

FEDERAL RESERVE BANK OF ST. LOUIS



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Review

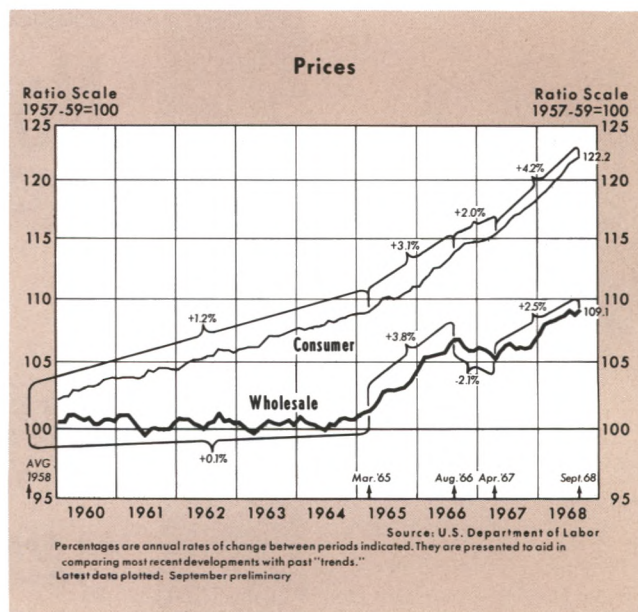
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Total Demand, Fiscal Restraint, and Reduced Monetary Expansion

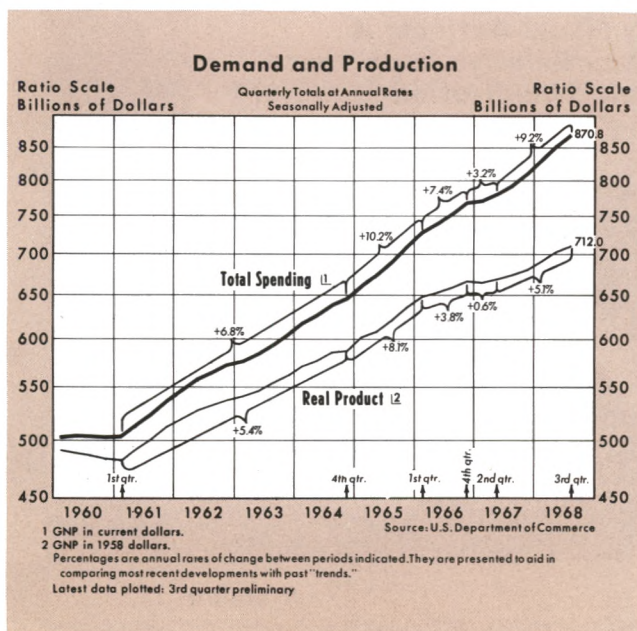
TOTAL DEMAND for goods and services showed a strong gain in the third quarter, continuing the rapid pace of the previous year. Expansion of aggregate spending outpaced gains in productive capacity, and prices increased at about a 4 per cent rate. Consumer spending rose sharply, as the tax increase had no immediate dampening effect on consumer demand. Buoyant consumer demand in the face of the increase in Federal income taxes has cast doubt in some quarters on the effectiveness of tax policy as an anti-inflationary weapon. Individuals, benefiting from rapid increases in income and a relatively large stock of savings, absorbed the initial impact of the tax hike without moderating their spending.

Less stimulative monetary and fiscal actions in the recent past are expected to dampen pressures on aggregate spending in coming months, however. In addition to the burden of the income tax surcharge,



consumers will face larger social security contributions in late 1968 and early 1969. Under the provisions of the June fiscal program, Government spending, which has buoyed total demand for some time, is scheduled to slow. The rate of monetary expansion has slowed considerably since mid-year, and continuation of such a trend would tend to dampen growth of total spending.

Demand and Production



Total spending increased at an 8.7 per cent annual rate in the third quarter, about the same rate as the 9.3 per cent during the previous four quarters, and substantially above the 6 per cent average rate of increase from 1957 to 1967. Real product rose at a 5 per cent rate in the quarter, about the same as during the previous year. Prices advanced at a 3.7 per cent rate in the third quarter, not significantly

less than during the previous year, and substantially above the 1957 to 1967 trend rate of 2 per cent.

Since the moderate slowdown in early 1967, growth of total spending has reflected primarily expansion of final sales, i.e., spending other than for inventory. Final sales increased at a 10 per cent rate in the third quarter, slightly faster than the 8.2 per cent increase of the previous year and significantly above the average gain of 6 per cent from 1957 to 1967.

Despite the increase in personal income taxes which became effective in July, individuals increased their demand for goods and services in the third quarter. Consumer spending rose at a 10.6 per cent rate, compared with an 8 per cent increase during the previous year and a trend rate of 6 per cent from 1957 to 1967.

The 10 per cent surcharge on personal income taxes withdrew about \$5.5 billion from disposable income in the third quarter, reducing the gain to a 4.4 per cent annual rate in the third quarter from an 8.3 per cent advance in the previous year. From 1957 to 1967, disposable income increased at an average rate of 6 per cent per year. With the surcharge in effect, disposable income in coming months can be expected to advance at about the same rate as personal income.

The surcharge is intended to dampen consumer spending by slowing growth of take-home pay. Individuals offset this effect, however, by sharply reducing their rate of saving and by making increased use of credit. Individuals saved an average 7.3 per cent of their income from late 1966 to mid-1968,

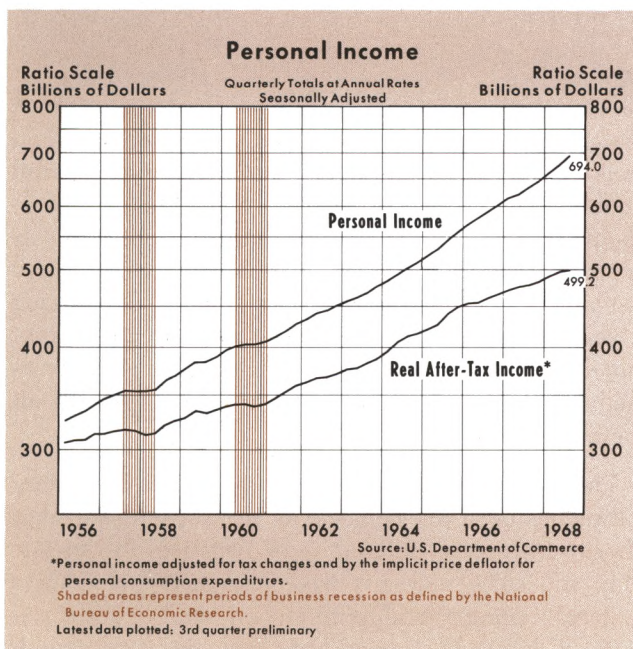


TABLE I:

Trends in Spending, Final Sales, and Disposable Income

(Compounded Annual Rates of Change)

Total Spending (G.N.P.)						
Terminal Quarter*	Initial Quarter					Billions of Dollars Annual Rates
	1967			1968		
	II	III	IV	I	II	
1967 III	8.0					795.3
IV	8.1	8.1				811.0
1968 I	8.8	9.2	10.4			831.2
II	9.3	9.8	10.6	10.9		852.9
III	9.2	9.5	10.0	9.8	8.7	870.8
Final Sales						
Terminal Quarter*	Initial Quarter					Billions of Dollars Annual Rates
	1967			1968		
	II	III	IV	I	II	
1967 III	6.3					789.9
IV	6.5	6.6				802.7
1968 I	8.9	10.2	13.8			829.1
II	8.2	8.9	10.1	6.4		842.1
III	8.7	9.3	10.2	8.4	10.4	863.1
Consumer Spending						
Terminal Quarter*	Initial Quarter					Billions of Dollars Annual Rates
	1967			1968		
	II	III	IV	I	II	
1967 III	4.3					495.5
IV	4.9	5.5				502.2
1968 I	8.0	9.9	14.4			519.4
II	7.7	8.8	10.5	6.7		527.9
III	8.2	9.3	10.5	8.6	10.6	541.3
Final Sales Less Consumer Spending						
Terminal Quarter*	Initial Quarter					Billions of Dollars Annual Rates
	1967			1968		
	II	III	IV	I	II	
1967 III	8.3					293.5
IV	9.1	8.5				300.5
1968 I	10.3	10.7	12.8			309.7
II	9.2	9.1	9.3	5.9		314.2
III	9.4	9.3	9.6	8.0	10.0	321.8
Disposable Personal Income						
Terminal Quarter*	Initial Quarter					Billions of Dollars Annual Rates
	1967			1968		
	II	III	IV	I	II	
1967 III	6.4					550.0
IV	6.8	7.2				559.6
1968 I	8.2	9.1	11.0			574.4
II	8.3	8.9	9.8	8.6		586.3
III	7.5	7.8	7.9	6.4	4.4	592.6

*Third quarter 1968 data are preliminary.

Source: Department of Commerce

compared with an average of 6 per cent over the previous decade. More than half of the third quarter increase in consumer spending reflected the shift from saving to spending, as the saving rate fell to about 6 per cent. By maintaining an average rate of saving at 6 per cent of take-home pay during the year that the surcharge is scheduled to be in effect, individuals could meet about \$7 billion of tax liabilities with little or no effect on spending. The surcharge is currently estimated to increase personal income taxes by \$7.8 billion during fiscal 1969.

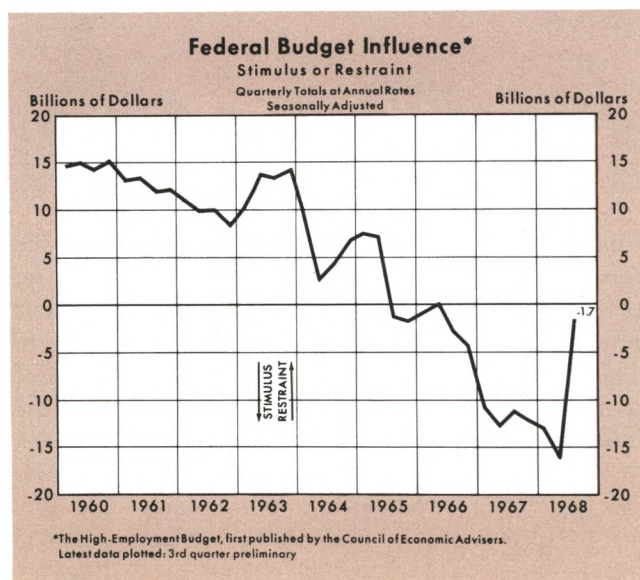
Recent Fiscal Actions

Federal spending increased 12 per cent in the year ending in the third quarter, compared with a 15 per cent rate of increase from 1965 to 1967. Defense spending rose 9 per cent in the last year, after rising at a 20 per cent rate from 1965 to 1967. Nondefense spending advanced 14 per cent from third quarter 1967, compared with the 1965-1967 rate of 12 per cent.

Federal expenditures for fiscal 1969 are currently projected to total 5 per cent above fiscal 1968. This is above the level of spending proposed in the Budget message of last January. Increased spending for programs exempt from expenditure limitations is expected to more than offset the \$6 billion cut required in other areas.

The expansionary fiscal actions necessitated by the Vietnam engagement and the stimulus of monetary expansion prior to mid-year are still influencing the economy. The move toward fiscal restraint has been more than offset in its early stages by the continuing effects of earlier stimulative actions. As the earlier actions run their course, the restrictive pressure of current fiscal actions on the economy should begin to take effect, assuming, of course, that such effects are not more than offset by expansionary monetary actions.

The effect of the current tax program will be reinforced by other legislation scheduled to take effect in late 1968 and early 1969. The social security tax base has been increased from \$6,600 to \$7,800, effective last January. Persons who previously made no further contributions once their income reached \$6,600, now must pay taxes on an additional \$1,200.



Since the incomes of most individuals do not reach \$6,600 until after mid-year, a large part of the extra tax is being withheld in the second half of 1968. Social security tax rates are also scheduled to increase on January 1 of next year, withdrawing an estimated \$1.5 billion from consumer income in 1969.

The net impact of these fiscal actions is reflected in the high-employment budget. After averaging a \$13 billion deficit from mid-1967 to mid-1968, the high-employment budget moved to a \$2 billion deficit in the third quarter. Given the expected course of the Government's program for fiscal 1969, the high-employment budget is expected to be in surplus by \$3 billion in the first half of calendar 1969.

Monetary Developments

The rate of monetary expansion is an important determinant of the ultimate success of the fiscal program in dampening inflationary pressures. Since July, monetary indicators have shown divergent patterns (See Table II). Growth of member bank re-

TABLE II:

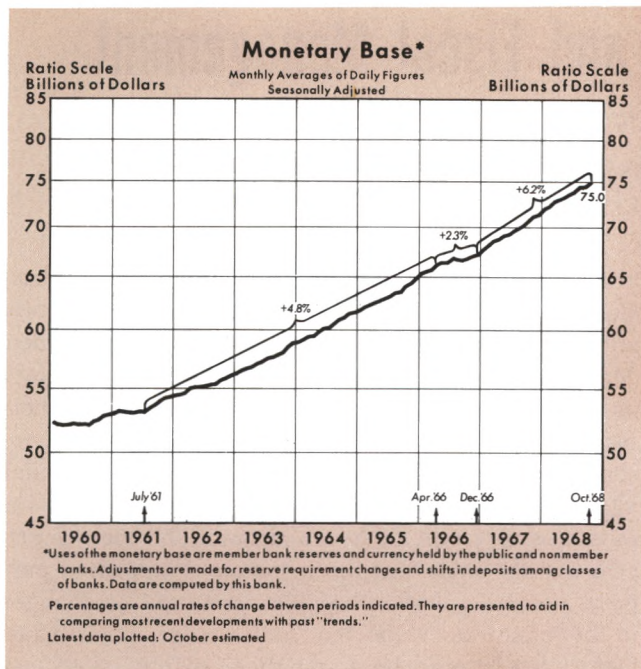
Trends in Monetary Aggregates

(Compounded annual rates of change)

	1957 to 1967	Jan. 1968 to July 1968	July 1968 to Oct. 1968
Federal Reserve Credit	7.6	10.5	13.0
Monetary Base	3.3	5.4	6.0
Member Bank Reserves	3.4	3.4	9.8
Reserves Available for			
Demand Deposits	1.7	5.7	-2.8
Demand Deposits	2.4	7.9	0.5
Time Deposits	12.1	7.0	19.4
Money Stock	2.6	7.9	1.7
Money plus Time Deposits	6.2	7.4	10.4
Bank Credit	7.6	8.8	18.0

serves, time deposits, money plus time deposits, and bank credit has accelerated. The monetary base and Federal Reserve credit have continued to expand at about the same rates as during the previous six months. Expansion of private demand deposits and the money stock has slowed considerably. In judging which of these measures may best indicate the current monetary influence on total demand, it is necessary to analyze the determinants of the trend growth of these magnitudes.

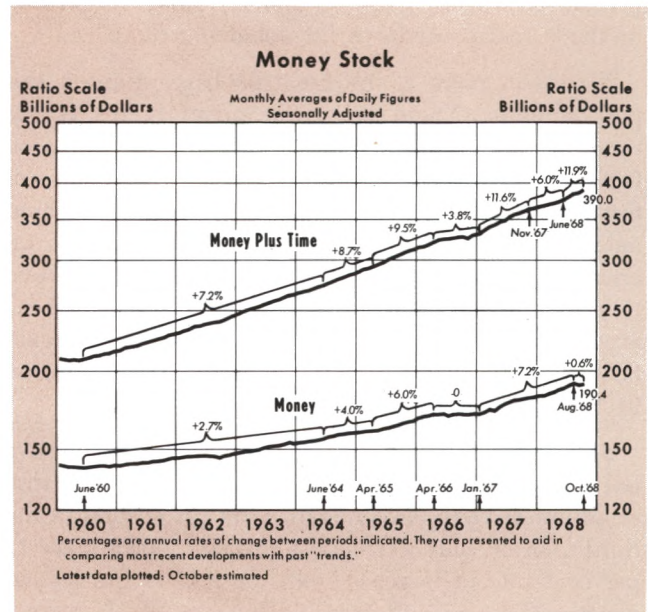
The major key to the recent diverse monetary trends has been the behavior of market interest rates. Short-term market interest rates began to fall in late May and since mid-year have remained low relative to legal ceiling rates permitted on time deposits. As a result, banks have been able to again attract funds



in competition with other market instruments since mid-year. Time deposits have grown at a 19 per cent annual rate since July compared to a 7 per cent rate in the previous six months. The rapid increase of time deposits has resulted in an accelerated growth of bank credit and of money plus time deposits. The expansion of time deposits was largely a diversion of flows of funds from one channel to another and did not necessarily indicate an increase in either total liquid instruments or in total bank and nonbank credit.

The decelerated growth of money since July, measured by private demand deposits plus currency in the hands of the public, may be accounted for in large part by the absorption of reserves and monetary base by the accelerated growth of time deposits. In addition, Government deposits at commercial banks have increased since July. Over the long run, however, the trend growth of money is largely determined by the monetary base, which has continued to grow rapidly in recent months. The base increased at a 6 per cent annual rate in the past three months, compared to a 5.4 per cent rate in the previous six months.

To the extent that growth of the money stock has slowed, monetary influence has probably been less stimulative in the last three months than during the preceding six and eighteen-month periods. Since monetary developments are generally expected to affect total spending with some lag, it should not be expected that the deceleration of monetary expansion would, as yet, have had a restraining influence on total demand and inflation. Further, the effect of the restraint is likely to be moderate and short-lived unless either the growth rate of the monetary base soon slows, or the unusually rapid growth of time deposits continues.



Summary

Inflationary pressures continued to be strong in the third quarter, as growth of total and final demand remained rapid. While the program of fiscal restraint did not immediately dampen the advance of spending, some degree of moderation may result from this source late this year and early in 1969. If the less expansionary fiscal situation is accompanied by continuation of the current reduced rate of monetary expansion, growth of final spending and total demand should soon begin to slow.



An Approach to Monetary and Fiscal Management

A speech given by DARRYL R. FRANCIS, President, Federal Reserve
Bank of St. Louis, before The Money Marketeers, New York City
October 30, 1968.

ANYONE who is seriously interested in economic stabilization policy may be very much in a quandary at the present time. There is general acceptance of the goals of stabilization policy which include high employment, rising output, and relatively stable prices. However, there is much debate regarding methods and procedures for achieving these goals.

A case in point is the fiscal package adopted this past summer. There was widespread belief at the time of its adoption that the surtax and the curbs on Government expenditures provided a massive dose of fiscal restraint. Some believed that this action offered an immediate and strong restraint on the rate of increase in total spending, leading thereby to a reduction in inflationary pressures. In fact, some analysts argued that there was need for relaxation of monetary restraint, such as there was, to avoid a recession in late 1968 or early 1969.

Such consequences of last summer's action have not as yet materialized. Gross national product rose at an excessive 9 per cent rate from the second to the third quarter, only a little less than the inflationary 11 per cent rate of increase from the first to the second quarter. The over-all price index rose at about a 4 per cent rate in the third quarter, continuing the trend of the past year and a half. These unexpected developments have produced considerable concern among monetary and fiscal authorities, as well as among interested segments of the public in general. Questions are now being raised about the validity of some generally accepted propositions underlying monetary and fiscal management.

Tonight I will discuss an approach to monetary and fiscal management which I believe may provide a basis for more rational economic stabilization policy. I will identify this approach as the "Monetary View." It is my opinion that the usual division of fiscal and monetary actions into separate entities with differing relative importance has frequently led to inappropriate and unexpected developments. Price stability and high employment achievements have often been less satisfactory than would have been practical.

Before moving on to the main body of my remarks, I want to clarify briefly my use of the term "Monetary View." Most economists today believe that monetary

actions have an important role in economic stabilization, but there is lack of agreement on what constitutes such actions or their relative importance. Many economists stress the influence of monetary authorities in terms of market interest rates. Others measure this influence in terms of member bank reserves, the monetary base, the money stock, or similar aggregates. Still others consider changes in various measures of credit to be important. The view I discuss tonight holds that for economic stabilization purposes monetary actions are best measured by changes in the money stock and that such changes are a major factor determining total spending, that is, gross national product.

I will develop this view in a sequence of three topics: first, some basic premises underlying this approach to economic stabilization; second, some specific principles regarding monetary management which follow from these premises; finally, an appraisal of the current economic situation in terms of these principles.

Four Basic Premises

In discussing a proposed approach to monetary and fiscal management, one must set forth at an early stage its basic premises. Failure to do so often leads to misunderstandings. Of course, there is a hazard — explicit assertion of underlying premises may lead to challenge and possible doubt being cast on the recommended course of action. Yet, the desire to improve monetary and fiscal management necessarily involves a willingness to subject all recommendations to close examination by others. Development of proper procedures for economic stabilization will evolve only through a process of offering propositions which may be subjected to repeated examination and testing.

Accordingly, I advance the following four premises underlying my version of the Monetary View. First, a predominantly market orientation is most appropriate for monetary and fiscal analysis. Second, quantification is essential if economic stabilization is to become more of a science than a guessing game. Third, our economic system is more stable than was believed a few years ago. Fourth, monetary management is more properly directed toward influencing changes in total spending than toward concern for its

impact on selected markets. Let us now examine each in more detail.

Premise One: Market Orientation

Market orientation holds a foremost position in current economic thinking. A basic principle of economics is that free markets are the most efficient allocator of both real and financial assets. Free interplay of market forces results in an efficient allocation of scarce resources and in production directed by the public's preferences.

Contemporary theories of monetary and fiscal management, as distinguished from traditional Keynesian economics stemming from the 1930's, stress the role of individual markets. These current theories have gained growing emphasis since the early 1950's. They are based on an examination of the factors determining consumers' or businessmen's choices among a wide variety of real and financial assets. Decisions of these and other economic units are studied as they are manifested through the operations of markets. At a fundamental level there is little basic difference between the "portfolio" extension of traditional Keynesian economics and the "broader portfolio" approach to economic theory sometimes called the "Modern Quantity Theory." Some noted economists identified with the modified Keynesian or "portfolio" view are James Tobin, Paul Samuelson, and James Duesenberry. Leading advocates of the Modern Quantity Theory include Karl Brunner, Allan Meltzer, and Milton Friedman. Despite some differences, both views are market-oriented.

Premise Two: Quantification is Essential

Quantification of both actions and results is required for development and implementation of rational procedures for stabilization policy. Those responsible for carrying out stabilization responsibilities require considerable knowledge of the probable results of any particular course of action. Such knowledge includes identification of strategic variables and specification of operational hypotheses about the end results expected from alternative courses of action. Development of this knowledge requires empirical verification of various economic theories.

Not only the results, but also the actions, must be measurable. Rational economic stabilization policy requires that its operations be conducted in terms of specified and measurable changes in strategic variables. Vague concepts such as "easier," "tighter," or "more restrictive" carry little operational content for monetary management. If the FOMC directive contained truly quantified instructions, those responsible

for its implementation would receive definite rather than impressionistic instructions. Under these conditions monetary managers at all levels could be held accountable for the success or failure of their actions.

This ideal of quantification is not out of reach. Since World War II much research has pointed to the possibility of improving the precision of economic stabilization. Statistical analyses and econometric procedures have been applied to a wide variety of economic problems. Quantitative methods for making decisions in the face of uncertainty have been successfully applied to many problems of business management. It is time that scientific methodology and modern quantitative analysis be used to a greater extent in developing appropriate procedures for monetary and fiscal management.

Premise Three: Inherent Economic Stability

The proposition of inherent economic stability is beginning to play a more important role in thinking about economic stabilization policy. Until recently there was quite general acceptance of the view that there is basic instability in the economy which produces wide fluctuations in output and employment. Some recent studies have cast considerable doubt upon this view. In its place is proposed the proposition that there is a high degree of inherent stability in our economic system. According to this proposition, population, natural resources, capital formation, and technology determine growth in output of goods and services. Since these factors change slowly and exert a powerful influence, they provide great underlying stability to the trend growth of output and employment. Variations in total spending can be induced by monetary and fiscal actions, but they have only a short-run effect on output and employment. In the longer run they mainly affect the price level.

Premise Four: Focus on Total Spending

This proposition is based on the generally accepted proposition that economic stabilization actions should be concerned primarily with prevention of inflation or deflation. Such price movements are viewed as detrimental to the well-being of our citizens. At times actions are required to match growth in total spending to growth permitted by increases in our economy's productive potential. Such actions may be viewed by some as impinging unduly on certain sectors of our economy. But when free markets are allowed to channel the influence of monetary and fiscal actions throughout the multitude of individual markets for goods, services, and financial assets, over-all economic efficiency and individual freedom will be less af-

fect. Of course, many markets do not meet completely the criterion of "free"; but, nevertheless, the allocation of resources through imperfect markets is to be preferred over allocations made by administrative fiat. Furthermore, markets could be made more free if various price and interest rate controls were relaxed.

Propositions for Monetary and Fiscal Management

Application of these four basic premises leads to a number of specific propositions regarding the conduct of monetary and fiscal management. Let me now discuss these propositions as they apply to the monetary aspects of economic stabilization policy.

Monetary management is properly directed, in the main, toward influencing movements in total spending for goods and services. Such movements should be consistent with price level and employment goals and with fulfillment of our economy's productive potential. Incidentally, the inherent stability I mentioned previously still leaves room for discretionary monetary management. Monetary forces must be managed if they themselves are not to be a source of economic instability. Also, the impact of Government deficits and surpluses on total spending depends greatly on the extent to which monetary authorities monetize changes in the national debt.

Recent theoretical and empirical research has raised doubts regarding the validity of some widely held concepts of monetary management. The use of such vague concepts as "tone" and "feel" of the money market have been found to carry little useful information. Measures of money market conditions such as market interest rates and free reserves have been shown to be poor indicators of the influence of monetary actions. These two measures are affected greatly by forces other than actions of monetary authorities; hence, interpretation of their movements for economic stabilization purposes is problematic. Likewise, "tight money," as measured by money market indicators (in other words, high interest rates), does not necessarily indicate restrictive monetary actions in terms of their influence on growth in total spending. Instead, high or rising interest rates are frequently the result of excessive monetary stimulus in the past rather than of present restraint.

Primary and consistent use of monetary aggregates, a practice which has not prevailed heretofore, would seem to be essential for sound monetary policy. Certain aggregates such as Federal Reserve credit, member bank reserves, the monetary base, and the money stock have been shown on theoretical and empirical grounds to be useful and important tools

of monetary management. All of these aggregates can be rather precisely controlled by monetary authorities. Much of contemporary monetary theory and related research has assigned an important role in economic stabilization to some of these or closely related measures. In many recent studies changes in the outstanding volume of these aggregates are viewed as influencing total spending through changes in market-determined prices and interest rates. But I want to point out that it is changes in monetary aggregates which initiate changes in total spending; interest rates and prices only constitute the transmission mechanism. For stabilization purposes, movements in interest rates should be viewed no differently than movements in commodity prices.

The monetary view I am espousing includes the following points. Changes in Federal Reserve credit are under direct Federal Reserve control and have been found to be the main determinant of the monetary base. Since the monetary base is subject to rather precise Federal Reserve control, it is a very useful indicator of Federal Reserve actions. This statement holds regardless of what indicator is used by the Federal Reserve, because the result of System actions is reflected in the monetary base. A very stable empirical relationship has been found to exist between the monetary base and the money stock. Consequently, the money stock is viewed as a good measure of over-all monetary influence. It reflects primary actions of the Federal Reserve System, taking account of decisions of others involved in the monetary process, specifically, commercial banks, the nonbank public, and the Treasury.

This brings me to the most important aspect of my suggested approach to economic stabilization — *the proposition that monetary actions are a major determinant of short-run movements in total spending*. This is in contrast with much of the current economic stabilization theory and practice. It has been fashionable to ascribe to fiscal actions a large and immediate effect on total spending and to monetary actions a small and long-delayed effect. Consequently, taxing and Government spending actions have been assigned the major role in economic stabilization. Monetary actions, according to some proponents of this dominant view, are of small consequence, with little effect on total spending, output, and prices. These same proponents argue, however, that monetary actions have a potential for doing great harm to specific sectors of the economy, for example, thrift institutions and the housing industry. They conclude that actions of monetary authorities are more properly directed toward the well-being of these sectors than toward influencing total spending.

Much research has recently been devoted to testing the proposition that monetary actions are a major determinant of total spending, but the issue is far from settled. Friedman in the early 1950's advanced on empirical and theoretical grounds the proposition that money is the most important determinant of economic activity. In extensive tests conducted a few years ago in collaboration with David Meiselman, he concluded that money rather than autonomous expenditures, which include fiscal actions, is the major determinant of consumption expenditures. This proposition was immediately challenged by several economists. Franco Modigliani and Albert Ando, major figures in this debate, reported tests which showed that money was an important, but not the most important, determinant of consumption spending.

Thomas Mayer, one of the original challengers of the Friedman position, concluded in a recent book that much recent evidence supports the view that the money stock, and therefore monetary policy, has a substantial effect on income. He points out, however, that there is not general acceptance of the view that the money stock has a dominant effect.

All this research did not test directly the relative importance of monetary and fiscal actions in economic stabilization. At the Federal Reserve Bank of St. Louis we have recently made an attempt to test their relative importance. I summarize the results of this research as an example of one attempt to provide a more scientific underpinning to stabilization policies.

The time period examined was from 1947 to mid-1968.* Monetary actions, measured by changes in the narrowly defined money stock, accounted for about 40 per cent of the variation of quarter-to-quarter changes in GNP. Changes in tax rates were found to have little, if any, direct influence on changes in GNP. Changes in Government expenditures explained a comparatively small per cent of changes in GNP. This evidence does not support the conventional view that fiscal actions evoke a larger and faster response in total spending than do monetary actions.

The influence of monetary actions on GNP is quite large in the quarter in which they occur, larger yet in the next quarter, and is fully manifested by two quarters after action is taken. The influence of changes in Government spending, on the other hand

is relatively small, and its impact is not fully manifested until three quarters after a change. Once again, the conventional view is not supported.

These results suggest that the following hypotheses for economic stabilization are more appropriate than the conventional ones used at the present time. The response of total spending to changes in the money stock is relatively large and fast. By contrast, the response to changes in Government taxing provisions is negligible. Furthermore, the response of total spending to changes in Government expenditure programs is much smaller than its response to changes in money, and the ultimate effect takes a longer time interval.

An additional point raised is that the manner of financing Government expenditures provides the main avenue by which fiscal actions influence total spending. Financing expenditures by borrowing from the public is not much different in its impact on total spending from taxing. Government expenditures financed by monetary expansion, however, will be expansionary. Most studies, until recently, using traditional Keynesian analysis ignore this consideration.

Another result of our research on the determinants of total spending is that forces other than monetary and fiscal actions exert a significant influence, but that this influence is less than that of money. These other forces have not been examined in detail, but it is believed that they include changes in consumer and investor preferences, outbreak of war, and strikes in major industries. There is considerable doubt in my mind whether any stabilization actions could provide effective offsets to such forces as these.

The hypotheses advanced by this research should, of course, be subjected to repeated testing. As I said earlier, only by advancing propositions, testing them, and having them challenged by others will progress be made toward developing rational procedures for economic stabilization.

Finally, the evidence pointing to the strength and speed of the influence of monetary actions on total spending leads to the conclusion that attempts by monetary authorities to control developments in specific markets are undesirable on both allocation and stabilization grounds. Regulation of interest rates paid by commercial banks and thrift institutions unduly disrupts the allocation function of markets. Furthermore, excessive concern for the well-being of these institutions and the housing industry has caused monetary authorities to expand the money stock at a rapid rate during much of the current inflationary period.

*An article based on the research referred to in this speech is also published in this issue of the *Review*. The article, "Monetary and Fiscal Actions: A Test of Their Relative Importance In Economic Stabilization" by Leonall C. Andersen and Jerry L. Jordan, reports results for a somewhat different time period than discussed in this speech. The results reported in the article strengthen and expand the conclusions discussed here.

Undue concern for the well-being of the Government securities market and the concept of "even keel" during Treasury financing are other impediments to rational monetary management. These considerations have greatly hampered the carrying out of monetary actions designed to influence or to maintain an appropriate rate of expansion in total spending. For example, during the last nine months of 1967 the FOMC imposed the even-keel constraint more than half the time. In those periods the money stock grew at a 12 per cent rate during Treasury financings and at a 4 per cent rate the remainder of the periods. The result was an over-all increase in money at a 7 per cent rate, an excessive rate of increase in view of the mounting inflationary pressures.

In summary, the monetary approach to economic stabilization I have just presented incorporates the following points:

- (1) Public stabilization policies should focus on total spending, allowing markets to filter their influence throughout the economy.
- (2) Monetary actions are a very important influence on changes in total spending.
- (3) The money stock is the best measure of the influence of monetary actions on total spending, given the current state of knowledge.
- (4) Growth in total spending at a rate consistent with price level and employment objectives is more important to the over-all well-being of our citizens than are monetary actions directed toward the welfare of special sectors.

Monetary Interpretation of the Current Economic Situation

I now turn to a monetary interpretation of recent economic developments. As a result of the fiscal actions of last June, it is estimated that the high-employment budget will swing from a \$16 billion deficit (annual rate) in the second quarter of 1968 to a \$15 billion rate of surplus a year later. This \$31 billion turnaround within a year has been cited as a massive dose of fiscal restraint. The money stock continued to rise rapidly up to mid-summer followed by a more moderate rate of growth in the last three months.

For purposes of this analysis, I will use the propositions advanced by the study I reported earlier. It concluded that the response of total spending to monetary actions is much larger than the response to fiscal actions and that the monetary response occurs

within a shorter time period. Applying this proposition, little slowdown in GNP growth should have been expected in the recent third quarter. GNP was under the influence of rapid monetary expansion in the previous two quarters. One factor tending to offset partially the influence of the rapid monetary expansion to July on GNP was the rundown in steel inventories built up in expectation of a steel strike. This factor, however, was not related to stabilization actions.

What does the results of this research imply for the influence of the fiscal package? The impact would come from sources other than those cited last summer. The increase in tax rates by itself, according to our study, would have virtually no influence on total spending, and a reduced rate of increase in Government spending, if implemented, would have only a small direct effect. The main restraining influence of the fiscal package would result from the Government having to finance a smaller deficit, thereby relieving upward pressures on interest rates. Attempts to offset such pressures in the past have induced excessively rapid monetary expansion during inflationary periods.

Growth of GNP during the next three quarters, according to this monetary view, as supplemented by our research, depends largely on the rate of increase in the money stock. If money should rise rapidly, there will be little reduction in the rate of expansion in total spending. Only if the recent slower rate of monetary expansion is continued will there be appropriately slower growth in total spending and a reduction in inflationary pressures.

Conclusion

In conclusion, I want to point out two important implications of this monetary view for the conduct of economic stabilization policies. First, the proposition that monetary actions, measured by movements in the money stock, have a large and immediate effect on total spending implies that the monetary authorities should not engage in activities which cause large swings in growth of money. Second, the proposition that the influence of fiscal actions is comparatively small and longer delayed implies that if we are to have appropriate results from stabilization policies, monetary authorities should not wait for fiscal measures to be undertaken before changing the thrust of their own actions.

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*Monetary and Fiscal Actions: A Test of Their Relative Importance In Economic Stabilization**

HIGH EMPLOYMENT, rising output of goods and services, and relatively stable prices are three widely accepted national economic goals. Responsibility for economic stabilization actions to meet these goals has been assigned to monetary and fiscal authorities. The Federal Reserve System has the major responsibility for monetary management. Fiscal actions involve Federal Government spending plans and taxing provisions. Governmental units involved in fiscal actions are the Congress and the Administration, including the Treasury, the Bureau of the Budget, and the Council of Economic Advisers.

This article reports the results of recent research which tested three commonly held propositions concerning the relative importance of monetary and fiscal actions in implementing economic stabilization policy. These propositions are: The response of economic activity to fiscal actions relative to that of monetary actions is (I) greater, (II) more predictable, and (III) faster. Specific meanings, for the purposes of this article, of the broad terms used in these propositions are presented later.

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

tion policy and are inconsistent with others, as will be pointed out.

A brief discussion of the forces influencing economic activity is presented first. Next, with this theory as a background, specific measures of economic activity, fiscal actions, and monetary actions are selected. The results of testing the three propositions noted above, together with other statements concerning the response of economic activity to monetary and fiscal forces, are then presented. Finally, some implications for the conduct of stabilization policy are drawn from the results of these tests.

A Theoretical View of Economic Activity

Our economic system consists of many markets. Every commodity, service, and financial asset is viewed as constituting an individual market in which a particular item is traded and a price is determined. All of these markets are linked together in varying degrees, since prices in one market influence decisions made in other markets.

About a century ago, Leon Walras outlined a framework for analyzing a complex market economy. Such an analysis includes a demand and a supply relationship for every commodity and for each factor of production. Trading in the markets results in prices being established which clear all markets, i.e., the amount offered in a market equals the amount taken from the market. According to this analysis, outside occurrences reflected in shifts in demand and supply relationships cause changes in market prices and in quantities traded. These outside events include changes in preferences of market participants, in resource endowments, and in technology. Financial assets were not viewed as providing utility or satisfaction to their holders and were therefore excluded from the analysis.

Later developments in economic theory have viewed financial assets as providing flows of services which also provide utility or satisfaction to holders. For example, a holder of a commercial bank time

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deposit receives liquidity service (ease of conversion into the medium of exchange), store of value service (ability to make a future purchase), risk avoidance service (little risk of loss), and a financial yield. According to this later view, economic entities incorporate choices among goods, services, and financial assets into their decision-making processes.

The fact that economic entities make choices in both markets for goods and services and markets for financial assets requires the addition of demand and supply relationships for every financial asset. Market interest rates (prices of financial assets) and changes in the stocks outstanding of most financial assets are determined by the market process along with prices and quantities of goods and services.

These theoretical developments have enlarged the number of independent forces which are regarded as influencing market-determined prices, interest rates, quantities produced of commodities, and stocks outstanding of financial assets. Government and monetary authorities are viewed as exerting independent influences in the market system. These influences are called fiscal and monetary policies or actions. Random events, such as the outbreak of war, strikes in key industries, and prolonged drought, exert other market influences. Growth in world trade and changes in foreign prices and interest rates, relative to our own, influence exports and therefore are largely an outside influence on domestic markets.

Market expectations have also been assigned a significant factor in markets, but these are not viewed as a distinctly independent force. Expectations result from market participants basing their decisions on movements in market-determined variables, or they are derived from market responses to the expected results of random events, such as the outbreak of a war or the anticipation of changes in fiscal or monetary policy.

These dependent and independent market variables are summarized in Exhibit I. The dependent variables are determined by the interplay of market forces which results from changes in the independent variables. Market-determined variables include prices and quantities of goods and services, prices and quantities of factors of production, prices (interest rates) and quantities of financial assets, and expectations. Independent variables consist of slowly changing factors, forces from outside our economy, random events, and forces subject to control by fiscal and monetary authorities. A change in an independent variable (for example, a fiscal or a monetary action) causes changes in many of the market-determined (dependent) variables.

EXHIBIT I

Classification of Market Variables

Dependent Variables

- Prices and quantities of goods and services
- Prices and quantities of factors of production.
- Prices (interest rates) and quantities of financial assets.
- Expectations based on:
 - a. movements in dependent variables.
 - b. expected results of random events.
 - c. expected changes in fiscal and monetary policy.

Independent Variables

- Slowly changing factors:
 - a. preferences.
 - b. technology.
 - c. resources.
 - d. institutional and legal framework.
- Events outside the domestic economy:
 - a. change in total world trade.
 - b. movements in foreign prices and interest rates.
- Random events:
 - a. outbreak of war.
 - b. major strikes.
 - c. weather.
- Forces subject to control by:
 - a. fiscal actions.
 - b. monetary actions.

Measures of Economic Activity and of Monetary and Fiscal Actions

Three theoretical approaches have been advanced by economists for analyzing the influence of monetary and fiscal actions on economic activity. These approaches are the textbook Keynesian analysis derived from economic thought of the late 1930's to the early 1950's, the portfolio approach developed over the last two decades, and the modern quantity theory of money. Each of these theories has led to popular and familiar statements regarding the direction, amount, and timing of fiscal and monetary influences on economic activity. As noted earlier, these theories and their linkages will not be tested directly, but the validity of some of the statements which purport to represent the implications of these theories will be examined. For this purpose, frequently used measures of economic activity, monetary actions and fiscal actions are selected.

Economic Activity

Total spending for goods and services (gross national product at current prices) is used in this article as the measure of economic activity. It consists of total spending on final goods and services by households, businesses, and governments plus net foreign investment. Real output of goods and services is limited by resource endowments and technology, with the actual level of output, within this constraint, determined by the level of total spending and other factors.

Monetary Actions

Monetary actions involve primarily decisions of the Treasury and the Federal Reserve System. Treasury monetary actions consist of variations in its cash holdings, deposits at Federal Reserve banks and at commercial banks, and issuance of Treasury currency. Federal Reserve monetary actions include changes in its portfolio of Government securities, variations in member bank reserve requirements, and changes in the Federal Reserve discount rate. Banks and the public also engage in a form of monetary actions. Commercial bank decisions to hold excess reserves constitute a monetary action. Also, because of differential reserve requirements, the public's decisions to hold varying amounts of time deposits at commercial banks or currency relative to demand deposits are a form of monetary action, but are not viewed as stabilization actions. However they are taken into consideration by stabilization authorities in forming their own actions. Exhibit II summarizes the various sources of monetary actions related to economic stabilization.

The monetary base¹ is considered by both the portfolio and the modern quantity theory schools to be a strategic monetary variable. The monetary base is under direct control of the monetary authorities, with major control exerted by the Federal Reserve

¹The monetary base is derived from a consolidated monetary balance sheet of the Federal Reserve and the Treasury. See Leonall C. Andersen and Jerry L. Jordan, "The Monetary Base: Explanation and Analytical Use," in the August 1968 issue of this *Review*. Since the uses of the base are bank reserves plus currency held by the public, it is often called "demand debt of the Government." See James Tobin, "An Essay on Principles of Debt Management," in *Fiscal and Debt Management Policies*, The Commission on Money and Credit, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1963. In some analyses, Tobin includes short-term Government debt outstanding in the monetary base.

System. Both of these schools consider an increase in the monetary base, other forces constant, to be an expansionary influence on economic activity and a decrease to be a restrictive influence.

The portfolio school holds that a change in the monetary base affects investment spending, and thereby aggregate spending, through changes in market interest rates relative to the supply price of capital (real rate of return on capital). The modern quantity theory holds that the influence of the monetary base works through changes in the money stock which in turn affect prices, interest rates, and spending on goods and services. Increases in the base are reflected in increases in the money stock which in turn result directly and indirectly in increased expenditures on a whole spectrum of capital and consumer goods. Both prices of goods and interest rates form the transmission mechanism in the modern quantity theory.

The money stock is also used as a strategic monetary variable in each of the approaches to stabilization policies, as the above discussion has implied. The simple Keynesian approach postulates that a change in the stock of money relative to its demand results in a change in interest rates. It also postulates that investment spending decisions depend on interest rates, and that growth in aggregate spending depends in turn on these investment decisions. Similarly, in the portfolio school of thought changes in the money stock lead to changes in interest rates, which are followed by substitutions in asset portfolios; then finally, total spending is affected. Interest rates, according to this latter school, are the key part of the transmission mechanism, influencing decisions to hold money versus alternative financial assets as

EXHIBIT II

Stabilization Actions and Their Measurement

STABILIZATION ACTIONS

1. Monetary Actions

Federal Reserve System

- a. open market transactions.
- b. discount rate changes.
- c. reserve requirement changes.

Treasury

- a. changes in cash holdings.
- b. changes in deposits at Reserve banks.
- c. changes in deposits at commercial banks.
- d. changes in Treasury currency outstanding.

2. Fiscal Actions

Government spending programs.
Government taxing provisions.

FREQUENTLY USED

MEASUREMENTS OF ACTIONS

1. Monetary Actions

Monetary base*
Money stock, narrowly defined*
Money plus time deposits
Commercial bank credit
Private demand deposits

2. Fiscal Actions

High-employment expenditures.*
High-employment receipts.*
High-employment surplus.*
Weighted high-employment expenditures.
Weighted high-employment receipts.
Weighted high-employment surplus.
National income account expenditures.
National income account receipts.
Autonomous changes in Government tax rates.
Net Government debt outside of agencies and trust funds.

*Tests based on these measures are reported in this article. The remaining measures were used in additional tests. These results are available on request.

well as decisions to invest in real assets. The influence of changes in the money stock on economic activity, within the modern quantity theory framework, has already been discussed in the previous paragraph.²

The monetary base, as noted, plays an important role in both the portfolio and the modern quantity theory approaches to monetary theory. However, there remains considerable controversy regarding the role of money in determining economic activity, ranging from "money does not matter" to "money is the dominant factor." In recent years there has been a general acceptance that money, among many other influences, is important. Thomas Mayer, in a recent book, summarizes this controversy. He concludes:

"All in all, much recent evidence supports the view that the stock of money and, therefore, monetary policy, has a substantial effect. Note, however, that this reading of the evidence is by no means acceptable to all economists. Some, Professor Friedman and Dr. Warburton for example, argue that changes in the stock of money do have a dominant effect on income, at least in the long run, while others such as Professor Hansen believe that changes in the stock of money are largely offset by opposite changes in velocity."³

The theories aside, changes in the monetary base and changes in the money stock are frequently used as measures of monetary actions. This article, in part, tests the use of these variables for this purpose. Money is narrowly defined as the nonbank public's holdings of demand deposits plus currency. Changes in the money stock mainly reflect movements in the monetary base; however, they also reflect decisions of commercial banks to hold excess reserves, of the nonbank public to hold currency and time deposits, and of the Treasury to hold demand deposits at commercial banks. The monetary base reflects monetary actions of the Federal Reserve, and to a lesser extent, those of the Treasury and gold flows. But changes in the base have been found to be dominated by actions of the Federal Reserve.⁴

Other aggregate measures, such as money plus time deposits, bank credit, and private demand deposits,

are frequently used as monetary indicators (Exhibit II). Tests using these indicators were also made. The results of these tests did not change the conclusions reached in this article; these results are available on request. Market interest rates are not used in this article as strategic monetary variables since they reflect, to a great extent, fiscal actions, expectations and other factors which cannot properly be called monetary actions.

Fiscal Actions

The influence of fiscal actions on economic activity is frequently measured by Federal Government spending, changes in Federal tax rates, or Federal budget deficits and surpluses. The textbook Keynesian view has been reflected in many popular discussions of fiscal influence. The portfolio approach and the modern quantity theory suggest alternative analyses of fiscal influence.

The elementary textbook Keynesian view concentrates almost exclusively on the direct influence of fiscal actions on total spending. Government spending is a direct demand for goods and services. Tax rates affect disposable income, a major determinant of consumer spending, and profits of businesses, a major determinant of investment spending. Budget surpluses and deficits are used as a measure of the net direct influence of spending and taxing on economic activity. More advanced textbooks also include an indirect influence of fiscal actions on economic activity through changes in market interest rates. In either case, little consideration is generally given to the method of financing expenditures.

The portfolio approach as developed by Tobin attributes to fiscal actions both a direct influence on economic activity and an indirect influence. Both influences take into consideration the financing of Government expenditures.⁵ Financing of expenditures by issuance of demand debt of monetary authorities (the monetary base) results in the full Keynesian multiplier effect. Financing by either taxes or borrowing from the public has a smaller multiplier effect on spending. Tobin views this direct influence as temporary.

The indirect influence of fiscal actions, according to Tobin, results from the manner of financing the Government debt, that is, variations in the relative amounts of demand debt, short-term debt, and long-term debt. For example, an expansionary move would be a shift from long-term to short-term debt or a shift from short-term to demand debt. A restrictive action would result from a shift in the opposite direc-

²Also see Leonall C. Andersen and Jerry L. Jordan, "Money in a Modern Quantity Theory Framework" in the December 1967 issue of this *Review*. For an excellent analysis of these three monetary views see David I. Fand, "Keynesian Monetary Theories, Stabilization Policy and the Recent Inflation," a paper presented to the Conference of University Professors, Ditchley Park, Oxfordshire, England, Sept. 13, 1968.

³Thomas Mayer, *Monetary Policy in the United States*, Random House, N. Y., 1968, pp. 148-149.

⁴For a discussion of these points, see: Karl Brunner, "The Role of Money and Monetary Policy," in the July 1968 issue of this *Review*.

⁵Tobin, pp. 143-213.

tion. As in the case of monetary actions, market interest rates on financial assets and their influence on investment spending make up the transmission mechanism.

The modern quantity theory also suggests that the influence of fiscal actions depends on the method of financing Government expenditures. This approach maintains that financing expenditures by either taxing or borrowing from the public involves a transfer of command over resources from the public to the Government. However, the net influence on total spending resulting from interest rate and wealth changes is ambiguous. Only a deficit financed by the monetary system is necessarily expansionary.⁶

High-employment budget concepts have been developed as measures of the influence of fiscal actions on economic activity.⁷ In these budget concepts, expenditures include both those for goods and services and those for transfer payments, adjusted for the influence of economic activity. Receipts, similarly adjusted, primarily reflect legislated changes in Federal Government tax rates, including Social Security taxes. The net of receipts and expenditures is used as a net measure of changes in expenditure provisions and in tax rates. These high-employment concepts are used in this article as measures of fiscal actions (Exhibit II). Tests were also made alternatively using national income account Government expenditures and receipts, a series measuring autonomous changes in Government tax rates, a weighted high-employment expenditure and receipt series, and a series of U. S. Government debt held by the public plus Federal Reserve holdings of U. S. Government securities. These tests did not change the conclusions reached in this article. Results of these tests are available on request.

⁶The importance of not overlooking the financial aspects of fiscal policy is emphasized by Carl F. Christ in "A Simple Macroeconomic Model with a Government Budget Restraint," *Journal of Political Economy*, Vol. 76, No. 1, January/February 1968, pp. 53-67. Christ summarizes (pages 53 and 54) that "the multiplier effect of a change in government purchases cannot be defined until it is decided how to finance the purchases, and the value of the multiplier given by the generally accepted analysis [which ignores the government budget restraint] is in general incorrect . . . (the) multiplier effect of government purchases may be greater or less than the value obtained by ignoring the budget restraint, depending on whether the method of financing is mainly by printing money or mainly by taxation."

⁷See Keith M. Carlson, "Estimates of the High-Employment Budget: 1947-1967," in the June 1967 issue of this *Review*. The high-employment budget concept was used in the *Annual Report of the Council of Economic Advisors* from 1962 to 1966. For a recent analysis using the high-employment budget, see "Federal Fiscal Policy in the 1960's," *Federal Reserve Bulletin*, September 1968, pp. 701-718. According to this article, "the concept does provide a more meaningful measure of the Federal budgetary impact than the published measures of actual Federal surplus or deficit taken by themselves."

Other Influences

Measures of other independent forces which influence economic activity are not used in this article. Yet this should not be construed to imply that these forces are not important. It is accepted by all economists that the non-monetary and non-fiscal forces listed in Exhibit I have an important influence on economic activity. However, recognition of the existence of these "other forces" does not preclude the testing of propositions relating to the relative importance of monetary and fiscal forces. The analysis presented in this study provides indirect evidence bearing on these "other forces." The interested reader is encouraged to read the technical note presented in the Appendix to this article before proceeding.

Testing the Propositions

This section reports the results of testing the three propositions under consideration. First, the concept of testing a hypothesis is briefly discussed. Next, the results of regression analyses which relate the measures of fiscal and monetary actions to total spending are reported. Finally, statistics developed from the regression analyses are used to test the specific propositions.

The Concept of Testing a Hypothesis

In scientific methodology, testing a hypothesis consists of the statement of the hypothesis, deriving by means of logic testable consequences expected from it, and then taking observations from past experience which show the presence or absence of the expected consequences. If the expected consequences do not occur, then the hypothesis is said to be "not confirmed" by the evidence. If, on the other hand, the expected consequences occur, the hypothesis is said to be "confirmed."

It is important to keep the following point in mind. In scientific testing, a hypothesis (or conjecture) may be found "not confirmed" and therefore refuted as the explanation of the relationship under examination. However, if it is found to be "confirmed," the hypothesis cannot be said to have been proven true. In the latter case, however, the hypothesis remains an acceptable proposition of a real world relationship as long as it is found to be "confirmed" in future tests.⁸

⁸For a detailed discussion of testing hypotheses in reference to monetary actions, see Albert E. Burger and Leonall C. Andersen, "The Development of Testable Hypotheses for Monetary Management," a paper presented at the annual meeting of the Southern Finance Association, November 8, 1968. It will appear in a forthcoming issue of the *Southern Journal of Business*, University of Georgia, Athens, Georgia.

The results presented in this study all bear on what is commonly called a "reduced form" in economics. A reduced-form equation is a derivable consequence of a system of equations which may be hypothesized to represent the structure of the economy (i.e., a so-called structural model). In other words, all of the factors and causal relations which determine total spending (GNP) are "summarized" in one equation. This reduced-form equation postulates a certain relationship over time between the independent variables and the dependent variable — total spending. Using appropriate statistical procedures and selected measures of variables, it is possible to test whether or not the implications of the reduced-form equation have occurred in the past. If the implied relationships are not confirmed, then the relationship asserted by the reduced-form equation is said to have been refuted. However, not confirming the reduced form does not necessarily mean that the whole "model," and all of the factors and causal relations contained in it, are denied. It may be only that one or more of the structural linkages of the model is incorrect, or that the empirical surrogates chosen as measures of monetary or fiscal influence are not appropriate.⁹

Frequently one encounters statements or conjectures regarding factors which are asserted to influence economic activity in a specific way. These statements take the form of reduced-form equations, and are sometimes attributed to various theories of the determination of economic activity. As stated previously, this study does not attempt to test the causal linkages by which fiscal and monetary actions influence total spending, but is concerned only with the confirmation or refutation of rival conjectures regarding the strength and reliability of fiscal and monetary actions based on frequently used indicators of such actions.

Measuring the Empirical Relationships

As a step toward analyzing the three propositions put forth earlier, empirical relationships between the measures of fiscal and monetary actions and total spending are established. These relationships are developed by regressing quarter-to-quarter changes in GNP on quarter-to-quarter changes in the money stock (M) and in the various measures of fiscal actions: high-employment budget surplus (R-E), high-employment expenditures (E), and high-employment receipts (R). Similar equations were estimated where changes in the monetary base (B) were used in place of the money stock.

Changes in all variables were computed by two

⁹A more specific statement relating to these considerations is presented in the Appendix.

methods. Conventional first differences were calculated by subtracting the value for the preceding quarter from the value for the present quarter.¹⁰ The other method used is an averaging procedure used by Kareken and Solow called central differences.¹¹ The structure of lags present in the regressions was estimated with use of the Almon lag technique.¹² The data are seasonally adjusted quarterly averages for the period from the first quarter of 1952 to the second quarter of 1968.¹³

As discussed previously, statements are frequently made from which certain relationships are expected to exist between measures of economic activity on the one hand and measures of monetary and fiscal actions on the other hand. Such relationships consist of a direct influence of an action on GNP and of an indirect influence which reflects interactions among the many markets for real and financial assets. These interactions work through the market mechanism determining the dependent variables listed in Exhibit I. The postulated relationships are the total of these direct and indirect influences. Thus, the empirical relationship embodied in each regression coefficient is the *total* response (including both direct and indirect responses) of GNP to changes in each measure of a stabilization action, assuming all other forces remain constant.

The results presented here do not provide a basis for separating the direct and indirect influences of monetary and fiscal forces on total spending, but this division is irrelevant for the purposes of this article. The interested reader is referred to the Appendix for further elaboration of these points.

¹⁰Changes in GNP, R and E are quarterly changes in billions of dollars measured at annual rates, while changes in M and B are quarterly changes in billions of dollars. Changes in GNP, R and E are changes in flows, whereas changes in M and B are changes in a stock. Since all of the time series have strong trends, first differences tend to increase in size over time. Statistical considerations indicate that per cent first differences would be more appropriate. On the other hand, regular first differences provide estimates of multipliers which are more useful for the purposes of this study. Test regressions of relative changes were run and they did not alter the conclusions of this article.

¹¹John Kareken and Robert M. Solow, "Lags in Monetary Policy" in *Stabilization Policies* of the research studies prepared for the Commission on Money and Credit, Prentice-Hall, Inc., 1962, pp. 18-21.

¹²Shirley Almon, "The Distributed Lag Between Capital Appropriations and Expenditures," *Econometrica*, Vol. 33, No. 1, January 1965, pp. 178-196.

¹³As a test for structural shifts, the test period was divided into two equal parts and the regressions reported here were run for each sub-period and for the whole period. The Chow test for structural changes accepted the hypothesis that the sets of parameters estimated for each of the sub-periods were not different from each other or from those estimated for the whole period, at the five per cent level of significance. As a result, there is no evidence of a structural shift; consequently, the whole period was used.

Using the total response concept, changes in GNP are expected to be positively related to changes in the money stock (M) or changes in the monetary base (B). With regard to the high-employment surplus (receipts minus expenditures), a larger surplus or a smaller deficit is expected to have a negative influence on GNP, and conversely. Changes in high-employment expenditures (E) are expected to have a positive influence and changes in receipts (R) are expected to have a negative influence when these variables are included separately.

Considering that the primary purpose of this study is to measure the influence of a few major forces on changes in GNP, rather than to identify and measure the influences of all independent forces, the results obtained are quite good (Table I). The R^2 statistic, a measure of the per cent of the variance in changes in GNP explained by the regression equation, ranges from .53 to .73; these values are usually considered

to be quite good when first differences are used rather than levels of the data. All of the estimated regression coefficients for changes in the money stock or the monetary base have the signs implied in the above discussion (equations 1.1 to 2.4 in Table I) and have a high statistical significance in most cases. The estimated coefficients for the high-employment measures of fiscal influence do not have the expected signs in all cases and generally are of low statistical significance. These regression results are discussed in greater detail below.

Money and the Monetary Base — The total response of GNP to changes in money or the monetary base distributed over four quarters is consistent with the postulated relationship (i.e. a positive relationship), and the coefficients are all statistically significant. The coefficients of each measure of monetary action may be summed to provide an indication of the overall response of GNP to changes in monetary actions.

TABLE I:

Regression of Changes in GNP on Changes in Monetary and Fiscal Actions

First Differences	(Equation 1.1)		(Equation 1.2)			(Equation 1.3)		(Equation 1.4)		
	ΔM	$\Delta(R-E)$	ΔM	ΔE	ΔR	ΔM	ΔE	ΔB	ΔE	ΔR
t	1.57* (2.17)	-.15 (.65)	1.51* (2.03)	.36 (1.15)	.16 (.53)	1.54* (2.47)	.40 (1.48)	1.02 (.49)	.23 (.67)	.52 (1.68)
t-1	1.94* (3.60)	-.20 (1.08)	1.59* (2.85)	.53* (2.15)	-.01 (.03)	1.56* (3.43)	.54* (2.68)	5.46* (3.37)	.37 (1.36)	.02 (.07)
t-2	1.80* (3.37)	.10 (.55)	1.47* (2.69)	-.05 (.19)	-.03 (.10)	1.44* (3.18)	-.03 (.13)	6.48* (4.10)	-.21 (.84)	-.17 (.64)
t-3	1.28 (1.88)	.47* (1.95)	1.27 (1.82)	-.78* (2.82)	.11 (.32)	1.29* (2.00)	-.74* (2.85)	3.05 (1.54)	-.93* (3.10)	.14 (.39)
Sum	6.59* (7.73)	.22 (.45)	5.84* (6.57)	.07 (.13)	.23 (.32)	5.83* (7.25)	.17 (.54)	16.01* (5.67)	-.54 (.89)	.51 (.67)
Constant	1.99* (2.16)		2.10 (1.88)			2.28* (2.76)		1.55 (1.22)		
R^2	.56		.58			.60		.53		
S.E.	4.24		4.11			4.01		4.35		
D-W	1.54		1.80			1.78		1.71		

Central Differences	(Equation 2.1)		(Equation 2.2)			(Equation 2.3)		(Equation 2.4)		
	ΔM	$\Delta(R-E)$	ΔM	ΔE	ΔR	ΔM	ΔE	ΔB	ΔE	ΔR
t	1.50 (1.84)	-.24 (.91)	1.58* (2.01)	.53 (1.52)	.32 (1.05)	1.54* (2.45)	.63* (2.21)	.61 (.28)	.28 (.73)	.87* (2.55)
t-1	2.11* (3.61)	-.23 (1.16)	1.57* (2.78)	.60* (2.44)	-.04 (.17)	1.63* (3.57)	.59* (2.61)	5.42* (3.16)	.50 (1.87)	-.07 (.27)
t-2	1.89* (3.18)	.15 (.81)	1.41* (2.45)	-.15 (.60)	-.11 (.47)	1.43* (3.16)	-.16 (.71)	6.87* (3.92)	-.27 (1.04)	-.33 (1.31)
t-3	1.06 (1.36)	.52 (1.90)	1.26 (1.72)	-.96* (3.15)	.18 (.48)	1.13 (1.71)	-.86* (3.07)	3.51 (1.71)	-1.26* (3.65)	.35 (.87)
Sum	6.56* (8.16)	.21 (.47)	5.80* (7.57)	.02 (.04)	.34 (.54)	5.74* (8.45)	.19 (.77)	16.41* (6.95)	-.75 (1.37)	.82 (1.16)
Constant	2.02* (2.48)		2.00* (2.14)			2.30* (3.55)		1.24 (1.14)		
R^2	.66		.72			.73		.67		
S.E.	3.35		3.03			2.97		3.26		
D-W	.88		1.14			1.13		1.05		

Note: Regression coefficients are the top figures, and their "t" values appear below each coefficient enclosed by parentheses. The regression coefficients marked by an asterisk (*) are statistically significant at the 5 per cent level. R^2 are adjusted for degrees of freedom. S.E. is the standard error of the estimate, and D-W is the Durbin-Watson statistic.

These summed coefficients are also statistically significant and consistent with the postulated relationships. The results obtained for measures of monetary actions were not affected significantly when measures of fiscal actions other than those reported here were used in the regressions.

High-Employment Budget Surplus — As pointed out previously, the high-employment surplus or deficit is often used as a measure of the direction and strength of fiscal actions. Equation 1.1 summarizes the total response of GNP to changes in money and changes in the high-employment surplus. The coefficients of the high-employment surplus estimated for the contemporaneous and first lagged quarter have the expected sign, but the coefficients are of very low statistical significance and do not differ significantly from zero. The signs of the coefficients estimated for the second and third lagged quarters are opposite to the expected signs. The sum of the coefficients (total response distributed over four quarters) is estimated to have a positive sign (opposite the postulated sign) but is not statistically significant. These results provide no empirical support for the view that fiscal actions measured by the high-employment surplus have a significant influence on GNP. In principle, these results may have occurred either because the high-employment surplus was not a good measure of fiscal influence, or because fiscal influence was not important during the sample period.¹⁴

Expenditures and Receipts — Simple textbook Keynesian models of income determination usually demonstrate, theoretically, that changes in tax rates exert a negative influence on economic activity, while changes in Government expenditures exert a positive influence. Equations 1.2 and 1.3 provide tests of these propositions. The signs of the coefficients estimated for tax receipts are the same as the hypothesized signs for only the first and second lagged quarters. However, since these coefficients (individually and the sums) are of low statistical significance, no importance can be attached to this variable. Inclusion of changes in receipts (ΔR) in equation 1.2 does not improve the over-

all results, in terms of R^2 and the standard error of estimate, compared with equation 1.3 from which receipts are excluded.

These results provide no support for theories which indicate that changes in tax receipts due to changes in tax rates exert an overall negative (or any) influence on economic activity. The results are consistent with theories which indicate that if the alternative to tax revenue is borrowing from the public in order to finance Government spending, then the influence of spending will not necessarily be greater if the funds are borrowed rather than obtained through taxation. They are also consistent with the theory that consumers will maintain consumption levels at the expense of saving when there is a temporary reduction in disposable income.

The signs of the coefficients estimated for high-employment expenditures in equations 1.2 and 1.3 indicate that an increase in Government expenditures is mildly stimulative in the quarter in which spending is increased and in the following quarter. However, in the subsequent two quarters this increase in expenditures causes offsetting negative influences. The overall effect of a change in expenditures distributed over four quarters, indicated by the sum, is relatively small and not statistically significant. These results are consistent with modern quantity theories which hold that Government spending, taxing and borrowing policies would have, through interest rate and wealth effects, different impacts on economic activity under varying circumstances.¹⁵

Three Propositions Tested

The empirical relationships developed relating changes in GNP to changes in the money stock and changes in high-employment expenditures and receipts are used to test the three propositions under consideration. The results of testing the propositions using changes in the money stock are discussed in detail in this section. Similar results are reported in the accompanying tables using changes in the monetary base instead of the money stock. Conclusions drawn using either measure of monetary actions are similar.

¹⁴It was suggested to the authors that a weighted high-employment budget surplus might be a better measure of fiscal influence than the usual unweighted series. For an elaboration of such a weighted series, see Edward M. Gramlich, "Measures of the Aggregate Demand Impact of the Federal Budget," in *Staff Papers of the President's Commission on Budget Concepts*, U.S. Government Printing Office, Washington, D.C., October 1967. Gramlich provided weights from the FRB-MIT model of the economy for constructing a weighted series. It was further suggested that the level of the high-employment budget surplus was a more appropriate measure of fiscal actions. Coefficients of fiscal influence were estimated using both changes in the weighted series, and levels of the high-employment surplus. The results did not change any of the conclusions of this article.

¹⁵John Culbertson points out that in a financially constrained economy (i.e., no monetary expansion to finance Government expenditures), expenditures by the Government financed in debt markets in competition with private expenditures can very possibly "crowd out of the market an equal (or conceivably even greater) volume that would have financed private expenditures." He asserts that it is possible to have a short-lived effect of Government spending on total spending if the financial offsets lag behind its positive effects. The results obtained for ΔE in this article are consistent with his analysis. See John M. Culbertson, *Macroeconomic Theory and Stabilization Policy*, McGraw-Hill Inc., New York, 1968, pp. 462-63.

TABLE II:

Measurements of the Relative Importance of Monetary and Fiscal Actions

First Differences (equations 1.2 and 1.4)

Quarter	Beta Coefficients						Partial Coefficients of Determination					
	ΔM	ΔE	ΔR	ΔB	ΔE	ΔR	ΔM	ΔE	ΔR	ΔB	ΔE	ΔR
t	.24	.14	.05	.06	.09	.16	.07	.02	.01	*	.01	.05
t-1	.26	.20	*	.31	.14	.01	.14	.08	*	.18	.03	*
t-2	.24	-.02	-.01	.37	-.08	-.05	.12	*	*	.24	.01	.01
t-3	.20	-.30	.03	.17	-.36	.04	.06	.13	*	.04	.16	*
Sum	.94	.02	.07	.91	-.21	.16	.45	*	*	.38	.02	.01

Central Differences (equations 2.2 and 2.4)

Quarter	Beta Coefficients						Partial Coefficients of Determination					
	ΔM	ΔE	ΔR	ΔB	ΔE	ΔR	ΔM	ΔE	ΔR	ΔB	ΔE	ΔR
t	.26	.20	.09	.04	.11	.25	.07	.04	.02	*	.01	.11
t-1	.26	.23	-.01	.31	.19	-.02	.13	.10	*	.16	.06	*
t-2	.23	-.06	-.03	.40	-.10	-.09	.11	.01	*	.23	.02	.03
t-3	.20	-.36	.05	.20	-.47	.10	.05	.16	*	.05	.21	.01
Sum	.95	.01	.10	.95	-.27	.24	.53	*	.01	.49	.04	.03

* Less than .005.

Proposition I states that fiscal actions exert a larger influence on economic activity than do monetary actions. A test of this proposition involves an examination of the size of the regression coefficients for high-employment expenditures relative to those for money and the monetary base.¹⁶ Proposition I implies that the coefficients for ΔE would be larger, without regard to sign, than those for ΔM and ΔB .

The coefficients presented in Table I are not appropriate for this test because the variables have different time dimensions and are a mixture of stocks and flows. An appropriate measure is developed by changing these regression coefficients to "beta coefficients" which eliminate these difficulties (Table II). These coefficients take into consideration the past variation of changes in each independent variable relative to the past variation of changes in GNP.¹⁷ The size of beta coefficients may be, therefore, directly compared as a measure of the relative contribution of each variable to variations in GNP in the test period.

According to Table II, the beta coefficients for changes in money are greater than those for changes in high-employment expenditures for the quarter in which a change occurs and during the two following quarters. The coefficients for changes in the monetary base are greater for the two quarters immediately following a change in the base. In the lagged quarters in which the beta coefficients for ΔE are largest, a negative sign is associated with the regression coefficient, indicating a lagged contractionary effect of increased expenditures. As a measure of the total contribution over the four quarters, the sum of the beta coefficients

for changes in money and the monetary base are much greater than those for changes in expenditures.

Proposition I may also be tested by the use of partial coefficients of determination. These statistics are measures of the percent of variation of the dependent variable remaining after the variation accounted for by all other variables in the regression has been subtracted from the total variation. Proposition I implies that larger coefficients should be observed for fiscal actions than for monetary actions. Table II presents the partial coefficients of determination for the variables under consideration. For the quarter of a change and the subsequent two quarters, these coefficients for ΔM are much greater than those for ΔE . With regard to ΔB , the coefficients are about equal to those for ΔE in the first quarter and are much greater in the two subsequent quarters. The partial coefficients of determination for the total contribution of each policy variable to changes in GNP over four quarters may be developed. Table II shows that the partial coefficients of determination for the over-all response of ΔGNP to ΔM and ΔB range from .38 to .53, while those for ΔE are virtually zero.

Other implications of the results presented in Table I may be used to test further the relative strength of the response of GNP to alternative government actions under conditions where "other things" are held constant. Three alternative actions are assumed taken by stabilization authorities: (1) the rate of government spending is increased by \$1 billion and is financed by either borrowing from the public or increasing taxes; (2) the money stock is increased by \$1 billion with no change in the budget position; and (3) the rate of government spending is increased by \$1 billion for a year and is financed by increasing the money stock by an equal amount.

¹⁶Since little response of GNP to ΔR was found, further discussions consider only ΔE .

¹⁷Arthur S. Goldberger, *Econometric Theory*. John Wiley & Sons, Inc., December 1966, New York, New York, pp. 197-200.

Table III:

**Simulated Response of an Increase in Government
Expenditures Financed by Monetary Expansion**
(Millions of dollars)

Quarter	Increase in Government Expenditures			Required Increase in Money			Total Response in GNP	
	Change in Expenditures	Impact Effect on GNP	Cumulative Effect on GNP	Change in Money Stock	Impact Effect on GNP	Cumulative Effect on GNP	Impact Effect on GNP	Cumulative Effect on GNP
1	\$1000	\$400	\$400	\$250	\$ 385	\$ 385	\$ 785	\$ 785
2	0	540	940	250	775	1160	1315	2100
3	0	— 30	910	250	1135	2295	1105	3205
4	0	— 740	170	250	1458	3753	718	3923
5	— 1000	— 400	— 230	0	1072	4825	672	4595
6	0	— 540	— 770	0	682	5507	142	4737
7	0	30	— 740	0	323	5830	353	5090
8	0	740	0	0	0	5830	740	5830

The impact on total spending of the first two actions may be measured by using the sums of the regression coefficients presented for equation 1.3. A billion dollar increase in the rate of government spending would, after four quarters, result in a permanent increase of \$170 million in GNP. By comparison, an increase of the same magnitude in money would result in GNP being \$5.8 billion permanently higher after four quarters.

The results of the last action are presented in Table III.¹⁸ The annual rate of government spending is assumed to be increased by \$1 billion in the first quarter and held at that rate for the following three quarters. This would require an increase in money of \$250 million during each of the four quarters to finance the higher level of expenditures. Since we are interested only in the result of financing the original increase in expenditures by monetary expansion, expenditures must be reduced by \$1 billion in the fifth quarter. If expenditures were held at the higher rate, money would have to continue to grow \$250 million per quarter. According to Table III, GNP would rise to a permanent level \$5.8 billion higher than at the beginning. This increase in GNP results entirely from monetary expansion.

According to these three tests, the regression results implied by Proposition I did not occur. Therefore, the proposition that the response of total demand to fiscal actions is greater than that of monetary actions is not confirmed by the evidence.

¹⁸The authors wish to give special thanks to Milton Friedman for suggesting this illustration and Table III. However, the formulation presented here is the sole responsibility of the authors.

Proposition II holds that the response of economic activity to fiscal actions is more predictable than the response to monetary influence. This implies that the regression coefficients relative to their standard errors (this ratio is called the "t-value"), relating changes in E to changes in GNP, should be greater than the corresponding measures for changes in M and in B. The greater the t-value, the more confidence there is in the estimated regression coefficient, and hence, the greater is the reliability of the estimated change in GNP resulting from a change in the variable. These t-values are presented in Table IV.

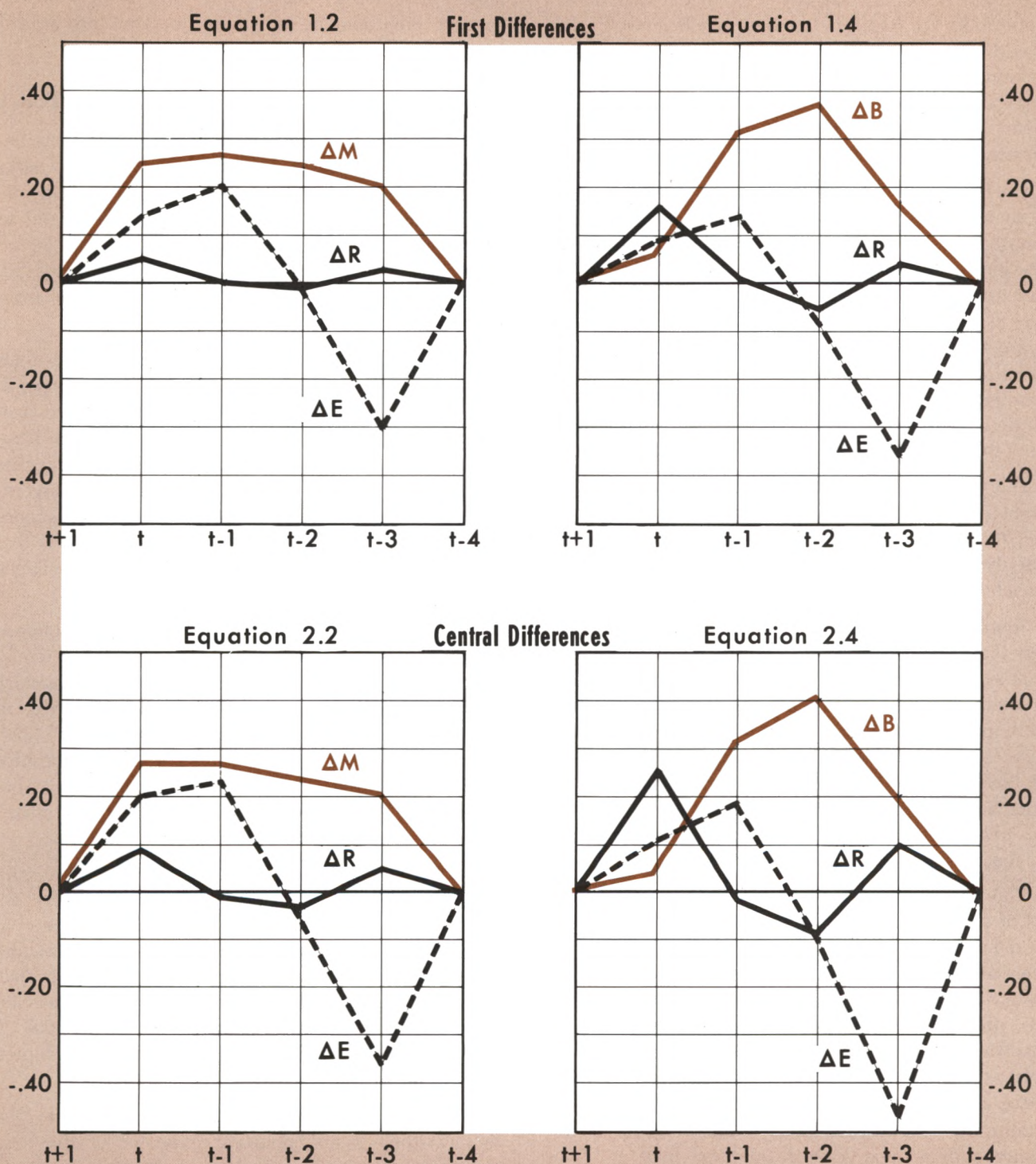
An examination of this table indicates greater t-values for the regression coefficients of the two monetary variables than for the fiscal variable, except for the third quarter after a change. Also, the t-values for the sum of the regression coefficients for ΔM and ΔB are large, while those for ΔE are not statistically significant from zero. Since the regression results implied by Proposition II did not appear, the proposition is not confirmed.

TABLE IV:
**Measurement of Reliability of the Response of GNP
to Monetary and Fiscal Actions**
("t-values" of Regression Coefficients¹)

Quarter	First Differences					
	ΔM	ΔE	ΔR	ΔB	ΔE	ΔR
t	2.03	1.15	0.53	0.49	0.67	1.68
t-1	2.85	2.15	0.03	3.37	1.36	0.07
t-2	2.69	0.19	0.10	4.10	0.84	0.64
t-3	1.82	2.82	0.32	1.54	3.10	0.39
sum	6.57	0.13	0.32	5.67	0.89	0.67
Quarter	Central Differences					
	ΔM	ΔE	ΔR	ΔB	ΔE	ΔR
t	2.01	1.52	1.05	0.28	0.73	2.55
t-1	2.78	2.44	0.17	3.16	1.87	0.27
t-2	2.45	0.60	0.46	3.92	1.04	1.31
t-3	1.72	3.15	0.48	1.71	3.65	0.87
sum	7.57	0.04	0.54	6.95	1.37	1.16

¹t-values associated with equations 1.2, 1.4, 2.2 and 2.4 in Table I.

Measures of Lag Response



Beta coefficients are for changes in the money stock (ΔM), the monetary base (ΔB), high-employment expenditures (ΔE), and high-employment receipts (ΔR). These beta coefficients are calculated as the products of the regression coefficient for the respective variables times the ratio of the standard deviation of the variable to the standard deviation of GNP.

Proposition III states that the influence of fiscal actions on economic activity occurs faster than that of monetary actions. It is tested by examining the characteristics of the lag structure in the regressions. Proposition III implies that beta coefficients for ΔE should be greater than those for ΔM in the quarter of a change and in those immediately following. It also implies that the main response of GNP to fiscal actions occurs within fewer quarters than its response to monetary actions.

The beta coefficients are plotted in the above chart.¹⁸ A change in the money stock induces a large and almost equal response in each of the four quarters. The largest response of GNP to changes in the monetary base occurs in the first and second quarters after a change. The beta coefficients for changes in M are greater than those for changes in E for the quarter of a change and the following quarter, indicating comparatively smaller response of GNP to fiscal actions in these first two quarters. Moreover, the largest coefficient for ΔE occurs for the third quarter after a change.

The expected regression results implied by Proposition III were not found. Therefore, the proposition that the major impact of fiscal influence on economic activity occurs within a shorter time interval than monetary influence is not confirmed.

Summary — This section tested the propositions that the response of economic activity to fiscal actions relative to monetary actions is (I) larger, (II) more predictable, and (III) faster. The results of the tests were not consistent with any of these propositions. Consequently, either the commonly used measures of fiscal influence do not correctly indicate the degree and direction of such influence, or there was no measurable net fiscal influence on total spending in the test period.

The test results are consistent with an alternative set of propositions. The response of economic activity to monetary actions compared with that of fiscal actions is (I') larger, (II') more predictable, and (III') faster. It should be remembered that these alternative propositions have not been proven true, but this is always the case in scientific testing of hypothesized relationships. Nevertheless, it is asserted here that these alternative propositions are appropriate for the conduct of stabilization policy until evidence is presented proving one or more of them false.

¹⁸The Almon lag structure was developed by using a fourth degree polynomial and constraining the coefficients for $t-4$ to zero. The regressions indicate that four quarters constitute an appropriate response period for both fiscal and monetary actions. Equations using up to seven lagged quarters were also estimated, but there was little response in GNP to fiscal and monetary actions beyond the three quarter lags reported.

There is a major qualification to these statements. Since the propositions were tested using the period first quarter 1952 to second quarter 1968, it is implicitly assumed in making these statements that the general environment prevailing in the test period holds for the immediate future.

Implications for Economic Stabilization Policy

Rejection of the three propositions under examination and acceptance of the alternatives offered carry important implications for the conduct of economic stabilization policy. All of these implications point to the advisability of greater reliance being placed on monetary actions than on fiscal actions. Such a reliance would represent a marked departure from most present procedures.

The finding that statements which assert that changes in tax rates have a significant influence on total spending are not supported by this empirical investigation suggests that past efforts in this regard have been overly optimistic. Furthermore, the finding that the response of total spending to changes in Government expenditures is small compared with the response of spending to monetary actions strongly suggests that it would be more appropriate to place greater reliance on the latter form of stabilization action.

Finding of a strong empirical relationship between economic activity and either of the measures of monetary actions points to the conclusion that monetary actions can and should play a more prominent role in economic stabilization than they have up to now. Furthermore, failure to recognize these relationships can lead to undesired changes in economic activity because of the relatively short lags and strong effects attributable to monetary actions.

Evidence was found which is consistent with the proposition that the influence of monetary actions on economic activity is more certain than that of fiscal actions. Since monetary influence was also found to be stronger and to operate more quickly than fiscal influence, it would appear to be inappropriate, for stabilization purposes, for monetary authorities to wait very long for a desired fiscal action to be adopted and implemented.

Evidence found in this study suggests that the money stock is an important indicator of the total thrust of stabilization actions, both monetary and fiscal. This point is argued on two grounds. First, changes in the money stock reflect mainly what may be called discretionary actions of the Federal Reserve System as it uses its major instruments of monetary management — open market transactions, discount rate

changes, and reserve requirement changes. Second, the money stock reflects the joint actions of the Treasury and the Federal Reserve System in financing newly created Government debt. Such actions are based on decisions regarding the monetization of new debt by Federal Reserve actions, and Treasury decisions regarding changes in its balances at Reserve banks and commercial banks. According to this second point, changes in Government spending financed by monetary expansion are reflected in changes in the monetary base and in the money stock.

A number of economists maintain that the major influence of fiscal actions results only if expenditures are financed by monetary expansion. In practice, the Federal Reserve does not buy securities from the Government. Instead, its open market operations and other actions provide funds in the markets in which both the Government and private sectors borrow.

The relationships expressed in Table I may be used to project the expected course of GNP, given alternative assumptions about monetary and fiscal actions. Such projections necessarily assume that the environment in the period used for estimation and the average relationships of the recent past hold in the future. The projections are not able to take into consideration the influences of other independent forces; therefore, they are not suitable for exact forecasting purposes. However, they do provide a useful measure of monetary and fiscal influences on economic activity.

An example of such projections using equation 1.3 is presented in Table V. Equation 1.3 related quarter-to-quarter changes in GNP to changes in the money stock and changes in high-employment expenditures, both distributed over four quarters.

Assumptions used in computing the projections of quarterly changes in GNP reported in Table V include: (a) high-employment expenditures were projected through the second quarter of 1969 under the assump-

TABLE V:

**Projected Change in GNP With
Alternative Rates of Change in Money Stock¹**

Quarter	Assumed Rates of Change in Money Stock ²			
	2%	4%	6%	8%
1968/III ³	17.9	17.9	17.9	17.9
IV	14.6	16.0	17.5	19.0
1969/I	12.0	15.0	18.0	20.7
II	11.0	15.2	19.4	23.7
III	6.8	12.3	18.0	23.4
IV	8.0	13.7	19.4	25.2

¹First differences of quarterly data. All variables are in billions of dollars. Projections are based on coefficients of equation 1.3 in Table I.

²Assumed alternative rates of change in the money stock from III/68 to IV/69.

³Preliminary estimate by the Department of Commerce.

tion that Federal spending in fiscal 1969 will be about 5 per cent (or \$10 billion) greater than fiscal 1968; (b) Federal spending was assumed to continue increasing at a 5 to 6 per cent rate in the first two quarters of fiscal 1970; and (c) quarter-to-quarter changes in the money stock were projected from III/68 to IV/69 for four alternative constant annual growth rates for money: 2 per cent, 4 per cent, 6 per cent, and 8 per cent.

The highest growth rate of the money stock (8 per cent) indicates continued rapid rates of expansion in GNP during the next five quarters. The slowest growth rate of money (2 per cent) indicates some slowing of GNP growth in the fourth quarter of this year and further gradual slowing throughout most of next year.

The projections indicate that if the recent decelerated growth in the money stock (less than 4 per cent from July to October) is continued, and growth of Government spending is at about the rate indicated above, the economy would probably reach a non-inflationary growth rate of GNP in about the third quarter of 1969 and would then accelerate slightly. These projections, of course, make no assumptions regarding the Vietnam war, strikes, agricultural situations, civil disorders, or any of the many other noncontrollable exogenous forces.

LEONALL C. ANDERSEN

JERRY L. JORDAN

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APPENDIX¹

The specific hypothesis underlying the analysis in this study is expressed by the following relation:

$$(1) Y = f(E, R, M, Z),$$

where: Y = total spending;

E = a variable summarizing government expenditure actions;

R = a variable summarizing government taxing actions;

M = a variable summarizing monetary actions;

Z = a variable summarizing all other forces that influence total spending.²

Expressing this relation in terms of the changes of each variable yields:

$$(2) \Delta Y = f(\Delta E, \Delta R, \Delta M, \Delta Z).$$

If this relation (2) were empirically estimated, the following would be obtained:³

$$(3) \Delta Y = \alpha_1 \Delta E + \alpha_2 \Delta R + \alpha_3 \Delta M + \alpha_4 \Delta Z,$$

where the values for α_1 , α_2 , α_3 , and α_4 are estimated by regression of the observed values of ΔY on the observed values of ΔE , ΔR , ΔM and ΔZ . In (3) the value of the coefficients (α 's) are the total response of ΔY to changes in each of the four independent variables.

As discussed in the text, time series for E , R and M have been selected on the basis of frequently used indicators or measures of fiscal and monetary actions. The purpose of this study was to test some frequently encountered rival conjectures regarding the influence of fiscal and monetary forces on economic activity, not to quantify all forces influencing our economy. Therefore, attention here has been directed toward estimating the magnitude and statistical reliability of the response of ΔY to ΔE , ΔR , and ΔM . However, ΔZ cannot be simply ignored.

The reader will note that there is no constant term in equation (3) since the effect of "all other forces" influencing spending are summarized by $\alpha_4 \Delta Z$. However, in the results reported in Table I of this study, a constant term is reported for each equation. These constant terms are an estimate of α_4 times the average autonomous non-monetary and non-fiscal forces summarized in Z .

In a complex market economy, it is possible for monetary and fiscal actions to exert an indirect as well as a direct influence on ΔY . This indirect influence would

operate through ΔZ . One form of the relation between ΔZ and monetary and fiscal forces is shown by:

$$(4) \Delta Z = b_0 + b_1 \Delta E + b_2 \Delta R + b_3 \Delta M.$$

The empirical values of α_1 , α_2 , and α_3 , which were estimated by regression analysis and reported in this study, embody both the direct and the indirect responses of total spending to monetary and fiscal actions. Using ΔE as an example, the expression $(a_1 + b_1 a_4)$ is an estimate of α_1 , the total response of ΔY to ΔE . The direct response is a_1 , and the indirect response is $b_1 a_4$. Consequently, the equation estimated and reported in this study (for example, equation 1.2 in Table I) is:

$$(5) \Delta Y = b_0 a_4 + (a_1 + b_1 a_4) \Delta E + (a_2 + b_2 a_4) \Delta R + (a_3 + b_3 a_4) \Delta M;$$

where $b_0 a_4$ is the "constant" reported in Table I. If it were known that b_1 , b_2 and b_3 are zero, it could be concluded that there are no indirect effects of monetary and fiscal forces operating through Z on Y , only direct effects which are measured by a_1 , a_2 and a_3 . Since this cannot be established conclusively, it cannot be ruled out that ΔZ may include some indirect monetary and fiscal forces influencing economic activity.

The constant term is estimated to be quite large and statistically significant. This provides indirect evidence that ΔZ is explained to some extent by factors other than ΔE , ΔR , and ΔM . The value of $b_0 a_4$ is a measure of the average effect of "other forces" on ΔY , which operate through ΔZ .

As another test of the independence of ΔZ from monetary and fiscal forces, the total time period was divided into two sub-samples and the equations were estimated for these sub-samples. The Chow test (see text) was applied to the sets of regression coefficients estimated from the sub-samples compared to the whole sample; the hypothesis that there were no structural shifts in the time period could not be rejected, implying no change in the size of $b_0 a_4$. If there was a significant indirect influence of ΔE , ΔR and ΔM operating through ΔZ , $b_0 a_4$ would change along with changes in these independent variables. Since this intercept was found to be stable over the test period, this provides further evidence that ΔZ is influenced by factors other than monetary and fiscal forces.

The results from the sub-samples indicate that there were differences in the relative variability of the independent variables between the two sub-samples. This tends to strengthen the conclusions of this article since the response of ΔGNP to ΔM or ΔB was greater even in the first sub-sample (I/53 to I/60) in which the variability of ΔM and ΔB was smaller than the variability of ΔE and ΔR .

¹ The authors would like to give special thanks to Karl Brunner for useful discussion regarding the points made in this note.

² See Exhibit I for a listing of "other forces" which influence total spending.

³ For purposes of this note the lags of the independent variables are ignored.