CONTENTS

Monetary Restraint and Inflationary Momentum .................................................... 3
A Monetarist Model for Economic Stabilization .................................................. 7
Summary of U. S. Balance of Payments, 1969 .................................................. 26
Reprint Series

OVER THE YEARS certain articles appearing in the Review have proved to be helpful to banks, educational institutions, business organizations, and others. To satisfy the demand for these articles, our reprint series has been made available on request. The following articles have been added to the series in the past two years. Please indicate the title and number of article in your request to: Research Department, Federal Reserve Bank of St. Louis, P.O. Box 442, St. Louis, Mo. 63166

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>TITLE OF ARTICLE</th>
<th>ISSUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>28.</td>
<td>1967 — a Year of Constraints on Monetary Management</td>
<td>May 1968</td>
</tr>
<tr>
<td>29.</td>
<td>Does Slower Monetary Expansion Discriminate Against Housing?</td>
<td>June 1968</td>
</tr>
<tr>
<td>30.</td>
<td>The Role of Money and Monetary Policy</td>
<td>July 1968</td>
</tr>
<tr>
<td>31.</td>
<td>The Monetary Base — Explanation and Analytical Use</td>
<td>August 1968</td>
</tr>
<tr>
<td>32.</td>
<td>Interest Rate Controls — Perspective, Purpose, and Problems</td>
<td>September 1968</td>
</tr>
<tr>
<td>33.</td>
<td>An Approach to Monetary and Fiscal Management</td>
<td>November 1968</td>
</tr>
<tr>
<td>34.</td>
<td>Monetary and Fiscal Actions: A Test of Their Relative Importance in Economic Stabilization</td>
<td></td>
</tr>
<tr>
<td>35.</td>
<td>A Program of Budget Restraint</td>
<td>November 1968</td>
</tr>
<tr>
<td>36.</td>
<td>The Relation Between Prices and Employment: Two Views</td>
<td>March 1969</td>
</tr>
<tr>
<td>37.</td>
<td>Monetary and Fiscal Actions: A Test of Their Relative Importance in Economic Stabilization — Comment and Reply</td>
<td>April 1969</td>
</tr>
<tr>
<td>40.</td>
<td>Controlling Money</td>
<td>May 1969</td>
</tr>
<tr>
<td>42.</td>
<td>An Explanation of Federal Reserve Actions (1933-68)</td>
<td>July 1969</td>
</tr>
<tr>
<td>43.</td>
<td>International Monetary Reform and &quot;the Crawling Peg&quot; Comment and Reply</td>
<td>February 1969</td>
</tr>
<tr>
<td>44.</td>
<td>The Influence of Economic Activity on the Money Stock — Comment; Reply; and Additional Empirical Evidence on the Reverse-Causation Argument</td>
<td>August 1969</td>
</tr>
<tr>
<td>45.</td>
<td>A Historical Analysis of the Credit Crunch of 1966</td>
<td>September 1969</td>
</tr>
<tr>
<td>46.</td>
<td>Elements of Money Stock Determination</td>
<td>October 1969</td>
</tr>
<tr>
<td>47.</td>
<td>Monetary and Fiscal Influences on Economic Activity — The Historical Evidence</td>
<td>November 1969</td>
</tr>
<tr>
<td>48.</td>
<td>The Effects of Inflation (1960-68)</td>
<td>November 1969</td>
</tr>
<tr>
<td>49.</td>
<td>Interest Rates and Price Level Changes, 1952-69</td>
<td>December 1969</td>
</tr>
<tr>
<td>51.</td>
<td>Some Issues in Monetary Economics</td>
<td>January 1970</td>
</tr>
<tr>
<td>52.</td>
<td>Monetary and Fiscal Influences on Economic Activity — The Foreign Experience</td>
<td>February 1970</td>
</tr>
<tr>
<td>53.</td>
<td>The Administration of Regulation Q</td>
<td>February 1970</td>
</tr>
<tr>
<td>55.</td>
<td>A Monetarist Model for Economic Stabilization</td>
<td>April 1970</td>
</tr>
</tbody>
</table>
Monetary Restraint and Inflationary Momentum

The economy is showing the continuing effects of the policies of monetary and fiscal restraint actively pursued during the past year. The rate of growth of total spending has slowed since last summer, real product has declined slightly, and industrial production has fallen moderately. Employment growth has slackened and unemployment has increased. The primary goal of reduced inflation has not yet been achieved, however, as upward pressure accumulated over the past five years continues to be a powerful influence on current prices. The rate of price increase can be expected to moderate only after the reduced pace of spending and of real economic activity begins to overcome the momentum of inflation.

Excess Demand and Inflation

Excessive growth of total spending from 1964 to 1968, fostered by expansive monetary and fiscal actions, resulted in ever-mounting pressure on prices. The response of production to growth of demand for goods and services is limited by the productive capacity of the economy. Production can be expanded by employment of more resources, but as the economy approaches full employment, increasingly less efficient resources are employed, increases in production become more difficult and upward pressure on prices intensifies.

From 1964 to late 1968, total spending increased at an average 8 per cent rate, while production capacity increased at about a 4 per cent rate. During the early part of the period the economy had resources which could be tapped and consequently production could be increased to meet most of the sudden increase in demand, with little upward pressure on prices. As the unused resources were employed, however, growth of production was constrained and price increases accelerated. Prices rose at a 3 per cent rate from 1965 to mid-1967, a 4 per cent rate from mid-1967 through 1968, and a 5 per cent rate in 1969.

The accelerated growth of total spending was closely related to the rapid monetary expansion, which was apparently undertaken to counter the upward pressure on interest rates being generated by growing Federal government budget deficits and other large demands for credit. The stock of money in the economy was increased at a 5 per cent average annual rate from 1964 to 1968, markedly faster than the 2 per cent average rate of rise of money in the previous eight years. In the short run of a few months, increased monetary expansion did help to hold interest rates down by increasing the supply of loan funds. In the longer run, however, the faster rate of money growth stimulated total spending and price increases and thereby the demand for credit. The overall result was pronounced increases in interest rates.

The tax surcharge and the program of reduced Federal Government expenditure growth adopted in mid-1968 were designed to curb inflation but proved to have much less effect than had been intended. The growth of total spending was not slowed by the
fiscal actions, and the rate of inflation continued to accelerate. The acceleration of price rises was facilitated by stimulative monetary actions as the stock of money continued to grow at a 7 per cent rate from June 1968 to January 1969, following a trend set in early 1967.

**The Momentum of Inflation**

Monetary policy moved toward moderate restraint early in 1969, with money stock growth at a reduced 4 per cent annual rate from January to June. Monetary influence became much more restrictive about mid-1969 — the stock of money remained essentially unchanged through the last half of 1969. As yet, there has been no abatement of inflation, however, as the impact of the monetary restraint has fallen initially on real economic activity.

Once prices have risen in response to excess demand, actions taken to moderate total spending initially reduce production and have but a delayed effect on prices. In the current situation, inflation was allowed to accelerate for four years before effective restraint was exercised. The longer inflation is allowed to continue, the more resistant it becomes to stabilization actions. Inflation becomes a major factor in expectations and planning, and is written into wages and other contracts, incorporated into interest rates, and considered in revenue forecasts of investors.

What is often called “cost-push” inflation in our economy today is more accurately the delayed effects of past excessive spending. For example the wage increases demanded by labor during recent years, cited as one of the primary factors in pushing up prices, actually reflect, in part, the increasing costs of living experienced in the past few years. Average hourly wages in manufacturing increased at a 6 per cent annual rate during 1969 but, due to inflation, actual purchasing power of hourly wages was about unchanged. It is this experience which has caused labor to seek wage increases in excess of gains in productivity. These negotiated wage increases appear as increases in unit labor costs and consequently are assumed by some observers to be the cause of inflation. Unit labor costs in manufacturing have been increasing rapidly since mid-1965. However, these costs did not begin to rise sharply until more than a year after prices of industrial commodities began to increase. These “cost-push” factors are a part of the inflationary process and act to further inflation once it has begun. They are more a symptom of demand inflation than an independent influence.

The restrictive monetary action inaugurated early in 1969 and intensified at mid-year resulted in a slowdown of total spending late in the year. Total spending increased at a 4 per cent annual rate from the third to the fourth quarter, down from an 8 per cent rate of increase during the previous two years. The growth of total spending declined further in the first quarter of this year.

Virtually all of the recent moderation in total spending resulted in slowing of real product growth. Real output decreased slightly from the third to the fourth quarter and is expected to show a significant decline in the first quarter. Industrial production has decreased at a 5 per cent annual rate since last July, compared with a 5.7 per cent annual rate of increase over the previous two years.

Along with the moderation of production, growth of employment has declined. Payroll employment, which had expanded at a 3.4 per cent annual rate from mid-1967 to mid-1969, increased at a 1.5 per cent rate from June to October and since October it has increased at a 1.3 per cent rate. Employment in manufacturing has declined sharply since last summer, and the average workweek of those employed has been reduced by almost one hour since late last year. Unemployment has risen since year-end, and reached 4.4 per cent of the labor force in March, higher than the 3.7 per cent average rate of the 1966-1969 period, but still well below the 5.5 per cent average from 1961 to 1965.

Personal income grew at a 5.4 per cent rate from August to February, after rising at a 9 per cent rate in the previous year. Since the rate of increase of prices has not slowed, the reduced growth of income represents very little gain in purchasing power. Real personal income, which had increased at a 5 per cent rate from late 1967 to the fall of last year, has since increased at about a 1 per cent annual rate.

The Outlook

The pattern of total spending, real economic activity, and prices in the second quarter of this year has been essentially determined by stabilization actions already taken. Evaluation of the probable path of the economy, including prices, through the rest of the year depends on consideration of most recent and prospective monetary and fiscal actions.

The major contribution of fiscal policy to the current anti-inflation programs has been a sharp reduction in net borrowing by the Federal Government. Large and growing deficits in the 1965-68 period were accompanied by rapid money creation, as the Federal Reserve underwrote much of the newly-created Federal debt. Since late 1968 the Federal budget has generally been in surplus, and the upward pressure on the money stock of large Federal Government financing requirements has been removed. As presented in January, the Government's official budget plan for the fiscal year which begins July 1 indicates a surplus of $1.3 billion, about the same as the $1.5 billion surplus expected in this fiscal year. The budget is subject to change, however, and items such as the recently proposed postal pay increase could reduce the expected surplus.

Through early February there had been no significant shift in the influence of monetary actions on the economy. The sharp increase in the stock of money in late December was due primarily to technical factors and was offset by a large decline during January. Since early February money has been growing, but the period is still too short to determine whether this is another irregular movement or the beginning of a new trend. If maintained, however, growth of money would tend to provide some stimulus to economic activity late this year.

The declines in interest rates experienced since December apparently reflect reductions in the demand for credit and cannot be interpreted as indicative of a change in the basic impact of monetary actions. Most of the rise in interest rates from 1966 to 1969 was due to rising expectations of inflation as both lenders and borrowers came to expect the value of money to decline. The recent declines in rates have probably been due to the reaction of these market expectations to the signs of increasing weakness in the economy.

Short-term interest rates have declined sharply since early in the year, falling to about the levels of last spring. The market yield on Treasury bills fell from 8.02 per cent in early January to 6.40 per cent in early April. In the spring of last year these bills yielded an average of 6.20 per cent. The interest rate on commercial paper stood at 8.10 per cent in early April, down from an average of 9 per cent early in the year, but above the average 7.55 per cent rate in the spring of last year. Short-term rates in general remain high relative to previous years. The yield on Treasury bills averaged 5.33 per cent in 1968 and 4.30 per cent in 1967. The interest rate on commercial paper averaged 5.90 per cent in 1968 and 5.10 per cent in 1967.

Long-term interest rates have not shown the marked declines experienced in the short-term market. The yield on corporate Aaa-rated bonds was 7.85 per cent in early April, slightly lower than the January average. Corporate Aaa bonds yielded an average 6.90 per cent last spring, 6.18 per cent in 1968, and 5.51 per cent in 1967.
The current slowdown in economic activity should put downward pressure on interest rates. However, it will probably take considerable time to reduce the inflation premium already built into rates, especially on long-term debt. This can only be accomplished through a reduction in the rate of increase of prices. In the current situation long-term interest rates probably cannot be reduced significantly by a large increase in the supply of money without a serious risk of further stimulating inflation and causing rates to rise to even higher levels later on.

Research conducted at this Bank (pages 7-25 of this Review) suggests that monetary actions have their major affect on total spending after about two quarters. Accordingly, the policy of monetary restraint in the last six months of 1969 is likely to have a significant impact on total spending through this summer. Because of the momentum of inflation, most of the impact of this restraint will probably continue to be on production and employment. More and more of the lagged effect of monetary restraint should fall on prices, as continued rapid price increases become progressively difficult to maintain in the face of a slowdown in income, spending, and employment.

Conclusion

The magnitude and duration of the excessive total spending and inflation in the 1964-69 period have precluded a swift and painless moderation of the rapid rate of price increases. The pressure of accelerating inflation of the last few years is still a strong force pushing upward on current prices, and this effect will have to be overcome first. The restrictive monetary and fiscal actions of the past year have slowed spending, production and income growth, and further slowing is probable. The current inflation is stubborn and cannot be eased quickly, but some moderation in the rate at which prices are increasing is likely later this year.

TRUTH-IN-LENDING FILMSTRIP

A 20-minute filmstrip on the Truth-In-Lending law and Regulation Z has been made available by the Board of Governors of the Federal Reserve System. This new filmstrip, and an earlier film intended for creditors, may be borrowed free of charge from the Bank Relations and Public Information Department of the Federal Reserve Bank of St. Louis.

The filmstrips are designed to be used with a Dukane or similar projector which simultaneously views the 35mm film and plays a 33⅓ RPM record. Film changing is synchronized with the narration. The projector is not furnished with the filmstrip, but it is understood that such equipment is widely available.

When submitting requests for the filmstrip, please indicate the date desired with alternates and the approximate number of the expected audience. Copies of an informative booklet for consumers, entitled “What Truth-In-Lending Means To You,” will accompany the filmstrip.
A Monetarist Model for Economic Stabilization*

by LEONALL C. ANDE RSEN and KEITH M. CARLSON

THE MONETARIST VIEW that changes in the money stock are a primary determinant of changes in total spending, and should thereby be given major emphasis in economic stabilization programs, has been of growing interest in recent years. From the mid-1930's to the mid-1960's, monetary policy received little emphasis in economic stabilization policy. Presumed failure of monetary policy during the early years of the Great Depression, along with the development and general acceptance of Keynesian economics, resulted in a main emphasis on fiscal actions — Federal Government spending and taxing programs — in economic stabilization plans. Monetary policy, insofar as it received any attention, was generally expressed in terms of market rates of interest.

Growing recognition of the importance of money and other monetary aggregates in the determination of spending, output, and prices has been fostered by the apparent failure of stabilization policy to curb the inflation of the last half of the 1960's. Sharply rising market interest rates were interpreted to indicate significant monetary restraint, while the Revenue and Expenditure Control Act of 1968 was considered a major move toward fiscal restraint.

Despite these policy developments, total spending continued to rise rapidly until late 1969, and the rate of inflation accelerated. Those holding to the monetarist view were not surprised by this lack of success in curbing excessive growth in total spending, largely because the money stock grew at a historically rapid rate during the four years ending in late 1968. Economic developments from 1965 through 1969 were in general agreement with the expectations of the monetarist view.

This article develops a model designed to analyze economic stabilization issues within a framework which focuses on the influence of monetary expansion on total spending. Most of the major econometric models have not assigned an important role to the money stock or to any other monetary aggregate. Furthermore, most econometric models contain a large number of behavioral hypotheses to be empirically estimated and integrated with each other, because they are designed to aid in understanding the determination of many economic magnitudes. By comparison, the model presented in this article is quite small. It is designed to provide information on the most likely course of movement of certain strategic economic variables in response to monetary and fiscal actions.

The model presented here is the authors' own version of how monetary and fiscal actions influence the economy. Other economists (including those of a monetarist persuasion) may prefer to develop certain aspects of the model in a different way. Two such modifications are presented in Appendix C. The model is considered open to revision, but is presented at this time with a view to stimulating others to join in quantifying relationships that are generally associated with the monetarist view.

This article is divided into five major sections. A general monetarist view of the response of spending, output, and prices to monetary and fiscal actions is summarized first. Next, the specific features of the model are discussed within a formal framework of analysis. Statistical estimates of the model's parameters are presented in the third section. The fourth section tests the performance of the model with several dynamic simulation experiments. Finally, by simulating the response of the economy to alternative rates of monetary expansion, an illustration is provided of how the model can be used for current stabilization analysis.

**General Monetarist View**

The general monetarist view is that the rate of monetary expansion is the main determinant of total spending, commonly measured by gross national product (GNP). Changes in total spending, in turn, influence movements in output, employment, and the general price level. A basic premise of this analysis is that the economy is basically stable and not necessarily subject to recurring periods of severe recession and inflation. Major business cycle movements that have occurred in the past are attributed primarily to large swings in the rate of growth in the money stock.

This view regarding aggregate economic relationships differs from prevailing views which consider aggressive policy actions necessary to promote stability. Monetarists generally hold that fiscal actions, in the absence of accommodative monetary actions, exert little net influence on total spending and therefore have little influence on output and the price level. Government spending unaccompanied by accommodative monetary expansion, that is, financed by taxes or borrowing from the public, results in a crowding-out of private expenditures with little, if any, net increase in total spending. A change in the money stock, on the other hand, exerts a strong independent influence on total spending. Monetarists conclude that actions of monetary authorities which result in changes in the money stock should be the main tool of economic stabilization. Since the economy is considered to be basically stable, and since most major business cycle movements in the past have resulted from inappropriate movements in the money stock, control of the rate of monetary expansion is the means by which economic instability can be minimized.

The theoretical heritage of the monetarist position is the quantity theory of money. This theory dates back to the classical economists (particularly David Ricardo) in the early 1800's. The quantity theory in its simplest form is characterized as a relationship between the stock of money and the price level. Classical economists concentrated on the long run aspects of the quantity theory in which changes in the money stock result in changes only in nominal magnitudes, like the price level, but have no influence on real magnitudes like output and employment.

The quantity theory of money in its modern form recognizes the important influence that changes in the money stock can have on real magnitudes in the short run, while influencing only the price level in the long run. The modern quantity theory postulates that in the short run a change in the rate of growth in money is followed with a moderate lag by changes in total spending and output, while changes in the price level follow with a somewhat longer lag. These changes in total spending, output, and prices are in the same direction as the change in the rate of monetary expansion.

The modern quantity theory still accepts the long-run postulates of its older version. A change in the rate of monetary expansion influences only nominal magnitudes in the long run, namely, total spending (GNP) and the price level. Real magnitudes, notably

---

output and employment, are unaffected. Following the short-run responses to a change in the rate of monetary growth, total spending and the price level grow at rates determined by the rate of increase in money, while output moves toward and resumes a long-run growth path. Such growth in output is little influenced by the rate of monetary expansion. Instead, it is determined by growth in the economy's productive potential, which depends on growth of natural resources, capital stock, labor force, and productivity.

General Form of the Model

A summary of the model is presented in algebraic form in Exhibit I, along with a listing of variables classified as to whether they are endogenous or exogenous to the model (for a graphical illustration of the model, see Appendix B). This general form of the model summarizes its essential features, ignoring problems of dimensionality and lag length.

Equations of the Model

Equation (1) is the total spending equation. The change in total spending (ΔY) is specified as a function of current and past changes in the money stock (ΔM) and current and past changes in high-employment Federal expenditures (ΔE). This general specification represents the reduced form for that class of structures which has ΔM and ΔE as exogenous variables. In this form the total spending equation remains uncommitted as to structure; it is potentially consistent with both Keynesian and quantity theory models. (The magnitude and significance of the estimated parameters determine whether the data conform more closely to a Keynesian or a quantity theory).

Equation (2) specifies the change in the price level (ΔP) as a function of current and past demand pressures (D) and anticipated price changes (ΔPA). Demand pressure is defined in equation (3) as the change in total spending minus the potential increase in output (XF - X). The price equation is an alternative to the standard short-run Phillips curve relation generalized to include changes in total spending and anticipated prices. (See Appendix A for further development of this relationship.)

Equation (4) defines a change in total spending in terms of its components, the part associated with changes in the price level (ΔP) and the part associated with changes in output (ΔX). With ΔY determined by equation (1), and ΔP by equation (2), ΔX can be derived from equation (4).

Equation (5) specifies the market rate of interest (R) as a function of current changes in the money stock (ΔM), current and past changes in output (ΔX), and current changes in the price level (ΔP).

Equation (6) specifies the anticipated price level (ΔPA) as a function of past anticipated price changes.

Equation (7) specifies the unemployment rate (U) as a function of the GNP gap (G).

Equation (8) defines the GNP gap identity.

---

Exhibit I

MODEL IN ALGEBRAIC FORM

1. Total Spending Equation
   \[ ΔY_t = f_1(ΔM_t, ..., ΔM_{t-n}, ΔE_t, ..., ΔE_{t-n}) \]

2. Price Equation
   \[ ΔP_t = f_2(D_t, ..., D_{t-n}, ΔP_{A_t}) \]

3. Demand Pressure Identity
   \[ D_t = ΔY_t - (X^F_t - X_{t-1}) \]

4. Total Spending Identity
   \[ ΔY_t = ΔP_t + ΔX_t \]

5. Interest Rate Equation
   \[ R_t = f_3(ΔM_t, ΔX_t, ..., ΔX_{t-n}, ΔP_t, ΔP_{A_t}) \]

6. Anticipated Price Equation
   \[ ΔP_{A_t} = f_4(ΔP_{t-1}, ..., ΔP_{t-n}) \]

7. Unemployment Rate Equation
   \[ U_t = f_5(G_t, G_{t-1}) \]

8. GNP Gap Identity
   \[ G_t = \frac{X^F_t - X_t}{X^F_t} \]

---

Endogenous Variables

- ΔY_t: change in total spending (nominal GNP)
- ΔP_t: change in price level (GNP price deflator)
- ΔX_t: change in output (real GNP)
- D_t: demand pressure
- ΔPA_t: anticipated change in price level
- R_t: market interest rate
- U_t: unemployment rate
- G_t: GNP gap

Exogenous Variables*

- ΔM_t: change in money stock
- ΔE_t: change in high-employment Federal expenditures
- ΔP_{A_t}: potential (full-employment) output
- X^F_t: potential (full-employment) output

*Other than lagged variables.

---


---

8The change in the price level, ΔP, and the change in output, ΔX, are defined in dollar units so that their sum is equal to the change in total spending, ΔY.
(ΔX), current price change (ΔP), and anticipated price change (ΔPA). The price anticipations term is included to capture the Fisher effect. The anticipated price function is defined in equation (6). Anticipated price change (ΔPA) in the current period is assumed to depend on past price changes (ΔP).

Equation (7) is the unemployment rate equation and is a transformation of the GNP gap (G), as defined in equation (8), into a measure of unemployment relative to the labor force. This transformation is based on "Okun's Law."10

**Workings of the Model**

The workings of the model are summarized by a flow diagram (Exhibit II). Only variables in the current period are shown in the diagram; lagged variables, with the exception of past changes in prices, are omitted. The relationship that determines total spending is the fundamental one among those that determine the endogenous variables of the model. Total spending is determined by monetary actions and fiscal actions (Federal spending financed by taxes or borrowing from the public), though no direct information is provided as to how such actions affect spending.

The change in total spending is combined with potential (full employment) output to provide a measure of demand pressure. Anticipated price change, which depends on past price changes, is combined with demand pressure to determine the change in the price level.

The total spending identity enables the change in output to be determined, given the change in total spending and the change in prices. This method of determining the change in total spending and its division between output change and price change differs from most econometric models. A standard practice in econometric model building is to determine output and prices separately, then combine them to determine total spending.

The change in output, the change in prices and in anticipated prices, along with the change in the money stock, determine market interest rates. The flow diagram shows that the market interest rate does not exercise a direct role in the model in the determination of spending, output, and prices.

To determine the unemployment rate, the change in output is first combined with potential output to determine the GNP gap relative to potential output. The GNP gap is then transformed into the unemployment rate.

**Summary**

The model has been presented in general form to show the basic linkages postulated among money, Federal expenditures, prices, and output. The purpose of the following statistical section is to estimate

---


\[ X^F_t - X_t = 0.03(U_t - 4)X_t. \]

The number .03 is a productivity factor and 4 is defined as the unemployment rate consistent with full resource utilization.
the response of output and prices to monetary and fiscal actions, not to test a hypothesized structure. The focus is on the response in the short run — periods of two or three years — but the long-run properties of the model also are examined.

Estimation of the Model

The general form of the model indicates those variables that are included in each equation. Estimation requires selection of the algebraic form of the equations and the techniques to be used in estimation.

Each of the equations of the model is estimated by ordinary least squares. Lag structures, with one exception, are estimated by the Almon lag technique. The reported relationships reflect considerable experimentation with the number of lags and the degree of the polynomial. The sample period starts with 1953 for the spending equation and with 1955 for all the others. The data are quarterly and, with the exception of interest rates, are seasonally adjusted.

Criteria used in the selection of the equations were minimizing the standard error of estimate and eliminating serial correlation in the estimated residuals. In addition, the signs and statistical significance of the estimated coefficients received consideration, along with the pattern of the lag distribution. Since these criteria frequently could not be satisfied simultaneously, an element of subjectivity was present in selecting the “best” equation.

Total Spending

The change in total spending is specified as a function of current and past changes in the money stock (demand deposits and currency held by the nonbank public) and in high-employment Federal expenditures (expenditures on goods and services plus transfer payments adjusted to remove the influence of variations in economic activity on unemployment benefit payments). The choice of the particular equation (Table I) is based on previous work by Andersen and Jordan. Implicit in this choice is the assumption that the change in the money stock is an exogenous variable. A more complete model would specify a mechanism whereby the money stock is determined by actions of the monetary authorities, the public, and the banking system.

11For discussion of the use and interpretation of the Almon lag technique, see Keran, p. 10.


13Andersen and Jordan tried several measures of fiscal actions in their basic equation. The best results were obtained by using only high-employment expenditures, rather than the high-employment surplus or both high-employment expenditures and receipts. They justify their choice by appealing to the notion that financing expenditures by borrowing from the public and taxes have essentially the same impact on total GNP. For some results that contradict those of Andersen and Jordan, see E. G. Corrigan, “The Measurement and Relative Importance of Fiscal Policy,” forthcoming in Federal Reserve Bank of New York Monthly Review. It should be repeated that, a priori, specification of the total spending equation was sufficiently general as to be consistent with a number of theories of GNP determination.

14Andersen and Jordan, p. 18, indicate that these results are consistent with a “crowding-out” theory of effects of government spending.
Prices and Output

The total spending equation is the cornerstone of the model, providing its monetarist character. The focus of this paper, however, is on determining the division of the change in total spending between price and output changes. Price changes are estimated as a function of (1) current and past demand pressure, and (2) anticipated price change.

Demand pressure — As a measure of demand pressure on prices, the change in total spending is related to the potential change in output (GNP in constant prices). These two variables, when combined, provide a measure of the economy’s demand for goods and services relative to its capacity to supply goods and services. The change in prices is specified as a positively related linear function of this measure of demand pressure (see Appendix A).

Demand pressure, Dt, is defined as:

\[ D_t = \Delta Y_t - (X_F - X_{t-1}) \]

where \( \Delta Y_t \) is the change in total spending in quarter \( t \); \( X_F \) is potential (full employment) GNP in 1958 prices in quarter \( t \); and \( X_{t-1} \) is real GNP in the previous quarter.18 Given the GNP gap, defined as \( X_F - X_{t-1} \), the larger is the change in total spending (\( \Delta Y_t \)), the greater is the spillover into higher prices. Given \( \Delta Y_t \), the larger is \( X_F - X_{t-1} \), the greater is the expansion of output and the less the spillover into higher prices.

In addition to current values, past values of the demand pressure variable are included in the price equation. The purpose of including past values is to allow for lags in the determination of prices in response to changing demand. Furthermore, the impact of changing demand through changing input prices and costs of production is given a chance to operate by including lagged values for the demand pressure variable.

Anticipated Price Change — The other independent variable included in the price equation is a measure of anticipated price change (\( \Delta P_{At} \)). The purpose of including this variable as a factor influencing current changes in the price level is to allow anticipations of future price movements to influence the decisions of market participants. Since such a variable is not observable, it has to be constructed. This is accomplished by assuming that anticipations about future price changes are formed on the basis of past price experience.

The measure of price anticipations used in this study is a by-product of estimating long-term market interest rates. Yohe and Karnosky showed that long-term market interest rates respond to price anticipations of borrowers and lenders, since commit-

\[ \Delta P_{At} = \Delta Y_{t-2} \left( \frac{1}{17} \sum_{i=1}^{17} \frac{\Delta U_{t-i/4}}{1.01 + (1/17)} \right) \]

Symbols are defined as:

- \( \Delta P_{At} \): anticipated price change (scaled in dollar units) in quarter \( t \)
- \( \Delta U_{t-i/4} \): annual rate of change in GNP deflator (1958 = 100) in quarter \( t-i \)
- \( \Delta Y_{t-2} \): total spending (GNP in current prices) in quarter \( t-2 \)

\[ \Delta U_{t-i/4} = \frac{100}{100} \left( \frac{Y_t}{Y_{t-i}} - 1 \right) \]

The series on potential output is based on that used by the Council of Economic Advisers. Currently, potential output is estimated to be rising at a 4.5 per cent annual rate. For alternative estimates of potential output, see Fair, “The Determination of Aggregate Price Changes.”

---


17This measure was apparently first used by Ray Fair of Princeton University. See his “The Determination of Aggregate Price Changes,” forthcoming in the Journal of Political Economy. For a similar specification of a price equation, see Milton Friedman, “A Theoretical Framework for Monetary Analysis,” also forthcoming in the Journal of Political Economy. See also a paper by William Considine of Stanford University, “Public Policy and the Current Inflation,” prepared as a part of a summer intern program at the U.S. Treasury Department (September 5, 1969).

18The series on potential output is based on that used by the Council of Economic Advisers. Currently, potential output is estimated to be rising at a 4.5 per cent annual rate. For alternative estimates of potential output, see Fair, “The Determination of Aggregate Price Changes.”

19For other ways of handling expectations, see Appendix C on alternative price equations.
ments to borrow and lend funds require an assessment of anticipated changes in the price level for the period of the loan. The problem consists of isolating this price effect on market interest rates from factors influencing the real rate.

In the process of constructing a measure of anticipated price change, past changes in prices are adjusted by a summary measure of current economic conditions. Since price changes tend to lag changes in total spending, the degree of resource utilization as measured by the unemployment rate is used as a leading indicator of future price movements. For example, if unemployment is rising relative to the labor force, decision-making economic units would tend to discount current inflation in forming anticipations about future price movements. Reflecting this consideration, the price change in each quarter is divided by an index of the unemployment rate applicable to that quarter. Thus the measure of price anticipations would be less for a given inflation rate accompanied by high or rising unemployment than when unemployment is low or falling.

The specific definition of price anticipations is shown in Table II. The weights and the length of the lag period were obtained from the estimated long-term interest rate equation.

Estimated price equation—The estimated price equation is shown in Table III, where ΔP_t is defined as the dollar change in total spending due to price changes in quarter t. The influence on prices of the demand pressure variable, D_{t-i}, is significant and positive for five quarters but very small thereafter. The pattern of influence is one of steady decay, with 70 per cent of the total effect of demand pressure taking place in the first three quarters and 95 per cent in the first five quarters.

Anticipated price change, represented by ΔPA_t, is a significant determinant of current price change.

20For purposes of exposition the unemployment rate was not included in the definition of anticipated price change in Exhibits I and II.

21The price expectations variable as shown in Table II is scaled in dollar units. This transformation is made because prices are estimated as the dollar change in total spending due to price changes.

22When the price equation is estimated with the components of D_{t-i} separated, the coefficients for the ΔY_t portion are not statistically significant at the five per cent level, implying that the gap portion, (XF_t - X_{t-i}), explains most of the changes in ΔP_t. However, there may be collinearity problems which influence the estimated coefficients. Furthermore, the D_{t-i} form is used because, theoretically, it is a measure of excess demand (see Appendix A).

Though significant, the measure of the impact of this variable should not be taken too literally, because its construction indicates that it cannot really be viewed independently of the demand pressure variable. The influence of these two variables should perhaps be viewed in combination, rather than as independent and separate influences.

Determination of output—Given ΔY_t, as determined by the total spending equation, and ΔP_t from the price equation, the dollar change in total spending due to output changes, defined as ΔX_t, can be derived from the following identity:

\[ \Delta X_t = \Delta P_t + \Delta X_t + (P_t - P_{t-1}) (X_t - X_{t-1}). \]

The cross product term is assumed equal to zero.

*Less than .01

23From the standpoint of the model as a unit, price anticipations are important only in determining the division of total spending between prices and output, not the level (or change) of spending itself. To allow for the possible direct influence of price expectations on total spending, the spending equation was estimated with the price anticipations variable. The coefficient of the price anticipations variable was not significant for this specification.

24There is, however, some evidence that the price anticipations variable may be interpreted as an independent and separate influence. When the price equation is estimated without ΔPA_t, the sum of the coefficients on D_{t-i} is only slightly more than shown in Table III and the standard error is increased considerably.

25The value of this cross-product term was calculated from 1953 to the present and provides ample justification for
Unemployment Rate

The unemployment rate plays a role in the model, representing the means by which past prices are adjusted to take into account varying economic conditions in the formation of anticipated price changes. To estimate the unemployment rate, the unemployment rate is regressed on current and lagged values of the GNP gap, expressed as a per cent of potential GNP. This equation is estimated by unconstrained ordinary least squares, and is shown in Table IV.

Interest Rates

Interest rates do not function explicitly in the model as a part of a transmission mechanism running from changes in the money stock to output and prices. The estimated long-term interest rate equation plays a vital role in the model, however, providing the information to calculate the measure of price anticipations.

Market interest rates are specified to depend on current and past rates of change of output (\(\Delta x\)), the current rate of change in the money stock (\(\Delta m\)), and current and past rates of change in prices (\(\Delta p\)) adjusted by an index of the unemployment rate. This specification draws on Sargent's work, which was explored further by Yohe and Karnosky.26

<table>
<thead>
<tr>
<th>Table IV</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UNEMPLOYMENT RATE EQUATION</strong></td>
</tr>
<tr>
<td>Sample Period: 1/1955 - IV/1969</td>
</tr>
</tbody>
</table>
| \(U_t = 3.90 \pm .04G_t + .28G_{-1}  
72.50  
1.10  
(6.80)  
R^2 = .92  
S.E. = .30  
D-W = .66  |

Symbols are defined as:
- \(U_t\) = unemployment as a per cent of labor force in quarter \(t\)
- \(G_t\) = potential output in quarter \(t\)
- \(X_t\) = output (GNP in 1958 prices) in quarter \(t\)

Note: “t” statistics appear with each regression coefficient, enclosed by parentheses. \(R^2\) is the percent of variation in the dependent variable which is explained by variations in the independent variables, S.E. is the standard error of the estimate. D-W is the Durbin-Watson statistic.

Long-term interest rate – The long-term market rate (\(R^{U}_L\)) is measured by the rate on seasoned corporate Aaa bonds. Changes in output and prices (adjusted for unemployment) lagged for 17 quarters provide the most satisfactory results. The estimated equation for the long-term rate is shown in Table V.

The results reflect, in a general way, the view stressed by monetarists that a change in the rate of monetary expansion influences market interest rates in three stages.27 First, the liquidity effect of an increase in the rate of change of the money stock about this procedure, but it is felt that a price expectations variable should not be constructed on the basis of a sample period containing only an expansion like 1961-69. Including the dummy variable leaves unexplained that factor (or factors) which changed the relationship, but it does provide a way of estimating a set of coefficients on prices that is based on a sample period reflecting varying economic circumstances.

---

26Thomas Sargent, “Commodity Price Expectations and the Interest Rate,” Quarterly Journal of Economics (February 1969), pp. 127-40, and Yohe and Karnosky, pp. 31-34, 38. The estimated interest rate equations also contain a dummy variable (0 for 1955-60 and 1 for 1961-69). The significance of this dummy variable indicates a shift of structure within the sample period. Questions can be raised

on market interest rates is negative. Second, an increase in the rate of monetary expansion influences the rate of change in output, which in turn has a positive influence on market interest rates. Finally, an increase in money growth influences the rate of change in prices, which has a positive effect on market interest rates.

**Short-term interest rate** — The short-term interest rate \( R^s_t \) which is estimated is the four- to six-month commercial paper rate. The equation is shown in Table VI. Price changes are found to enter significantly for a shorter lag period than in the long-term rate equation. Also, the short-term rate, as measured by the four- to six-month commercial paper rate, is much more sensitive to changes in output and the money stock than is the long-term rate as measured by the rate on seasoned corporate Aaa bonds.

### Table VI

**SHORT-TERM INTEREST RATE EQUATION**

Sample Period: 1/1955 - IV/1969

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Coefficient</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>( R^s_t )</td>
<td>-1.13</td>
<td>-3.14</td>
</tr>
<tr>
<td>( M_t )</td>
<td>-0.17</td>
<td>(9.22)</td>
</tr>
<tr>
<td>( Z_t )</td>
<td>0.92</td>
<td>(5.03)</td>
</tr>
<tr>
<td>( X_{t-1} )</td>
<td>0.1</td>
<td>(18.52)</td>
</tr>
<tr>
<td>( P_{t-1} )</td>
<td>0.14</td>
<td>(13.17)</td>
</tr>
<tr>
<td>( U_{t-1/4} )</td>
<td>0.18</td>
<td>(8.14)</td>
</tr>
<tr>
<td>( x_0 )</td>
<td>0.08</td>
<td>(8.10)</td>
</tr>
<tr>
<td>( x_1 )</td>
<td>0.08</td>
<td>(8.99)</td>
</tr>
<tr>
<td>( x_2 )</td>
<td>0.08</td>
<td>(8.97)</td>
</tr>
<tr>
<td>( x_3 )</td>
<td>0.08</td>
<td>(8.45)</td>
</tr>
<tr>
<td>( x_4 )</td>
<td>0.07</td>
<td>(7.83)</td>
</tr>
<tr>
<td>( x_5 )</td>
<td>0.07</td>
<td>(7.25)</td>
</tr>
<tr>
<td>( x_6 )</td>
<td>0.07</td>
<td>(6.76)</td>
</tr>
<tr>
<td>( x_7 )</td>
<td>0.06</td>
<td>(6.36)</td>
</tr>
<tr>
<td>( x_8 )</td>
<td>0.05</td>
<td>(6.02)</td>
</tr>
<tr>
<td>( x_9 )</td>
<td>0.03</td>
<td>(5.75)</td>
</tr>
<tr>
<td>( x_{10} )</td>
<td>0.02</td>
<td>(5.52)</td>
</tr>
<tr>
<td>( \Sigma x_i )</td>
<td>0.71</td>
<td>(8.24)</td>
</tr>
</tbody>
</table>

Symbols are defined as:

- \( R^s_t \) = four- to six-month commercial paper rate in quarter \( t \)
- \( M_t \) = annual rate of change in money stock in quarter \( t \)
- \( Z_t \) = dummy variable in quarter \( t \) (0 for 1/1955 - IV/1960 and 1 for 1/1961 - IV/1969)
- \( X_{t-1} \) = annual rate of change in output (GNP in 1958 prices) in quarter \( t-1 \)
- \( P_{t-1} \) = annual rate of change in GNP deflator (1958 = 100) in quarter \( t-1 \)
- \( U_{t-1/4} \) = index of unemployment as a per cent of labor force (base = 4.0) in quarter \( t-1 \)

Note: "t" statistics appear with each regression coefficient, enclosed by parentheses. \( R^2 \) is the percent of variation in the dependent variable which is explained by variations in the independent variables. S.E. is the standard error of the estimate. D-W is the Durbin-Watson statistic.

**Time Response to Monetary Actions:**

A Summary

The pattern of the coefficients in the equations provides information about the time response of total spending, output, and prices to monetary and fiscal actions. The equations indicate that monetary actions generally affect total spending with a two- to three-quarter lag. A change in the rate of growth of total spending is accompanied by a simultaneous change in the rate of growth of output, and it is not until three quarters later that the response of prices to a change in demand pressure builds to 70 per cent of the total. The response of prices to a change in total spending is yet slower when there are anticipations of a high rate of inflation.

The spending equation (Table I) indicates that about half of the total response to a change in monetary growth occurs in the first two quarters, and about 80 per cent in the first three quarters.

The pattern of coefficients in the price equation (Table III) indicates that the effect of a change in total spending is reflected first in output and later in prices. Operating through the demand pressure variable, about a fourth of the response of prices to a change in total spending is in the first quarter, which is about two quarters after the change in monetary actions. Over 70 per cent of the price response is in the first three quarters, and 95 per cent in the first five quarters. The response of the price level to changes in total spending is also influenced by anticipated prices. The greater the anticipated rise in prices, the longer delayed is the response of the price level to a decline in the rate of change in total spending.

Tests of the Model's Performance

The equations of the model are to be viewed as a unit, and the specification of the model is such that given the change in money (\( \Delta M \)), and the change in high-employment expenditures (\( \Delta E \)), the model can be solved in the following sequence: for the change in total spending (\( \Delta Y \)), the change in the price level (\( \Delta P \)), the change in real output (\( \Delta X \)), the unemployment rate (\( U \)), and the long- and short-term interest rates (\( R^l \) and \( R^s \)).

The explanatory power of each of the equations shown in Tables I-VI may be acceptable by conventional standards, but this provides no guarantee that the model will perform satisfactorily as a unit. There are interdependencies in the model that have to be taken into account when evaluating the complete
model. Of interest in evaluating the model as a unit is the implied pattern for the endogenous variables when only an initial set of lagged endogenous variables and the time paths of the exogenous policy variables (money stock and high-employment Federal expenditures) are assumed known. To conduct such a test, several dynamic simulation experiments were performed. These simulations take the form of \textit{ex post} dynamic simulations and an \textit{ex ante} dynamic simulation.\footnote{For a discussion of the different ways of assessing the tracking ability of econometric models, see Carl F. Christ, "Econometric Models of the Financial Sector," forthcoming in the \textit{Journal of Money, Credit, and Banking}. For a discussion of simulation procedures and results with an income-expenditure model, see Evans and Klein, pp. 50-69.}

**Ex Post Dynamic Simulations**

An \textit{ex post} dynamic simulation is confined to the sample period from which the estimated relationships are derived. Actual values for all current and lagged exogenous variables are used, but only initial actual values for the lagged endogenous variables are used. The model generates solution values for the endogenous variables in the first simulation period, which are then used to generate solution values for the second period, and so on for each succeeding period.\footnote{See de Leeuw and Gramlich, "The F.R.B. - M.I.T. Econometric Model: Its Special Features," \textit{American Economic Review}, Papers and Proceedings (May 1968), p. 142.} A comparison of these calculated time paths for the endogenous variables with their actual time paths enables one to formulate some judgment as to how well the model performs as an interdependent unit in tracking the movements of certain strategic economic variables.

\textit{Ex post} dynamic simulations were conducted for several subperiods within the sample period (1955-69). The results for the entire sample period are summarized in Chart I on the next page. When simulations are conducted for subperiods within the 1955-69 period, the pattern of movement as shown for the whole period simulation tends to hold, but the levels are closer to the actual values at the beginning of each subperiod.

Chart 1 indicates that the model tends to track the movement of the endogenous vari-

\begin{table}[h]
\centering
\begin{tabular}{|l|l|l|l|l|l|l|l|}
\hline
 & \textbf{Nominal GNP}\textsuperscript{2} & \textbf{Real GNP}\textsuperscript{2} & \textbf{Price Level}\textsuperscript{2} & \textbf{Unemployment Rate}\textsuperscript{4} \\
\hline
\textbf{1963: I} & 0.4 & -0.4 & -0.1 & 0.9 \\
\textbf{II} & 0.3 & 0.4 & 0.1 & 0.7 \\
\textbf{III} & 1.5 & 2.5 & 0.3 & 0.9 \\
\textbf{IV} & 2.1 & 0.6 & 0.2 & 1.2 \\
\hline
\textbf{1964: I} & 1.7 & 0.6 & 0.3 & 1.4 \\
\textbf{II} & 1.3 & 2.7 & 0.4 & 1.6 \\
\textbf{III} & 1.7 & 2.0 & 0.5 & 1.2 \\
\textbf{IV} & 1.7 & 2.6 & 0.9 & 1.0 \\
\hline
\textbf{Average Error} & 0.76 & 1.88 & 0.28 & 0.16 \\
\hline
\end{tabular}
\caption{ALTERNATIVE EX POST SIMULATIONS: ACTUAL MINUS PREDICTED\textsuperscript{1}}
\end{table}

\footnotesize{\textsuperscript{1}Comparison of Wharton and St. Louis Models for 1963-64 \textsuperscript{2}Billions of dollars. \textsuperscript{3}Computed from the level of implicit price deflator. \textsuperscript{4}Per cent. \textsuperscript{5}Wharton: 1948-1964 \textsuperscript{6}St. Louis: 1955-1969 \textsuperscript{7}St. Louis:}
Chart I
Results of Ex Post Dynamic Simulation
Annual Rates of Change

Real GNP

Note: Predicted values based on estimate of model for sample period ending IV/1969.
The comparison is not meant to imply that the St. Louis model is superior. Rather, the suggestion is offered that a small model constructed within a monetarist framework may yield as much information about the key aggregates as a large structural model. In summary, small monetarist models may be useful as a guide in the formulation of stabilization policy.

**Ex Ante Dynamic Simulations**

An *ex ante* dynamic simulation is like an *ex post* dynamic simulation, except that it extends beyond the sample period. To conduct such a simulation for this model, it was necessary to re-estimate the model for a subperiod within the full sample period. All equations of the model were re-estimated with data through 1967. The period of the *ex ante* dynamic simulation is 1968 and 1969. The results are summarized in Chart II and in Tables VIII and IX.

The success of the *ex ante* dynamic simulation can be assessed by comparing it with the tracking record of the *ex post* simulation for the same period. A comparison of the errors associated with the *ex ante* simulation with those of the *ex post* simulation (where the errors in both cases are computed with reference to actual values) suggests that any structural shifts that occurred in the 1968-69 period were not of such a magnitude that the *ex ante* tracking ability of the model was significantly different from that of *ex post* simulation.

Any conclusions about the tracking ability of the model are necessarily tentative, because they are based on only one *ex ante* dynamic simulation experiment. Nevertheless, these results provide a tentative basis for confidence in the tracking ability of the model in es-

### Table VIII

**MODEL SIMULATIONS**

<table>
<thead>
<tr>
<th></th>
<th>1968</th>
<th>1969</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td><strong>GNP Level (Billions of dollars)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual</td>
<td>835.3</td>
<td>858.7</td>
</tr>
<tr>
<td>Ex Ante ¹</td>
<td>834.1</td>
<td>856.7</td>
</tr>
<tr>
<td>Ex Post ²</td>
<td>834.6</td>
<td>856.7</td>
</tr>
<tr>
<td><strong>Annual Rate of Change in Y</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual</td>
<td>9.7</td>
<td>11.7</td>
</tr>
<tr>
<td>Ex Ante</td>
<td>9.1</td>
<td>11.3</td>
</tr>
<tr>
<td>Ex Post</td>
<td>9.4</td>
<td>11.0</td>
</tr>
<tr>
<td><strong>Annual Rate of Change in X</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual</td>
<td>5.9</td>
<td>7.4</td>
</tr>
<tr>
<td>Ex Ante</td>
<td>5.7</td>
<td>7.6</td>
</tr>
<tr>
<td>Ex Post</td>
<td>5.4</td>
<td>6.7</td>
</tr>
<tr>
<td><strong>Annual Rate of Change in P</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual</td>
<td>3.7</td>
<td>4.0</td>
</tr>
<tr>
<td>Ex Ante</td>
<td>3.3</td>
<td>3.4</td>
</tr>
<tr>
<td>Ex Post</td>
<td>3.8</td>
<td>4.0</td>
</tr>
<tr>
<td><strong>Unemployment Rate (per cent)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual</td>
<td>3.7</td>
<td>3.6</td>
</tr>
<tr>
<td>Ex Ante</td>
<td>3.9</td>
<td>3.8</td>
</tr>
<tr>
<td>Ex Post</td>
<td>3.9</td>
<td>3.7</td>
</tr>
<tr>
<td><strong>Corporate Aaa Rate (per cent)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual</td>
<td>6.1</td>
<td>6.3</td>
</tr>
<tr>
<td>Ex Ante</td>
<td>5.8</td>
<td>5.9</td>
</tr>
<tr>
<td>Ex Post</td>
<td>5.9</td>
<td>6.0</td>
</tr>
<tr>
<td><strong>Commercial Paper Rate (per cent)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual</td>
<td>5.6</td>
<td>6.1</td>
</tr>
<tr>
<td>Ex Ante</td>
<td>5.1</td>
<td>5.1</td>
</tr>
<tr>
<td>Ex Post</td>
<td>5.8</td>
<td>5.8</td>
</tr>
</tbody>
</table>

**Key to Abbreviations:**

*Y* = Nominal GNP  
*X* = Real GNP  
P = GNP price deflator  
1Simulation based on equations estimated through IV/1967.  
2Simulation based on equations estimated through IV/1969.
Simulations of the model are conducted only for alternative rates of monetary expansion. This is done because of the nature of the results for the spending equation. The net effect of a change in Federal expenditures on total spending (GNP) over a five-quarter period is very small if unaccompanied by monetary expansion.

Short-Run Projections

The results of simulating the model for alternative growth rates of money, and for the growth of Federal expenditures as projected in the fiscal 1971 budget, are shown in Table X. These simulation results reflect the accelerating inflation of the past several years and the fiscal and monetary restraint in force throughout 1969 and early 1970. These projections assume that empirical relationships based on past experience will continue to hold in the near future.

Rates of change in the money stock were computed from the first quarter of 1970. Three alternative rates are shown in Table X. The “no-change case” corresponds to the course of monetary actions in the second half of 1969. The “three per cent case” corresponds to the trend rate of increase in money from 1961 to 1965. Finally, the “six per cent case” represents monetary actions similar to those of 1967 and 1968.
No-change case — A course of no change in the money stock from the first quarter of 1970 would lead to further reduction in the rate of increase of total spending in 1970 and 1971 (Table X). A slowing of total spending along with upward pressures on prices from the past inflation (anticipated price effect) would lead to continued declines in output through 1971. Such a restrictive course of monetary actions would slow the rate of price increase to a four per cent rate by late 1970 and to a two per cent rate by late 1971. The decline in output would be accompanied by a rise in the unemployment rate to over seven per cent by late 1971.

The effects of such restrictive monetary actions on interest rates would be to keep the long-term interest rate at recent levels through 1970, mainly because of the effects of past inflation. By early 1971, the slower advance of prices in 1970 and the slowing of output growth would lead to declines in the long-term rate. The short-term interest rate, on the other hand, would hold at recent levels only temporarily, partly because of continued restrictive monetary actions. Short-term rates would drop sharply by the second half of 1970, reflecting primarily the slowing of output growth. Since the price lags are shorter for the short-term rate, the effects of past inflation are not so pervasive as for the long-term rate.

Three per cent case — Growth of the money stock at a three per cent annual rate is presented to illustrate the effects of a moderate expansion of money. This rate corresponds to the trend rate of increase in money from 1961 to 1965. In the current economic situation, a three per cent rate of expansion in money would represent a moderate easing of monetary policy from its restrictive influence of late 1969 and early 1970.

The effect of such expansion would be to maintain growth in total spending at a rate about the same as in the fourth quarter of 1969. Given the influence of past inflation on prices, output would decline slightly through 1970, but would resume its increase by 1971. The effect on prices in 1970 would be little different from the no-change case, but by late 1971 the difference would be marked. In the three per cent case prices would still be rising at a three per cent rate by late 1971 compared with a two per cent rate for the no-change case. Moderate expansion of the money stock leads to a rise in the unemployment rate through 1970 and 1971. In general, for this model, the unemployment rate rises as long as output grows at less than a four per cent rate.

The long-term interest rate would remain at recent levels throughout 1970, and not until early 1971 would the effect of slower price increases and output growth be enough to offset the effects of past inflation. The short-term interest rate would fall more quickly than the long-term rate but would not fall as much by late 1971 as in the no-change case. Such a pattern for the short-term rate illustrates the short-and longer-run influence of quickened monetary expansion.

Six per cent case — A six per cent annual rate of increase in money is shown to illustrate the effects of a sudden shift to a very rapid rate of monetary expansion in the second quarter of 1970. Such increase in money would be about the same as during 1967 and 1968.

A major effect of shifting to rapid monetary expansion would be to advance the rate of total spending growth. By late 1971, total spending would be increasing at an eight per cent rate with such monetary actions. The rate of price increase would fall somewhat, however, because of past restrictive monetary actions. But the gain in price performance would be small, because by late 1971 prices would still be increasing at a four per cent rate. The effects of past monetary and fiscal actions, along with past inflation, would lead to a decline in output through mid-1970. From then through 1971, output growth would increase.

Despite a shift to a very rapid rate of monetary growth, unemployment would rise until mid-1971. This increase in unemployment would follow because of the continued influence of past monetary and fiscal actions. By late 1971, the recovery in output growth would be pushing the unemployment rate back down.

A shift to rapid monetary expansion has a pronounced effect on market interest rates. The long-term rate would stay at recent levels through 1971, because the influence of past prices (anticipated price effect) would not be offset by a sustained reduction in output growth. The short-term rate would fall, in response to the temporary reduction in output growth, but the decline by late 1971 would be less than for either the no-change or three per cent case.

Implications of the Model for the Long Run

Short-run prospects for economic variables tend to dominate policymakers’ decisions. However, the longer-run consequences of alternative monetary policies should also be given consideration. This model
is incomplete for long-run analysis; nevertheless, it yields results that are of interest and may not be too far removed from results that might evolve from a more complete specification.\footnote{The shortcomings of the model for the long-run analysis are quite evident. There are no assumptions specified as to labor force growth and productivity. Furthermore, there is no investment function and, therefore, the capital stock is not an endogenous variable. All long-run assumptions are embodied in assumptions about the growth rate of potential output. With these assumptions, policy actions cannot affect the economy's long-run growth rate.}

When simulations are conducted for long periods into the future (thirty years), the model demonstrates properties consistent with those expounded by the classical economists. Over the long run, monetary actions have no effect on real magnitudes; the rate of growth of output, the unemployment rate, and the real rate of interest all tend to move toward some equilibrium rate, regardless of which rate of money growth is maintained. The effects of alternative rates of monetary expansion are on nominal magnitudes, namely, total spending, prices, and market interest rates.

Based on the assumptions of the model, a six per cent rate of growth in money along with a six per cent growth rate in Federal expenditures, for example, would lead ultimately to about a six per cent rate of growth in total spending, a four per cent rate of growth in output, a two per cent rate of increase in prices, and market interest rates about two percentage points in excess of the real rate. Alternatively, a two per cent growth rate in money would result approximately in a two per cent growth in total spending, a four per cent rate of growth in output, a two per cent rate of decline in prices, and market interest rates about two percentage points below the real rate. Over the long run, the model indicates that high employment and price stability are compatible.

Summary

The main purpose of this study has been to quantify the effects of monetary and fiscal actions within a small-model framework and thereby offer an alternative to existing large-scale econometric models. Such a model has been formulated and the effects of monetary and fiscal actions on spending, output, prices, employment, and interest rates have been estimated.

The model developed in this article is primarily "monetarist" in character. The estimated equations indicate that monetary actions, as measured by changes in the money stock, play a strategic role. Fiscal actions, as measured by high-employment Federal expenditures, have some short-run effects, but for periods of a year or more the net effect on spending, output, and prices is near zero. Simulations of alternative rates of monetary expansion produce short-run and long-run responses which are consistent with the general monetarist view of the economy.

One of the chief advantages of this model is that it depends primarily on information about only two variables—the money stock and high-employment expenditures.\footnote{This feature has led John Deaver to conjecture that the standard error of forecast in the Andersen-Jordan model may be far lower than that of the FRB-MIT model. See his "Monetary Model Building," Business Economics, (September 1969), p. 30.} Considerable insight can be gained about the pattern of expected movements of certain strategic economic variables by considering alternative courses of monetary and fiscal actions. However, since the model is limited to only monetary and fiscal influences, to the exclusion of other independent forces, it is not suitable for exact forecasting.\footnote{See Andersen and Jordan, pp. 15, 23, 24, and Leonall C. Andersen, "Money in Economic Forecasting," Business Economics, (September 1969), p. 17.} Its primary purpose is to measure the general pattern of influence of monetary and fiscal actions on several strategic economic variables. Since the economy is viewed as being basically stable, other factors influencing total spending, output, and prices are not considered to be of great importance in estimating the response to monetary and fiscal actions.
APPENDIX A

EXPLANATION OF THE PRICE EQUATION

The price equation (omitting timescripts and lags) is
\[ \Delta P = f (D, \Delta P^A), \]
where \( D \), demand pressure, is defined as
\[ D = \Delta Y - (X^F - X). \]
\( \Delta Y \) is the change in total spending, \((X^F - X)\) is the
GNP gap, that is, the difference between potential and
actual output, and \( \Delta P^A \) is anticipated price change. This
specification of the price equation is based on standard
theory of macroeconomic equilibrium.

Macroeconomic equilibrium can be depicted graphically as in Figure I. The solid downward-sloping line,
\( X_Y^D \), is the total spending line, which represents the
combinations of prices and output consistent with a
particular level of total spending, \( Y \). This total spending
line can be interpreted as total demand for output.

The upward-sloping line, labeled \( X^S \), is the total supply
line. This line corresponds to that combination of prices
and output which maximizes profits of firms, given the
prices of factors of production, the degree of competition
among firms and the stock of human and physical capital
(defined to embody the state of technology).

The intersection of total supply and total demand
determines the levels of output and prices. The equilibrium
price level is that level which equates the amount
of output supplied with the amount demanded.

The focus of the model is on the change in prices
and the change in output. In terms of Figure I,
changes in prices and output are brought about by shifts
in demand and/or supply. Since \( X_Y^D \) is drawn for a level
of total spending, a shift of that line upward and to the
right to \( X_Y^{D+\Delta Y} \) represents an increase in total spending.
If the total supply line remains fixed, the effect of \( \Delta Y \)
on prices depends on (1) the magnitude of \( \Delta Y \), and on
(2) the slope of the total supply line, \( X^S \).

The purpose of the model is to estimate the response
of spending, output, and prices to monetary and fiscal
actions, not to test a hypothesized structure. Conse­
quently, rather than attempt to determine the shape
of the total supply line empirically, its variable slope is
proxied by the difference between potential output and
actual output. As drawn in Figure I, there is a one-to-one
relationship between \( X^F - X^S \) and the slope of \( X^S \). Assum­
ing that this relationship is approximately linear
within the range of experience since 1955, and that the
observed values fall on the supply line, the effect of
a variable slope for \( X^S \) can be approximated by \( X^F - X \).
In this way the term \( \Delta Y - (X^F - X) \) brings to­
gether both the magnitude of demand shift and the
slope of the supply line.

The other term in the price equation, anticipated price
change, \( \Delta P^A \), is considered as a separate influence on
prices. In terms of Figure I, the anticipated price term
is a shift parameter for the total supply line (an increase
in \( \Delta P^A \) shifts \( X^S \) upward and to the left). Including it in
this way allows for the influence of past prices on current
pricing policies of firms and factors of production.
APPENDIX B

GRAPHICAL ILLUSTRATION OF THE MODEL

The workings of the model can be demonstrated with graphical techniques. Figure II is a representation of the core of the model, showing the determination of changes in spending, output, and prices.

Panel A of Figure II is a graphical representation of the total spending equation with $\Delta M$ on the horizontal axis and $\Delta Y$ on the vertical axis. Changes in $\Delta E$ shift the total spending line.

Panel B shows prices ($\Delta P$) as a function of $\Delta Y$. A short-run price line ($\Delta P_1$) is drawn consistent with empirical results showing that $\Delta P$ is not very sensitive to $\Delta Y$ in the short run. Important determinants of the position of the short-run price line are the size of the GNP gap and anticipated price changes. The long-run price line ($\Delta P(LR)$) is drawn to show the relationship between $\Delta P$ and $\Delta Y$ when the GNP gap is zero and anticipated prices are equal to actual prices. Its slope (45 degrees from its origin on the $\Delta Y$ axis) is based on the monetarist view that in the long run, $\Delta M$ influences only $\Delta P$.

Panel C expresses the total spending identity in graphical terms. Total spending is divided between output and prices; to reflect this, the line in panel C is drawn as a 45 degree line with its position determined by the magnitude of total spending ($\Delta Y$). There is a family of 45 degree lines, one for each possible $\Delta Y$. Also included in panel C is a horizontal line representing the long-run growth rate of output. It is shown as a horizontal line to indicate that long-run output growth is exogenously determined by resource growth and technology.

In panel D, the $\Delta X_1$ line shows the relationship between money ($\Delta M$) and output ($\Delta X$) as derived from the other three panels. The equation for this line is not shown in Exhibit I in the text, but it can be derived from the other equations of the model.

Figure II is drawn to represent an initial equilibrium for a given $\Delta M$, which has associated with it the short-run price and output lines, $\Delta P_1$ and $\Delta X_1$. The effect of a change in $\Delta M$, given $\Delta E$, is shown as a movement along the spending line in panel A from 1 to 2. Given the initial price line, $\Delta P_1$, and the changed $\Delta Y$, the effect on prices and output is shown in panels B, C and D as a movement from 1 to 2.

This case illustrates the impact of a change in $\Delta M$ in the short run. For longer periods, anticipated price changes and the GNP gap will also change; they become endogenous variables in a long-run model. To illustrate the effects for the long run, the long-run price line, $\Delta P(LR)$, in panel B, is relevant. The interpretation of the long-run price line is that changes in $\Delta M$ are reflected only in $\Delta P$, with $\Delta X$ determined by considerations of resource growth and technology. The horizontal line in panels C and D is the long-run relation between prices and output.

In the short-run, the solution of the model need not lie on the long-run price line in panel B (or the long-run output line in panels C and D). However, a succession of short-runs (shown as a shift of the $\Delta P$ and $\Delta X$ lines to $\Delta P_2$ and $\Delta X_2$) will tend to move equilibrium toward the long-run price and output lines, as anticipated prices adjust to actual prices and the GNP gap goes to zero.
APPENDIX C

ALTERNATIVE PRICE EQUATIONS

The model consists, for the most part, of equations which have been estimated in previous studies. The purpose of this paper is to combine the equations in a way which represents the general monetarist view.

The primary distinguishing feature of this model, other than the reduced-form total spending equation, is the inclusion of a price anticipations variable in the price equation. Two alternative methods of introducing price anticipations were considered. One alternative bypasses the precise form of the price anticipations function and uses the long-term market interest rate (yield on corporate Aaa bonds) as an independent variable in the price equation. The other alternative bypasses both price expectations and interest rates, and introduces changes in money as an independent variable in the price equation. Such a specification allows monetary actions to serve as a proxy for anticipated prices.

A Market Interest Rate in the Price Equation

The first alternative replaces the price anticipations variable with the long-term market interest rate. The rationale is that the process of price anticipations formation is so complex that it defies measurement. However, there seems to be agreement that the level of market interest rates reflects anticipated price changes, however formed. Thus the market interest rate can be used as a proxy for price anticipations.

Since interest rates reflect factors other than price anticipations, including the interest rate does not provide a clean measure of price anticipations. Using the market interest rate allows those factors influencing the real rate of interest to enter indirectly as an influence on prices. In general, however, it has been argued that the real rate of interest is very stable.

Following this reasoning, the price equation was estimated by including the long-term interest rate. The results are shown in Table XI. The coefficient of the interest rate variable is significant at the five per cent level for this specification, and the sum of the coefficients for the demand pressure variable is roughly the same as for the price anticipations version of the equation. However, the length of the lag structure is longer, indicating that the response of prices to changes in demand pressure may be slower than in the basic equation. But this need not imply that prices are slower to respond to monetary actions, since the magnitude of the interest rate contribution to price change is smaller than with the price anticipations specification.

Money in the Price Equation

Several observers have been critical of price equations that do not include monetary variables directly. As shown in the text, excluding monetary variables from the price equation does not necessarily imply a non-monetary theory of inflation. Such a conclusion cannot be derived by examining the price equation alone, but requires an examination of the whole model, and the linkages between money and prices in particular.

The second alternative that is considered is based on the central proposition of the quantity theory—that changes in money are ultimately reflected in changes in the price level. Accordingly, current and past changes in money are used as a proxy to measure anticipated movements in prices. Though this rationale for including money is somewhat narrower than that proposed by some monetary economists, the direct and indirect effects of money are being measured once it is included in the price equation.

Note: Regression coefficients are the top figures; their "t" statistics appear below each coefficient, enclosed by parentheses. R2 is the per cent of variation in the dependent variable which is explained by variations in the independent variable. S.E. is the standard error of the estimate. D-W is the Durbin-Watson statistic.

---

1The suggestion for using the interest rate in the price equation came from the Money and Banking Workshop at the University of Chicago.


3This suggestion was made by Professors David Fand and Allan Meltzer.
The price equation incorporating current and lagged values of changes in money is shown in Table XI. Except for the current quarter, the coefficients are significant for nine lagged quarters. The effect of including changes in money lowers the sum of the coefficients on the demand pressure variable, however. The overall explanatory power of the equation is about the same as for the price anticipations model.

Comparison of Ex Post Simulations

To compare the price equation in the text with the two alternatives in this Appendix, the model was simulated with each of the three different specifications from 1965 through 1969. The period starting in 1965 is used because the relative tracking ability of the models during a period of accelerating inflation is especially relevant in assessing the current economic situation. Since the price equation is the only part that varies from one model to the next, only the results for the rate of change of prices are reported. (see Table XII).

The price anticipations specification has the smallest average absolute error and the smallest root mean squared error for the period. During the last two years of the period, 1968 and 1969, each of the alternative specifications tends to underestimate price changes. However, for 1968 and 1969, the price anticipations specification again has both the smallest average absolute error and root mean squared error.

Conclusions

An examination of the model reflecting three different specifications for the price equation indicates that none of the specifications is clearly superior as judged by conventional criteria. A policymaker might well consider the results provided by each of the three.

When simulations are performed for thirty-year periods beginning in 1970, the price anticipations version (as presented in the text) approaches closest a long-run classical solution. For the other two specifications the unemployment rate does not stabilize at the same level for alternative growth rates of money. These two alternatives yield the same equilibrium growth rates of output for alternative growth rates of money, but since this rate is approached asymptotically, unemployment stabilizes at a different rate for each alternative growth rate of money.4

Supplementary materials relating primarily to the long-run simulations are available on request.

"QUARTERLY ECONOMIC SUMMARY," a new release of this bank, will replace the quarterly "Triangles of U.S. Economic Data" next month, and is available to the public without charge. Based on the approach to stabilization analysis presented in this article, "Quarterly Economic Summary" will contain an outlook for Total Spending, Real Product, and Prices. It will include an explanation of the analysis, as well as charts and rates-of-change tables for national income accounts data and related series. Persons who have been receiving "Triangles of U.S. Economic Data" will automatically receive the new release. For subscriptions, write: Research Department, Federal Reserve Bank of St. Louis, P.O. Box 442, St. Louis, Missouri 63166.
Summary of U.S. Balance of Payments, 1969

by MICHAEL W. KERAN

Balance of Payments Accounts

The Balance of Payments Accounts are a double-entry record of commodity and financial transactions between United States and foreign residents. Because it is based on double-entry bookkeeping principles, the balance of payments always balances in the sense that receipts equal payments. The double-entry nature of the balance of payments is illustrated on the lefthand side of the table on the next page. This accounting balance must not be confused, however, with a meaningful economic balance, because the economic behavior underlying some of these transactions may not be sustainable. For example, the receipt of $8.8 billion in 1969 from the sale of convertible currencies (IV.3.b) can only continue as long as the United States’ stock of convertible currencies lasts. There are two officially recognized measures of the economic balance of payments: the Liquidity Balance and the Official Settlements Balance. They represent alternative ways of arranging the balance of payments accounts, and are shown on the righthand side of the table.

The Accounts are divided into four categories: Goods and Services, Private Capital, Government, and Other. These accounts are, of course, interrelated; an export of goods can be financed by private capital, a Government loan or grant, or by a private transfer.

(I) Goods and Services — Merchandise exports and imports (I.1.) are a measure of physical goods which cross national boundaries. The demand for imports depends largely upon domestic income, while the demand for exports depends largely upon the level of income abroad. Because of excess demand in the United States, the trade balance of $.7 billion is unusually small by historic U.S. standards. However, there was a pattern of improvement during the year due to the slowdown in the United States economy which reduced import growth, while exports continued to grow rapidly in response to high levels of demand in Europe and Japan.

In spite of the decline in U.S. troops in Vietnam, military spending abroad increased $.4 billion in 1969 to a level of $4.9 billion (I.2.a). Other components of services were relatively unchanged from 1968.

(II) Private Capital — Long-term capital (II.1.) represents changes in United States private assets purchased from foreigners (payments column) and liabilities to foreigners (receipts column). There was a long-term capital outflow of $.7 billion in 1969 versus an inflow of $.19 billion in 1968. This turnaround is attributed largely to a decrease in foreign private and official portfolio investment in the United States.

For short-term capital (II.2.), the payments column represents changes in all private United States assets, while the receipts column records only changes in private nonbank liabilities, and thus does not record Euro-dollar transactions. Changes in bank liabilities are listed with changes in short-term Treasury liabilities under IV.4, to facilitate analysis of the distinction between the Liquidity Balance and Official Settlements Balance.

(III) Government — The net outflow of Government loans, grants, and transfers was $4.0 billion in 1969, up $1.5 billion from 1968. Foreign official institutions, which had purchased $1.8 billion of U.S. Government bonds in 1968, sold $.2 billion in 1969. This $2.0 billion turnaround more than explains the deterioration in the Government capital account.

(IV) Other — Private transfers (IV.1.) represent gifts and similar payments by American residents to foreign residents. Errors and Omissions (IV.2.) is the statistical discrepancy between all specifically identifiable receipts and payments. The importance of this item is discussed below. Changes in U.S. Reserve Assets (IV.3.) represent official transactions of the United States Government with foreign governments and the International Monetary Fund (IMF). The $.12 billion increase in reserve assets is recorded with a minus sign because dollars were “spent” to acquire them. Changes in U.S. Liquid Liabilities (IV.4.) represent increased foreign holdings of liquid dollar liabilities of U.S. banks and the Treasury. The major difference between the Liquidity and the Official Settlements Balances is in the different categorization of these U.S. Liquid Liabilities.

Balance of Payments Measures

The Net Balance columns show the source and overall size of the deficit or surplus, while the Financing columns show how the deficit is financed or the surplus is disposed.

Liquidity Balance — The underlying assumption about economic behavior is that all foreign liquid dollar holdings (IV.4) both private and official, are a potential claim on United States reserve assets, especially the gold stock. The Liquidity Balance was in deficit by $7 billion in 1969, compared to a $.2 billion surplus in 1968. This great change is partially a statistical illusion resulting from two specific events which in no way reflect a weakening in the basic external position of the United States. First, Federal Reserve Regulation Q, which imposed an interest rate ceiling of 6% per cent or less on deposits in American banks, created an incentive for many depositors to switch their deposits to the foreign branch offices of American banks where Regulation Q did not apply and interest rates were in excess of 9 per cent. As the transfers were outside usual Department of Commerce reporting channels, they show up in Errors and Omissions, which increased from a $.7 billion deficit in 1968 to a $3 billion deficit in 1969. Second, official institutions switched their dollar reserves from “nonliquid” Treasury notes and corporate bonds to “liquid” form by $1 billion in 1969.
Official Settlement Balance – The underlying economic rationale is that only official holdings of dollars represent a meaningful potential claim on U.S. reserve assets. Foreign private persons and international organizations demand dollar balances to meet the needs of international trade and finance. Thus, an increase in foreign private holdings of dollars (IV.4.b) is treated as a capital inflow, while changes in foreign official holdings of dollars (IV.4.a) is treated as a financing item. The Official Settlements Balance recorded a surplus of $2.7 billion in 1969, almost double the surplus recorded in 1968. This undoubtedly overstates the underlying strength of the balance of payments, because the $8.8 billion capital inflow through the Eurodollar market (IV.4.b) was mainly due to the need of U.S. banks to find sources of funds not subject to Regulation Q interest rate ceilings.

Conclusion – Regulation Q has distorted both of these measures in 1969, making one look stronger and the other weaker than it really was. These measurement problems caution us not to rely on summary statements about the balance of payments. This is especially true of a reserve currency country like the United States.

### U. S. Balance of Payments, 1969* (In Billions of Dollars)

<table>
<thead>
<tr>
<th>Transactions</th>
<th>Balance of Payments Accounts</th>
<th>Balance of Payments Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Receipts</td>
<td>Payments</td>
</tr>
<tr>
<td>I. Goods and Services</td>
<td>55.4</td>
<td>53.3</td>
</tr>
<tr>
<td>1. Merchandise</td>
<td>36.5</td>
<td>35.8</td>
</tr>
<tr>
<td>Trade (goods)</td>
<td>18.9</td>
<td>17.5</td>
</tr>
<tr>
<td>2. Services</td>
<td>1.5</td>
<td>4.9</td>
</tr>
<tr>
<td>a. Military</td>
<td>8.9</td>
<td>4.4</td>
</tr>
<tr>
<td>b. Investment Income</td>
<td>2.1</td>
<td>3.4</td>
</tr>
<tr>
<td>c. Travel</td>
<td>6.4</td>
<td>4.8</td>
</tr>
<tr>
<td>d. Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II. Private Capital</td>
<td>3.7</td>
<td>5.0</td>
</tr>
<tr>
<td>1. Long term</td>
<td>3.7</td>
<td>4.4</td>
</tr>
<tr>
<td>a. Direct Investment</td>
<td>0.7</td>
<td>3.1</td>
</tr>
<tr>
<td>b. Portfolio Investment</td>
<td>3.0</td>
<td>1.3</td>
</tr>
<tr>
<td>c. Bank and Other Loans (Net)</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>2. Short term</td>
<td>0.0</td>
<td>0.6</td>
</tr>
<tr>
<td>III. Government</td>
<td>1.5</td>
<td>5.5</td>
</tr>
<tr>
<td>1. Loans</td>
<td>1.5</td>
<td>3.4</td>
</tr>
<tr>
<td>2. Grants and Transfers</td>
<td>2.1</td>
<td>- 2.1</td>
</tr>
<tr>
<td>IV. Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Private Transfers</td>
<td></td>
<td>0.8</td>
</tr>
<tr>
<td>2. Errors and Omissions</td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>3. Changes in U.S. Reserve Assets</td>
<td>0.8</td>
<td>2.0</td>
</tr>
<tr>
<td>a. Gold (outflow is receipt)</td>
<td>0.8</td>
<td>1.0</td>
</tr>
<tr>
<td>b. Convertible Currencies</td>
<td>1.0</td>
<td>- 1.0</td>
</tr>
<tr>
<td>c. I M F Gold Tranche</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Changes in U.S. Liquid Liabilities</td>
<td>8.9</td>
<td>0.7</td>
</tr>
<tr>
<td>a. Foreign Official Holders</td>
<td>8.8</td>
<td>0.8</td>
</tr>
<tr>
<td>b. Foreign Private Holders</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>c. International Organizations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other than I M F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>70.3</td>
<td>70.3</td>
</tr>
</tbody>
</table>

Note: Figures may not add because of rounding.  
*Preliminary
SUBSCRIPTIONS to this bank's REVIEW are available to the public without charge, including bulk mailings to banks, business organizations, educational institutions, and others. For information write: Research Department, Federal Reserve Bank of St. Louis, P. O. Box 442, St. Louis, Missouri 63166.