

# FEDERAL RESERVE BANK OF ST. LOUIS

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# REVIEW



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# The Economy in 1972

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**A**LTHOUGH most projections of the pace of economic activity this year are quite optimistic, uncertainty continues to cloud the 1972 economic horizon. With unemployment still high by historical standards, many people remain concerned about their ability either to obtain a job to their liking or to retain their present one. Inflation and potential inflationary pressures are not yet subdued. The effectiveness of the price and wage control program is still debated by those who regard it as a necessary, long-term supplement to orthodox monetary-fiscal policies, and by those who see the program as a disturbing encroachment on individual freedom. Nineteen seventy-two could also be a year marking the most sweeping changes in the international monetary payments mechanism since the 1944 Bretton Woods Conference. Finally, all these economic developments take on added significance in light of the coming presidential election.

Many of these issues evolved over a long period and will be difficult to resolve in a single year. To assess the course of economic activity over the next several months, this article discusses first the principal influences on the course of economic activity and secondly, the economic outlook.

## Factors Influencing The Economic Outlook

The chief factors to be considered in projecting the economic outlook for 1972 are given in Figure I. The three major categories are cyclical forces, structural changes and policy actions.

At any time, the economy has a certain "momentum" of its own. The direction and magnitude of the momentum reflect the particular stage of the business

cycle. The momentum of cyclical forces can be offset or augmented by structural changes or stabilization policy actions.

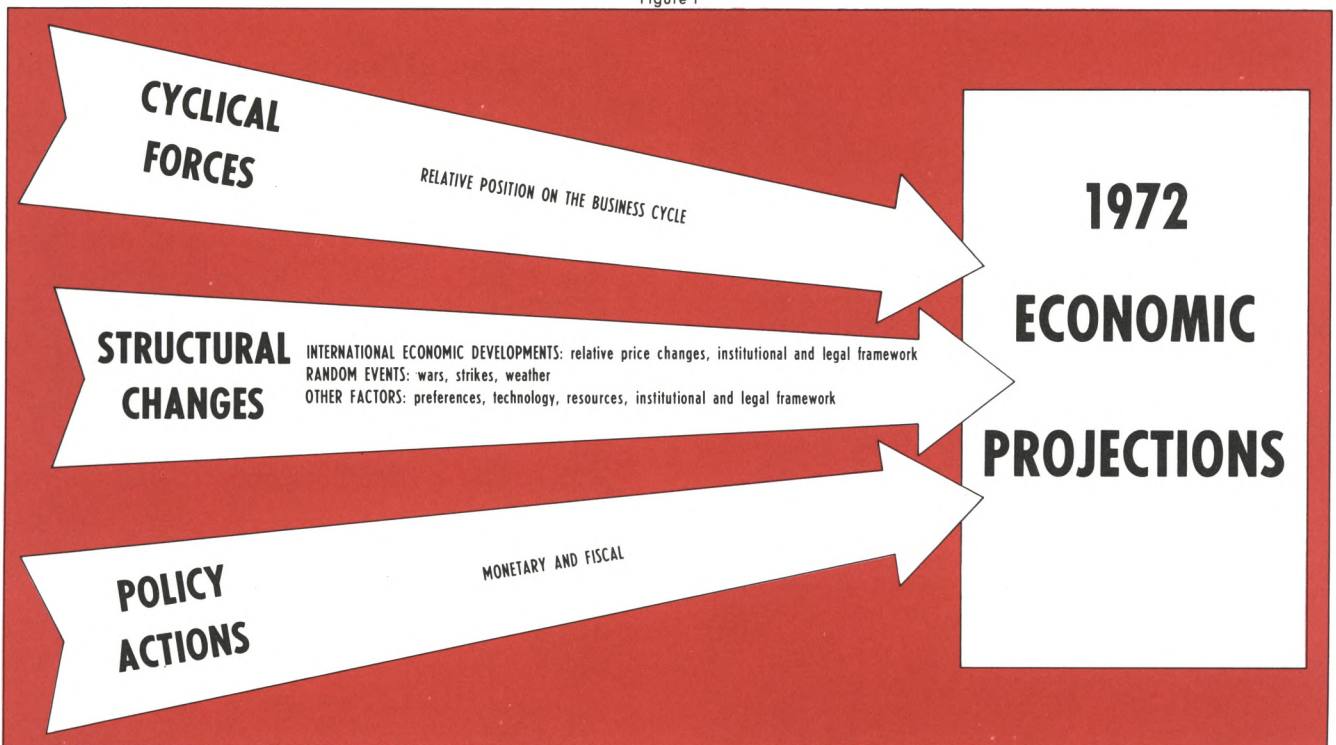
Structural changes include developments in the world trade picture which influence the U.S. balance-of-payments position, random events such as wars, strikes and weather shifts, as well as "other" factors. These other factors include: (1) changes in preference, such as an increased preference for saving relative to consumption, or liquidity relative to goods and services; (2) changes in the nature or rate of increase of technological advance; (3) changes in the quantity and quality of available resources, such as a shift toward more availability of inexperienced labor resources relative to experienced labor resources; and (4) changes in the institutional and legal framework, such as the initiation of legally authorized price and wage controls in a peace-time economy.

Policy actions are the orthodox measures employed by stabilization authorities to guide the course of economic activity. Monetary and fiscal actions taken prior to and during 1972 will have a substantial bearing on economic developments during the current year.

## *Cyclical Influences*

Nineteen seventy-two begins the second year of recovery from the moderate recession which ended in November 1970. Much has been made of the fact that the first year of the current recovery period was not as strong as the first year of previous recoveries, but insufficient attention has been given to the relation between the moderate recession and the moderate recovery. To the extent that forces are set in motion

Figure 1



which influence the scope of business cycles independent of policy actions or other outside forces, a strong recovery in 1971 should not have been anticipated.<sup>1</sup> Indeed, many observers accurately predicted a moderate recovery in 1971 based, in some degree, on such reasoning.

<sup>1</sup>Wesley C. Mitchell, a pioneer in business cycle analysis, wrote on the automatic forces influencing the up and down phases of the cycle:

The various processes just described combine reductions in both prime costs and fixed charges with an expansion in the physical volume of business. In this fashion depression ultimately brings about revival. For of course these changes increase prospective profits, and in the money economy prospective profits are the great incentive to activity. . . .

In fine, this business situation is that described in the first section of Chapter 1—the situation out of which a revival of activity presently develops. Having thus come round again to its point of departure, after tracing the processes of cumulative change by which prosperity breeds crisis, crisis evolves into depression, and depression paves the way for a return of prosperity, the present theory of business cycles has reached its appointed end. [Wesley Clair Mitchell, *Business Cycles and Their Causes* (Berkeley and Los Angeles: University of California Press, 1950), pp. 146-47.] This volume is a reprint of Part III of Mitchell's *Business Cycles*, originally published in 1913 by the University of California Press.

There is some likelihood that, other things equal, the more severe is the downturn due to such factors as described by Mitchell, the stronger will be the upturn. For example, if the downturn is of sufficient scope that even very efficient resources become unemployed, the efficient resources can be utilized to produce a strong upturn after the crisis point is passed. Outside forces, however, such as strikes and policy actions, can effectively alter this relation.

Nevertheless, the weakness of the recovery last year has contributed to the view that there has been a change in the way the economy works, that the economic principles which held in times past no longer apply. There is no question that the economy is constantly changing and the policies used to influence the course of its movement must be reasonably flexible. However, a simple comparison of the moderate recovery in 1971 with vigorous first year recoveries in the past may overstate the degree of structural change, especially with regard to production and employment.

Table I presents changes in several important economic variables for each business downswing, for each recovery and for each entire recession-early recovery period of the past two decades (see also the accompanying chart). The "Total Period" data reflect both the depth of the recession and the strength of the early portion of the ensuing recovery. On this basis, the recent economic experience does not appear as strikingly different from other periods as a comparison of recessions alone or early recovery periods alone would suggest.<sup>2</sup>

<sup>2</sup>Most recessions are often termed "inventory" recessions since much of the adjustment in total spending is reflected in the rate of inventory accumulation. The 1969-70 recession differed in the respect that inventories did not fall as they did in previous recessions. Accordingly, it should not have been expected that inventories would have increased significantly in the early recovery, and they did not. The change in real (price-deflated) inventories averaged \$2.3 billion in the

Table I

Recent Recession and Early Recovery Periods  
(Annual Rates of Change)

	Industrial Production	Real Product	Payroll Employment	GNP Deflator
<b>RECESSION</b>				
III/53-III/54	-7.6%	-1.6%	-3.2%	1.4%
III/57-II/58	-14.5	-4.6	-5.0	2.3
II/60-I/61	-7.3	-1.9	-2.4	1.6
IV/69-IV/70	-6.3	-1.3	-1.0	5.7
<b>RECOVERY</b>				
III/54-III/55	14.7	8.6	4.7	1.6
II/58-I/59	20.2	8.9	4.5	1.9
I/61-IV/61	15.1	8.1	2.8	1.0
IV/70-IV/71	3.4	5.0	1.3	3.3
<b>TOTAL PERIOD</b>				
III/53-III/55	2.9	3.4	0.7	1.5
III/57-I/59	1.4	2.0	-0.4	2.1
II/60-IV/61	3.3	3.0	0.1	1.3
IV/69-IV/71	-1.6	1.8	0.1	4.5

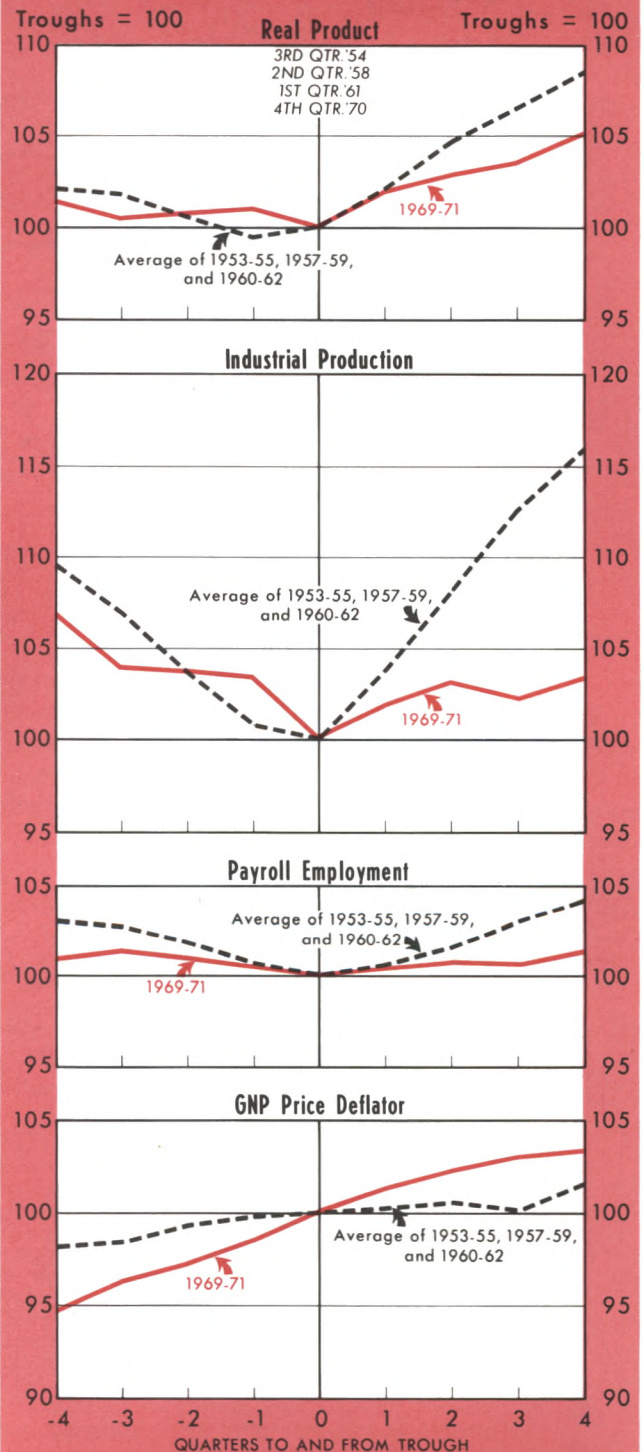
Notes: The early recovery period is arbitrarily dated the same length as its accompanying recession; thus, the first and last recovery periods (1954-55 and 1970-71) are one year in duration and the other two are three quarters. The periods of recession used in the article have been defined by the National Bureau of Economic Research. Because of the automobile workers strike in late 1970, the depth of the most recent recession and strength of the recovery are somewhat overstated. A 1967=100 base was used for the industrial production calculations, except for the first recession-recovery period, in which a 1957-59=100 base was used.

**Production and Employment**-Industrial production rose about 20 percent in the first year following the 1957-58 recession, compared with a 3.4 percent increase in the year following the 1969-70 recession. However, industrial production fell at a 14.5 percent annual rate during the 1957-58 recession, compared with a 6.3 percent decline in the 1969-70 recession. Table I indicates that there has been a strong relation between the severity of a recession and the strength of the immediate recovery. In general, the most severe recession of the four compared was that which occurred in 1957-58, and the strongest immediate recovery followed the 1957-58 recession. The mildest recession was the most recent one (1969-70), and the mildest recovery was in the 1970-71 period.

1969-70 recession, compared with an average decline for the three previous recessions of \$2.9 billion. The change in real inventories averaged \$2 billion in the 1970-71 recovery, compared with a \$3.8 billion average for the three previous recoveries.

Some analysts have suggested the current "low" inventory/sales ratio indicates large increases in inventories in the near future. The inventory/sales ratio is currently "low" only in relation to the past four years. It is not far from the average in relation to past early recovery periods. The average of the inventory/sales ratio in the early recovery period (through November 1971) following the 1969-70 recession was 1.56 compared with 1.54, 1.56 and 1.50 for the recoveries immediately following the recessions of 1960-61, 1957-58 and 1953-54, respectively.

Comparison of Four Economic Indicators  
Recession—Recovery



Note: A 1967=100 base was used for the industrial production calculations, except for the first recession-recovery period, in which a 1957-59=100 base was used.

Sources: U.S. Department of Labor, Board of Governors of the Federal Reserve System, and U.S. Department of Commerce. Latest data plotted: 4th quarter 1971.

Growth in real product or industrial production has not been as strong in the 1969-71 recession-recovery period as in earlier comparable periods, but differences (particularly with the 1957-59 period) are not as great as one might expect. Although industrial production has not yet reached its 1969 peak, real product gains over the latest recession-recovery period are only slightly less than in the earlier comparable periods.

Payroll employment changes over the several periods are quite comparable. Payroll employment rose at a 0.1 percent annual rate in the 1969-71 period, compared with a 0.1 percent rate rise in the 1960-61 period, a 0.7 percent rate rise in the 1953-55 period, and a 0.4 percent rate *decline* in the 1957-59 period.

**Prices**—One of the most substantial differences among the indicators and periods given in Table I is the movement of prices in the most recent period. The implicit GNP deflator rose in the 1969-71 period at a 4.5 percent annual rate, more than twice as rapid as in any earlier comparable recession-recovery period. On its face, such a difference would appear to reflect substantial structural changes in the economy.

An alternative, or supplementary, explanation for the difficulty in restraining price advances in the most recent recession-recovery period is framed in terms of price anticipations. The longer that prices are permitted to rise unchecked, the more expectations of rising prices are incorporated into current prices through higher wages, rents, and other contractual obligations. Anticipations of higher prices built up over a period of years can effectively impede the efforts of stabilization authorities to halt inflation without any significant changes in economic structure (for example, more monopoly power on the part of unions or businesses) having occurred.

Prices rose for 35 quarters from the trough of the 1961 recession to the peak of the recovery ending in 1969. The next longest period from trough to peak (in the past two decades) in which prices were permitted to rise was the 15 quarter period preceding the 1953-54 recession. Given the length of the period over which prices rose and the fact that price increases accelerated in each succeeding year after 1962 (especially in the latter half of the 1960s), it should not have been surprising that the moderate stabilization measures adopted in 1969 to stem inflation were not immediately successful in reversing the trend.<sup>3</sup>

<sup>3</sup>The model of the Federal Reserve Bank of St. Louis, published in the April 1970 issue of this *Review*, indicated at that time that following a course of 6 percent money growth (and high-employment expenditures as estimated by this Bank) from the fourth quarter of 1969 to the fourth quarter

## *Structural Influences*

There are sufficient differences in the economic indicators over the recession-recovery periods to suggest that cyclical influences alone cannot explain the variations. The structural changes which have occurred over the years have affected, in particular, the short-run unemployment-prices relation.

The unemployment rate rise from 3.6 percent at the beginning of the recession to 6 percent at the end of the early recovery over the latest recession-recovery period is the most severe of the past four such periods, despite the fact that payroll employment increased more rapidly in the most recent period than in 1957-59, as rapidly as in 1960-61, and only slightly less rapidly than in 1953-55.<sup>4</sup> Part of the explanation for this apparent paradox is that (1) the labor force has been increasing more rapidly in the past recession-recovery period than in most earlier ones, and (2) the composition of the labor force has been shifting such that proportionately more of the labor force is composed of individuals with a historically high average rate of unemployment. Women and teen-agers, for example, comprise relatively more of the labor force than in earlier recession-recovery periods.

The change in the composition of the labor force over the past decade represents a structural shift in the economy. It is a shift which has worsened the tenuous, short-term relation between unemployment and prices through the aggravation of unemployment.

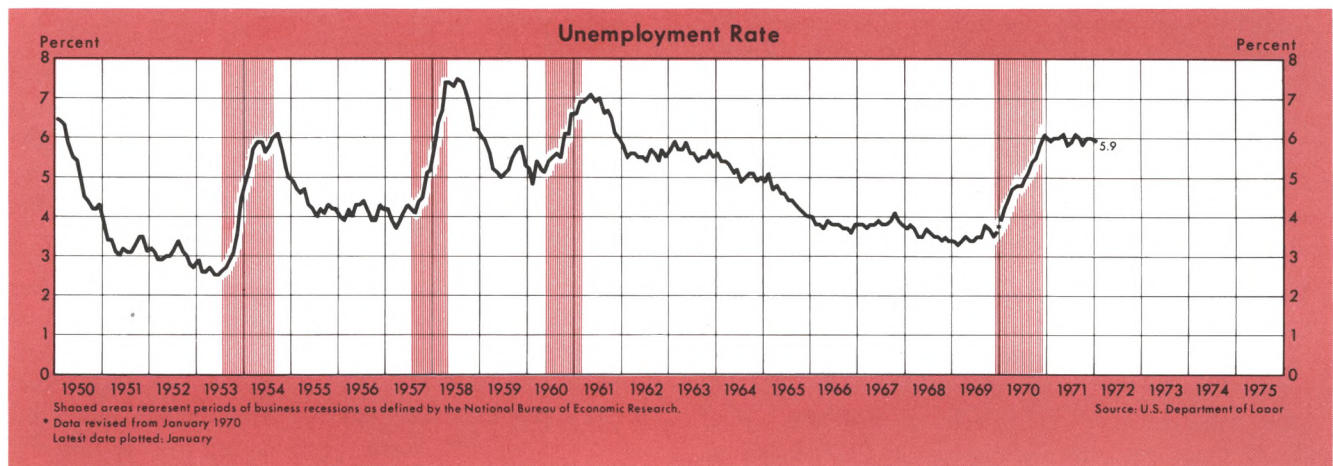
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of 1971 would find prices still rising at a rapid rate at the end of 1971.

By late 1971, total spending would be increasing at an eight percent rate with such monetary actions [6 percent annual rate of increase of money]. 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 percent rate [Leonall C. Andersen and Keith M. Carlson, "A Monetarist Model for Economic Stabilization," this *Review* (April 1970), p. 20].

A simulation of the model over the IV/1969-II/1971 period (before price and wage controls) with actual money and high-employment expenditures and coefficients estimated through IV/1969, projected a 4.9 percent six-quarter average price increase, compared with an actual average of 5.4 percent. See Keith M. Carlson, "Projecting With the St. Louis Model: A Progress Report," this issue of the *Review*, pp. 20-27, for other comments on the model's predictive performance.

<sup>4</sup>The rise in the unemployment rate from 3.6 percent in IV/1969 to 6 percent in IV/1971 reflects the persistence of relatively high levels of unemployment during the recent recovery. Unemployment rose from 2.7 percent of the labor force in III/1953 to 4.1 percent in III/1955, an increase of 1.4 percentage points. Unemployment increased 1.6 percentage points from 4.2 percent to 5.8 percent in the 1957-59 period and one percentage point from 5.2 to 6.2 percent in the 1960-61 recession-recovery period.



Another structural change which may have affected unemployment is the fact that U.S. exports relative to imports have been slowing in recent years. Net U.S. exports slowed each year (except 1970) from \$8.5 billion in 1964 to \$0.7 billion in 1971. Employment and output in a number of U.S. industries are probably less than they would be otherwise if it were not for the deterioration of the U.S. competitive position over the past several years. Over a long period, U.S. resources may shift from industries with declining export demand to other industries, but during the period of adjustment, employment is probably affected adversely.

Quite likely, structural changes have also hampered efforts to slow price increases. The shifting composition of final output from the production of goods to the production of services has probably tended to reinforce price pressures. Because of the nature of many services rendered, such as those of barbers, lawyers, and government workers, productivity gains are difficult to achieve (or measure). The production of goods such as automobiles or appliances can be more easily enhanced by technological advances and/or mass assemblage techniques. Lower productivity, other things equal, results in lower potential output, a more severe total supply constraint relative to total demand, and consequently, higher prices.<sup>5</sup>

The minimum wage, which puts a floor under wage rates, and also tends to increase unemployment by making inexperienced workers ineligible for many jobs, has been extended to cover more workers in recent years than in the 1950s. Although the minimum wage was designed to benefit the worker, it is possible

that it has affected adversely *both* unemployment and prices. This structural shift is one endorsed by law.

Because structural changes probably have accounted for some worsening of the prices-unemployment relation, structural measures could play a strong role in improving the relation. Job training, information and relocation subsidies, and the elimination of legal and institutional barriers to jobs (such as the minimum wage) could bolster orthodox monetary and fiscal stabilization techniques to achieve the goals of a low rate of unemployment and price stability.

### *Stabilization Policy Actions*

The impact of monetary and fiscal policy actions on economic activity is, like cyclical and structural influences, not easy to identify or measure. A rough approximation of aggregate monetary and fiscal policy actions prior to and during recent recession-recovery periods is given in Table II. Such actions normally influence economic activity with some lag, and a period of three quarters before each peak was arbitrarily selected as the point from which actions affecting activity over the course of the recession-early recovery periods should be dated.<sup>6</sup> Money, defined to include demand deposits and currency in the hands of the public, is used to represent monetary policy actions and high-employment expenditures is selected as the fiscal policy variable. Both are deflated by the implicit price deflator to account for varying price trends over the past twenty years.<sup>7</sup>

<sup>6</sup>See Andersen and Carlson, "A Monetarist Model," for some evidence on the relevant length of policy action lags.

<sup>7</sup>Another method of adjusting stabilization policy actions for changes in trend over a long period is given in Leonall C. Andersen, "A Monetarist View of Demand Management: The United States Experience," this *Review* (September 1971), p. 9. Andersen adjusts the money supply by comparing its growth relative to various trends over the 1952-71 period.

<sup>5</sup>See Roger W. Spencer, "Population, The Labor Force, and Potential Output: Implications for the St. Louis Model," this *Review* (February 1971), pp. 15-23.

Table II

**Monetary and Fiscal Trends Prior to and During Recent Recession-Recovery Periods (Annual Rates of Change)**

Period	Money/Prices	Expenditures/Prices
IV/1952-III/1955 . . . . .	1.08%	-3.7%
IV/1956-I/1959 . . . . .	-0.81	6.4
III/1959-IV/1961 . . . . .	-0.95	4.3
I/1969-IV/1971 . . . . .	0.21	2.3

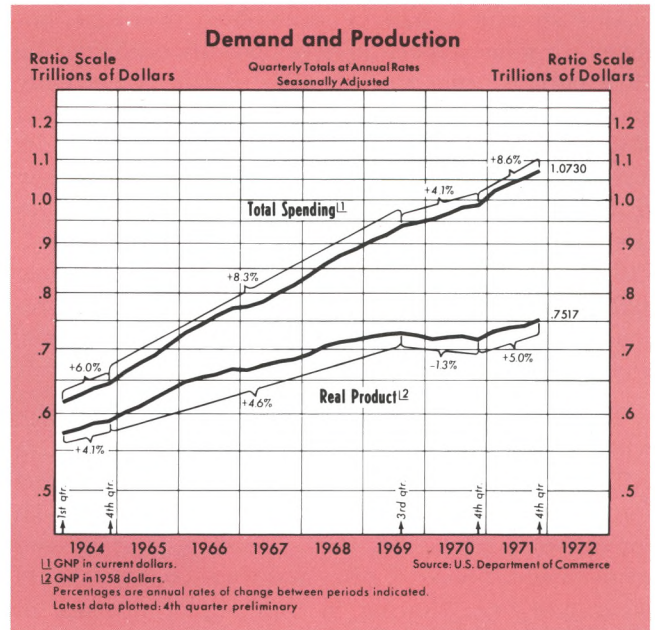
Rapid growth of the money stock, relative to prices, is presumed to have a short-run stimulative effect on the economy, as is rapid growth of high-employment expenditures relative to prices. For example, there would probably be general agreement that monetary actions were stimulative in the IV/1967-IV/1968 period when money/prices rose 3.2 percent and restrictive in the IV/1968-IV/1969 period when money/prices declined 1.3 percent.<sup>8</sup>

Table II suggests that monetary actions were relatively stimulative in the 1952-55 period, but fiscal actions were not (unwinding of the Korean War). Fiscal actions were relatively stimulative in the 1956-59 and 1959-61 periods (compared to the 1952-55 and 1969-71 periods), but monetary actions were not. Neither monetary nor fiscal actions were overly expansive in the 1969-71 period.

By these crude indexes, the slightly stimulative monetary actions in 1969-71 relative to 1956-59 or 1959-61, would tend to exert more inflationary pressure than in the two earlier periods, and also tend to maintain the unemployment rate at a relatively lower level than in the two earlier periods. This most recent monetary trend may represent a partial explanation for the lack of success in slowing price rises in recent years relative to the two earlier periods, and for the success attained in holding the aggregate unemployment rate lower than in the two earlier periods (the unemployment rate reached a peak of 6 percent in the latest recession-recovery period, compared with 7.4 percent and 7 percent for the 1957-59 and 1960-61 periods, respectively).

Two other factors – the shifts in composition of the labor force mentioned above and the sizable defense cutbacks in recent years (reflected in the 2.3 percent figure for expenditures/prices in the table) – have contributed to the high unemployment rates for in-

<sup>8</sup>It should be noted that monetary and fiscal authorities cannot control money/prices and expenditures/prices over any brief period; they may, however, control money and expenditures.



experienced workers across the country and defense-oriented workers in particular geographic areas of the United States.<sup>9</sup>

**The Economic Outlook**

The current economic outlook is based on recent and projected cyclical, structural and policy influences. These factors affect economic activity in 1972 and beyond.

*Current Cyclical and Structural Considerations*

The U.S. economy begins the year 1972 at a position on the business cycle not substantially different from that a year ago in terms of actual “momentum” relative to potential. Although real product rose at a 6.1 percent rate from the third to the fourth quarter of 1971, after increasing at a 3 percent rate from the first to the third quarter, output advances have not been sufficient to reduce unemployment. The rate of utilization of both labor and capital resources has changed little in the past year. Actual output is approximately 93 percent of potential output, about the same as a year ago. Thus the “momentum” of the economy moving into 1972 gives little reason by itself to alter economic projections from the actual developments of 1971.

<sup>9</sup>“The total employment attributable to military expenditures, including military forces and government civilian personnel, dropped from a peak of 7.8 million in 1968 to about 6.1 million in 1971, a loss of 1.7 million jobs over the three-year period, with more than 900,000 of these lost during 1970-71.” Richard P. Oliver, “Employment Effects of Reduced Defense Spending,” *Monthly Labor Review* (December 1971), p. 4.

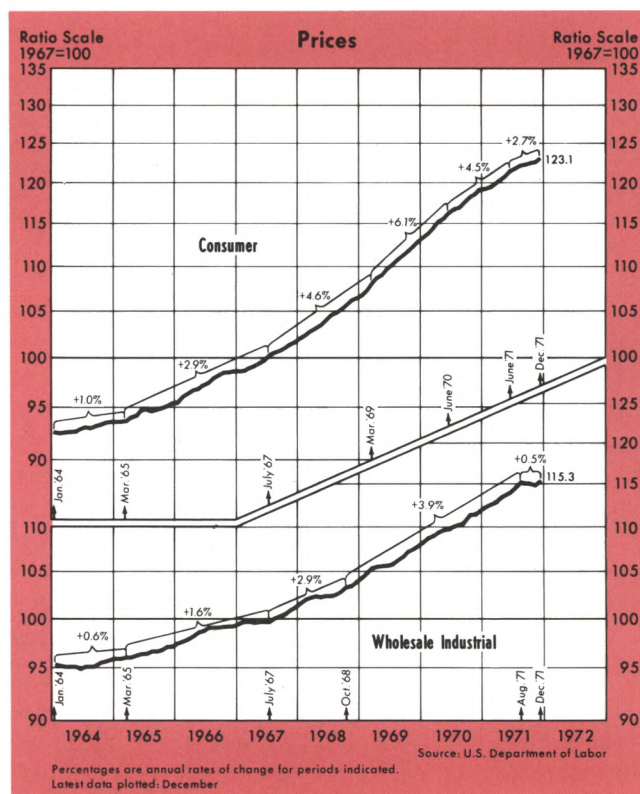
Most structural changes occur slowly over time, but there are some important developments changing the 1972 outlook from that of 1971. Little is currently known as to whether preferences for liquidity and saving relative to the purchase of goods and services have changed much from last year, but it is unlikely that the long-term trend of preference toward services from goods will be much altered. Moreover, there is little basis on which to project changes in economic activity in 1972 over 1971 because of differing resource trends, weather changes, war developments, technological advancements, or strike patterns.

There are at least two structural changes which will likely exert some influence on the economy in 1972. First, the anticipated improvement in demand for U.S. exports relative to imports should have an expansionary effect on total spending, output, and employment.<sup>10</sup> Second, price and wage controls should contribute to a slowing in the rate of increase of prices in 1972, given moderate stabilization actions.

Price increases leveled off in 1970 and 1971, and may have been decelerating slightly when the President called for a wage-price freeze last August 15. Since the imposition of the freeze and the second phase of the Administration's program, measured prices have slowed. Wholesale prices of industrial commodities increased at a 0.5 percent rate from August to December, after rising at a 4.6 percent rate in the preceding eight months. Consumer price increases slowed to a 2.5 percent rate from August to December, compared with a 3.8 percent rate from December 1970 to August.

Problems of administration and equity will likely intensify the longer the program remains in existence, but in the latter months of 1971, at least, wage and price controls seemed to have had the desired effect. The potential for eventual success of the program is enhanced by: (1) the fact that the controls have not been accompanied by excessive monetary stimulus; (2) the fact that there is currently substantial economic slack; (3) the possibility that controls may have helped stem anticipations of higher prices; and

<sup>10</sup>"The expected employment gains for the United States will probably be spread over about two years, too, according to Peter G. Peterson, the White House International Economic Policy Chief. Each \$1 billion of payments turnaround will create 60,000 to 80,000 jobs, he estimates. Thus, attaining the Connally goal of a \$9 billion swing for the better could mean more than 700,000 additional jobs by late 1973; that in itself would be enough to lower the unemployment rate to about 5.2 percent from November's 6 percent," Richard F. Janssen, "The New Dollar: Devaluation of 8.57 Percent Likely to Create Jobs, Help Nixon Summitry," *The Wall Street Journal*, December 20, 1971, p. 25. These export-related employment gains anticipated by the administration seem overly optimistic.



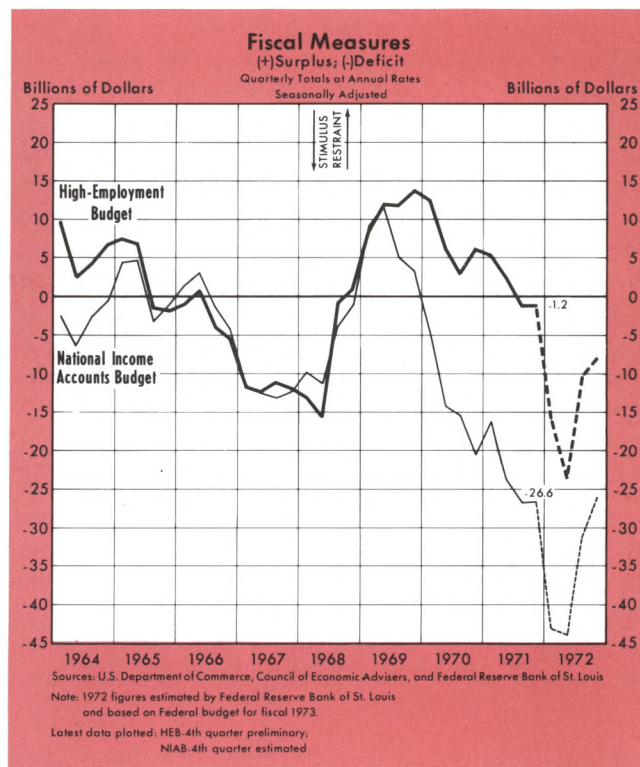
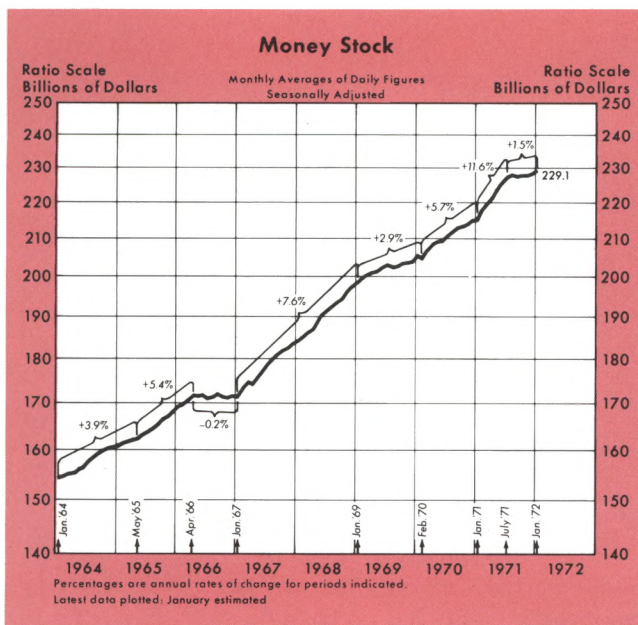
(4) the fact that the wage negotiation calendar for 1972 is relatively light.

### Recent Monetary and Fiscal Policy Actions

The course of economic activity in 1972 depends, in part, on both monetary and fiscal policy actions. There is a carry-over effect from actions taken last year, and there will be some effect from actions taken during 1972.

**Monetary Actions**—The rate of growth of the money stock fluctuated more widely in 1971 than usual. After rising 5.4 percent from December 1969 to December 1970, the money stock accelerated to a 10.3 percent annual rate of growth in the first seven months of 1971, and then slowed markedly to very little growth during the last five months of the year and into January 1972.

These violent swings in money movements were accompanied by roughly similar changes in interest rates. The three-month Treasury bill rate, for example, rose from a low of 3.3 percent in March 1971 to a peak of 5.5 percent in July, and then fell to a little over 3 percent in January 1972. Falling interest rates in the latter half of 1971 have been viewed by many analysts as a spur to economic activity in 1972, and indeed a lower cost of capital is often one of the ways by which monetary changes influence spending.



However, because there are channels other than interest rates through which monetary growth affects economic activity, the recent slower growth in the money stock may have a restrictive effect on spending (assuming a relatively stable demand for money). When the money stock expands rapidly relative to demand, its value falls, and people exchange money for goods and services at a rapid rate. Conversely, when growth of the money stock slows, relative to demand, its higher value makes people more reluctant to exchange their cash for goods and services. Persistent and pronounced swings in monetary growth rates have consistently led similar swings in spending.

Thus, the slower monetary expansion during late 1971 may retard economic activity during the first part of 1972 from what it would otherwise have been. Activity later in the year will be influenced by monetary expansion during the early part of 1972.

**Fiscal Actions** – Federal expenditures affect economic activity in two ways. First, Federal Government outlays, whether financed by taxes or borrowed from the public, have an important short-run stimulative effect on total spending. Over longer periods of time, such expenditures tend to displace private purchases of goods and services. Second, increased Federal Government expenditures, financed in part by borrowing, often induce expansion in the money stock, as the Federal Reserve “monetizes” a part of the debt increase. Tax reductions also tend to expand the size of the deficit. The larger the deficit, the more likely is the Federal Reserve to increase its purchases of Treasury securities, which in turn, increases the money stock.

The Federal budget deficit in fiscal year 1971 (on a unified budget basis) was \$23 billion, the second largest deficit recorded since World War II. The budget deficit for fiscal year 1972, estimated at \$11.6 billion in early 1971, has been revised upward to \$38.8 billion. Reasons for the revision include an overestimate of the strength of the economy in calendar year 1971, and the Administration’s new fiscal proposals of last August and this January. Congress has already acted favorably on a number of the Administration’s proposals of August 1971.

The high-employment budget, which assumes budget expenditures and tax revenues at a constant 4 percent level of unemployment, is expected to shift markedly from a \$4.2 billion surplus (as estimated by this Bank) in fiscal 1971 to a \$10.5 billion deficit in fiscal 1972. The fiscal 1973 high-employment budget is expected to run a \$10.9 billion deficit. Thus the budget, by such actions as the 7 percent tax investment credit, the increased personal income tax exemptions and accelerated expenditures, should have a stimulative effect on economic activity this calendar year.

**1972 Projections**

Stimulative fiscal actions provide much of the basis for the very optimistic 1972 forecasts which have appeared regularly in the media the past few months.

A large majority of economic forecasters have predicted a strong surge in spending this year. Such unanimity is difficult to understand in view of the additional uncertainties with which the analysts are faced in 1972. The chief unknown influences on spending are usually monetary and fiscal actions, but this year the analysts must also project the expected impact of the possible removal of some trade barriers, the dollar devaluation, and foreign exchange rate adjustments, as well as the effects of price-wage controls, their duration, and the successive phases, if any, of controls. Uncertainty often breeds divergence, but this year the product of uncertainty is conformity.

The standard projections of economic activity in 1972 include: (1) approximately a \$100 billion rise in total spending compared to a \$73 billion increase in 1971; (2) an increase in real product growth from 2.7 percent in 1971 to about 6 percent; (3) a decline in the rate of price increase from 4.7 percent in 1971 to a little over 3 percent; and (4) a steady fall in the unemployment rate from 6 percent to a little over 5 percent by year end.

Most forecasters believe these ebullient figures will be achieved by way of the following standard route: the consumer, bolstered by the progress of the wage-price control program and higher tax exemptions, starts spending more (and saving less); the increased expenditures reduce sellers' inventories, which must then be replenished; a greater sales volume leads to higher profits which, together with the tax investment credit, induce capital expenditures; exports accelerate in response to increased demand from abroad, thereby creating many more jobs; residential construction and state and local spending pick up moderately, while Federal Government purchases of goods and services accelerate.

**MIT-PENN-SSRC Model**—Typical of the models which generate such projections for 1972 is the MIT-PENN-SSRC(MPS) econometric model. It is a large model of the economy with many behavioral relationships and most of the latest features in model building, such as a well-developed financial sector. In addition, the model can give detailed projections of each economic sector in response to any of a large number of simulated policy actions. It, like most large models, incorporates cyclical forces, some structural changes, and possible policy alternatives.

Unlike the small St. Louis Bank model, the larger, more detailed MPS model: (1) contains both money demand and supply functions; (2) can account to some extent for the expected improvement in U.S. net exports; (3) can simulate changes in activity

Table III

Model Projections of Economic Activity in 1972  
Under Specific Assumptions\*

	1971 Actual	MPS Model 1972 Projected	St. Louis Model 1972 Projected
Rates of change in:			
Nominal GNP . . . . .	7.5%	9.4%	7.5%
Real GNP . . . . .	2.7	5.8	3.5
Price Deflator . . . . .	4.7	3.3	3.9
Unemployment Rate . . . . .	5.9	5.9	6.2

\*Among the many assumptions in the MPS model are a 6 percent rate of growth in the money stock, price and wage controls effective through III/1972 and rising prices of U.S. imports relative to exports. The St. Louis model assumes a 6 percent rate of growth in the money stock and high-employment expenditures as estimated by this Bank through IV/1972. Coefficients are estimated through II/1971 for the MPS model and through III/1971 for the St. Louis model.

under varying assumptions of both price and wage constraints; (4) has relatively long lags in the effect of changes in the money supply on economic activity and short lags in the effect of fiscal actions on economic activity; (5) projects estimates of total spending indirectly by the addition of GNP components rather than directly.

Table III indicates that the MPS model, under the assumptions that the money stock will grow at a 6 percent rate, that price and wage controls will be effective through III/1972, and that import prices will rise relative to the prices of U.S. exports, projects changes in total spending, real output, and prices in 1972 similar to those of the "standard" forecast.<sup>11</sup> The unemployment rate projection is high relative to the standard.

**St. Louis Model**—Table III gives the projections of the St. Louis model for total spending, real output, prices, and the unemployment rate using the 6 percent money growth assumption employed with the MPS model. In this model, monetary and fiscal actions affect prices and real output (and, in turn, employment) by influencing the course of total spending. Monetary actions are the dominant source of changes in total spending. Whether the spending is channeled into real output changes or price changes depends on the degree of slack (actual output relative to potential) in the economy and the intensity of price anticipations. The model can account for cyclical forces, but offers a more limited selection of policy alternatives than the large models. Some provision for structural change is found in the potential output variable.

<sup>11</sup>Six percent money supply growth was arbitrarily selected as the monetary assumption. Other assumptions are similarly arbitrary.

The St. Louis model projects considerably smaller economic advances in 1972 over the year 1971 than either the standard or the MPS forecast (based on a 6 percent money growth assumption). Total spending, according to the St. Louis model, will rise 7.5 percent, the same as in 1971, real output will increase 3.5 percent, somewhat more than in 1971, prices will rise 3.9 percent, somewhat less than in 1971, and the unemployment rate will be little changed from this past year.

There are three basic reasons why this set of St. Louis projections differs so much from the standard. First, the model has incorporated the sharply lower growth of the money stock in late 1971, the effect of which does not appear in the MPS or most other models for a long period. Second, no provision is made for the actions of the Price Commission and Pay Board. Third, the model does not account for the expected increase in foreign demand for U.S. goods.

Because price and wage controls will likely keep price advances in 1972 below what they otherwise would be, and because increased demand for exports will probably stimulate spending, output and employment, the St. Louis projections for prices and unemployment should be adjusted downward, and the projections for total spending and real output upward, given a 6 percent rate of increase in the money stock. These projections should not be adjusted to the optimistic levels of the standard forecast, however, since the standard forecast is not appropriately "adjusted" for the influence of the recent slowdown in the growth rate of money.

### *Looking Past 1972*

To this point, only a limited set of figures for a few economic variables for a single year, 1972, have been discussed. To focus on such a narrow field is to miss much of the importance of current and future domestic economic developments. At least one issue — price and wage controls — merits further consideration. The adoption of price and wage controls by the U.S. Government in a period of peace time is a move which has strong long-term implications for our basically free market economy. Although there have been some brief periods of success with controls in this country as well as in a number of foreign countries, instances in which inflation was effectively curbed over sustained periods are rare indeed. Price and wage freezes have typically been followed by controls inequitably applied and ineffectively administered.

The initial euphoria over the fact that someone is doing something to stop inflation has often given way

to dissatisfaction on the part of those whose incomes do not rise as fast as others and to cheating by those who cannot buy or sell goods at the administered prices. Once the controls are removed, past experience indicates prices may rise back to about where they would have been in the absence of controls.<sup>12</sup>

The MPS model, using the assumed 6 percent rate of monetary growth, indicates that prices would rise about as rapidly in 1973 as in 1972 if controls were removed toward the end of this year. This model also indicates that without any controls, but with moderate monetary growth, there would be less inflation in 1973 than in 1972, a result also given by the St. Louis model.

### Summary

Nineteen seventy-one was a year of moderate recovery following the moderate recession in 1970. Comparisons with previous recession-early recovery years indicate that economic expansion in the 1970-71 period was slightly weaker than in earlier comparable periods. A major difference is that prices rose at a much faster rate during the recent period than in the earlier ones. Some structural changes in the economy have undoubtedly occurred over the years, but they have probably played a minor role in influencing recent activity relative to normal cyclical adjustments and policy changes. Excessively stimulative monetary and fiscal policies over the extended 1965-68 period, for example, undoubtedly made the recent inflationary situation much more difficult to control than earlier ones.

Most projections of economic activity in 1972 are quite optimistic relative to the actual experience of 1971. What makes 1972 that much different from 1971? The differences may be explored by examining cyclical influences, structural changes, and policy actions.

The economy begins 1972 at only a slightly different position on the business cycle than a year ago in terms of actual "momentum" relative to potential. The

<sup>12</sup>Lloyd Ulman and Robert Flanagan recently completed a study of incomes policies in other countries. "However, as indicated at the outset, periods of apparent effectiveness [of price-wage controls] were typically short-lived; they were frequently followed by wage or price explosions which sometimes blew up the policies themselves. Thus the policy at best seems to have been gaited for a short sprint rather than a long race, which suggests that it was better suited to deal with short-run emergencies like balance-of-payments disequilibria than with persistent inflationary forces." See Lloyd Ulman and Robert J. Flanagan, *Wage Restraint: A Study of Income Policies in Western Europe* (Berkeley and Los Angeles: University of California Press, 1971) p. 223.

rate of utilization of both labor and capital resources is little changed from this time last year. Actual output relative to potential output is approximately the same as a year ago. Some structural aspects of the economy such as the composition of the labor force and the ratio of goods to services will be little different than in 1971. Productivity may rise at a more rapid rate in 1972 than 1971, but short-run changes in productivity are more a result of cyclical changes than a cause.

There are at least two institutional changes which will likely exert a strong influence on the economy in 1972. First, the anticipated improvement in demand for U.S. exports relative to imports due to exchange rate and tariff changes should have an expansionary effect on total spending, output and employment. Second, price and wage controls should contribute to a slowing in the rate of increase of prices in 1972. If the controls are effective over the short period of a year, many analysts believe this will have a positive influence on consumer confidence and lead to spending gains. The effect of controls on profits, work stoppages and price-wage escalator contracts is unclear.

A major difference between 1971 and 1972 is that fiscal policy actions will likely be much more stimulative. To the extent that the large, projected 1972 deficit is "monetized" by the Federal Reserve System, monetary policy may also be quite stimulative. Most economic analysts and models have not, however, accounted for the recent slowing in the rate of growth of the money stock. Correction for this factor suggests somewhat lower projections than the norm for spending, output, and employment in 1972.

Focusing on economic developments in 1972 runs the risk of overlooking the important long-range implications of recent policy actions. The record of price-wage controls and sharp fluctuations in the money stock over a number of years gives little reason for continuation of such actions over an extended period. In developing stabilization policies, it should be recognized that an economy the magnitude of ours cannot be steered in any direction instantaneously, and that effective policies should look to the *long-run* effects, rather than to the short cures which often lead to long-run instability.



# Operations of the Federal Reserve Bank of St. Louis — 1971

**T**HE ST. LOUIS Federal Reserve Bank and its branches provide numerous services to member banks, the United States Government, and the public. These service operations include collecting checks, maintaining member bank reserve accounts, transferring funds, distributing coin and currency, and acting as fiscal agent for the Federal Government. The Bank also extends credit to its member banks, exercises supervision over certain commercial banks, engages in research directed toward the formulation of monetary policy, and performs educational functions in regard to both monetary actions and Federal Reserve operations. In addition, it participates in Federal Open Market Committee deliberations, which are discussed in other issues of the *Review*.<sup>1</sup>

This report on the operations of the Federal Reserve Bank of St. Louis includes the operations of its head office in St. Louis and its branches in Little Rock, Louisville, and Memphis. The Federal Reserve Bank of St. Louis is one of twelve Federal Reserve Banks which, with their branches and the Board of Governors, form the Federal Reserve System. The St. Louis Bank operates in the Eighth Federal Reserve District, which includes all of Arkansas and portions of Illinois, Indiana, Kentucky, Mississippi, Missouri, and Tennessee.

## Check Collection and Clearance

The operation of the Federal Reserve Bank of St. Louis utilizing the largest number of employees is collecting and clearing checks. At the close of last year, 299 persons or 21 percent of the employees at this Bank and its branches were engaged in the check collection operation.

<sup>1</sup>See Reprints 13, 17, 22, 28, 39, 57, and 68 for annual reviews of monetary actions by the FOMC for the years 1964 through 1970, available on request from this Bank.

Table 1

### VOLUME OF OPERATIONS<sup>1</sup>

	Dollar Amount (millions)		Percent Change
	1971	1970	
Checks collected <sup>2</sup> . . . . .	\$155,803.1	\$138,945.2	12.1%
Noncash collection items . . . . .	268.9	434.3	-38.1
Coin counted . . . . .	86.0	79.6	8.0
Currency counted . . . . .	1,866.8	1,816.2	2.8
Transfers of funds . . . . .	349,249.4	287,467.7	21.5
U.S. Savings Bonds <sup>3</sup> . . . . .	585.0	579.4	1.0
Other Government securities <sup>3</sup> . . . . .	23,629.2	21,706.2	8.9
U.S. Government coupons paid . . . . .	229.4	202.1	13.5

	Number (thousands)		Percent Change
	1971	1970	
Checks collected <sup>2</sup> . . . . .	480,946	397,504	21.0%
Noncash collection items . . . . .	804	855	- 6.0
Coin counted . . . . .	725,885	715,505	1.5
Currency counted . . . . .	248,806	240,452	3.5
Transfers of funds . . . . .	356	317	12.3
U.S. Savings Bonds <sup>3</sup> . . . . .	10,724	10,943	- 2.0
Other Government securities <sup>3</sup> . . . . .	581	978	-40.6
U.S. Government coupons paid . . . . .	804	814	- 1.2

<sup>1</sup>Total for St. Louis office and the Little Rock, Louisville, and Memphis branches

<sup>2</sup>Excludes Government checks and money orders

<sup>3</sup>Issued, exchanged, and redeemed

Checks drawn on commercial banks are the means of settling the major portion of all nonbank financial transactions. Payment by check offers many advantages over payment by cash, including less risk from theft, fire, and other disasters; greater convenience in making large transactions; greater opportunity to make large unscheduled transactions; and provision of a record of disbursements. The use of checks by individuals and businesses is facilitated by the collection and clearing operations of the Federal Reserve Banks, which provide a mechanism for settlement of checks collected by commercial banks. Settlement is accomplished by entries to the member banks' reserve accounts at the Reserve Banks.

The dollar volume of checks collected by the St. Louis Federal Reserve Bank and its branches rose from \$139 billion in 1970 to \$156 billion in 1971, an

increase of 12 percent. The number of checks collected increased 21 percent from 398 to 481 million.

These sharp rises in number and dollar volume of checks collected last year reflect improved economic activity (including inflation) in the district and a trend increase in the use of checks as a means of payment. The greater rise in the number of checks collected than in the dollar volume reflects the Bank's new program of sorting many checks received from St. Louis area banks drawn on each other. Before mid-1970, these checks were sorted by the Suburban Check Exchange clearing banks and were cleared in bundles through the Collection Department. The dollar value of checks cleared was not affected by this change, but the number increased because a pre-sorted bundle is counted as one item, whereas checks sorted and cleared at this Bank are counted individually.

Technological innovations, such as the conversion to electronic equipment, have increased the efficiency of collecting checks over the years. In 1960, prior to the installation of high-speed collection equipment, the St. Louis office and its three branches collected checks at the rate of 372 per man hour. By 1970 the rate of such collections had increased almost three-fold to 1,026 checks per man hour. In 1971 approximately 97 percent of all checks received at this Bank were processed through computers.

The Federal Reserve System in June 1971 outlined a program to streamline the structure of the U.S. payments system by expanding zones of overnight check clearance around Federal Reserve Banks and branches and by opening new regional zones for check clearance. The establishment of regional facilities would accelerate check collections and increase availability of funds. The St. Louis Bank expanded its zones of immediate payment several decades ago to include most suburban banks in the St. Louis area. The zones of immediate clearing around St. Louis and its branch cities will be further expanded as transportation and equipment problems are resolved.<sup>2</sup>

In addition to collecting checks, the Federal Reserve Banks handle numerous other settlement items such as postal money orders, food stamp coupons,

and noncash collections. Among the latter are collections for drafts, promissory notes, bonds, and bond coupons.

### *Transfer of Funds*

Wire transfer of funds is a service that the Federal Reserve provides to member banks to promptly and efficiently transmit funds around the country. These transfers primarily result from transactions involving interbank loans, check collections, and U.S. Treasury obligations. In implementing the new program for more rapid check clearance, the Federal Reserve in 1971 removed charges on wire transfers of \$1,000 or more made through member banks by third parties — nonmember banks, businessmen and individuals — to encourage immediate payment of large amounts by wire. In addition, plans are being made to extend the hours of the wire transfer operations when warranted by a sufficient volume.

The St. Louis Reserve Bank processed 356 thousand wire transfers amounting to \$349 billion in 1971, an increase of 12 percent in number and 22 percent in dollar volume from 1970. These rapid increases in the number and dollar volume probably reflect in part the elimination of the above mentioned fees.

### *Coin and Currency Operations*

The Federal Reserve Banks maintain a readily available supply of coin and currency to provide the amounts, kinds, and denominations demanded by the public. The public holds about a fifth of its money in currency, which is more universally acceptable than checks and is more desirable in settling some transactions.<sup>3</sup> The use of currency, especially for small transactions, is more timesaving and often a less expensive means of settlement than the use of checking accounts. To meet the public demand for currency, member banks order funds from their Reserve Bank, which charges the order to their reserve accounts. Nonmember banks generally receive their currency supplies from member banks. Those member banks with excess currency may deposit it in their reserve account at the Reserve Bank. The usable coin and currency is then redistributed, and the unfit is removed from circulation to be melted down or destroyed.

Coin and paper currency handled at the St. Louis Bank increased in 1971 as the demand for a hand-to-hand medium of exchange rose with increased economic activity. Pieces of coin counted and sorted

<sup>3</sup>Money is defined as demand deposits of the nonbank public plus currency outside banks.

<sup>2</sup>During the first half of 1972, the Little Rock immediate check clearing zone will be expanded to include Pulaski and Saline Counties in Arkansas; the Louisville zone will include Clark and Floyd Counties in Indiana and Jefferson County in Kentucky; and the Memphis zone will include Shelby County in Tennessee, Crittenden County in Arkansas, and DeSoto County in Mississippi. During the first half of 1973, the St. Louis zone will be expanded to include the City of St. Louis and St. Louis, Franklin, Jefferson, St. Charles and Warren Counties in Missouri, and Madison, St. Clair and Monroe Counties in Illinois.

totalled 726 million, up 2 percent from 1970, and their value amounted to \$86 million, up 8 percent. Pieces of paper currency counted and sorted increased 4 percent in 1971 to 249 million, and the value rose 3 percent to \$1.9 billion.

### *Fiscal Agency Operations*

As fiscal agents for the U.S. Treasury, the Federal Reserve Banks service the Treasury's checking account, perform much of the work involved in the issuance and redemption of Government securities, and execute numerous other fiscal duties.

The Federal Reserve Banks add to the Treasury's checking account by periodically collecting Treasury funds from commercial banks. These funds were previously deposited in commercial banks by the payment of taxes and sales of Government securities. When the Government disburses its funds, the checks issued in payment are drawn against its account at the Federal Reserve Banks.

When a new Government security is issued, the Federal Reserve Banks circulate subscription forms and receive applications for its purchase. The securities are allotted according to the Treasury's instructions and are delivered to the purchasers. In addition, the Reserve Banks redeem Government securities upon maturity, make exchanges, and pay interest by redeeming coupons.

In 1971 the four offices of this Bank issued, re-issued, exchanged, and redeemed 11 million U.S. Savings Bonds valued at \$585 million. The number declined 2 percent from a year earlier, but the value rose one percent. The number of other Government securities issued, serviced, and redeemed decreased 41 percent in 1971 to 581 thousand while the dollar value rose 9 percent to \$23.6 billion. The rapid decline in the number of such Government issues processed, particularly with respect to securities issued, resulted from several factors. After interest rates on short-term Government securities continued to decline in early 1971, funds of small investors were attracted to other investments, such as certificates of deposit, with higher rates of return. In addition, the Government no longer issued Treasury bills under \$10,000 after March 1969. Therefore, no bills of a smaller denomination were handled after the maturity dates in 1970.

### *Lending Activity*

Member banks may borrow from Reserve Banks over short-term periods to meet their required re-

serves. The volume of these borrowings tends to rise when the Federal Reserve lending rate is below other short-term rates, such as those on Treasury bills and prime commercial paper. Conversely, these loans decline when the discount rate, the interest rate charged to member banks on funds borrowed from Reserve Banks, is above these market rates.

After being well below market rates during 1969 and most of 1970, the discount rate exceeded market interest rates during most of the past year. Reflecting these interest rate differentials, loans to member banks by the Federal Reserve Bank of St. Louis have declined sharply since 1969. Daily borrowings averaged only \$1.5 million in 1971, compared with \$12.7 million in 1970 and \$41.8 million in 1969. The percent of member banks borrowing from this Bank sometime during the year decreased from 17 in 1970 to 7 in 1971.

The St. Louis Reserve Bank altered the discount rate six times during 1971 to realign it with fluctuations in market rates. The effective rate on discounts under Sections 13 and 13a of the Federal Reserve Act was reduced from 5.5 percent to 5.25 percent on January 8, to 5 percent on January 29, and then to 4.75 percent on February 13. It was increased to 5 percent on July 16 and was reduced again on November 11 to 4.75 percent and on December 13 to 4.5 percent, the lowest rate since March 1968.

In early 1971 the Board of Governors introduced several major changes in lending procedures to facilitate Federal Reserve credit services to member banks. The new procedures were designed to simplify discount window accommodation by:

- 1) using a continuing lending agreement instead of an application and note for most borrowings;
- 2) collecting interest at the time of repayment rather than by deduction in advance; and
- 3) making changes in the discount rate applicable to outstanding loans.

### *Supervision*

Federal Reserve Banks perform a variety of supervisory activities to foster effective operation of the commercial banking system. A major supervisory function is the annual examination of state chartered member banks to evaluate their assets, liabilities, capital, liquidity, operations, and management. This examination information is used by banking authorities to correct unsatisfactory practices and conditions. Examiners from the Federal Reserve Bank of St.

Louis along with the state supervisory authorities examine the 111 state member banks in the Eighth Federal Reserve District.<sup>4</sup> The staff of the Comptroller of the Currency examines the 347 national banks in the district, which are required by law to be members of the Federal Reserve System. Other insured banks are examined by the Federal Deposit Insurance Corporation and state supervisory authorities while the few noninsured banks are examined by state examiners only. Although fewer in number than the 1,064 nonmember banks, member banks hold about 60 percent of the total district bank deposits.

Other supervisory functions of the Federal Reserve System include the admission of state banks to membership in the System and the approval of acquisitions by registered bank holding companies, bank mergers, and new branches of state member banks. During 1971, this Bank processed 6 applications to form one-bank or multiple bank holding companies and 14 applications by holding companies to acquire additional subsidiaries. The passage of the "Bank Holding Company Act Amendments of 1970" placed one-bank holding companies under Federal Reserve regulation similar to that of multiple bank holding companies. These amendments will continue to increase supervisory activities. Approximately 75 of the estimated 1,500 one-bank holding companies in the nation have registered through this Bank.

### Research

The research operations at the Federal Reserve Bank of St. Louis are directed toward the collection and analysis of regional, national, and international data. These data are instrumental in the formulation of monetary policy recommendations used by the President of this Bank in meetings of the Federal Open Market Committee. Information and data related to economic developments are available to the public in the monthly *Review* and other periodicals.

The Research Department's role in reviewing proposed bank holding company acquisitions and bank mergers has greatly expanded in recent years. The passage of the "Bank Holding Company Act Amendments of 1970" further increased research operations, especially with respect to one-bank holding companies.

### Bank Relations and Public Information

This activity of the St. Louis Federal Reserve Bank is designed to maintain personal contact with all

banks in the Eighth District and to assist member banks with their operations relative to those of the Federal Reserve. Each year this department makes available to all district member banks the Federal Reserve Functional Cost Accounting Program, which provides a cost-income profile of each participating bank's major functions. These data enable an individual bank to make comparisons with its previous operating statistics and with an average of banks of similar size.

This department also distributes educational films on banking and makes arrangements for the display of currency exhibitions, speeches by the Bank's staff, and tours of the Bank.

### Transfer of Counties from Eighth District

Operations of the St. Louis Federal Reserve Bank in 1972 will be affected by the transfer of 26 member and 92 nonmember banks, located in 24 counties in western Missouri, from the St. Louis to the Kansas City Federal Reserve District. The twelve Federal Reserve Districts were originally constructed in 1914 by the Reserve Bank Organization Committee,<sup>5</sup> which was authorized by the Federal Reserve Act to apportion the districts "with due regard to convenience and customary course of business."<sup>6</sup> In line with the efforts of the Federal Reserve to accelerate check clearances, the transfer of these counties, which are economically aligned with metropolitan Kansas City, will shorten the distances of check and cash delivery routes. This change, effective January 24, 1972, is the first in Federal Reserve district boundaries since 1926 when two counties were transferred from the Dallas to the Kansas City District.

### Financial Statements

Although the Federal Reserve Banks generate earnings, their operations are directed primarily toward influencing monetary conditions. In 1971 the portion

<sup>5</sup>In making its districting decisions, the Organization Committee stated that it had been guided by the following six considerations: "mercantile, industrial, and financial connections existing in each district; ability of reserve bank in each district to meet legitimate demands on it; fair division of capital among the districts; general geographical and transportation situation of the districts; population, area, and prevalent business activities of the district; and ability of member banks of each district to provide the minimum necessary capital." See H. Parker Willis, *The Federal Reserve System: Legislation, Organization and Operation* (New York: The Ronald Press Company, 1923), p. 586.

<sup>6</sup>U.S., Congress, Senate, U.S. Reserve Bank Organization Committee, *Location of Reserve Districts in the United States*, 63rd Cong., 2nd Sess., 1914, document no. 485, p. 361.

<sup>4</sup>Number of banks as of December 31, 1971.

of the System's earnings allocated to the St. Louis Bank and its branches totaled \$136.9 million, a decrease of one percent from a year earlier. This decline reflects the lower rates received on earning assets, which more than offset the increased holdings of such assets. After operating costs, net additions, statutory dividends to member banks, and additions to surplus, the remaining earnings of \$115.9 million were paid to the U.S. Treasury as interest on Federal Reserve notes. Dividends and transfers to surplus totaled \$1.5 million and \$1.1 million, respectively.

Total assets of the Federal Reserve Bank of St. Louis and its branches at the end of 1971 were \$4 billion, an increase of 13 percent from a year earlier. Most of this rise resulted from increased holdings of Government securities, which are the principal means of creating Reserve Bank credit. Two-thirds of the assets were Government securities, primarily short-term Treasury bills and notes. The remaining assets, including the gold certificate account, the special drawing rights certificate account, notes on other Reserve Banks, Federal agency obligations, cash items in process of collection, and bank premises, totaled \$1.3 billion.

Liabilities of the St. Louis Bank and its branches rose to \$3.9 billion at the close of 1971. Federal Reserve notes, the principal type of currency in circulation, amounted to \$2.1 billion or more than half of this Bank's liabilities. Deposits, consisting primarily of the reserve accounts of member banks, amounted to \$1.2 billion, and other liabilities including deferred availability cash items and accrued dividends totaled \$0.6 billion.

Table II  
**COMPARATIVE PROFIT AND LOSS STATEMENT**  
 (Dollar Amounts in Thousands)

	1971	1970	Percent Change
Total earnings . . . . .	\$136,856	\$138,738	- 1.4%
Net expenses . . . . .	21,912	18,248	20.1
Current net earnings . . . . .	114,944	120,490	- 4.6
Net additions (+) or deductions (-) . . . . .	+ 3,551	+ 416	753.6
Net earnings before payments to U.S. Treasury . . . . .	\$118,495	\$120,906	- 2.0
Distribution of Net Earnings:			
Dividends . . . . .	\$ 1,474	\$ 1,406	4.8
Interest on Federal Reserve notes . . . . .	115,887	118,298	- 2.0
Transferred to surplus . . . . .	1,134	1,202	- 5.7
Total . . . . .	\$118,495	\$120,906	- 2.0%

Table III  
**COMPARATIVE STATEMENT OF CONDITION**  
 (Dollar Amounts in Thousands)

	ASSETS	
	December 31, 1971	December 31, 1970
Gold Certificate Account . . . . .	\$ 346,208	\$ 468,866
Special Drawing Rights Certificate Account . . . . .	15,000	15,000
Federal Reserve Notes of Other Banks . . . . .	40,140	32,102
Other Cash . . . . .	17,475	12,279
Discounts and Advances . . . . .	—	380
Acceptances . . . . .	—	—
Federal Agency Obligations . . . . .	18,621	—
U.S. Government Securities:		
Bills . . . . .	1,157,788	952,157
Certificates . . . . .	—	—
Notes . . . . .	1,365,056	1,218,810
Bonds . . . . .	126,175	107,825
TOTAL U.S. GOVERNMENT SECURITIES . . . . .	\$2,649,019	\$2,278,792
TOTAL LOANS AND SECURITIES . . . . .	\$2,667,640	\$2,279,172
Cash Items in Process of Collection . . . . .	854,530	671,121
Bank Premises (Net) . . . . .	14,682	12,125
Other Assets . . . . .	26,644	28,468
TOTAL ASSETS . . . . .	\$3,982,319	\$3,519,133
LIABILITIES AND CAPITAL ACCOUNTS		
LIABILITIES		
	December 31, 1971	December 31, 1970
Federal Reserve Notes (Net) . . . . .	\$2,118,926	\$1,951,221
Deposits:		
Member Bank — Reserve Accounts . . . . .	1,015,178	884,761
U.S. Treasurer — General Account . . . . .	153,419	73,887
Foreign . . . . .	9,520	4,250
Other Deposits . . . . .	27,851	10,906
TOTAL DEPOSITS . . . . .	\$1,205,968	\$ 973,804
Deferred Availability Cash Items . . . . .	584,961	525,050
Other Liabilities and Accrued Dividends . . . . .	22,112	20,972
TOTAL LIABILITIES . . . . .	\$3,931,967	\$3,471,047
CAPITAL ACCOUNTS		
Capital Paid In . . . . .	25,176	24,043
Surplus . . . . .	25,176	24,043
Other Capital Accounts . . . . .	—	—
TOTAL CAPITAL ACCOUNTS . . . . .	\$ 50,352	\$ 48,086
TOTAL LIABILITIES AND CAPITAL ACCOUNTS . . . . .	\$3,982,319	\$3,519,133
MEMORANDA: Contingent liabilities on acceptances purchased for foreign correspondents increased from \$8,503,000 on December 31, 1970 to \$8,667,000 on December 31, 1971.		

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HumKo Products, Division of Kraftco Corporation,  
Memphis, Tennessee

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HUGH M. SHWAB, Chairman of the Boards, First National Bank of Louisville and The Kentucky Trust Company, Louisville, Kentucky	(VACANCY)

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### *Chairman of the Board*

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# Projecting With the St. Louis Model: A Progress Report

by KEITH M. CARLSON

**T**HE ST. LOUIS model was designed to project the general time path of response of certain key economic variables to monetary and fiscal actions.<sup>1</sup> What can be said, in retrospect, about the success of the model in achieving its stated objectives?

The period from fourth quarter 1969 to second quarter 1971 is taken as the focus of discussion. Late 1969 is chosen as the starting point for the analysis because the current version of the St. Louis model was developed at that time. Mid-1971 is selected as the terminal point of reference because of the adoption of an incomes policy in mid-August. The model, as designed, is not able to capture the short-run effects of price-wage controls, nor does it allow incorporation of the effects of restructured international monetary arrangements. The model is purposely kept small to aid in the identification of the fundamental determinants of economic trends over periods as long as a year or more.

The St. Louis model is small in size and is not designed for quarter-to-quarter forecasting because many factors are known to influence short-run movements in economic activity. For this reason, the model's performance is examined for the six-quarter period as a whole, rather than quarter by quarter.

There are three exogenous variables in the St. Louis model — changes in the money stock and high employment Federal expenditures, considered summary measures of monetary and fiscal actions, and potential output, which reflects growth of the labor force and productivity.<sup>2</sup> In using the model for purposes of monetary policy recommendation, alter-

native steady growth rates of the money stock are assumed. This procedure does not entail forecasting movements in the money stock over short periods. Instead, it presents a set of simulations using alternative steady growth rates which can aid in assessing the economic impact over several quarters of different trend growth rates of money.

## *Background*

The economy was in the early stage of a recession in late 1969.<sup>3</sup> GNP had risen 7.5 percent in 1969, compared with 8.9 percent the previous year, and the rate of increase from third to fourth quarter of 1969 had slowed to 3.4 percent. Real product had declined from third to fourth quarter 1969. Despite a slowdown of growth in nominal and real terms, prices had continued to accelerate through 1969.

St. Louis model projections in early 1970 indicated there was little prospect of strong economic recovery in 1970 because of the lagged effect of monetary restraint in 1969.<sup>4</sup> For example, assuming 6 percent growth in money, real output was projected to decline in the first two quarters of 1970, pick up slightly in the second half, then advance at a 3.5 to 4 percent rate in 1971.

The outlook for prices with a 6 percent rate of monetary growth was for a very slow decline in the rate of inflation throughout the projection period — from a 4.7 percent rate of increase in fourth quarter 1969, to a 4.3 percent rate in fourth quarter 1970, and a 3.8 percent rate in late 1971. Unemployment was projected to rise quite rapidly in 1970, then level off in 1971 at about 5.7 percent.

The model presented a mixed picture for interest rates. Long-term rates were projected to change

<sup>1</sup>Leonall C. Andersen and Jerry L. Jordan, "Monetary and Fiscal Actions: A Test of Their Relative Importance in Economic Stabilization," this *Review* (November 1968), pp. 11-24, and Leonall C. Andersen and Keith M. Carlson, "A Monetarist Model for Economic Stabilization," this *Review* (April 1970), pp. 7-25.

<sup>2</sup>For a discussion of the role of potential output in the St. Louis model, see Roger W. Spencer, "Population, Labor Force, and Potential Output: Implications for the St. Louis Model," this *Review* (February 1971), pp. 15-23.

<sup>3</sup>See "Real Economic Expansion Pauses," this *Review* (February 1970), pp. 2-7.

<sup>4</sup>See Andersen and Carlson, "A Monetarist Model," p. 19.



little for the period through 1971, while short-term rates were projected to decline sharply in 1970, to about 6.3 percent, then drop further to 5.5 percent by late 1971.

**Procedure**

To provide a basis for a systematic evaluation of the St. Louis model, three sets of simulations were

prepared. One simulation was based on coefficients estimated with data for the variables of the model through second quarter 1971, and used observed values for money and Federal expenditures to drive the model in the simulation period. This simulation is referred to as the "ex post" simulation. Another simulation, called "ex ante A," used coefficients estimated from data through fourth quarter 1969, and like the "ex post" simulation, actual data on money and Federal expenditures were used to drive the model. Finally, a simulation referred to as "ex ante B" was run which again had coefficients based on data through late 1969, but steady growth rates of money and Federal expenditures (at their average rates over the simulation period from late 1969 to mid-1971) were used.

These three simulations were designed to identify the sources of error underlying model projections based on constant growth rates of money and Federal expenditures during the six-quarter period.<sup>5</sup> Total error is defined as the difference between the observed value (either its level or rate of change) of a variable and the value projected in the ex ante B simulation. These values for the variables in the ex ante B simulation can be compared with those published in the April 1970 issue of this *Review*.

For purposes of evaluation, total projection error is divided into explained and unexplained error. Unexplained error is the difference between actual values and those yielded by the ex post simulation. Explained error is attributed to two factors – changing economic structure, which is reflected in changes in the coefficients, and deviations of monetary and fiscal variables from the assumed steady rates.

The method used here to identify the sources of error is summarized as follows:

<u>Error</u>	<u>Defined as:</u>
Actual minus Ex Post	Unexplained
Ex Post minus Ex Ante A	Due to changing economic structure
Ex Ante A minus Ex Ante B	Due to steady rate assumption
Actual minus Ex Ante B	Total error

<sup>5</sup>The sources of error relate to the use and interpretation of the St. Louis model, and are not to be confused with studies of sources of forecasting error published by other investigators. See, for example, Jared J. Enzler and H. O. Stekler, "An Analysis of the 1968-69 Economic Forecasts," *The Journal of Business* (July 1971), pp. 271-81, for a discussion of forecast error attributable to inaccurate predictions of public policy.

Unexplained error provides an indication of the overall reliability of the specification of the model. Error attributable to changing economic structure provides a measure of the stability of the coefficients over time, although with the addition of only six quarters of data, this is a very weak test of parameter stability. Finally, error attributable to the steady rate assumption regarding the monetary and fiscal variables sheds light on the usefulness of the model as a guide to the formulation of policy.

### Results

The results of the three types of simulations with the St. Louis model for first quarter 1970 through second quarter 1971 are summarized in Table II and Chart II. The sources of error as defined above are shown in Table I. The focus of discussion is the average error for each variable, i.e., the last column of Table I. Rates of change in total spending, real product and prices are emphasized because the part of the model relating to these variables is estimated in first difference form, reflecting greater confidence in the statistical reliability of first difference estimates in the GNP accounts than of levels.

**Total spending** — Assuming steady growth of money and expenditures at the average rate that actually occurred (ex ante B simulation), the average annual rate of change of total spending would have been overpredicted by 1.37 percentage points. Of this overprediction, 0.32 is unexplained. In other words, using all available information, including observations in the simulation period, but retaining the fundamental

Table I

#### SOURCES OF ERROR IN ST. LOUIS MODEL\*

	(Percent)							
	1970				1971		Six-Quarter Average	
	I	II	III	IV	I	II		
<b>Total Spending</b>								
Total error	-2.7	-1.7	-2.0	-6.8	5.5	-0.5	-1.37	
Unexplained error	-1.6	-2.0	-0.5	-4.0	7.7	-1.5	-0.32	
Error due to changing economic structure	-0.2	-0.3	-0.5	-0.3	0.5	0.5	-0.05	
Error due to steady rate assumption	-0.9	0.6	-1.0	-2.5	-2.7	0.5	-1.00	
<b>Real Product</b>								
Total error	-3.8	-1.2	-1.9	-7.7	4.7	0.2	-1.62	
Unexplained error	-2.4	-1.1	-0.1	-4.7	7.1	-0.5	-0.28	
Error due to changing economic structure	-0.6	-0.7	-0.9	-0.6	0.0	0.0	-0.47	
Error due to steady rate assumption	-0.8	0.6	-0.9	-2.4	-2.4	0.7	-0.87	
<b>Prices</b>								
Total error	1.5	-0.5	0.1	1.3	0.4	-0.7	0.35	
Unexplained error	1.1	-0.9	-0.3	1.0	0.2	-0.9	0.03	
Error due to changing economic structure	0.4	0.5	0.4	0.4	0.5	0.4	0.43	
Error due to steady rate assumption	0.0	-0.1	0.0	-0.1	-0.3	-0.2	-0.12	
<b>Unemployment Rate</b>								
Total error	-0.3	0.0	0.3	0.9	0.8	0.9	0.43	
Unexplained error	-0.3	-0.1	0.1	0.6	0.3	0.2	0.13	
Error due to changing economic structure	0.0	0.1	0.1	0.2	0.3	0.2	0.15	
Error due to steady rate assumption	0.0	0.0	0.1	0.1	0.2	0.5	0.15	
<b>Corporate Aaa Rate</b>								
Total error	0.7	0.8	0.8	0.3	-0.4	-0.2	0.33	
Unexplained error	0.3	0.5	0.5	0.0	-0.5	0.0	0.13	
Error due to changing economic structure	0.3	0.3	0.2	0.3	0.2	0.2	0.25	
Error due to steady rate assumption	0.1	0.0	0.1	0.0	-0.1	-0.4	-0.05	
<b>Commercial Paper Rate</b>								
Total error	1.5	1.1	0.6	-0.9	-2.5	-1.9	-0.35	
Unexplained error	1.1	1.1	0.6	-0.8	-1.7	-0.5	-0.03	
Error due to changing economic structure	0.1	0.0	-0.1	-0.2	-0.2	-0.1	-0.08	
Error due to steady rate assumption	0.3	0.0	0.1	0.1	-0.6	-1.3	-0.23	

\*Total error = actual — ex ante B

Unexplained error = actual — ex post

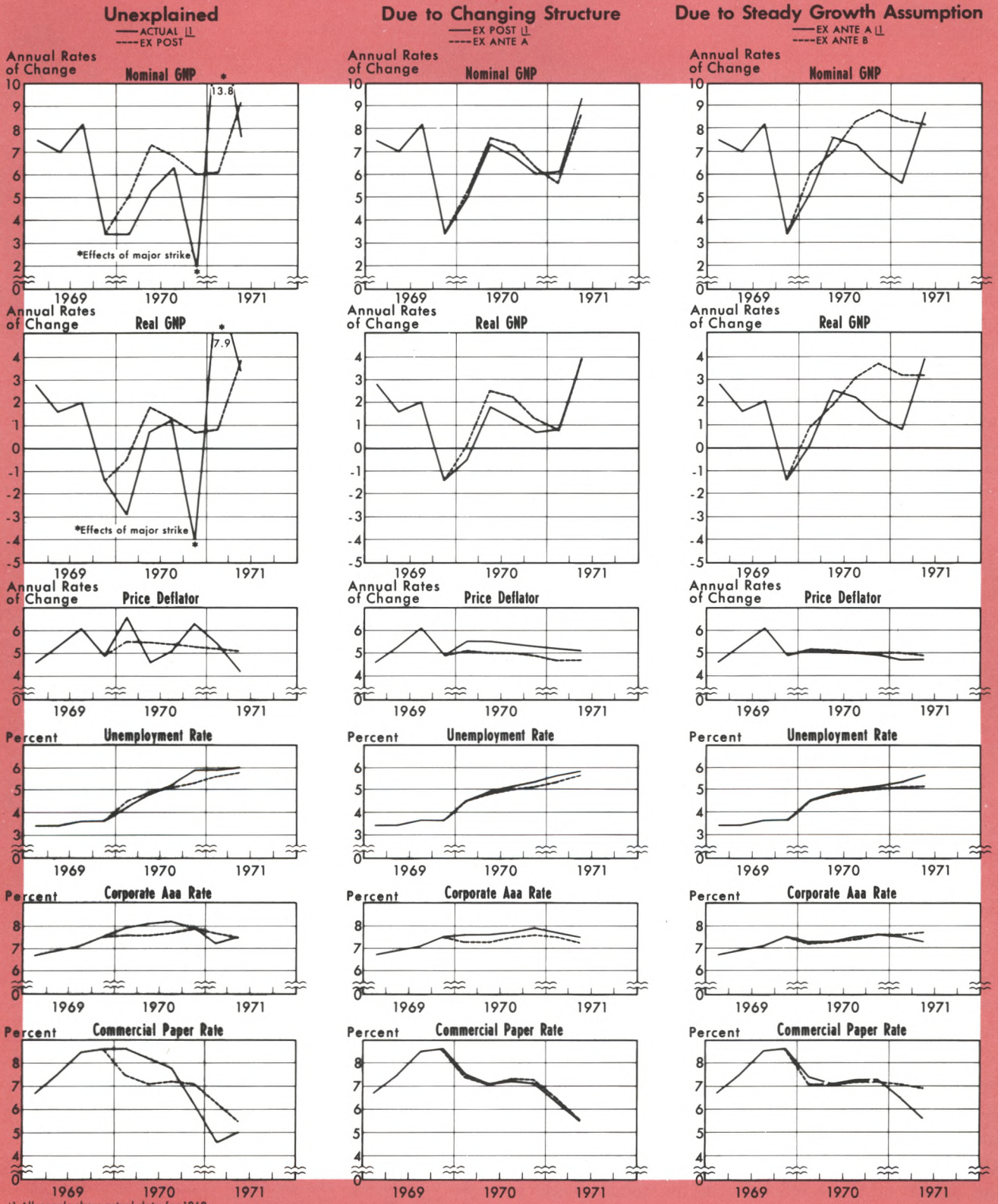
Error due to changing economic structure = ex post — ex ante A

Error due to steady rate assumption = ex ante A — ex ante B

specification of the St. Louis model, average projection error was 0.32 percentage points for this period.

The average error associated with changing economic structure is .05 percentage points. Updating

Chart II  
**Errors in the St. Louis Model: I/1970 - II/1971**



LL All panels show actual data for 1969.

the coefficients with six additional quarters of data improves the accuracy of the total spending projection by .05 percentage points, on average.

The average error for total spending attributable to the assumption of steady growth of the policy variables is the largest, amounting to one percentage point. This result follows from the pattern of variability of quarter-to-quarter rates of change of both money and expenditures during this six-quarter period (see Chart I). The annual rate of change of money varied from 4.2 to 11.3 percent to yield the 6.5 percent average rate of change for the period, whereas Federal expenditures varied between -3.4 and 24 percent, averaging 8.6.

Error attributable to the steady rate assumption would not normally be expected to be this large, but it is a factor to consider when using this equation for a horizon as short as six quarters. It is not only the variability but also the pattern of the variability that leads to this type of error. For example, consider the accompanying figure on the following page, where two patterns of money growth are shown, both of which yield the same average for the period.

Because of the lags in the impact of monetary actions, the money growth pattern in Case B will be associated with a larger growth of total spending for the period than in Case A.<sup>6</sup> If total spending growth were considered for a longer period of time, the pattern would be irrelevant. Furthermore, the error in total spending attributable to the steady rate assumption can be traced primarily to the pattern of variation in monetary growth, rather than Federal expenditures, because of the nature of the coefficients in the total spending equation.

Table II

ST. LOUIS MODEL SIMULATIONS VS. ACTUAL  
(Percent)

ACTUAL	1970				1971		Six-Quarter Average
	I	II	III	IV	I	II	
Annual Rates of Change in:							
Total Spending	3.4	5.3	6.3	2.0	13.8	7.7	6.42
Real Product	-2.9	0.7	1.2	-4.0	7.9	3.4	1.05
Prices	6.6	4.6	5.1	6.3	5.4	4.2	5.37
Unemployment Rate	4.2	4.8	5.2	5.9	5.9	6.0	5.33
Corporate Aaa Rate	7.9	8.1	8.2	7.9	7.2	7.5	7.80
Commercial Paper Rate	8.6	8.2	7.8	6.3	4.6	5.0	6.75
EX POST SIMULATION <sup>1</sup>							
Annual Rates of Change in:							
Total Spending	5.0	7.3	6.8	6.0	6.1	9.2	6.73
Real Product	-0.5	1.8	1.3	0.7	0.8	3.9	1.33
Prices	5.5	5.5	5.4	5.3	5.2	5.1	5.33
Unemployment Rate	4.5	4.9	5.1	5.3	5.6	5.8	5.20
Corporate Aaa Rate	7.6	7.6	7.7	7.9	7.7	7.5	7.67
Commercial Paper Rate	7.5	7.1	7.2	7.1	6.3	5.5	6.78
EX ANTE A SIMULATION <sup>2</sup>							
Annual Rates of Change in:							
Total Spending	5.2	7.6	7.3	6.3	5.6	8.7	6.78
Real Product	0.1	2.5	2.2	1.3	0.8	3.9	1.80
Prices	5.1	5.0	5.0	4.9	4.7	4.7	4.90
Unemployment Rate	4.5	4.8	5.0	5.1	5.3	5.6	5.05
Corporate Aaa Rate	7.3	7.3	7.5	7.6	7.5	7.3	7.42
Commercial Paper Rate	7.4	7.1	7.3	7.3	6.5	5.6	6.87
EX ANTE B SIMULATION <sup>3</sup>							
Annual Rates of Change in:							
Total Spending	6.1	7.0	8.3	8.8	8.3	8.2	7.78
Real Product	0.9	1.9	3.1	3.7	3.2	3.2	2.67
Prices	5.1	5.1	5.0	5.0	5.0	4.9	5.02
Unemployment Rate	4.5	4.8	4.9	5.0	5.1	5.1	4.90
Corporate Aaa Rate	7.2	7.3	7.4	7.6	7.6	7.7	7.47
Commercial Paper Rate	7.1	7.1	7.2	7.2	7.1	6.9	7.10

<sup>1</sup>Coefficients estimated through II/1971; actual money and expenditures used in simulation.

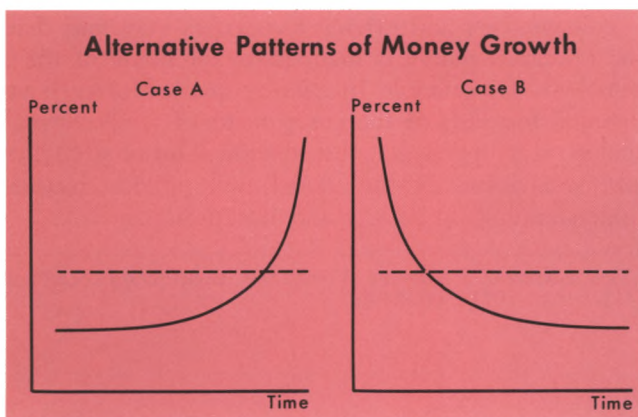
<sup>2</sup>Coefficients estimated through IV/1969; actual money and expenditures used in simulation.

<sup>3</sup>Coefficients estimated through IV/1969; money at 6.5 percent and expenditures at 8.6 percent in simulation period. (Averages of actual quarter-to-quarter rates from I/1970 to II/1971.)

<sup>6</sup>Money growth in 1971 is a case in point. Assuming lags in the impact of monetary actions, as used in the St. Louis model, the steady rate equivalent is calculated as follows:

	Annual Rate of Change of Money	Weight	Weighted Annual Rate of Change
I/71	7.3	.375	2.74
II/71	11.3	.320	3.62
III/71	7.7	.214	1.65
IV/71	.4	.090	.04
			8.05

An unweighted average of the monetary growth rates would be 6.7 percent. The economic impact of monetary actions in 1971, though averaging a 6.7 percent growth, is the equivalent of an 8 percent steady rate in the St. Louis model.



**Prices** – The total error for price projections was 0.35 percentage points during the six-quarter simulation period. However, unexplained error was negligible.

The major source of error in the price projections was associated with changing economic structure. Updating the price equation with observations from the six-quarter simulation period alters the coefficients significantly – in particular, increasing the coefficient on the weighted sum of past prices. The implications of this result are unclear, since our knowledge of the determinants of price level movements and price expectations and their interaction is so limited.

Error attributable to the steady rate assumption was in a direction opposite that due to changing economic structure. In other words, the steady growth case (ex ante B) tended to predict faster inflation than when the actual course of the policy variables (ex ante A) was included in the ex ante simulations. Like total spending, the error for prices attributable to the steady rate assumption can be traced to the pattern of variation in monetary growth.

**Real product** – The projections of real product are dependent on those for total spending and prices because real product is calculated by subtracting from the change in total spending that portion which is associated with estimated price change. Overprediction of total spending along with underprediction of prices leads to an average overprediction of real product of 1.62 percentage points. Unexplained error is about the same as for total spending because such error is negligible for prices.

Changing economic structure accounts for a substantial portion of total error for real product, reflecting the underprediction of prices. Error due to the steady rate assumption is also significant and of the same order of magnitude as for the total spending projections, though it does receive some correction from such error in the price projections. The real

product projections bear the brunt of two types of errors – that due to the steady rate assumption in the total spending projections and that due to changing economic structure in the price projections.

**Unemployment rate** – Projections of the unemployment rate can be expected to reflect the projection errors for real product. The total error associated with the unemployment rate averaged 0.43 percentage points. The total was equally divided among the three categories of error.

It should be noted that the sources of error are difficult to identify for the unemployment rate because the errors are derived from full model simulations rather than the unemployment equation alone. All types of error come into play, operating through total spending and prices, as well as the unemployment rate equation itself.

**Corporate Aaa rate** – Examination of the corporate Aaa rate projections indicate total error averaged 33 basis points. Unexplained error averaged 13 basis points, but changing economic structure is the key factor in the Aaa projections. This result is to be expected because price movements play an important role in the corporate Aaa equation. Because prices tended to be underpredicted in the ex ante A simulation, the Aaa rate is underpredicted also. There is a partial offset from the overprediction of real product growth, but clearly the price effect dominates.

**Commercial paper rate** – Commercial paper rate projections exhibit an average total error of about the same absolute magnitude as the corporate Aaa projection, but, in contrast, it is overpredicted. Surprisingly, both unexplained error and that due to changing economic structure are small during the simulation period. The reason is that the overprediction of real product and the underprediction of prices tended to offset each other. The price effect does not dominate the short-rate projections like it does the long-term rate.

Error attributable to the steady rate assumption accounts for most of the total error in the commercial paper rate projections. One of the reasons is that the direct effect of money tends to be larger in the short-rate equation than for the long rate. In addition, over-predictions of *both* real product and prices, as associated with the steady rate assumption effect, reinforce each other in the commercial paper rate projections.

## Conclusions

The St. Louis model was not designed for quarter-to-quarter forecasting. When interpreted in light of

its objectives, the model succeeded in roughing out the average time paths of total spending, real product, prices, unemployment, and interest rates during the period from late 1969 to mid-1971. However, the degree of success can be gauged only by comparing the results with those of other models.<sup>7</sup>

<sup>7</sup>Some general comparisons with the Wharton model and the FRB-MIT-Penn model are given in Lawrence R. Klein, "Empirical Evidence on Fiscal and Monetary Models," in James J. Diamond, ed., *Issues in Fiscal and Monetary Policy*:

Policymakers and private forecasters may find that the St. Louis model is inadequate for many of their purposes—for example, quarter by quarter forecasts or detailed forecasts of the components of GNP. Nevertheless, it is hoped that this identification of strengths and weaknesses of the model will provide further understanding on its use and interpretation.

*The Eclectic Economist Views the Controversy* (DePaul University, 1971), pp. 35-50.

## APPENDIX

### Estimated Equations of the St. Louis Model\*

#### I. Total Spending Equation

A. Sample period: I/1953 — IV/1969

$$\Delta Y_t = 2.78 + 5.10 \Delta M_{t-1} + .10 \Delta E_{t-1}$$

(3.61) (7.99) (3.30)

R<sup>2</sup> = .66  
S.E. = 3.84  
D-W = 1.80

B. Sample period: I/1953 — II/1971

$$\Delta Y_t = 2.70 + 5.11 \Delta M_{t-1} + .09 \Delta E_{t-1}$$

(3.04) (7.37) (2.25)

R<sup>2</sup> = .58  
S.E. = 4.53  
D-W = 2.12

#### II. Price Equation

A. Sample period: I/1955 — IV/1969

$$\Delta P_t = 2.46 + .09 D_{t-1} + .93 \Delta P_t^A$$

(6.20) (8.64) (9.04)

R<sup>2</sup> = .87  
S.E. = 1.11  
D-W = 1.39

B. Sample period: I/1955 — II/1971

$$\Delta P_t = 2.05 + .08 D_{t-1} + 1.01 \Delta P_t^A$$

(6.32) (8.38) (15.70)

R<sup>2</sup> = .90  
S.E. = 1.23  
D-W = 1.67

\*Constraints and lag structures correspond to those set forth in the original article discussing the St. Louis model. See Andersen and Carlson, "A Monetarist Model." Coefficient values on lagged variables (subscripted "t-1") are sums of the coefficients for current and lagged quarters. Figures enclosed by parentheses under the coefficients are "t" statistics.

#### III. Unemployment Rate Equation

A. Sample period: I/1955 — IV/1969

$$U_t = 3.89 + .04 G_t + .29 G_{t-1}$$

(70.59) (.87) (6.94)

R<sup>2</sup> = .92  
S.E. = .31  
D-W = .59

B. Sample period: I/1955 — II/1971

$$U_t = 3.88 + .03 G_t + .29 G_{t-1}$$

(72.41) (.83) (7.66)

R<sup>2</sup> = .92  
S.E. = .30  
D-W = .65

#### IV. Long-Term Interest Rate Equation

A. Sample period: I/1955 — IV/1969

$$R_t^L = 1.23 - .06 \dot{M}_t + 1.44 Z_t + .21 \dot{X}_{t-1}$$

(4.90) (-3.52) (11.36) (2.96)

$$+ .99 \dot{P}/(U/4)_{t-1}$$

(18.51)

R<sup>2</sup> = .92  
S.E. = .28  
D-W = .67

B. Sample period: I/1955 — II/1971

$$R_t^L = 1.29 - .06 \dot{M}_t + 1.58 Z_t + .15 \dot{X}_{t-1}$$

(4.77) (-3.56) (13.00) (2.12)

$$+ 1.03 \dot{P}/(U/4)_{t-1}$$

(19.96)

R<sup>2</sup> = .95  
S.E. = .31  
D-W = .79

V. *Short-Term Interest Rate Equation*

A. Sample period: I/1955 — IV/1969

$$R_t^S = -1.07 - .17 \dot{M}_t + 1.01 Z_t + .66 \dot{X}_{t-1} + 1.30 \dot{P}/(U/4)_{t-1}$$

(-2.72) (-5.67)
(5.17)
(7.33)

(15.17)

R<sup>2</sup> = .88  
 S.E. = .51  
 D-W = .54

B. Sample period: I/1955 — II/1971

$$R_t^S = -1.00 - .18 \dot{M}_t + 1.05 Z_t + .64 \dot{X}_{t-1} + 1.30 \dot{P}/(U/4)_{t-1}$$

(-2.19) (-5.21)
(4.73)
(6.01)

(14.33)

R<sup>2</sup> = .87  
 S.E. = .60  
 D-W = .61

Symbols are defined as:

$\Delta Y$  = dollar change in total spending (GNP in current prices)

$\Delta M$  = dollar change in money stock

$\Delta E$  = dollar change in high-employment Federal expenditures

$\Delta P$  = dollar change in total spending (GNP in current prices) due to price change

$D$  =  $\Delta Y - (X^F - X)$

$X^F$  = potential output

$X$  = output (GNP in 1958 prices)

$\Delta P^A$  = anticipated price change (scaled in dollar units)

$U$  = unemployment as a percent of labor force

$G$  =  $((X^F - X)/X^F) \cdot 100$

$R^L$  = Moody's seasoned corporate Aaa bond rate

$\dot{M}$  = annual rate of change in money stock

$Z$  = dummy variable (0 for I/1955 — IV/1960 and 1 for I/1961 — end of regression period)

$\dot{X}$  = annual rate of change in output (GNP in 1958 prices)

$\dot{P}$  = annual rate of change in GNP price deflator (1958=100)

$U/4$  = index of unemployment as a percent of labor force (base = 4.0)

$R^S$  = four- to six-month prime commercial paper rate



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