three exogenous variables.

[10]Since the model does not include an explanation of interest rate determination, it is a partial equilibrium model.

Chart IV

Response of Velocity Growth to Different Rates of Money Growth*



*Partial equilibrium.

After the simulation results are presented, a qualitative assessment is made regarding the impact of possible feed-back influences. A second qualification is that the simulation results are only applicable to the experience within the sample period I/1955 to IV/1973.

Direct Response to Average Change in Efficiency of Payments System

The rate of change in observed velocity resulting from only the average rate of change in the efficiency of the payments system in the sample period is measured by simulating the model with the rates of changes in the three exogenous variables set at zero. This simulation indicates that nominal income, and therefore, observed velocity, would have grown at a 4.1 percent annual rate if there were zero rates of change in money, in government spending plus exports, and in the short-term interest rate.

Direct Response to Change in Money Growth

Two simulations of the direct response of the rate of change in observed velocity to a maintained change in the rate of change in money are performed, with the rates of change in the other two exogenous variables set at zero. The first one simulates the equilibrium rate of change with a 6 percent annual rate of change in money. The second one increases the rate of change in money from a 6 percent rate to an 8 percent rate. The simulation results are presented in Chart IV.

These simulations indicate that the equilibrium rate of change of observed velocity decreases when there is a *maintained* increase in the rate of change of money.

The equilibrium elasticity of response is —0.38 (Table II). This result comes from the fact that the estimated elasticity of desired money balances with respect to perceived income is greater than unity.[11] In equilibrium, with zero rates of change in the other exogenous variables, the annual rate of change in nominal income is equal to 4.1 percent plus the annual rate of change in money multiplied by the reciprocal of the elasticity of desired money balances with respect to perceived income. Since this elasticity is greater than unity, an increase in the rate of change in money produces a less than proportional change in the rate of change in income. Since the rate of change in observed velocity is defined as the difference between the rates of change in income and in money, the rate of change in observed velocity, therefore, decreases.

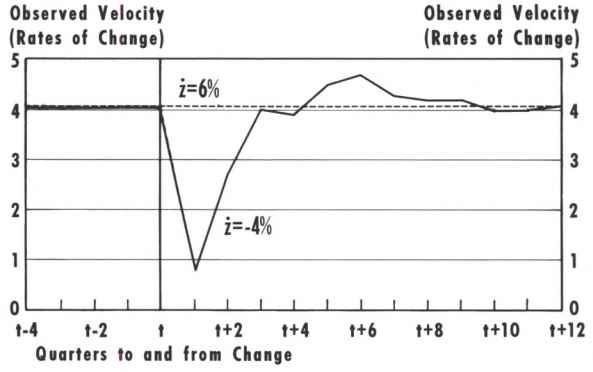
Direct Response to Change in the Rate of Change of Government Spending Plus Exports

The equilibrium rate of change in observed velocity for a maintained 6 percent annual rate of increase in government spending plus exports, with changes in the other two exogenous variables set at zero, is reported in Chart V. The Chart also shows the results when the rate of change in government spending plus exports is reduced from a 6 percent rate of increase to a 4 percent rate of *decrease*.

These simulations indicate that a change in the rate of change in government spending plus exports exerts a significant short-run impact on the rate of change in observed velocity, but has no long-run effect (Table II). This follows from the dynamic property of the model in which an increase in the rate of change in government spending plus exports initially increases the rate of change in income and, hence, in observed velocity. But, subsequently, the rate of change in desired money balances increases, producing a decrease in the rate of change in spending by households and business firms. In equilibrium, the rate of change in spending by households and business firms has been reduced to the extent that the initial increase in the rate of change in nominal income has been completely offset.[12] Since there is no effect on the equilibrium rate of change in income, there is also no effect on observed velocity.

Chart V

Response of Velocity Growth to Different Rates of Change in Government Spending Plus Exports*



*Partial equilibrium.

Direct Response to a Change in the Rate of Change in Interest Rate

The equilibrium rate of change in observed velocity for a 3 percent annual rate of increase in the interest rate, with changes in the other two exogenous variables set at zero, is reported in Chart VI. The Chart also shows the results when the rate of change in the interest rate changes from the previous 3 percent annual rate of increase to a 9 percent annual rate of *decrease*.

These simulations indicate that the rate of change in observed velocity is little influenced by a maintained change in the rate of change in the interest rate, unless such changes are exceedingly large. The equilibrium elasticity of response of observed velocity to a change in the rate of change in the interest rate is very small (Table II). This results from an exceedingly small (.028) estimated elasticity of desired money balances with respect to the interest rate.

Assessment of Feedback Responses

The simulations in Charts IV and V are for the direct (partial equilibrium) response of the rate of change in observed velocity to changes in the rate of change in money and in government spending plus exports. The total response for each simulation would also include the indirect response to induced changes

[11] *Ibid.*, p. 19. The estimated elasticity is 1.6. In equilibrium,

$$\Delta \ln Y_t = 4.1 + \frac{1}{\alpha} \Delta \ln M_t$$

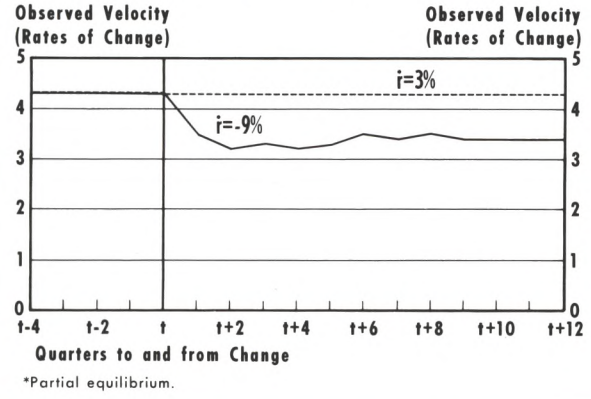
$$\Delta \ln V_t = 4.1 + \left(\frac{1}{\alpha} - 1\right) \Delta \ln M_t$$

The symbol "α" is the elasticity of desired money balances with regard to perceived income. If $\alpha = 1$, the usual assumption in monetary theory, there is no equilibrium response of the growth of observed velocity to a change in the growth of money, other factors held constant. If $\alpha < 1$, there is a positive response, and if $\alpha > 1$, there is a negative response.

[12] *Ibid.*, p. 13.

Chart VI

Response of Velocity Growth to Different Rates of Change in the Short-Term Interest Rate*



*Partial equilibrium.

in the rate of change in the short-term interest rate, or in the other variables previously treated as exogenous. Though the model does not provide an estimate of these indirect responses, a qualitative assessment of some of them can be made. This section analyzes two cases — an increase in the rate of change in money and a decrease in the rate of change in government spending.

There is a theory accepted by many economists that, starting from dynamic equilibrium, a maintained increase in the rate of change in money first decreases the nominal interest rate which, according to the model, increases the rate of change in desired money balances and thereby reduces the rate of change in nominal income. As a result, the rate of change in observed velocity would be less than that initially attributed to faster money growth in Chart IV. Then, according to this theory, the faster growth of nominal income increases the nominal interest rate during the next few quarters, thereby reducing the rate of change in desired money balances. This increases the rate of change in nominal income growth, and, hence, of observed velocity, above that reported in Chart IV. Subsequently, both the actual rate of inflation and the expected rate of inflation increase, which tends to increase further the nominal interest rate. As a result, there is an additional increase in the rate of change in nominal income, and, therefore, the rate of change in observed velocity will be greater than that reported in Chart IV.

In equilibrium, when the expected rate of inflation equals the actual rate, the nominal interest rate remains constant, the rate of change in nominal income is constant, and, thus, the rate of change in observed velocity no longer changes. In the transition to the new (lower) equilibrium growth rate of velocity, however, its rate of change is less than the initial response indicated in the simulations (Chart IV) but is subsequently higher for several quarters.

Since the rate of change in money and the interest rate are held constant, the simulation of the direct response of observed velocity to a decrease in the rate of change in government spending implies that a slower rate of change in government spending is matched by reduced tax collections. In the case of a reduction in the rate of change in government spending and no change in taxes, a government surplus would be generated. If the surplus were used to retire outstanding debt, the nominal interest rate would decrease and the rate of change in nominal income, and, hence, in observed velocity, would be smaller than that reported in Chart V as long as the nominal interest rate decreases. If debt is not retired as a result of the budget surplus, growth of money would be reduced as government adds to its cash balances, which are not included in the money stock. In this case, growth of nominal income would be smaller and, as a result, observed velocity growth would also be smaller than that reported in Chart V as long as the surplus exists.

Summary of Responses of Rate of Change in Nominal Income and Velocity

The simulation results (partial equilibrium analysis) indicate that in the sample period the "basic" trend growth rate (a 4.1 percent annual rate) of nominal income, and, therefore, observed velocity, is determined by the average long-run rate of increase in the efficiency of the payments system. The observed trend growth rate of velocity in the sample period is 4.1 percent (annual rate) *minus* 0.38 times the trend growth of money (annual rate) *plus* 0.07 times a maintained rate of change (annual rate) in the interest rate. The trend rate of change in government spending plus exports has no direct influence on the trend rate of change in nominal income and, consequently, has no direct influence on the trend in observed velocity.

Short-run changes in the rate of change in money, in government spending plus exports, and in the short-term interest rate exert a significant impact on the short-run rate of change in nominal income and, hence, in observed velocity. In addition, since it takes about ten quarters to move from one equilibrium rate of change to another, initial conditions in the form of

lagged rates of change in the three exogenous variables over the ten preceding quarters have an important influence on short-run changes in the rate of change in observed velocity.

These short-run responses of the rate of change in observed velocity result from two properties of the model. The change in the rate of change in nominal spending by households and business firms responds over time to a discrepancy between the rates of change in actual and desired money balances, and the rate of change in perceived income responds to lagged rates of change in nominal income.

FACTORS INFLUENCING OBSERVED MOVEMENTS IN VELOCITY 1955-1973

The implications of the model are used to ascertain the factors influencing observed movements in velocity in the 1955-73 period. Attention is focused on the special instances of observed velocity movements mentioned earlier in the article, which have been cited by some analysts as evidence that the response of income to a change in money is not very predictable.

Quarterly Movements

A considerable part of the current-quarter variability in the rate of change in observed velocity shown in Chart I can be attributed to current-quarter changes in the rates of change in money, in government spending plus exports, and in the interest rate that occurred in the sample period. Furthermore, current-quarter variability in the rate of change in observed velocity results from variability in the rates of change in the three exogenous variables in previous quarters.

The simulation exercises indicate that the changes in the current-quarter rate of change in money result in an opposite change in the current-quarter rate of change in observed velocity (Chart IV). This result is due to the property of the model that the rate of change in nominal spending by households and business firms responds only over time to a discrepancy between the rates of change in actual and desired money balances. For example, starting from equilibrium, an increase in the rate of change in actual money balances produces a positive discrepancy between the rates of change in actual and desired money balances. As a result the current-quarter rate of change in nominal spending by households and business firms (and, hence, in nominal income) increases, but not by as much as the increase in the rate of change in money. Consequently, the current-quarter rate of change in observed velocity decreases.

In addition, changes in the current-quarter rate of change in government spending plus exports, or in the interest rate, result directly in similar changes in the current-quarter rate of change in nominal income and, hence, in observed velocity (Charts V and VI). Thus, with no change in the current-quarter rate of change in money, a current-quarter decrease in the rate of change in government spending plus exports, or in the interest rate, would result in a decrease in the current-quarter rate of change in observed velocity.

Also, two important properties of the model are that the rate of change in desired money balances responds to lagged rates of change in nominal income and that the rate of change in spending by households and business firms responds over time to a discrepancy between the rates of change in actual and desired money balances. Consequently, even with no current-quarter changes in any of the three exogenous variables, the current-quarter rate of change in observed velocity changes as long as the model is not in equilibrium. In such a case, the current-quarter rate of change in observed velocity reflects the response of income to previous changes in the rates of change in money, in government spending plus exports, and in the interest rate.

Offsetting and Reinforcing Movements

It has been argued that changes in the rate of change in observed velocity over a few quarters at times offset the influence of a change in the rate of change in money on income, and at other times augment this influence. The simulation results (Chart IV) indicate that an increase in the rate of change in money, maintained for two quarters, decreases the rate of change in observed velocity markedly in the contemporaneous quarter, giving the appearance of an offsetting movement. Then, the rate of change in observed velocity rises considerably in the next quarter, giving the appearance of a reinforcing movement. Moreover, a pronounced change in the rate of change in money maintained over a few quarters tends to change the rate of change in observed velocity in an opposite direction (Chart IV). In addition, short-run accelerations and decelerations in the rates of change in government spending plus exports and in the interest rate, or the occurrence of a major strike, also can cause a growth of observed velocity which is opposite to, or in the same direction as, the growth of money (see Charts V and VI).

Consider the earlier analysis where it was alleged that a decrease in observed velocity in 1970 offset the influence of faster money growth on income in that year, and that an increase in observed velocity augmented its influence in 1971. These movements in observed velocity, however, can be largely explained by actual movements in money and by the occurrence of a major strike at the end of 1970.

A sharp deceleration in money growth occurred in 1969, with money growing at a 2.3 percent annual rate during the second half of that year, compared with a 7.7 percent average annual rate in 1967 and 1968. Such a deceleration in money growth, according to the results of this study, would lead to an increase in velocity growth, which did happen in 1969 — observed velocity grew 2.3 percent, compared with an increase of 1.5 percent in 1968. Subsequently, money growth increased sharply to a 5.7 percent annual rate during 1970 and there was an auto strike in the fourth quarter; observed velocity decreased at a 1.2 percent annual rate, a movement which is consistent with the results of this study. Much of the observed acceleration of velocity growth in 1971, measured from IV/1970 to IV/1971, which appeared to have augmented the influence of money on income, reflected the recovery of income (and hence, observed velocity) following the auto strike in the last quarter of 1970.

Thus, much of what appeared to be an offsetting movement in growth of observed velocity in 1970 reflected the influence of the simultaneous increase in the growth of money and the auto strike. The augmenting movement in 1971 reflected the recovery from the auto strike and the lagged response of income to the earlier more rapid monetary growth.

Changes in Trend Growth

Some analysts cite the breaks in the trend growth of observed velocity after 1966 (Chart II) as evidence of a structural change in the money demand function. A test of the hypothesis of such a structural change was made, and the hypothesis was rejected.[13] Simulation of the model (Chart III) indicates that the breaks in the trend of velocity growth can be largely explained by behavioral variables, rather than "structural change".

The model simulation projects a 3.6 percent annual rate of increase in observed velocity from I/1955 to IV/1966, the same as the actual increase. From IV/1966 to I/1971, the simulation projects a deceleration to a 1.5 percent rate of increase, compared with an actual 1.0 percent rate of increase. From I/1971 to IV/1973, an acceleration to a 2.7 percent rate of increase is projected, which compares with an actual rate of 3.1 percent.

Changes in the trend growth of observed velocity, according to the results of this study, reflect mainly changes in the trend growth of money. In addition, a prolonged change in the rate of change in the short-term interest rate, which is large, or in the rate of change in government spending plus exports, also exerts a temporary influence on the trend growth of observed velocity.

Simulations of the model (Chart IV) indicate, in partial equilibrium analysis, that an increase in the growth rate of money which is maintained for over ten quarters decreases the growth rate of observed velocity, and this decrease persists until there is another maintained change in the growth rate of money. Hence, the model indicates, in partial equilibrium analysis, that changes in the trend growth rate of observed velocity are inversely related to changes in the trend growth rate of money.

An examination of money growth from 1955 to 1973 (Chart II) in conjunction with the results of this study leads to the conclusion that the break in the trend of velocity observed from IV/1966 to I/1971 reflected mainly an acceleration in the growth of money during that period. The growth of money was at a 2.3 percent annual rate from I/1955 to IV/1966. Ignoring changes in the rates of change in government spending plus exports and in the interest rate, this projects a trend growth of observed velocity at a 3.2 percent annual rate, compared with the actual trend rate of 3.6 percent. Money then grew at a 6 percent annual rate to I/1971; this projects a deceleration to a 1.8 percent trend growth of observed velocity, compared with an actual rate of 1.0 percent.

Changes in the trend growth of money by themselves, however, cannot account for the acceleration of observed velocity growth to a 3.1 percent annual rate from I/1971 to IV/1973. During that period, money growth accelerated to a 6.9 percent rate, which, by itself, would imply a further deceleration of observed velocity growth to a 1.6 percent rate. Accelerations in the rate of change in government spending plus exports and in the interest rate, however, are consistent with the acceleration in growth of observed velocity. Government spending plus exports rose at a 15 percent annual rate from IV/1971 to IV/1973, com-

[13] *Ibid.*, p. 18.

pared with a 6 percent rate of increase in the preceding ten quarters. The short-term interest rate rose at a 15 percent annual rate from I/1972 to IV/1973, compared with an 8 percent rate of *decrease* in the preceding ten quarters. Both of these changes, according to the results of this study, would tend to increase substantially, but only temporarily, the growth rate of observed velocity.

IMPLICATIONS

The results of this study demonstrate that neither short-run nor long-run movements in observed velocity, taken alone, provide evidence in the debate regarding the predictability of the response of income to a change in money growth. In addition, the conclusion is reached that using changes in observed velocity alone in a naive manner, without information regarding the causes of the changes, in formulating a targeted rate of money growth could lead to undesired changes in the growth of nominal income.[14]

Implications for Debate Regarding Predictability of Response of Income to Money

The results of this study indicate that growth of observed velocity reflects factors influencing growth of desired money balances, changes in growth of the money stock, and changes in growth of government spending plus exports. Among these, there are three major influences: a basic trend rate of growth determined by the response of desired money balances to the average change over time in the efficiency of the payments system; deviations from this basic trend rate reflecting changes in the rates of change in the growth of money and of government spending plus exports; and initial conditions in the form of changes in past rates of change in these latter two variables over the previous ten quarters. When changes in the rates of change in the interest rate are extremely large, they also influence significantly changes in the rate of observed velocity growth.

These results thus indicate that observed movements in the growth of velocity, taken alone, yield little useful information regarding growth of desired money balances, in either the short run or the long run. Much of the observed movement in the growth rate of velocity reflects the adjustment process of the rate of change in nominal income to a discrepancy between the rates of change in desired and actual money balances. Consequently, variations in the rate of change in observed velocity reflect the response of the rate of change in income to *both* changes in the rate of change in money and changes in the rate of change in desired money balances.

Changes in desired money balances have been alleged by some analysts to produce a very unpredictable response of the rate of change in nominal income to a change in the rate of change in money. However, since this study indicates that observed changes in the rates of change in velocity reflect the influence of changes in the rates of change in desired money balances *and* in money, it is concluded that the behavior of observed velocity, by itself, provides little evidence regarding the predictability of the response of the rate of change in income to a change in the rate of money growth. Moreover, changes in the rate of change in nominal income in response to changes in the rate of change in government spending plus exports tend to obscure the observed response of income to changes in the rate of change in money.

Implications for Monetary Policy

It is further concluded that taking observed growth of velocity into consideration in the planning of a course of money growth, without taking into consideration the response of observed velocity growth to changes in growth of money and in growth of government spending plus exports, can lead to perverse results. For example, if the immediate decrease in observed velocity growth in response to a sharp increase in the rate of money growth is viewed as an increase in growth of desired money balances, and if an attempt is made to offset this by faster money growth in the next period, income would subsequently grow faster than planned. Or, if the fall in the trend growth of observed velocity in response to a maintained acceleration in money growth is viewed as a permanent increase in growth of desired money balances, an attempt to compensate for this by increasing money growth would lead subsequently to an acceleration of income growth.

Also, failure to take into consideration the influence of other exogenous factors on observed velocity growth can lead to perverse results. For example, if a temporary increase in growth of observed velocity resulting from an acceleration in growth of government spending is interpreted as a decrease in the

[14]It should be pointed out that the results of this study reflect the movements in the variables in the sample period 1955 to 1973. Specific conclusions drawn from these results, therefore, are applicable to the institutional setting of that period and to movements in the variables within their observed ranges.

growth of desired money balances, efforts to offset this supposed influence on income by a slower growth of money can lead to an undesired slowing in the growth of income.

Another implication is that a more stable growth of money would produce a more stable growth of observed velocity. This is in marked contrast to the views of some analysts that in seeking to control movements in nominal income, growth of money would have to be highly volatile in order to offset observed movements in velocity.[15]

[15]For example, see Chase, "Velocity: Can It Be Ignored as a Monetary Variable," p. 15. Chase argues that in order to control economic activity, "Perhaps the answer is that it is not enough to control money supply alone but that velocity must also be controlled and its swings damped."

SUMMARY OF IMPLICATIONS

In summary, the use of observed changes in velocity growth, by themselves, in conducting monetary policy is often misleading and potentially dangerous. Observed velocity changes are frequently a misleading indicator of changes in the growth of desired money balances. Moreover, taking into consideration observed changes in velocity growth in planning a path of monetary expansion, without separating its response to factors influencing growth of desired money balances from its response to changes in the growth of money or its response to changes in other exogenous factors, could lead to undesired movements in income.

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Income and Expenses of Eighth District Member Banks — 1974

WILLIAM C. NIBLACK

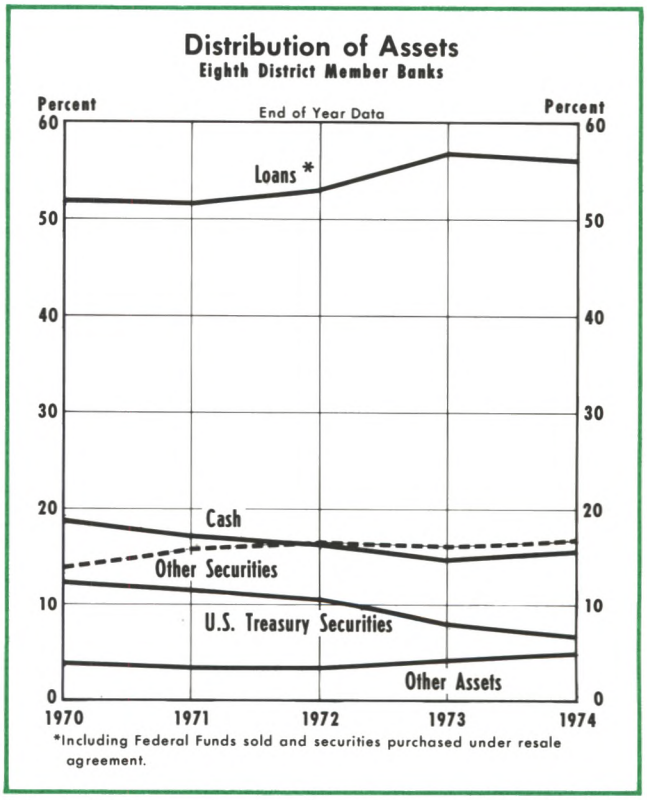
NET income of 429 Federal Reserve member banks in the Eighth District increased 10 percent in 1974, compared to a 13 percent increase in 1973.[1] Although total operating income jumped 29 percent over that of 1973, total operating expenses increased even more rapidly, paced by a 47 percent rise in interest expense and a 66 percent increase in the provison for loan losses. Eighth District member banks fared better, on average, than those in other districts; the total net income of all member banks in the nation increased by about 7 percent in 1974.[2] This increase reflects a marked slowdown from the rapid growth experienced in 1973.

Eighth District member banks were able to increase their capital slightly faster than total assets or deposits in 1974. Thus, capital ratios tended to inch up, reversing declines that had prevailed since 1969.

OPERATING INCOME

Total operating income of District member banks increased 29 percent to $1,572 million in 1974. About 90 percent of members banks' 1974 operating income was in the form of interest and fees from loans and securities.

Loans have accounted for an increasing share of bank assets in recent years. In 1974, however, the proportion of loans in the portfolios of member banks declined slightly.[3] At the same time there was a pronounced shift in the composition of banks' loan portfolios. Despite depressed conditions in real estate markets during much of the year, real estate loans at Eighth District member banks increased 13 percent in 1974, compared to an increase in total loans of 7 percent. Loans on farmland and conventional mortgages on residential property (both 1-4 family and multi-family) increased at roughly the same rate as all real estate loans, while loans on commercial and industrial property increased 17 percent. Outstanding automobile installment loans contracted by 5 percent in 1974. Other consumer loans increased, however, with the most rapid growth registered in credit card and related plans, which increased 23 percent. Commercial and industrial loans, the largest single category of loans, increased 5 percent.



[1] Income and expense items in this article have been adjusted to exclude one bank. Inclusion of this bank, which experienced unusual conditions in 1974, would have made the resulting totals for Eighth District member banks unrepresentative.

[2] "Member Bank Income in 1974," Federal Reserve *Bulletin* (June 1975), pp. 349-55.

[3] All comparisons of assets, liabilities, and capital in this article are made as of December 31 of each year. Unless otherwise indicated, loans do not include Federal funds sold and securities purchased under resale agreements.

Interest and fees on loans increased 29 percent to $974 million, reflecting both the increase in loan volume and a higher realized rate of return on loans.

Income from Federal funds sold (principally overnight advances to other banks) has grown significantly in recent years, reflecting the increased use of Federal funds as a means of obtaining funds by banks as well as higher average yields on these loans. Accounting for 10 percent of member bank operating income, this source of income increased 75 percent in 1974. Even so, this rate of growth was considerably slower than the 146 percent increase experienced in 1973.

The average rate of return on loans (including Federal funds sold) for all Eighth District member banks increased to 9.3 percent from 8.7 percent in 1973.[4] The rate of return varied from 9.1 percent for banks of $5 million to $10 million in deposits to 10.8 percent for banks with deposits of $100 million or more.

Another major change in bank portfolios during 1974 was the continuing decline in the share of bank assets held in U.S. Treasury securities. The amount of Treasury securities held by member banks fell by more than 9 percent. Even though the average yield on these securities increased from 6.2 to 6.6 percent, income from this source fell 3 percent. On the other hand, income from securities of U.S. Government corporations and agencies jumped 37 percent, while that from obligations of states and political subdivisions, the largest category of securities in the banks' portfolios, increased 21 percent.

Remaining categories of operating income, which are all relatively minor, increased at varying rates. Income from service charges on deposit accounts and from operation of trust departments grew less rapidly than total operating income, while that from all other sources, including other fees and service charges as well as interest on time deposits at other banks, increased 42 percent.

OPERATING EXPENSES

Total operating expenses of Eighth District member banks jumped 33 percent in 1974, to $1,339 million. Of this total, $798 million, or 60 percent, was paid by the banks as interest. These interest expenditures were 47 percent greater than those of 1973 as both bank indebtedness and costs of funds rose.

[4]Averages for groups of banks presented in this article are unweighted averages of individual banks' operating ratios. Balance sheet items used in constructing these ratios are averages of the figures from the Reports of Condition of December 1973 and June and December 1974. Where appropriate, the bank referred to in fn. 1 has been excluded.

The most rapidly growing category of interest expense was the cost of Federal funds purchased (that is, borrowed from other banks), which leaped 80 percent in 1974. This rapid growth in the cost of Federal funds, reflecting both the growth in the volume of funds purchased and the higher average interest rates, elevated this category to 25 percent of total interest expense.

Even with the rapid growth of expenses for Federal funds, interest paid on time and savings deposits still remains by far the largest category of operating expense, accounting for 44 percent in 1974. Paralleling the changes in banks' asset structure has been a change in banks' liabilities, involving a shift from demand deposits to time and savings deposits. For example, in 1973 demand deposits accounted for 44 percent of total liabilities and time and savings deposits for 43 percent. During 1974, total demand deposits grew very little, and demand deposits of individuals, partnerships, and corporations (IPC demand deposits) actually fell. During the same period, total time and savings deposits increased 14 percent; much of this increase was accounted for by growth of IPC time deposits, which increased 17 percent. At the end of 1974, time and savings deposits represented 46 percent of total liabilities, while the share of demand deposits had shrunk to 41 percent.

In addition to the rapid growth of time and savings deposits, the average interest rate paid by banks on

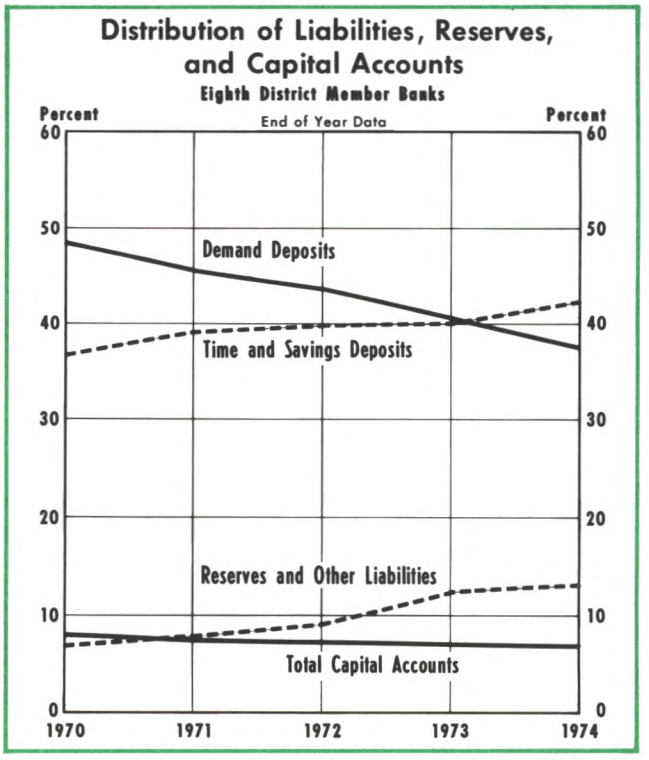


Table I

INCOME AND EXPENSES OF MEMBER BANKS IN THE EIGHTH FEDERAL RESERVE DISTRICT*

	Thousands of Dollars			Percent Change	
	1974	1973	1972	1973-74	1972-73
Total Operating Income	**$1,572,146**	**$1,222,821**	**$ 962,112**	**28.6%**	**27.1%**
Income from Loans	974,758	755,395	584,783	29.0	29.2
Income from Federal Funds Sold and Securities Purchased Under Resale Agreement	148,736	85,155	34,647	74.7	145.8
Income from Securities	292,321	257,575	232,327	13.5	10.9
U.S. Treasury Securities	101,020	104,116	103,192	- 3.0	0.9
Other U.S. Government Securities	67,878	49,701	38,093	36.6	30.5
States and Political Subdivisions	117,551	97,545	85,760	20.5	13.7
Other Securities	5,872	6,213	5,282	- 5.5	17.6
Trust Department Income	27,756	27,566	25,158	0.7	9.6
Service Charges on Deposit Accts.	30,099	27,896	26,386	7.9	5.7
Other Operating Income	98,475	69,233	58,812	42.2	17.7
Total Operating Expenses	**1,339,036**	**1,006,079**	**777,377**	**33.1**	**29.4**
Interest on Deposits	585,241	423,456	329,290	38.2	28.6
Expense of Federal Funds Purchased and Securities Sold Under Repurchase Agreement	198,481	110,517	37,990	79.6	190.9
Other Interest Expenses	13,895	9,656	5,003	43.9	93.0
Salaries, Wages and Benefits	258,815	226,933	201,883	14.0	12.4
Provision for Loan Losses	37,407	22,581	18,294	65.7	23.4
Other Operating Expenses	245,197	212,936	184,918	15.2	15.2
Income Before Income Taxes and Securities Gains (or Losses)	**233,110**	**216,742**	**184,735**	**7.6**	**17.3**
Less Applicable Income Taxes	49,322	51,222	43,867	- 3.7	16.8
Income Before Securities Gains/(or Losses)	**183,787**	**165,520**	**140,869**	**11.0**	**17.5**
Net Securities Gains (or Losses) After Taxes	- 2,252	211	4,676	—	- 95.5
Extra Charges or Credits After Taxes	- 119	- 738	605	—	—
Less Minority Interest in Consolidated Subsidiaries	- 11	20	85	—	- 76.5
Net Income	**181,428**	**164,973**	**146,064**	**10.0**	**12.9**
Cash Dividends Paid	63,404	57,220	53,722	10.8	6.5
Number of Banks	429	430	429	- 0.2	0.2

*Income and expense items have been adjusted to exclude one bank. Inclusion of this bank, which experienced unusual conditions in 1974, would have made the resulting totals for Eighth District member banks unrepresentative.

these deposits also rose, from 5.1 to 5.7 percent. As a result, the interest on deposits paid by District member banks in 1974 increased $162 million, or 38 percent, to $585 million. Other interest expenses of the banks, including interest on capital notes and on loans from the Federal Reserve Bank, grew almost as rapidly as interest on deposits. These other interest payments, however, were a comparatively minor portion of total operating expenses.

The second largest category of banks' operating expenses is salaries, wages, and fringe benefits of officers and employees, which totalled $259 million, or 19 percent of operating expenses, in 1974. The 14 percent increase in this category in 1974 reflected both an increase in the number of officers and employees from 26,030 to 28,804 and a 3 percent increase in average pay and benefits.

Provision for loan losses, which is classified as an operating expense, increased dramatically in 1974, as banks increased their loan loss reserves because of larger actual losses and uncertain economic conditions. These provisions rose from $23 million to $37 million, representing a 66 percent increase.[5]

Other operating expenses, including occupancy, furniture, and equipment costs, totalled $245 million — an increase of 15 percent from the previous year.

NET INCOME

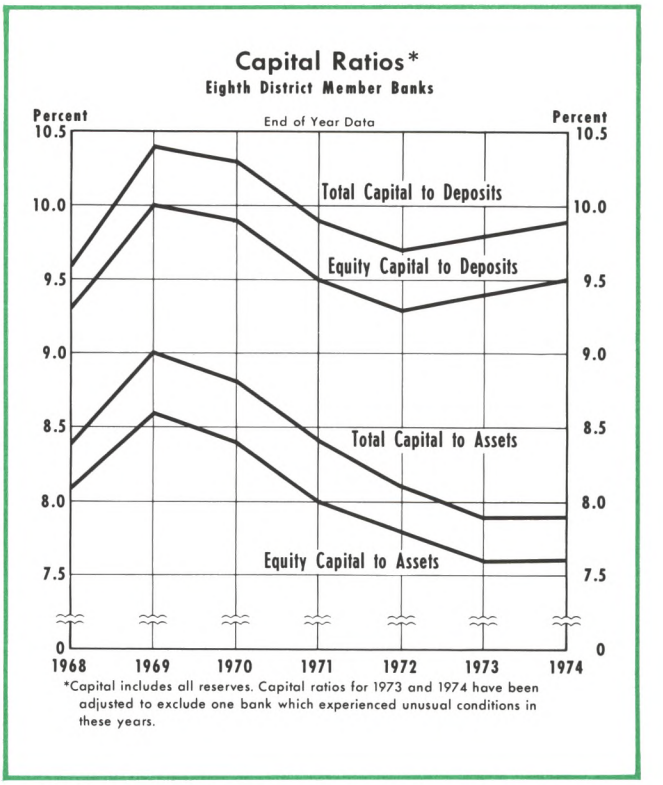
Based on total operating income of $1,572 million and total operating expenses of $1,339 million, member banks had income before taxes and securities

[5]Actual losses charged to loan loss reserves increased from $25 million to $41 million.

gains or losses of $233 million, up 7.6 percent from 1973. When net securities losses of more than $2 million and applicable income taxes of $49 million are subtracted, net income of member banks in 1974 was $181 million, up 10 percent from the year earlier.

The average rate of return on equity capital, including all reserves, declined to 12.2 percent in 1974 from 12.8 percent the year earlier. This rate varied among different sizes of banks. The highest rate of return was 12.8 percent for banks with deposits of $25-$50 million, while banks with deposits of $100 million or over had the lowest average rate of return. Only this large bank category experienced an increase in the rate of return, from 9.5 percent in 1973 to 10.3 percent in 1974.

Member banks paid cash dividends on common and preferred stock of $63 million, up 11 percent from the $57 million paid in 1973. Dividends in both 1973 and 1974 represented 35 percent of net income. This percentage also varied greatly among different sizes of banks. Banks in $5-$10 million deposit category paid dividends equal to 18.6 percent of net income, whereas the biggest banks paid out 41 percent of net income in the form of dividends.



CAPITAL ACCOUNTS

Total capital accounts of Eighth District member banks increased by $136 million, or more than 9 percent, in 1974 to $1,597 million at year end. The addition to capital accounts from retained earnings in 1974 was about $10 million more than in 1973 ($118 million compared to $108 million). Other net additions to capital accounts came from various comparatively minor sources. Sale of common stock was up 9 percent to $6.7 million in 1974, and the premium on new capital stock sold increased $3.1 million, or 41 percent, to $10.7 million. Common stock issued incident to mergers nearly tripled, with a par value of $3.3 million in 1974. Mergers also led to net additions to surplus, undivided profits, and reserves of about $7 million, compared to less than $1 million in 1973. Net increases to capital accounts from all other sources totalled $3.4 million in 1974, compared to a small net decrease in 1973. Much of this difference was accounted for by larger net transfers from undivided profits to loan loss reserves in 1973 than in 1974.

Since capital, including reserves, grew slightly more rapidly than assets or deposits,[6] the ratios of capital to deposits rose in 1974, while the capital-to-asset ratios increased slightly. The increase in capital ratios represented a reversal of the declines which have been predominant since 1969.

[6]Asset growth slowed to about 9 percent in 1974 from 14 percent in 1973. Deposits grew about 8 percent in 1974, compared to 10 percent in 1973. (These figures exclude the bank referred to in footnote 1.)