



REVIEW



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A Monetarist View of Demand Management: The United States Experience

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Paper Presented at the

Conference on Demand Management — Illusion or Reality?
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I AM PLEASED to have this opportunity to present a monetarist view of demand management with special reference to the United States' experience. I will attempt to present what appears to me to be, in my country, a general statement of this view of economic stabilization. My remarks, however, may not be consistent with every aspect of the views held by all of those actively engaged on the monetarist side of the current debate.

This paper first identifies quite generally the major factors which set the monetarist position apart from the prevailing view regarding economic stabilization. Then, there is a summary of the major propositions of this view of demand management. Following this discussion, the United States' experience of the last two decades is analyzed.

The General Monetarist View

In the United States, monetarists have stressed the importance of monetary actions in determining the course of economic activity. Monetary actions include such actions of the Federal Reserve System as changes in the discount rate, changes in commercial bank reserve requirements, and open market purchases and sales of Government securities. They also include the Treasury's management of its cash position. These are the basic exogenous variables of monetary management, with the major emphasis given to open-market transactions.

The role assigned to the money stock in the monetarist analysis is not generally understood. The money stock is most frequently used as an indicator of the thrust or influence of monetary actions on the economy. In the United States, there is a close empirical relationship between current and lagged changes in money and changes in nominal GNP. Money is not

necessarily considered a causal factor. It is used, instead, as a summary measure of the influence of exogenous monetary variables, primarily those controlled by the Federal Reserve, on aggregate demand. Actions of commercial banks regarding their holdings of excess reserves and actions of households and business firms regarding their holdings of currency, demand deposits, and time deposits are recognized as influencing movements in the money stock. Nevertheless, it is maintained that the usefulness of money as an indicator of central bank monetary influences is not seriously impaired by such actions, because there is considerable empirical evidence that Federal Reserve actions dominate movements in the money stock.

The role assigned to interest rates in this analysis has also been subject to misunderstanding. Contrary to general opinion, interest rates are an important aspect of the monetarist transmission mechanism linking monetary actions to economic activity, but interest rates are no more important than prices of goods and services. In many aspects, this transmission mechanism is close to the Tobin view, except that it takes into consideration many more rates of return and market prices of goods and services. Monetary actions of the Federal Reserve are considered a disturbance which influences the acquisition of financial and real assets. Rates of return on real and financial assets and market prices adjust to create a new equilibrium position of the economy; therefore, these changes are considered the main channels of monetary influence on aggregate demand.

The influence of monetary actions through market interactions is considered to be widely diffused across all of the markets for financial assets, real assets, and services. Consequently, it is contended that the influence of monetary actions on movements in total de-

mand is more important for monetary analysis than their influence on demands of individual sectors. This is contrary to the more conventional view which first considers the response of individual sector demands to monetary actions. Such responses, in turn, are then summed to give aggregate demand. The monetarist position is that the allocative effects of monetary actions have little bearing, if any, on movements in aggregate demand.

A central monetarist proposition is that the economy is basically stable and is not necessarily subject to wide variations in output and employment. In other words, the economy will naturally move along a trend path of output determined by growth in its productive potential. Exogenous events such as wars, droughts, strikes, shifts in expectations, changes in preferences, and changes in foreign demand may cause variations in output around the trend path. Such variations, however, under most circumstances, will be mild and of relatively short duration. This basic stability is brought about by market forces which change rates of return and prices of goods and services in response to these exogenous events. It is admitted that markets are not perfectly competitive and are subject to many rigidities. Such market "imperfections," however, do not greatly impair the stabilizing function of markets; they mainly result in an inefficient allocation of resources. Market imperfections also influence the time pattern of the response of output and prices to monetary actions.

The basic source of short-run economic instability, which will be discussed in more detail later, is monetary actions which result in accelerations and decelerations in the rate of money growth. In the long run, however, the trend rate of monetary expansion does not influence output and employment, but only movements in the price level and other nominal variables.

Monetarist View of Demand Management

The monetarist view of the role of monetary and fiscal actions in demand management makes a clear distinction between the influence of such actions on real and nominal economic magnitudes. It also differentiates between the short-run and the long-run aspects of monetary and fiscal actions.

Monetary Actions

The major impact of monetary actions is believed by monetarists to be on long-run movements in nominal economic variables such as nominal GNP, the general price level, and market interest rates. Long-run movements in real economic variables such as

output and employment are considered to be little influenced, if at all, by monetary actions. Trend movements in real variables are essentially determined by growth in such factors as the labor force, natural resources, capital stock, and technology.

In the short run, however, actions of the central bank which change the trend rate of monetary expansion or produce pronounced variations around a given trend rate exert an impact on both real and nominal variables. The timing and the extent to which such real variables as output and employment are affected depends on initial conditions at the time of a change in the rate of monetary expansion. Two major initial conditions are the level of resource utilization and the expected rate of inflation. For example, an acceleration in the rate of monetary expansion at a time of a high level of resource utilization will have little short-run influence on output but a quick influence on the price level. On the other hand, a reduction in the rate of monetary expansion will result in slower growth in real output in the short run, with a faster and larger response if there is a high level of inflationary expectations than if there is a low level.

Fiscal Actions

The monetarist view of fiscal actions is that their main impact is on long-run movements of real output. Government spending and taxing programs can change the rate of growth of potential real output by altering the composition of actual output. An expenditure program which re-allocates resources from current consumption (for example, reduced low income subsidies) to investment (for example, education) will tend to increase the growth rate of potential output. Or, a tax program which encourages private investment will have a similar impact on potential output. Since actual output naturally grows at the same rate as potential output in the long run, these allocative fiscal actions do influence the rate of growth of actual output.

While a faster rate of growth of potential output will tend to reduce the inflationary aspect of a given rate of monetary expansion, this influence is believed to be relatively minor and slow to develop. The reason for this is that the allocative effects of the usual magnitude of such fiscal actions on potential output are not too large and take time to appear.

In the short run, fiscal actions are believed by monetarists to exert some but little lasting influence on nominal GNP expansion and, therefore, have little affect on short-run movements of output and employment. It is argued that Government expenditures

financed by taxes or borrowing from the public tend to crowd out over a fairly short period of time an equal amount of private expenditures, either by interest rate and price changes or by credit rationing. There is some influence exerted over the first part of the adjustment period by a given change in Government expenditures financed in this manner; consequently, an acceleration or deceleration in the rate of Government spending will exert a short-lived influence on total demand. Changes in tax rates, according to some monetarists, can influence economic activity in the short run inasmuch as such changes alter rates of return on capital assets.

Summary of Views on Demand Management

The monetarist position on demand management may be summarized as follows:

1. Demand management is mainly the use of monetary actions to foster an acceptable trend rate of inflation.
2. Short-run instability of output and employment can be greatly reduced if monetary actions are avoided which result in accelerations and decelerations in the rate of money growth.
3. Fiscal actions are not an important aspect of short-run demand management, but the allocative aspect of such actions can be important for such other purposes as promoting economic growth or redistributing wealth.

A Monetarist View of Two Decades of Demand Management in the United States

In analyzing the demand management experience in the United States from the monetarist point of view, the last two decades will be divided into three episodes involving different trend rates of growth of the money stock. The experience of each episode will be presented, and then reasons for the recorded course of money supply growth will be developed.

Demand Management Experience

The last twenty years can be divided into three episodes according to trend rates of monetary expansion — 1952 to 1962, when money grew at a 1.7 per cent average annual rate; 1962 to 1966, when the trend rate of monetary growth was accelerated to a 3.7 per cent annual rate; and 1966 to the present, when there was a further acceleration to a 6.1 per cent annual rate of growth in the money stock (Chart I).

During the decade ending in 1962, demand management was primarily the Federal Reserve's respon-

sibility. Only one major fiscal action, the income tax cut of 1954, was undertaken for the purpose of influencing aggregate demand. An examination of the published minutes of the Federal Open Market Committee indicates that several monetary actions were taken for the purpose of promoting economic stability. From 1952 to 1962, the United States' money stock increased at a 1.7 per cent average annual rate. There was, however, considerable short-run variability around this trend rate, with periods of fairly rapid increase followed by absolute decrease.

The price level performance, except for a short burst of inflation in 1956 and 1957, was very good, and such performance continued into 1965. The GNP deflator rose at a trend rate of less than 2 per cent from 1952 to 1965. Performance of the real sector of the American economy, however, was far from acceptable as the decade was marked by three recessions. Over this ten year period, the unemployment rate averaged 4.5 per cent. Despite an average unemployment rate of this magnitude, however, real output grew only slightly less rapidly than the 3.5 per cent estimated growth rate of potential output.

The next episode — 1962 to 1966 — marked the emergence of attempts at "fine tuning" movements in aggregate demand. Fiscal actions became the main tool of such management of the economy, while monetary actions, in the Keynesian tradition, were assigned a purely accommodative role. Little consideration was given to the possibility that monetary actions could exert any independent influence.

Major fiscal actions undertaken during this period for purposes of stimulating aggregate demand were the investment tax credit and accelerated depreciation provisions of the Revenue Act of 1962, the Revenue Act of 1964 which reduced individual and corporate income tax rates, and the Excise Tax Reduction Act of 1965. Then as inflationary pressures began to mount late in the period, the Investment Credit Suspension Act of 1966 was adopted to reduce growth in aggregate demand.

Monetary actions, in their accommodative role, were expansive. The money stock rose at a 3.7 per cent trend rate from mid-1962 to the end of 1966 (Chart I). The rate of monetary expansion was variable over this period. It accelerated to a 6 per cent rate from April 1965 to April 1966, and then money did not grow to the end of 1966.

This episode marked the beginning of accelerating inflation in the United States. The GNP deflator rose at over a 3 per cent annual rate during 1966, com-

pared with a rate less than 2 per cent during the 1952-1962 period.

Many have viewed the movements in output and employment from 1962 to 1966 as very satisfactory. Output rose rapidly, eliminating the gap between potential and actual output which had existed in the early 1960's. As a result, the unemployment rate fell from 5.5 per cent in 1962 to less than 4 per cent in 1966. These developments have been cited as evidence proving the success of the fiscal, "fine-tuning" view of demand management.

The last episode — 1966 to the present — is one in which attempts were made to dampen growth in aggregate demand so as to curb an accelerating inflation. An overriding consideration, however, was to accomplish this objective without too great a loss of output and employment. First, fiscal actions were used, and then monetary actions.

The Revenue and Expenditure Control Act of 1968 imposed a temporary 10 per cent surcharge on individual and corporate income taxes and restricted the rate of increase in Federal Government expenditures. Next, the investment tax credit, which had been restored in early 1967, was repealed. Then as output grew more slowly later in the period and the unemployment rate rose, the income tax surcharge was allowed to phase out.

Monetary actions were of a stop-and-go nature similar to fiscal actions. At times during the period, monetary actions were assigned an independent role in demand management in contrast to the purely accommodative role during the 1962-66 episode. In addition, greater emphasis was placed on controlling movements in the money stock. Money grew at a 7 per cent annual rate in 1967 and 1968. Then, steps were taken to curb inflation, and money grew at a markedly lower 3 per cent rate in 1969. But when considerable economic slack appeared, the rate of monetary expansion was accelerated to a 5 per cent rate in 1970 and to a 10 per cent rate thus far in 1971. The over-all trend rate of monetary expansion over the whole four and one-half year period was about 6 per cent, a marked acceleration from the 3.7 per cent rate recorded from 1962 to 1966 (Chart I).

The performance of the American economy since 1966 has been considered highly unsatisfactory. The results of monetary and fiscal actions since 1966 have been a recession accompanied by a high rate of inflation. Inflation accelerated to over a 5 per cent annual rate, and the unemployment rate rose to over 6 per cent.

The experience of the last two decades demonstrates the great lack of success of demand management in the United States. This is particularly evident in the 1960's when very activist stabilization actions were undertaken. Some cite this experience as demonstrating the inability of traditional monetary and fiscal actions to promote economic stability. I do not accept such a view. Instead, I contend that the generally accepted economic foundation of demand management is faulty. Basing stabilization actions on this foundation is a sure formula for failure.

Reasons for Failure of Stabilization Policies

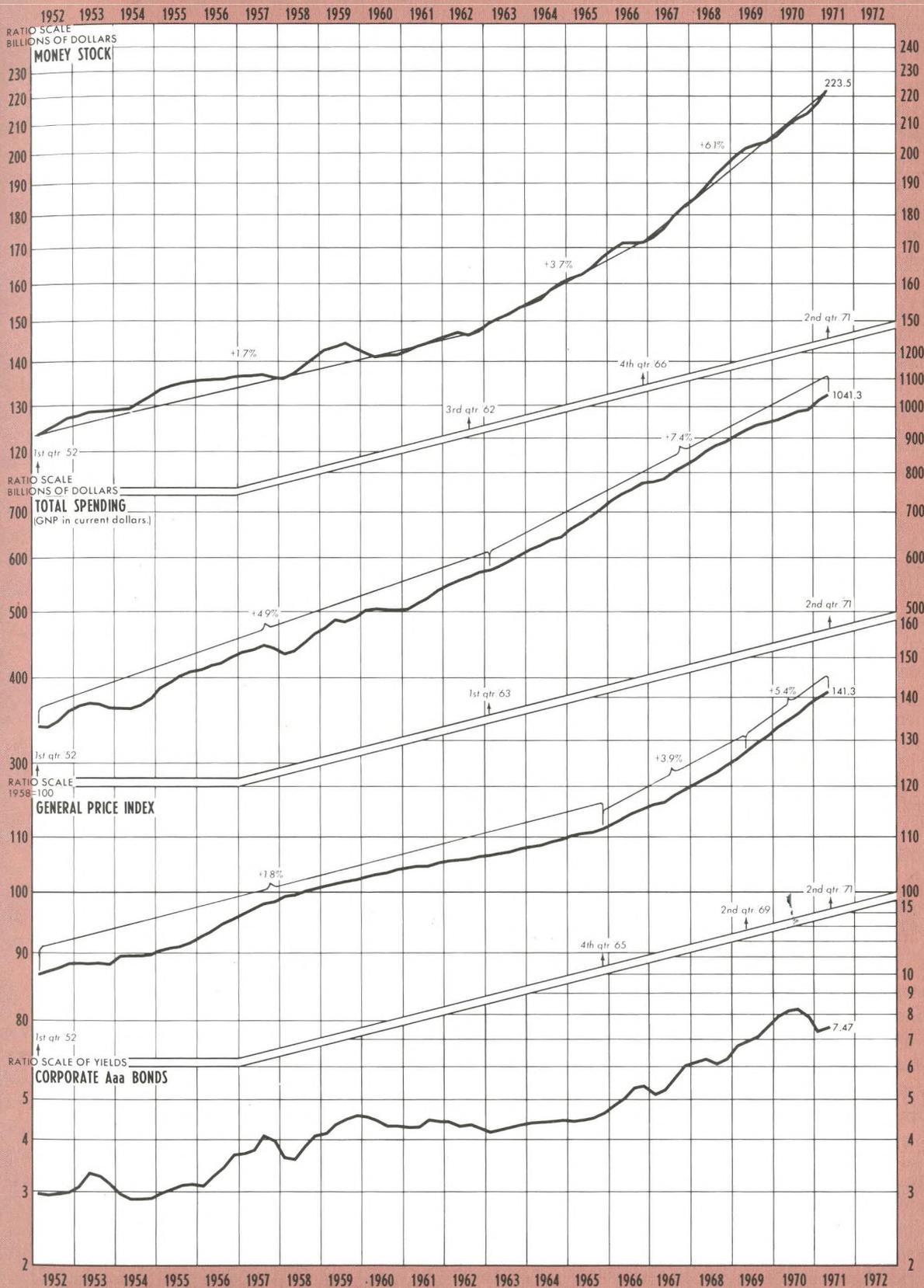
I attribute the very poor record of United States economic stabilization efforts to four main factors. First, and foremost, is lack of understanding of the independent impact of monetary actions, as measured by changes in the money stock, on the course of economic activity. Second, is the great emphasis given to guiding the course of real variables — output and employment — and the little emphasis, except for short intervals of time, given to controlling inflation. Third, is the great emphasis given to fiscal actions, especially in the 1960's. Fourth, is the use of market interest rates as an indicator of the influence of monetary actions on economic activity.

Role of Monetary Actions Ignored — According to the monetarist view, central bank actions which alter the trend growth rate of the money stock exert an important long-run influence on nominal GNP and the price level. Accelerations and decelerations of the money stock have only an important short-run influence on output and employment. Evidence supporting these two propositions is presented in Charts I and II.*

The money stock panel (Chart I) indicates three trend growth rates of monetary expansion, which were set forth in the preceding section. Money grew at a 1.7 per cent average annual rate from I/1952 to III/1962. Money growth then accelerated to a 3.7 per cent trend rate to IV/1966 and to a 6.1 per cent trend rate to II/1971. Total spending (nominal GNP) and the price level responded to the changes in the trend rate of monetary expansion as postulated by monetarists. Total spending rose at a 4.9 per cent annual rate from I/1952 to I/1963 and then rose at a 7.4 per cent trend rate. The price level (GNP deflator) rose first at a 1.8 per cent rate, then at a 3.8 per cent rate, and since II/1969 at a 5.4 per cent rate. The corporate

*Charts have been updated from those presented at the conference to include data for II/1971.

Chart I



All data except bond yields are seasonally adjusted.
Percentages are annual rates of change for periods indicated.

Aaa bond rate, another nominal magnitude, also moved in a manner similar to changes in the trend growth of money.

Chart II, top panel, presents deviations in the money stock from its trend growth. These deviations are expressed as the ratio of the money stock to its trend value for each quarter. The dashed line at the end of each episode is the ratio calculated on the basis of the previous episode's trend for a few quarters after a change in the trend. This overlap is used to allow for the fact that a change in the trend growth of money is not recognized immediately. The second panel presents the ratio of actual real GNP to potential real GNP. The trend growth of potential real GNP, as indicated on the second panel, has been estimated by the Council of Economic Advisers. The bottom panel presents the unemployment rate.

Regardless of the trend rate of monetary growth (1.7, 3.7, or 6.1 per cent), whenever the ratio of money to its trend value rose (an acceleration in money growth), the ratio of actual real GNP to its potential value rose soon thereafter, and the unemployment rate fell. The opposite happened whenever the rate of money growth decelerated. Despite such short-run developments and despite different trend rates of money growth, the unemployment rate averaged about the same from 1952 to 1962, when money growth was relatively slow, as from 1962 to 1971, when the trend rate of money growth was much greater.

The developments summarized in Chart II are consistent with the monetarist view that accelerations and decelerations of monetary expansion exercise a short-run influence on output and employment, but there is little, if any, long-run influence. These influences were given little consideration in demand management, particularly during the activist period from 1962 to 1968.

Focus Placed on Output and Employment — Another factor accounting for the poor stabilization record in the United States is the fact that demand management has been primarily focused on producing desired movements in output and employment. This was true of monetary actions for the 1950's and early 1960's when some independent monetary actions were taken, the period in the mid-1960's of fine tuning using planned fiscal actions and accommodative monetary actions, and the active use of monetary actions after 1968.

If the economy responds to monetary actions, as indicated above, a focus of policy primarily on output and employment can explain the existence of both

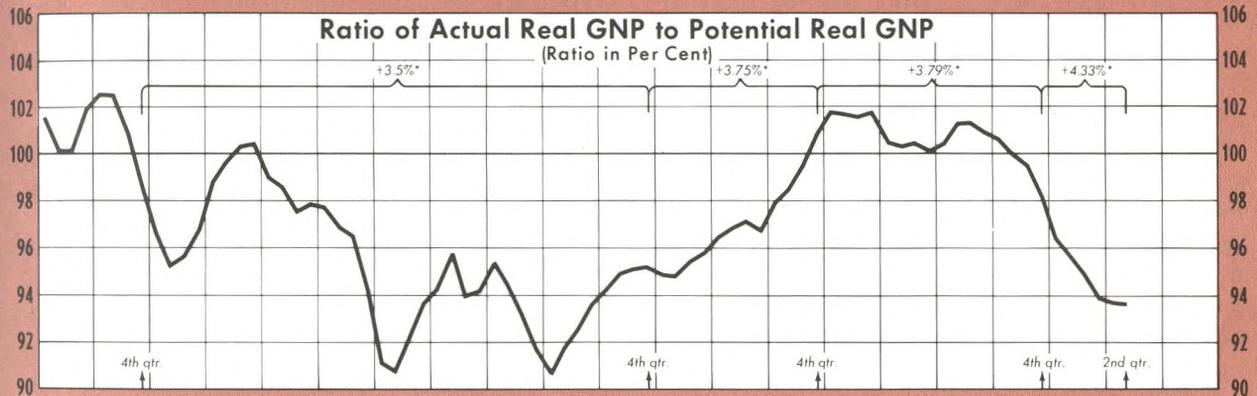
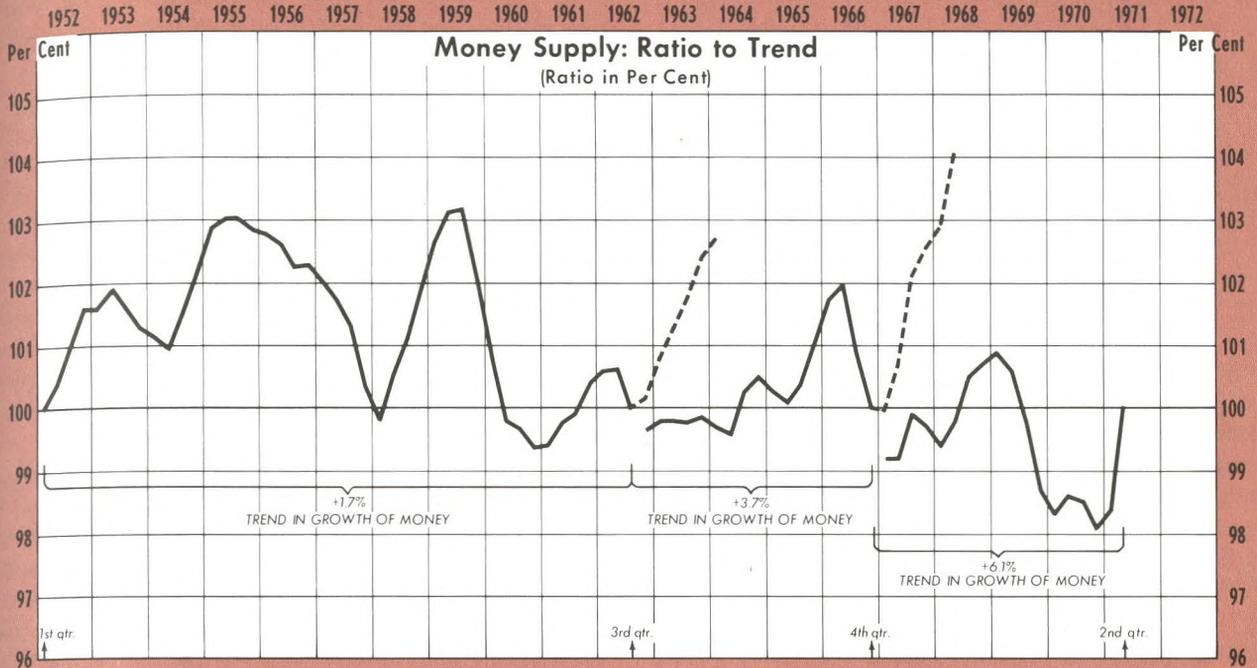
inflation and high unemployment. In attempting to promote rapid expansion of real output after mid-1962, active use of fiscal actions and accommodating monetary actions resulted in the money stock rising at an accelerated rate until early 1966. Inflation accelerated, and in response, monetary authorities reduced drastically the rate of money growth for two quarters. But then when economic slack appeared in early 1967, money growth was allowed to accelerate to a trend rate greater than the previous one. This sequence of events happened again in 1969 and 1970, producing a still higher rate of money growth. In these latter years, however, monetary actions were on more of a discretionary basis than earlier.

The end result, thus far, of guiding stabilization policy on real variables has been higher and higher trend rates of monetary expansion and greater inflation. Periodically, there have been temporary periods of monetary restraint to curb inflation, which in turn have produced slower output growth and rising unemployment. Such developments, in turn, induce stabilization authorities to initiate a still higher trend rate of money growth, which leads to further inflation. Thus, the American economy may be faced with high rates of inflation without achieving economic stability, unless the main emphasis of policy is shifted to curbing inflation.

Main Emphasis Given to Fiscal Actions — A third reason for the poor record of economic stabilization in the United States is the emphasis given to fiscal actions, particularly from 1962 to 1968. Until recently, fiscal actions in the form of Government spending and taxing programs have been given the main emphasis in economic stabilization efforts to the virtual exclusion of monetary actions. Such a development was an outgrowth of conventional economics which for the past 25 years has taught that Federal Reserve actions exercise little independent influence on total demand for goods and services.

According to this widely accepted view, changes in the money stock bring about changes in market interest rates, but total demand is little influenced by interest rate movements. Consequently, monetary actions have been thought to be of little use in any program of economic stabilization. On the other hand, increased Government expenditures are viewed as adding directly to total demand and tax reductions as adding to disposable income which would be used to purchase goods and services. Consequently, this view has argued that fiscal actions have an immediate and powerful influence on total spending. This analysis has received wide acceptance as evidenced in dis-

Chart II



Dotted lines represent an extension of the ratio to previous trend for six quarters into the next period.
 *Growth trend of Potential Real GNP.
 Growth trend from IV/70 to the present, 4.4%.
 All data are seasonally adjusted

cussions of economic stabilization by the general public, in the press, in the Congress, and in the Reports of the Council of Economic Advisers from 1962 to 1969.

It is my belief that the accelerating inflation of the last half of the 1960's can be attributed, in large part, to the great emphasis given to fiscal actions and the downgrading of monetary influence. Monetary authorities did not reduce the rapid rate of monetary expansion during a large part of that period because there was a desire to let fiscal actions curb inflation and a belief by some that only fiscal actions would be effective. Then, when restrictive fiscal actions were taken in mid-1968 — the surtax and slower increases in Government spending — many economists, on the basis of conventional wisdom, predicted "fiscal over-kill" by early 1969. In response to such predictions, monetary authorities continued even more expansionary actions.

Faulty Method of Monetary Management Used — A fourth reason for the poor stabilization record of the last 20 years has been due to the fact that the usual method of carrying out United States monetary policy in the 1950's and 1960's was faulty. Discretionary monetary policy was reinstated in 1951 after its suspension during World War II and up through the early part of the Korean War. The purpose of the 1951 change was to permit monetary authorities to fight the inflation of the Korean War. In conducting its monetary policy responsibilities since then, the Federal Open Market Committee has relied almost exclusively, until just recently, on measures of money market conditions as a guide to its operations. I am sure that most of you are familiar with the view that falling interest rates indicate expansionary monetary actions, while restrictive actions are indicated by rising interest rates.

Such a view was in general agreement with the conventional wisdom, which holds that monetary actions work primarily through changes in market interest rates. It also was in agreement with the view that the Federal Reserve has great ability to "set" market interest rates. Recent research and experience, however, have tended to reject these propositions. For example, it has been demonstrated that rapid monetary expansion, such as in 1967 and 1968, stimulates total spending, fosters inflation, and thereby generates rapidly growing demand for credit and rising interest rates, not lower rates.

By using market interest rates to indicate the thrust of its actions in the 1950's, the Federal Open Market

Committee frequently resisted the pace at which rates fell during recessions and rose during recoveries. Such actions did not alter the trend growth of money or inflation, but they produced accelerations and decelerations which led to economic instability.

Then in the fine tuning of the 1960's, the Committee concluded that, despite very rapid monetary growth, rising interest rates indicated considerable monetary restraint during 1967 and 1968. Consequently, it was believed by many that further steps need not be taken to reduce the excessive rate of monetary growth. In retrospect, it is now apparent that the traditional reliance on such measures of money market conditions as market interest rates contributed to our present inflation and to instability in the real sector.

The focus on market interest rates in conducting monetary management during the last half of the 1960's also led to higher trend rates of monetary expansion in two other ways. Constraints on interest movements imposed by public opinion and the Congress on Federal Reserve actions caused, in part, the very expansive monetary actions during 1967 and 1968. Following the rapid rise in market interest rates during the credit crunch of 1966, there was a belief that the extent of the increase was too great because of the dislocations which had occurred in the savings and housing industries. In order to forestall further dislocations, there was a desire to hold back the magnitude of interest rate increases; this led to passage of the Interest Rate Control Act of 1966. Presently there is a reluctance to allow rates to rise for fear of "choking-off" the economic recovery. Attempts to hold back interest rate increases at a time of expanding economic activity require great injections of bank reserves which contribute to a rapid growth in the money stock. This, in turn, fosters excessive total demand and feeds further the fires of inflation.

The focus on market interest rates also helped to bring about the extremely high rates of monetary growth during 1967 and 1968 as a result of the decision to finance the expansion of the Vietnam War and rapidly rising welfare programs by borrowing rather than exclusively by taxes. During 1967 and 1968, large Government financings in the security markets caused the Federal Reserve, because of an even-keel policy of stabilizing money markets at times of Government borrowing, to buy large quantities of Government securities. As mentioned earlier, there was great upward pressure on market interest rates from the private sector. Hence, with large demands for funds from

both private sources and the Government, large injections of member bank reserves were required for even-keeling by the Federal Reserve. These injections helped to foster rapid growth in the money stock.

Conclusions

Now to answer the question posed for this conference, "Demand Management, Illusion or Reality?" According to the monetarist view, the answer is "reality," but the essence of such reality is markedly different than that of the more conventional, activist view of demand management. Monetary actions should be directed primarily at fostering an acceptable rate of inflation; this requires the following of an appropriate trend rate of monetary expansion. With regard to output and employment, monetary actions should be conducted so as *not* to be a source of economic instability; this requires the avoidance of periods of marked accelerations and decelerations in the rate of money growth. Thus, I believe that there are strong economic reasons for the monetary growth rule and little room for discretionary, short-run monetary management.

The recent American experience demonstrates the potential of short-run monetary actions to produce both inflation and economic instability. For instance, the 6 per cent trend growth of money since 1966, given the 1.5 per cent trend increase in velocity that

has occurred since then, is consistent with a 7 to 8 per cent annual rate of increase in nominal GNP. If potential real output should continue to rise at its recent 4.3 per cent annual rate, this rate of money growth implies a trend rate of inflation between 3 and 4 per cent. If velocity, however, should resume its higher 3.5 per cent average annual rate of increase recorded from 1952 to 1966, the recent trend rate of money growth implies a 5 to 6 per cent rate of inflation. The monetary restraint of 1969, when money rose at only a 3 per cent rate, produced the recent recession in the United States, but since this was only a relatively short-lived deceleration in money growth, the rate of inflation was little influenced.

Stabilization actions since 1966 have not been conducive to a marked reduction in the rate of inflation. The United States inflation will not be reduced substantially until a lower trend rate of money growth is established; a 3 to 4 per cent rate probably would be optimal. Since the present high rate of inflation has been in existence for several years, however, expectations are for a continued high rate of price advance. In such a case, a move to less expansionary monetary actions will result in considerable adjustment costs in terms of slower expansion in output and employment. Such costs cannot be avoided if the United States inflation is ever to be contained, and attempts to avoid them will probably lead to higher rates of inflation.

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High Employment Without Inflation: On the Attainment of Admirable Goals

by ROGER W. SPENCER

HIGH EMPLOYMENT and price stability are two of this country's foremost economic goals. In contrast to the early part of the 1960's when prices were relatively stable but unemployment was high, and the latter part of that decade when unemployment was low but inflation was rapid, the early 1970's have been marked both by high unemployment rates and by rapid inflation. Since the adoption by the Congress in 1946 of goals calling for the achievement of maximum purchasing power and full employment, the simultaneous realization of price stability and full employment has been rare.

These goals were reaffirmed by the Joint Economic Committee (JEC) in a recent *Report*.¹ The Committee recommended that "The President and Congress should adopt as a long-term objective the twin goals of an unemployment rate no higher than 3 per cent and an annual increase in the GNP deflator of no more than 2 per cent."²

In only two years since 1946 have the Committee's employment and price stability goals been achieved simultaneously. In 1952 and 1953 an unemployment rate of 3 per cent or less and a rise in prices of less than 2 per cent were attained. Moderate monetary growth at a 3.7 per cent annual rate in the 1951-53 period facilitated the attainment of the inflation goal. Employment as a proportion of the labor force in 1952 and 1953 was enhanced by the fact that many

potential young workers were in the armed forces (proportionally more than during the Vietnam War). Moreover, there were fewer of these young individuals (whose unemployment rate is typically higher than the average) than usual because of the low birth rates of the 1930's.

Many of the conditions surrounding the 1952-53 attainment of the employment and price goals do not exist presently and are not likely to exist in the near future. For example, young inexperienced workers are expected to enter the labor force at more rapid rates than during the early 1950's for some time to come. Moreover, the money stock has expanded at a much more rapid rate in recent years than in the early 1950's. Thus, the Committee's endorsement of stable prices and a 3 per cent unemployment rate appears somewhat optimistic. Stabilization policy efforts to achieve such a low rate of unemployment could prove quite costly in terms of inflationary pressures. Low rates of unemployment could be achieved without aggravating inflation, however, by the adoption of measures designed to remove constraints on the functioning of labor markets.

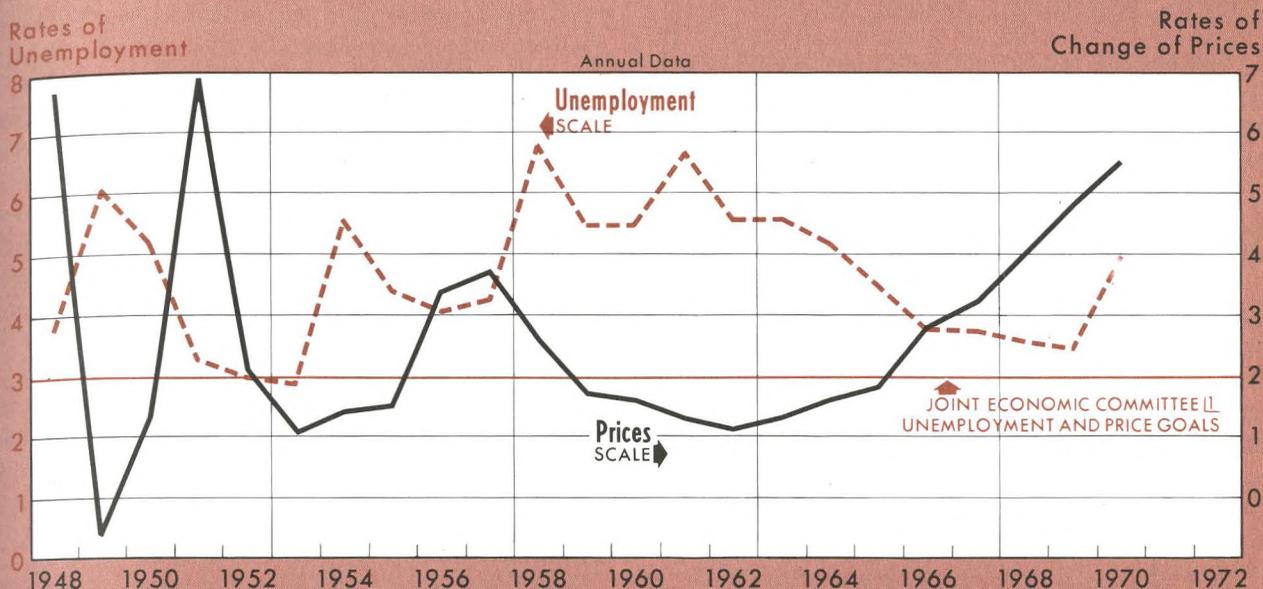
This article examines the reasons for the occurrence and duration of unemployment, and, given this analysis, explores ways in which unemployment might be reduced without generating excessive inflationary pressures. The emphasis on unemployment reflects the fact that over the past twenty-five years, the Committee's 3 per cent unemployment rate target has not been attained as often as the 2 per cent per year price target (see the following chart).

Unemployment has long been described as arising from frictional, structural, and "inadequate demand"

¹Report of the Joint Economic Committee, Congress of the United States, on the February 1971 *Economic Report of the President*, (Washington, D. C., 1971 *Joint Economic Report*, U. S. Government Printing Office, 1971), p. 34.

²*Ibid.* Representative Richard Bolling (Missouri) rejects the increase in prices of 2 per cent as being inconsistent with the 1946 Employment Act's objective of stable prices.

Prices and Unemployment 1948-70



1 The Joint Economic Committee of the United States Congress, in its February 1971 Report on the Economic Report of the President, p. 34, recommended goals of 3 per cent unemployment and 2 per cent annual increase in prices.

factors, along with wage-price inflexibility. More recently, a theory of unemployment based on job information and relocation costs has emerged. This article investigates the unemployment issue through integration of these basic approaches.

The first section of the article explains why there is unemployment. The explanation is facilitated by spelling out conditions under which the unemployment rate would be equal to zero. This euphoric situation is developed to make a clear contrast with the actual world in which some unemployment inevitably exists. The underlying cause of real world unemployment is the fact that job information and relocation costs are positive. Next, a "normal" unemployment rate and the reasons for deviations from it are explored.³ The term "normal rate" of unemployment does not imply that such unemployment is either desirable or immutable. One of the principal objectives of the advancement of the normal rate concept is to determine methods of lowering such a rate.

The second major section of the article outlines ways in which the rate of unemployment could be

³The "normal" unemployment rate, which has also been termed the "natural" rate, the "warranted" rate, and the "full employment" rate, is not a constant, but can vary over a short period with changes in the institutional setting of the labor market.

reduced without aggravating inflation. The roles of legislative, fiscal and monetary policies with regard to employment are analyzed in this context. Finally, the econometric model of this Bank is used in the third section to examine possible future patterns of economic adjustment to alternative monetary policies designed to achieve the Committee's economic goals. The model draws on data from a period in which labor market restrictions were little different from what may be expected in the near future. Through simulation techniques, the model suggests that accelerating inflation would be required to achieve and maintain an unemployment rate near 3 per cent.

WHY UNEMPLOYMENT?

Unemployment is usually considered undesirable from both the social and private points of view. Yet, there has always been some unemployment. Contrasting a hypothetical world in which there is no unemployment, with the real world, in which positive costs of information and relocation as well as frictional, structural, and aggregate demand-related forces combine to foster unemployment, should provide insight into the problem.

A World of Zero Unemployment

In developing an illustration of a hypothetical world in which there exists no unemployment, that is, every-

one who wants a job at the market wage rate has one, we assume: (1) prices and nominal wage changes are correctly anticipated; (2) all labor is homogeneous; and (3) there are no market imperfections.

The correct anticipation of wages and prices means that each firm and each worker has such knowledge. Wages and prices are flexible both upward and downward. Labor homogeneity implies that each worker is like that of every other in terms of such factors as skill, age, and sex. A perfect market is characterized by complete, costless knowledge of job information and unlimited, immediate and costless ability to transfer labor resources from one job to another. There are no artificial impediments to labor opportunities such as a minimum wage law or job discrimination on a nonprice basis. Markets are cleared instantaneously under the assumptions of this simple model (see the figure below) and, consequently, there is no unemployment. That is, all those who desire to work at the prevailing wage rate are employed.

A downward shift in the demand for labor (brought about, for example, by a long-lasting drop in consumer confidence) results in an excess quantity of labor supplied at the existing wage rate, and an immediate decline in the wage rate occurs to clear the market. The lower rate is immediately recognized by the workers as being widespread, and there is a decline in the total quantity of labor (in man-hours) worked. The fall in the quantity of labor worked may be reflected in fewer hours worked per employee or fewer employees. If no workers decide to drop out of the labor force and all accept the lower wage, the lower quantity of manhours is reflected in fewer hours of work per employee. Still, every worker who wants a job at the lower wage can find one, and a state of full employment is maintained continuously. Those who make the economic choice not to work at the lower rate have left the labor force voluntarily and are not considered unemployed. An increase in the supply of labor, due to a sharp increase in immigration, for ex-

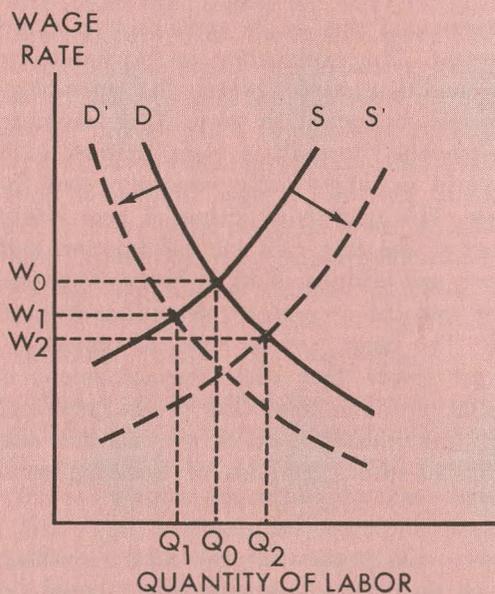
Demand for and Supply of Labor in a Zero Unemployment World

Assume wages and prices are correctly anticipated by all economic units, labor is homogeneous, and there are no market imperfections. The demand schedule for labor reflects the additional revenue provided by the labor services of an additional worker, that is, the worker's "marginal revenue product." The lower the price (or wage) of labor, the greater the amount of labor that will be demanded. The supply of labor depends on the population of labor force age and that population's evaluation of income-leisure considerations. A sharp increase in the population of labor force age would shift the supply curve to the right, as would a shift in workers' preferences toward income and away from leisure.

The exact position and slopes of the curves, even under the highly abstract conditions postulated, cannot be outlined definitively. Some analysts, for example, believe the labor supply curve is not only vertical in its upper regions, but bends backwards, indicating a lower quantity of labor supplied for increasingly higher wage rates. Labor studies of some underdeveloped countries suggest that with a target level of income in mind, workers will work less and maintain that target level of income at ever-higher wage rates.

The intersection of the demand for labor services and the supply of those services, under the described assumptions, gives the equilibrium quantity of labor (Q_0) and wage rate (w_0). At the equilibrium wage, firms are able to hire all the labor they want and the labor force is fully employed. Full employment in the present context is interpreted to mean that all workers desiring jobs at the existing wage find them, not that every possible hour of labor (24 hours of labor per worker per day) is worked.

A fall in the demand for labor is illustrated by the shift to the left of the demand curve to D' with a concomitant fall in wages to w_1 and a drop in the quantity of labor worked to Q_1 . An increase in the supply of labor is indicated by a rightward shift in the supply curve, which is associated with a fall in the wage rate to w_2 and a rise in the quantity of labor worked to Q_2 .



Note: The arrows illustrate a decrease in demand and an increase in supply.

ample, is accompanied by a lower wage rate and a larger total quantity of labor worked. Thus, in this assumed world of perfect labor markets and no costs of adjustment, full employment is maintained continuously. Although the level of employment may vary, both the market (or actual) rate of unemployment and the normal rate are zero.

Underlying Cause of Unemployment

In contrast to the hypothetical world in which there is no unemployment, consider the real world situation in which there is always a positive rate of unemployment.⁴ This positive unemployment rate emerges when the rigid assumptions of the "Zero Unemployment World" are dropped. The following Exhibit provides an overview of the causes of unemployment and a classification of the sources. "Sources" refers to the original reason for unemployment, that is, why unemployment initially occurs, and "causes" is concerned with its continuance, or why the unemployed individual does not immediately locate a job.

The underlying cause of unemployment is the fact that job information and relocation costs are positive. This lack of perfect (costless) knowledge and mobility means that a worker seeking a job for any reason (better pay, industry lay-offs, downturn in the economy) cannot immediately locate and accept the best employment for which he is suited. So long as there is some service he can perform (whether in the profession or trade in which he is trained, or some other economic services such as manual labor) for some positive wage rate, he need not be unemployed, but he cannot, in general, discover his best employment alternative without some costly period of search.

⁴According to the Department of Labor, "Unemployed persons comprise all persons who did not work during the survey week, who made specific efforts to find a job within the past 4 weeks, and who were available for work during the survey week (except for temporary illness). Also included as unemployed are those who did not work at all, were available for work, and (a) were waiting to be called back to a job from which they had been laid off; or (b) were waiting to report to a new wage or salary job within 30 days." U. S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings* (August 1971), p. 120.

Much of the following analysis (especially those sections on frictional, structural, and aggregate demand-related unemployment) is oriented toward explaining the observed unemployment rate as computed by the Bureau of Labor Statistics. The costs of information and relocation analysis applies not only to this measure of "involuntary" unemployment, but also to voluntary (or hidden) unemployment which is not accounted for in the observed unemployment rate. In many cases, labor market adjustment costs are so high as to discourage potential workers from seeking jobs. An estimate of the significance of hidden unemployment is provided by N. J. Simler and Alfred Tella, "Labor Reserves and the Phillips Curve," *The Review of Economics and Statistics* (February 1968), pp. 32-49.

During the period of search he is, by definition, unemployed.

The foregoing passage is of sufficient importance to require re-statement. If there is a service of any kind anywhere which an unemployed individual could perform for an above-zero wage, his unemployment may be attributed to the fact that he lacks complete knowledge of all job possibilities or that he does not have the resources to permit him to relocate. The unemployed normally prefer to seek jobs in fields in which they are skilled and in favored geographical areas, but after some period of fruitless search, they often scale down their requirements as to work field, geographical location, and/or wage rate.⁵

Since there are positive costs of information and mobility in the labor market, the unemployed expend scarce resources (time and money) to locate the vacancy they may eventually fill. Contrary to popular belief, job search (which accompanies unemployment) is a rational economic decision which often benefits the worker, the firm, and the economic system. The worker is best off (in terms of wealth and utility) by locating the job which offers him the greatest present value as discounted over some finite time span.⁶

By taking the first job he is offered, he may pass up jobs which would be more rewarding both monetarily and nonmonetarily over his working life. He is most able to obtain a preferable job by a search process which often accompanies unemployment.⁷ If

⁵The significance of information and relocation costs in the determination of unemployment is reflected in the description of the plight of an unemployed husband and his wife in a recent issue of a popular magazine.

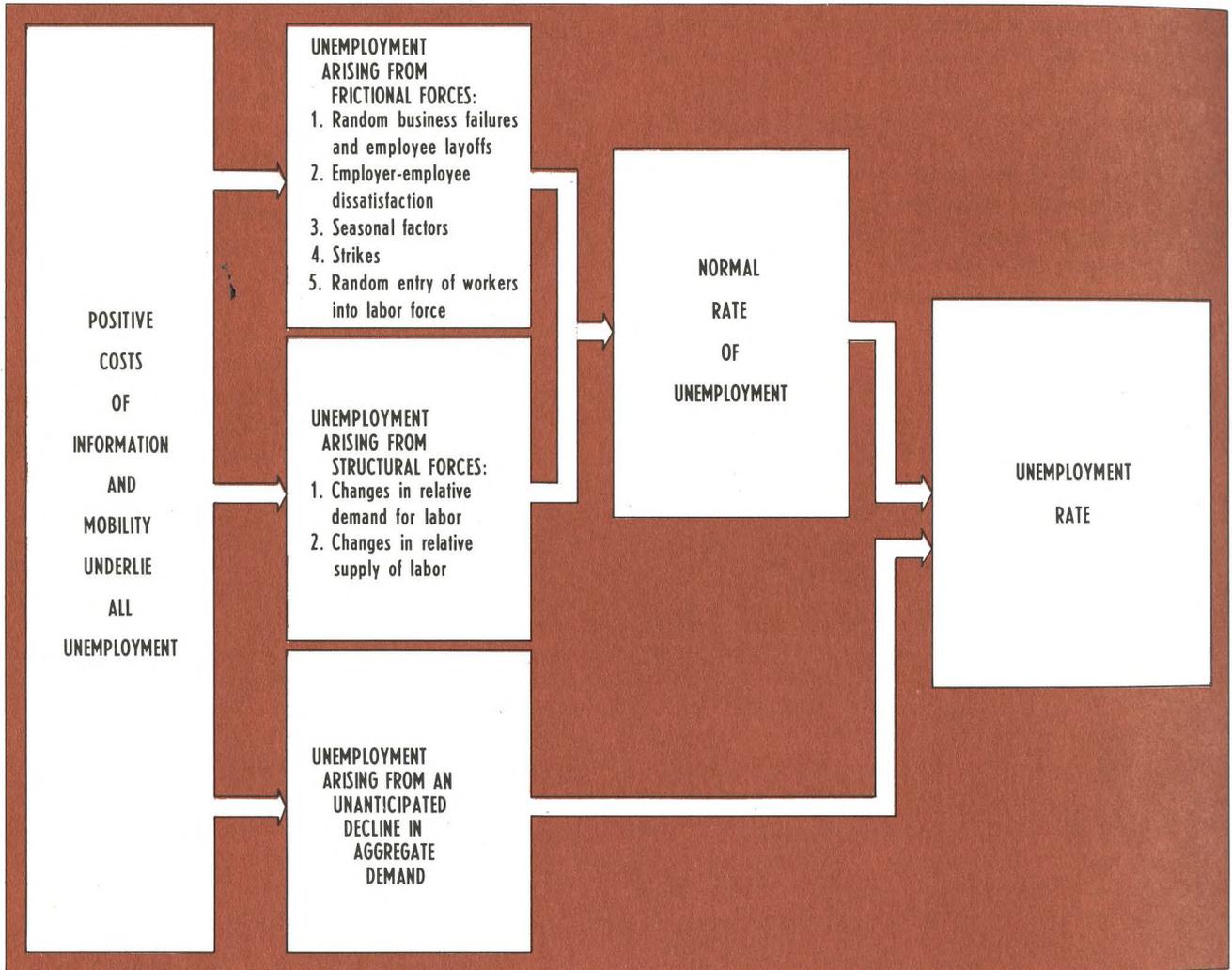
After a month of fruitless job hunting, Tim [laid off from his job as a toolmaker] and Rosemary sat down to consider their alternatives. He could take an unskilled job and supplement it with work in a tool shop. Rosemary could go back to work. They could move. None of the choices looked good. For Tim to work 60 hours for less than his former pay seemed a drastic backslide — besides, he would have no time to look for suitable work. Rosemary wants to be home with her children, if possible, at least until they're all in school. Moving would be a terrible sacrifice; . . .

Rollie Hochstein, "When the Pay Checks Stopped," *Good Housekeeping* (September 1971), p. 183.

⁶The principle that the probability of a worker obtaining the "best" job by taking the first offer is lower than with additional search finds its mirror image with firms and vacancies. A firm has a higher probability of selecting the best applicant for a vacancy by interviewing more than one applicant, despite the fact that the vacancy must remain open for a longer period.

⁷"Gathering and disseminating information about goods or about oneself is in some circumstances more efficiently done while the good or person is not employed, and thus able to specialize (i.e., while specializing) in the production of information." Armen A. Alchian, "Information Costs, Pricing and

Exhibit I
Unemployment Causes and Classifications



Note: Some over-simplification is inherent in the above unemployment distinctions.

Resource Unemployment," *Microeconomic Foundations of Unemployment and Inflation Theory*, Phelps, et. al. (New York: W. W. Norton & Co., Inc., 1970), p. 29. A large body of literature on the intensity and duration of job search has emerged in recent years. George J. Stigler, in "Information in the Labor Market," *Journal of Political Economy* (Supplement: October 1962), pp. 94-105, attempted to find the determinants of worker's wage demands and generated some data which suggested that workers who invested in some job search were better off than those who engaged in virtually no search. Armen A. Alchian and William R. Allen, in *University Economics*, (Belmont, California: Wadsworth Publishing Company, Inc., 1968), set down several postulates of job search in their text, and Alchian, "Information Costs, Pricing and Resource Unemployment," developed the theory of job search and costs of information more rigorously. Charles C. Holt, in "Job Search, Phillips' Wage Relation, and Union Influence: Theory and Evidence," Phelps, et. al., related the length of job search to wage aspirations, a concept given more attention heretofore by psychologists than economists.

he is well satisfied with the job he takes, (1) his firm will not have to advertise for and retrain a replacement for him after a brief period of employment; and (2) society will receive the benefits of a worker who is more productive the more satisfied he is with his position.

The search process is a two-way street — workers search for jobs and firms search for workers. Workers expend resources to secure information about job opportunities, and firms do the same to obtain information on the qualifications of job candidates. Transportation costs are often a part of the search process also. Firms may move plants near available labor

supply or absorb the costs of employee job transfer. Workers, however, often must bear the monetary and nonmonetary costs of obtaining work in other areas.

The Normal Rate of Unemployment

Given the underlying job search costs, observed unemployment derives from frictional, structural or aggregate demand-related factors.⁸ In addition, the observed unemployment rate may be viewed as consisting of a "normal" rate of unemployment and deviations from the normal rate. The level of the normal rate is determined by frictional and structural forces (see the Exhibit). The normal rate of unemployment reflects the adjustment of firms and workers to changing economic conditions independent of aggregate demand changes. Deviations from the normal rate may be ascribed to changes in aggregate demand which result in overall prices and wages changing at rates not correctly anticipated by firms and workers.

At the normal rate of unemployment, there is an equilibrium of a particular sort in the labor market. The equilibrium is not one which exists in the sense that the labor market clears at a single wage rate, and there are no excess supplies of or demands for labor.

Equilibrium in the labor market at the normal rate of unemployment is indicative of some average length of search time before a vacancy is filled or, alternatively, a job is taken.⁹ This average length of job search at the normal rate is a function of the degree of heterogeneity and imperfection in the job market. In this context, heterogeneity refers to the fact that all workers do not share the same skills and training,

nor do all job vacancies require the same qualifications. Job market imperfections mean that there is not perfect (costless) information about vacancies or qualifications, costless mobility, or equal job opportunities for workers with similar job qualifications.

The normal rate of unemployment at any time is not easily measured, but conceptually it can be defined as that rate which exists (given labor market imperfections and heterogeneity) when wages and other prices conform *on average* correctly with anticipations. Some firms and workers underestimate price and wage changes and some overestimate, but on average for the overall economy, prices and wages are correctly foreseen. Since the wage rate associated with vacancies at some firms will be below the rate expected by some applicants, these applicants will continue to search for higher wages.¹⁰ During the period of search, these particular applicants are unemployed, and their unemployment constitutes the normal rate of unemployment. Other applicants, however, are pleasantly surprised that the wage rate associated with a particular vacancy is higher than they anticipated. Their search time is shorter than the average associated with the normal rate of unemployment.

When nominal wages are rising faster than anticipated on average, job search time on average falls and there is "over-full" employment, that is, a fall in unemployment below the normal rate. When wages are increasing slower than anticipated on average, there is less than "full" employment, as unemployment rises above the normal rate. The normal rate itself varies with changes in the amount of frictional and structural unemployment.

Frictional Sources of Unemployment

Workers who are unemployed for short periods due to "standard" market adjustments are frictionally unemployed. Standard market adjustments refer to those situations in which workers enter the job market with little experience, quit jobs voluntarily to look for better ones, or are released from employment due to employer-employee dissatisfaction, strikes, seasonal factors, or business failures unrelated to changes in aggregate or relative demand. Frictional unemployment, characterized by a continual churning of jobs and workers, is basically institutional in that a so-

⁸These are not perfectly separable categorizations, but for expositional purposes, the generalization is useful.

⁹Since there is not a uniform wage rate at which everyone accepts employment, and market clearance in the usual sense does not occur, it is difficult to depict any sort of realistic labor market equilibrium with a static demand-supply diagram. Moreover, the equilibrium which exists at the normal rate of unemployment is dynamic and cannot be readily analyzed within the diagrammatical framework of comparative statics. The unemployment rate implied by the intersection of labor market demand and supply curves is zero, a figure not attained in an actual economy.

Holt, p. 58, uses the phrase "stochastic equilibrium" to describe the near equality between the large flows of workers into unemployment and from unemployment over any period. He points out that over the course of a year, the sum of quits and layoffs is about equal to the sum of new hires and recalls. Phelps, p. 8, discusses equilibrium in the non-Walrasian sense, that is, labor market equilibrium "in the large" which occurs despite the existence of some vacancies and some unemployment.

¹⁰The expectation of a higher wage than is offered is also a proxy for other reasons that a job seeker is not hired. For example, in the cases of both frictional and structural unemployment, the actual wage associated with a vacancy may be zero for unqualified applicants.

ciety's laws — both those of man and nature — govern its degree. The existence of frictional unemployment arises with the relaxation of only one of the assumptions made in the discussion of the zero unemployment model — labor market imperfections.¹¹

The following example illustrates the interplay of frictional sources and search and information costs in bringing about unemployment. If a worker is released from his job because of a strike in an industry which supplies his employer's firm with materials, he probably will not know whether he can get a similar job with another firm, or in another field, or with his own firm after the strike is ended. That is, he does not have perfect job market information. He is temporarily unemployed while seeking a similar job with another firm, or a different job in another field, or waiting to be called back to his old job. If he had complete information on all alternative employment opportunities, he could take the best job situation, but the absence of such information often requires costly search and/or relocation. Strikes, bad weather conditions, a jump in the number of random business failures, increased random worker entry, and worsening overall employer-employee relations lead to higher frictional unemployment and a higher normal rate of unemployment (because frictional unemployment is a major component of the normal rate of unemployment).

Such unemployment is basically a product of the institutional setting of the labor market. Changes in the institutions lead to changes in the degree of frictional unemployment. Since institutions change slowly, frictional unemployment probably does not tend to vary a great deal. If, however, there is a long-lasting change in, say, labor laws which affect the propensity to strike, or weather conditions which permanently change rainfall patterns, or communications developments which alter job information costs, there will likely be a permanent change in frictional unemployment and the normal unemployment rate. Aggregate stabilization policies could do little to alter unemployment arising from institutional sources.

Structural Sources of Unemployment

Unemployment resulting from shifts in *relative* demands for and supplies of labor is attributable to structural factors. These shifts are of sufficient magnitude to constitute a shock to the economic system, as opposed to the steady churning that marks fric-

tional unemployment. Relative demands change due to technological advances, changes in tastes, or depletion of a natural resource. Relative supplies may change with shifts in particular categories of workers (such as a large increase in sixteen-year-olds initially entering the labor force), minimum wage increases, or changes in the ability of some groups (such as unions) to alter the supply of labor in particular fields. Since the shifts in either demand or supply (and the degree of the shift) are not immediately evident to all workers, unemployment often arises as workers (and relative wages) adjust to the shift. Search costs are incurred during the period of adjustment.

Institutional factors are often responsible for shifts in labor supply much as with changes in frictional unemployment. A one-time-only change in the birth rate (which affects the size of the labor force sixteen years later) or military employment (which affects the civilian labor force, and, in turn, unemployment) gives rise to temporary changes in structural unemployment and the normal rate of unemployment. A long-lasting change in the birth rate (due to advances in birth control technology, for instance) or military requirements (due to war or threats of war) would tend to have a long-lasting influence on unemployment.

Changes in relative demand, however, are not likely to have a permanent effect on unemployment, because the affected workers eventually adjust to the demand shift. Workers who become unemployed because of a drop in the demand for their particular skill (due to, for instance, technological advances or changes in taste) may alter their skills over time. Also, a long-lasting shift in demand is likely to discourage workers from entering the field in which demand declined. By way of contrast, there is little on the supply side that sixteen-year-olds, for example, can do to enhance their employment opportunities. Moreover, workers cannot be "discouraged" from reaching the age of sixteen. Examples of the demand and supply shifts should help to illustrate unemployment caused by structural changes.

Shifts in relative demands for labor — Technological advances in the transportation industry have been accompanied by substantial shifts in the demand for particular types of transportation workers. The demand for ferryboat operators, pony express riders, and streetcar conductors has declined in the last century, while technological advances have created a demand for bus drivers, truck drivers and commercial airline pilots. In some cases, workers may be able to retain

¹¹Continuing the parallel with the zero unemployment world assumptions, structural unemployment is marked by dissimilarities among workers (labor heterogeneity), and unemployment arising from aggregate demand-related sources is attributable to incorrect anticipations of prices and wages.

jobs in their particular field by lowering their wage demands, but in other instances, jobs become unavailable regardless of the wage decline a worker is willing to accept.¹² The latter is the more likely case when workers' wages are a relatively small portion of the overall cost of providing a good or service. Large fixed (nonlabor) costs are typically characteristic of the transportation industry.

In those cases in which a worker could retain his job by accepting a wage cut, he will often prefer to look elsewhere for employment in his own field or take a job not in his primary field. He may look for a job requiring little or no skill (and accept the commensurately low pay) to obtain employment quickly and/or retrain himself in another field in order eventually to take a job paying skilled labor wages.

When a blacksmith, railroad fireman or ferryboat operator is told he must leave or accept a pay cut, he may not realize that demand for his particular occupation has fallen everywhere, not just within his own firm. It will probably take him some period of search to learn that the fall in demand is pervasive. Such unemployment is generally reduced over time as workers adapt to the changed composition of demand for their services. Hence, unemployment resulting from a change in relative demands for labor is temporary.

The effect of the changed composition in demand can also be illustrated by considering a change in tastes. If the public, through its representatives in government, decides to lower its demand for government-employed engineers and increase its demand correspondingly for government-employed school teachers (aggregate demand remaining the same), a likely result is that unemployment among engineers will rise, as will vacancies in the teaching field. The cutback in demand for engineers is reflected in both a less attractive wage and fewer hours of work required in that field. If each engineer were willing to take a wage cut¹³ and/or if each engineer-

ing firm reduced the hours of work required equally for all engineering employees, there would be no change in the number of people employed in engineering. In practice, however, the engineers will probably not realize until after some period of search that the decline in demand is not restricted to their firm alone, but is widespread. Also, the firms normally do not ask all their employees to work say, six hours, instead of eight; the firm accepts a reduced number of employees working the full eight-hour day.

Eventually, the engineers learn of the permanent decline in demand in their own field after some period of costly search, and take employment in other occupations for which they may be qualified, or retrain themselves to become, say, school teachers.¹⁴ The unemployed engineers may well have to move from their home area, particularly if government demand for engineers accounted for a sizeable portion of jobs in that area, to another location to find employment.¹⁵ After such adjustments they are once again employed.

doldrums, they may be forced to join the list of businesses that have already whittled pay checks.

Jim Hyatt, "Some Workers Accept Pay Cuts as Alternatives to Losing Their Jobs," *The Wall Street Journal* (July 23, 1971), p. 1.

¹⁴The situation of the unemployed toolmaker described in footnote 5 also provides an illustration of the case in which workers, after some period of unsuccessful search for work in their own field, switch to other occupations. With his unemployment benefits about to run out, . . . "His [Tim's] choice then may be to take a job, any job, or go on relief. He knows he will choose to work. Meantime he has applied for a job on the Trumbull police force. As a policeman he will not approach his AVCO Lycoming salary, but the respectability and security of that job appeal to him. Furthermore, he expects that the working hours will leave time for a second job." Hochstein, p. 184.

Another example is provided by the experience of recent college graduates who have had difficulty locating jobs in their field: "Most resist it, but sooner or later those [college graduates] who can't land a desired position or one even vaguely related to their field of study wind up considering something like secretarial work, driving a taxicab or waiting on tables." Gary Ronberg, "Many College Graduates Jobless After Trying for 3 Months," *St. Louis Post Dispatch* (September 7, 1971), p. 3.

¹⁵There is some question as to whether a worker who is qualified for a vacancy in an area not immediately accessible to him is frictionally or structurally unemployed. From the worker's point of view, if he must bear excessive moving costs, he is structurally unemployed since the costs of relocation make him, in effect, unqualified (or unavailable) for the vacancy. Assuming the firm would employ the worker if he were available, they would probably consider him frictionally unemployed.

Structural and frictional unemployment are not only related to each other, but also to aggregate demand-related unemployment. For example, an expansionary policy action which fosters a higher level of aggregate demand also tends to create more job vacancies in all occupations. Increases in vacancies will tend to lower structural unemployment because there will be, other things equal, more vacancies for which there are qualified job applicants.

¹²Unemployment compensation provides a partial lower limit for the wage cut a worker is likely to consider.

¹³Acceptance of a wage cut by employees may at first appear somewhat unrealistic, but workers in the recent past have taken such cuts to avoid losing their jobs.

In recent months, such diverse groups as taxi drivers in Cleveland, paper mill employees in New York, and watchmakers in Pennsylvania have taken pay cuts, some on a temporary basis. Now there's talk of wage-cutting among many of the 11,000 hourly workers at General Motors Corporation's Frigidaire Division in Dayton. It's still too early to call wage-cutting a trend. But both union officials and corporate labor experts in a number of industries concede that if the economy stays in the

Shifts in relative supplies of labor — One important way in which unemployment due to structural factors is aggravated is through limitations on the supply of qualified workers. At any time in an economy, there are workers in the labor force who are unable to obtain jobs in a particular field because of artificial barriers to entry. These workers (1) are qualified to fill a vacancy, but are kept from filling the vacancy by unions, formal lobbying groups, loosely organized associations of workers or “concerned citizens,” or (2) would be qualified to fill the vacancy if it were not for the hindrance of such groups.

Unions, for example, have some control over the size of their membership. If they were to restrict the size of their membership, they would be able to enhance the wage earning power of the current members.¹⁶ To see how the ability to restrict labor affects unemployment, take the example of a carpenter newly arrived from another country. If he is prohibited from entering the local union, and if the union controls most of the carpenter jobs (that is, determines who fills the vacancies and how many vacancies will be left temporarily unfilled), he will not be able to obtain work as a carpenter immediately. As a result, the immigrant carpenter is unemployed while he attempts to enter the union, seeks nonunion work in his own field locally or in other communities, or seeks work in other fields. With union control of vacancies being continually encountered by different workers over time, there may be at any time some unemployment attributable to union influence. Structural unemployment and the normal rate of unemployment may rise with an increase in union ability to control jobs and fall with a decline in that ability.

The prevention of blacks, women and others by any group from gaining qualifications for work through training programs may also be interpreted as giving rise to structural unemployment. If the worker were permitted to increase or upgrade his work skills, he could find more vacancies for which he would be qualified and, quite likely, reduce his unemployment search time. The costs of search underlie unemploy-

¹⁶No attempt is made here to criticize unions or any other groups. The power to control labor supply does not necessarily mean such power is inevitably exercised. We agree with the Committee for Economic Development that “Unions should be able to give adequate expression to the legitimate interests of their members. At the same time, steps must be taken to assure that they do not have excessive powers to restrict the supply of labor through such means as outdated apprenticeship requirements or racial discrimination, nor the power to place undue restrictions on productivity improvements.” Committee for Economic Development, *Further Weapons Against Inflation* (November 1970), pp. 18-19.

ment arising from frictional, structural, or aggregate demand-related sources.

Unions are not the only groups who may effectively curtail job entry. The practice of licensing job applicants to insure that qualitative standards are met is accompanied by the power to control entry. Those in charge of the licensing are often affiliated with the group in whose interest it is to limit the supply of workers. These groups may range from doctors to taxi drivers. One analyst, for example, found evidence suggesting discrimination by doctors against admitting Jews to medical schools for fear they might become price cutters.¹⁷

Besides licensing, other legal means of curbing the effective supply of workers include such laws as national and state minimum wage regulations. These laws are designed to set a floor under particular wage rates, but a side effect is a tendency to aggravate unemployment. A young, inexperienced worker entering the labor force for the first time might be able to contribute something to the value of a firm’s output, but if his contribution to the firm is not worth the minimum wage, he is not likely to be employed. The young worker may eventually find a job, but the tendency of the law is to lengthen his search time beyond what it would be without the law. That is, it is an additional factor tending to lengthen his search time, and consequently, his period of unemployment. Thus, an increase in the minimum wage (so long as it is higher than the value of the worker’s contribution to the firm) increases the normal rate of unemployment. Those most adversely affected by the minimum wage are the young, the old, the disabled, the uneducated and the disadvantaged.¹⁸

¹⁷Reuben A. Kessel, “Price Discrimination in Medicine,” *The Journal of Law and Economics* (October 1958), pp. 20-53.

¹⁸In profitable periods, firms may hire such workers to improve their image, but during cyclical downturns, these workers are often the first to be released. Milton Friedman and Yale Brozen, in “The Minimum Wage Rate — Who Really Pays? An Interview with Yale Brozen and Milton Friedman,” Free Society Association, Inc., (Washington D. C., 1966), contend that the minimum wage has a strong adverse effect on black unemployment rates. Other evidence of possible detrimental minimum wage effects on unemployment has been found by John M. Peterson, “Employment Effects of State Minimum Wages for Women: Three Historical Cases Re-examined,” *Industrial and Labor Relations Review* (April 1959), pp. 406-422; Colin D. Campbell and Rosemary G. Campbell, “State Minimum Wage Laws as a Cause of Unemployment,” *Southern Economic Journal* (April 1969), pp. 323-332; H. M. Douty, “Some Effects of the \$1.00 Minimum Wage in the United States,” *Economica* (May 1960), pp. 137-147; Arthur F. Burns, *The Management of Prosperity* (New York: Columbia University Press, 1966); and William J. Shkurti and Belton M. Fleisher, “Employment and Wage Rates in Retail Trade Subsequent to the 1961 Amendments of the

The normal rate of unemployment, in summary, tends to rise with increases in information and moving costs, unanticipated changes in tastes and technological developments, and certain shifts in the supply of labor. These factors help explain the existence of a variable normal rate of unemployment, but deviations from the normal rate itself can best be explained by changes in aggregate demand.

Deviations From the Normal Rate of Unemployment

If aggregate demand is rising at a steady rate such that wages and prices are anticipated correctly on average (some overanticipation and some underanticipation), unemployment is defined to be at its normal rate, and there exists a state of equilibrium "in the large." Policy actions which slow the rate of growth of aggregate demand, so that wages (and prices) rise less on the average than anticipated, cause unemployment to rise above the normal rate. These actions, like shifts in the relative demands for and supplies of workers, are of sufficient magnitude to constitute a shock to the economic system. Policy actions which stimulate the rate of growth of aggregate demand, so that wages (and prices) rise faster on the average than anticipated, push unemployment below the normal rate. These two cases are explored more fully below.

Unemployment Above the Normal Rate

Starting at a condition of equilibrium in the large with unemployment at the normal rate, the slowing of aggregate demand growth by, for instance, restrictive monetary actions, results in a decline in the demand for labor. Employers at first may reduce output by cutting back overtime and not filling vacancies created by normal attrition. If the slowing of aggregate demand is more than temporary, employers will have to reduce output and their wage bill by dismissing workers or possibly asking them to accept

lower wages. Because they do not have complete information on labor market conditions, many workers will seek employment at their earlier, higher wage level and will not discover for some time that overall prices and wages have fallen.

Prices may well fall relative to wages (an increase in the real wage rate) initially, because wage contracts are often of a longer-run nature than commodity prices.¹⁹ A rise in the real wage rate (a lag of wage changes after price changes) is not necessary for an increase in unemployment. All that is necessary is a lag in workers' realization of the fact that a widespread decline in the demand for labor has occurred. The costs of acquiring information about job vacancies increase for workers, since employers will have reduced their outlays, such as advertising, for recruiting new employees. Unemployment, which rises with the increased costs of information, will continue to rise until workers decide to accept employment at the new, lower money wage rate.²⁰ The workers, as a whole, revise their wage expectations downward over the period of increased unemployment less than in proportion to the actual fall in wages.²¹

Not until anticipated wage (or price) changes equal, on average, actual wage (or price) changes,

¹⁹The cyclical relation between employment and the real wage has long been of concern to economists. Keynes assumed an inverse relationship between employment and the real wage, but subsequent empirical studies provided little support for his thesis. See Ronald G. Bodkin, "Real Wages and Cyclical Variations in Employment: A Re-Examination of The Evidence," *Canadian Journal of Economics* (August 1969), pp. 353-74. Barro and Grossman synthesized the work of Patinkin and Clower to develop a macroeconomic model in which unemployment may be explained without resort to real wage movements. Robert J. Barro and Herschel I. Grossman, "A General Disequilibrium Model of Income and Employment," *The American Economic Review* (March 1971), pp. 82-93. Note that real wage changes are not an essential feature of the analysis given above, but provide a supplementary explanation of cyclical unemployment. The lag in workers' realizations of a pervasive change in aggregate demand behind the actual change is the essential feature.

²⁰The failure of workers to realize the pervasiveness of the decline in demand for their services is often interpreted to represent a "money illusion" on the part of the workers. The fall in prices will have increased their real (price-deflated) wages, but because money wages have fallen, workers will prefer to continue job search rather than initially accept the lower wages. There need be no irrationality on the part of those who continue their job search: they simply lack the complete information on which to base job search decisions. The acquisition of that information is often costly and time consuming.

²¹Some workers become discouraged enough about the wage and employment situation to drop out of the labor force and accept leisure instead. On the other hand, some members of the household who do not normally work for wages, such as housewives and students, will enter the labor force during slack periods to augment the household's income. The evidence on balance indicates that more workers are discouraged from working in a slack labor market than are encouraged to work. See Simler and Tella, pp. 32-49.

Fair Labor Standards Act," *Southern Economic Journal* (July 1968), pp. 37-48. Criticism of such studies usually has emphasized that the causes of unemployment are difficult to unravel, and that the statistical techniques employed to do so are inadequate.

The minimum wage also has the potential to aggravate inflation, since raising prices is one alternative which firms have to meeting increased labor costs. Firms may meet the rise in labor costs caused by the minimum wage—which often fosters an upward shift in the firm's whole wage structure—by reducing profits, increasing efficiency, raising the prices of their products, reducing the quantity of labor worked, or any combination of these. Firms which, for various reasons, are achieving low profits, or already are operating at peak efficiency, would have only the options of increasing unemployment or prices. The increase in prices would be permanent if validated by expansive policy actions.

will unemployment return to the normal rate. Stabilization at the normal unemployment rate will occur eventually unless monetary growth, and hence aggregate demand, not only declines but continually decelerates so that, on average, actual wages continually fall faster than expected wages.

Unemployment Below the Normal Rate

With unemployment initially at the normal rate, an increase in the rate of growth of the money stock will increase output, prices and the demand for labor. Initially, money wages rise more, on average, than anticipated, thereby providing the inducement for the unemployed to stop their search earlier than planned. The shorter average job search time is accompanied by a fall in unemployment below the normal rate. Also, search costs to workers decline as firms, recruiting more aggressively than before the increase in aggregate demand, absorb more of the search costs than previously. Prices may rise faster initially than wages (real wages decline), and many workers evaluate the new, higher money wages at the old price level.

Unemployment will remain below the normal rate until workers correctly anticipate, on average, the increases in prices and wages. With the realization that a wide-spread increase in the demand for their services has occurred, workers will become more selective in appraising job offers (to obtain the best one), average search time will rise and unemployment will rise to the normal rate. So long as the monetary expansion does not continually accelerate, workers will eventually demand money wages adequate to compensate them for the rise in prices. Real wages return to their earlier level and employers no longer find additional labor resources attractive. Growth in the demand for labor falls and unemployment returns to its normal rate.

Only if monetary growth accelerates will anticipated wages continue to increase less, on average, than actual money wages. Unemployment can be kept below the normal rate in this way, but the cost of continued monetary acceleration is the continued ac-

celeration of price rises.²² The cost of reducing job search time for a small minority of unemployed is excessive inflation for all. Job search time for such a group can be reduced by more efficient methods than monetary acceleration, as will be discussed below.

LEGISLATIVE, FISCAL AND MONETARY POLICIES TO REDUCE UNEMPLOYMENT

Legislative and allocative fiscal actions can best be used to lower the normal rate of unemployment, and monetary actions can foster a stable climate for prices consistent with a prevailing normal rate of unemployment.²³ Legislative actions which would reduce monopolistic powers of employers and unions in a world in which the costs of information are positive would tend to lower the normal rate of unemployment. Stronger legislation to eliminate job discrimination on nonprice grounds and improve the overall functioning of labor markets are examples of actions which could be taken by law-making bodies to improve the employment outlook. Legislation to mitigate the negative employment impact of the minimum wage would be particularly helpful to the young, the old, the inexperienced, and the disadvantaged.

Allocative fiscal policies could be oriented toward lowering the normal rate of unemployment by transferring government resources from a sector distantly related to employment, such as foreign aid, to direct employment assistance. One way of lowering the normal rate would be through actions designed to lower the costs of information and job transfer.²⁴ Job infor-

Level, (Manchester: Manchester University Press, 1969), p. 17; and Robert J. Gordon, "The Recent Acceleration of Inflation and Its Lessons for the Future," *Brookings Papers on Economic Activity* (1:1970), pp. 8-47.

²³Allocative fiscal actions are those designed to affect activity in a particular sector of the economy; aggregative fiscal actions are taken to influence overall activity.

²⁴Since unemployment associated with changes in aggregate demand is also ultimately related to information and mobility costs, a decline in these costs could help to lower aggregate demand-related unemployment. Under certain conditions, however, lower information costs may not lower unemployment. See Phelps, et. al., p. 18. Government-sponsored programs to provide statewide information on job vacancies are currently operational in a number of states. Not enough experience with the programs has yet been gained to assess adequately their contribution to employment assistance.

Other proposals which would have the effect of lowering the normal rate of unemployment have been introduced by the "Report of the Joint Economic Committee, Congress of the United States, on the February 1971 *Economic Report of the President*," and the Committee for Economic Development, *Further Weapons Against Inflation* (November 1970), p. 18. The Joint Economic Committee relies strongly on a proposal for a price-wage review board to maintain stable prices in the face of high employment. However, there is

²²Studies supporting the "accelerationist hypothesis" can be found in Milton Friedman, "The Role of Monetary Policy," *The American Economic Review* (March 1968), p. 10; Edmund S. Phelps, "Money Wage Dynamics and Labor Market Equilibrium," Phelps, et. al.; and Robert E. Lucas, Jr. and Leonard A. Rapping, "Price Expectations and the Phillips Curve," *American Economic Review* (June 1969), pp. 342-50. Some additional empirical evidence is provided in the final section of this paper. For an opposing view, see Robert M. Solow, *Price Expectations and the Behavior of the Price*

mation banks, training outlays and relocation subsidies could reduce the search time of workers between jobs and possibly increase the rate of growth of income because of a more efficient utilization of resources. Such policies to reduce the normal unemployment rate need not cause inflation.

Inflation, as discussed in the preceding section, results when monetary actions are taken which push the market rate of unemployment below the normal rate. Stimulative monetary policies may be appropriate when resources are underutilized and the market rate of unemployment is above the normal rate, but the temporary employment gains achieved by monetary actions when unemployment is already at the normal rate are offset by rising prices. Experience of the last two decades indicates that the use of monetary actions to reduce unemployment when it is above the normal rate runs the risk of creating inflationary pressures. First, there is not sufficient knowledge with regard to the existing level of the normal rate at any point in time, and second, stimulative monetary policies often have been carried on too long. Therefore, the proper role of monetary policy is the creation of an atmosphere of stable prices, while fiscal and legislative actions can be taken to lower the normal unemployment rate.

The normal rate of unemployment may rise in the near future unless legislative and fiscal actions are taken to counter such a tendency. In the decade of the 1970's, an increase in the supply of available labor is expected because of the increase in the population of labor force age, much of which will be attributable to young people.²⁵ Also, increases in labor force participation rates, particularly women and nonwhites, and expected reductions in military calls of draft-age males will tend to increase the civilian labor force. Attempting to lower the unemployment rate through monetary actions alone entails the risk of generating inflationary pressures.²⁶

little evidence that such income policies could exercise much long-lasting restraint on prices and wages, especially during periods of high employment. See Lloyd Ulman and Robert J. Flanagan, *Wage Restraint: A Study of Income Policies in Western Europe* (University of California Press, 1971), especially pp. 223-8.

²⁵The population of working force age 16 to 24 years old is expected to increase in the 1970's at a rate faster than during the 1945-60 period but slower than during the 1960's. The population of such young people actually declined in 1952 and 1953, when the overall unemployment rate last reached the 3 per cent level. The unemployment rate for workers aged 16 to 24 averages much higher than the overall unemployment rate. Since males between the ages of 25 and 54 are designated "primary workers," the young people are a part of the large group often termed "secondary workers."

²⁶The appropriate degree to which monetary actions may be used to reduce unemployment without aggravating inflation is primarily a function of the amount of unemployment

LIMITATIONS OF MONETARY POLICY IN THE ATTAINMENT OF THE JEC GOALS

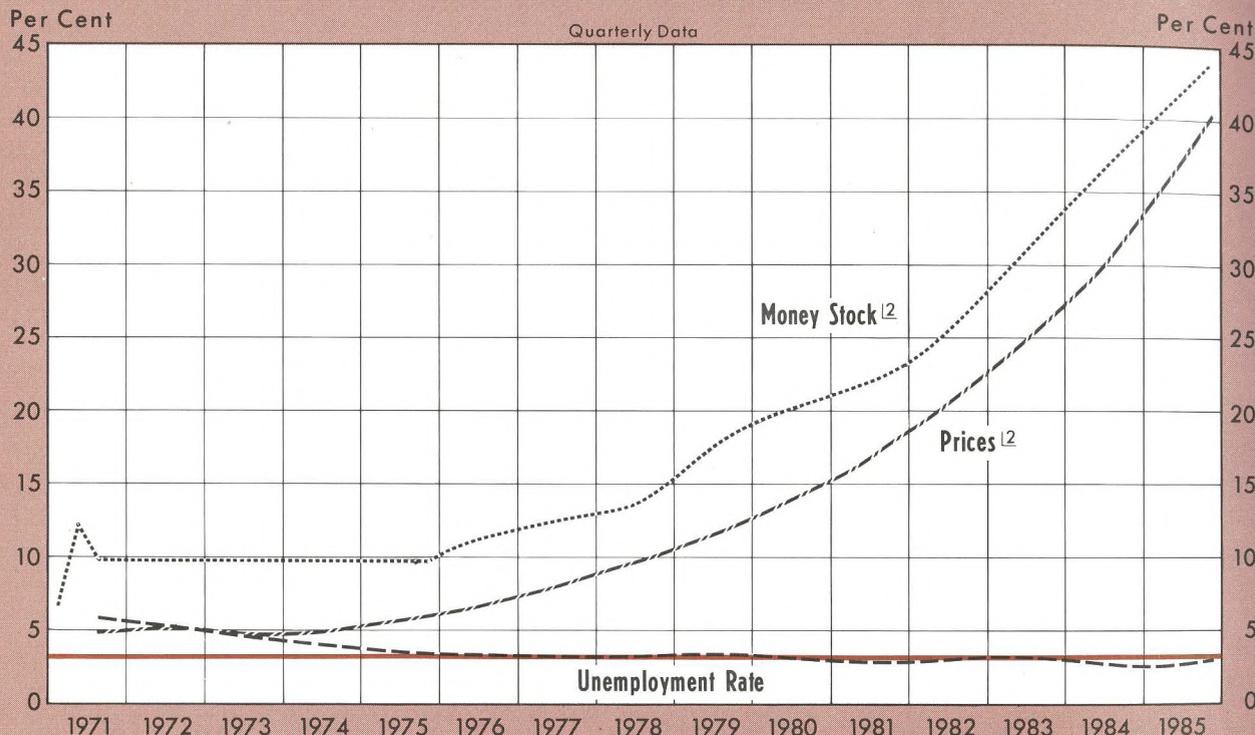
The use of legislative, allocative fiscal, and monetary policy actions working together is required to attain such ambitious goals as those advanced by the Joint Economic Committee. The fact that legislative and allocative fiscal actions to lower the normal rate of unemployment may be politically unpopular (such as actions curbing the employment influence of unions and minimum wage laws) tends to throw the burden of achieving these two admirable economic goals on monetary policies alone. In order to obtain some quantitative estimate of the implications of altering price and employment movements through monetary actions alone, it is useful to employ an econometric model which allows for the impact of monetary actions.

The econometric model of this Bank permits the manipulation of monetary variables to influence unemployment and prices. The model has been explained in full detail elsewhere.²⁷ Basically, monetary and fiscal actions (aggregative fiscal actions, not allocative) exercise an influence over prices and unemployment in the model by altering the course of total spending relative to the economy's productive potential. Changes in the rate of growth of the money stock have a positive multiplier effect on the economy, while the net effect of aggregate fiscal actions alone on total spending over time is negligible. Price anticipations are an important feature of the model, forming a part of the linkage between total spending and its division between current prices and output. Changes in actual output relative to potential output provide estimates of the unemployment rate.

traceable to aggregate demand influences. The discussion of actions to lower unemployment related to aggregate demand as opposed to unemployment fostered by frictional and structural factors finds historical precedent in the "Structural Unemployment vs. Insufficient Demand" controversy of the early 1960's. See, for example, Richard Perlman, *Labor Theory* (New York: John Wiley and Sons, Inc., 1969), pp. 167-196; and Eleanor G. Gilpatrick, *Structural Unemployment and Aggregate Demand* (The Johns Hopkins Press, 1966).

²⁷See Leonall C. Andersen and Keith M. Carlson, "A Monetarist Model for Economic Stabilization," this *Review* (April 1970), pp. 7-25; and Roger W. Spencer, "Population, The Labor Force, and Potential Output: Implications for the St. Louis Model," this *Review* (February 1971), pp. 15-23. This econometric model is basically a reduced form model in that it does not develop structurally various submarkets of the economy, such as the labor market for aggregation. Labor market imperfections can be captured by a reduced form model, however, as well as by a structural model. The model does not have the capability to capture the effect of particular legislative and fiscal actions on unemployment and prices. For example, actions to lower the costs of information to workers cannot be shown with this model, nor is it likely that such actions could be reflected adequately by other models.

Implications for Prices of Attaining and Holding Unemployment Near 3 Per Cent, 1975-85¹



¹ 2.6 to 3.4 per cent of the labor force.

² Money stock and the GNP price deflator projections are compounded annual rates of change.

Note: The above projections are based on actual data through II/1971. The money stock projection has been smoothed.

Government expenditures are estimated through II/1972 and are assumed to grow at an 8 per cent rate thereafter.

Note: The colored horizontal line represents the 3 per cent unemployment goal recommended by Joint Economic Committee (JEC) of the United States Congress. See the JEC's February 1971 Report on the Economic Report of the President, p.34.

Various monetary policy alternatives were attempted through standard simulation procedures to attain simultaneously the Joint Economic Committee's 3 per cent unemployment and 2 per cent per year price goals. These twin objectives could not be achieved at the same time over the arbitrarily selected 1971-85 period, given the current initial economic conditions. The goals, however, could be reached individually. Since unemployment considerations have been of dominant concern in this article, the attainment of a 3 per cent unemployment rate was given priority in the following simulation.

It is necessary to allow some reasonable period of time for unemployment to reach approximately 3 per cent of the labor force, because a wide gap between potential and real output exists in mid-1971. Increases in the money supply at a 10 per cent annual rate from II/1971 to IV/1975, a period of approximately four years, foster a steady decline in the unemployment rate from 6 per cent in II/1971 to 3.4 per cent

in IV/1975 (high-employment Government expenditures were estimated to II/1972 and assumed to grow at an 8 per cent rate thereafter for all simulations). "Appropriate" manipulations in the rate of growth of the money stock from 1975 to 1985 permit the model to generate unemployment rates within a narrow range (2.6 per cent to 3.4 per cent) near the employment objective for ten years. The attainment of this goal requires *accelerating* monetary growth from a 10 per cent annual rate in 1975 to a 44 per cent annual rate at the end of 1985 (see the above chart for the rates of change in the money stock).²⁸ The price level, according to the simulation, increases at a 41 per cent annual rate at the end of 1985. Accelerating monetary growth leads to accelerating inflation — a situation in which actual price rises continue to exceed

²⁸ Little significance should be attached to exact figures such as "44 per cent" for a fifteen-year simulation. The important aspect of this simulation is that accelerating monetary growth and inflation are required to maintain a 3 per cent unemployment rate.

anticipated rises — to keep the actual unemployment rate below some “normal” rate.

Other alternative simulations which take into account the JEC price goals are explored in the appendix. The price goal of 2 per cent per year is sought after varying degrees of price anticipations are permitted to develop. The results of these simulations suggest that if inflation, as well as unemployment, is deemed an important policy goal, it is far better (in terms of lost employment and output) to attack inflation as early as possible to halt its momentum and curtail inflationary expectations.

SUMMARY

The reasons for unemployment and ways to improve the unemployment situation were explored in this article through the use of an analytical framework based in large measure on the fact that costs of information and job transfer are positive. The conclusion reached is that the normal rate of unemployment can be lowered by appropriate allocative fiscal and legislative actions; monetary actions are best used to stabilize prices at the lower normal unemployment rate.

Positive costs of information and resource mobility, nonprice labor discrimination, and legal constraints on the supply of labor such as minimum wage legislation have curtailed the quantity of labor worked in the past and will, quite likely, continue to do so in the future. Moreover, expected increases in the supply of secondary workers at a rapid rate over the next decade suggest shifting the target rate of unemployment above, rather than below, 4 per cent, unless legislative and allocative fiscal actions are taken to

curtail labor market costs and restrictions.²⁹ With such legislative and fiscal actions to supplement monetary actions, a rate of unemployment below 4 per cent might be achieved and maintained without generating strong inflationary pressures.

Given current labor market conditions, it was not possible to reach simultaneously the Joint Economic Committee's twin goals of 3 per cent unemployment and 2 per cent annual rise in prices using simulations of this Bank's econometric model with alternative monetary policies. Attainment of the 3 per cent unemployment rate goal from 1975 to 1985 required accelerating monetary expansion over that period. This expansion was accompanied by accelerating inflation — a condition which implies that actual price rises continue to exceed anticipated rises — in order to keep unemployment below its “normal rate.” The inflation rate required to maintain the 3 per cent unemployment rate was so high that it is unlikely a price review board (as recommended by the Committee) or any price-wage control measure would succeed in stemming such great price pressures.

Two conclusions which emerge from the simulations of the econometric model are: (1) monetary actions must be supplemented by legislative and/or allocative fiscal measures to reach and maintain the JEC's goals of a 3 per cent rate of unemployment without excessive inflationary pressures; and (2) if inflation is permitted to develop through attempts to achieve an admirable unemployment goal such as that of the JEC, it is better to stem inflationary pressures at an early stage than later.

²⁹George L. Perry, “Changing Labor Markets and Inflation,” *Brookings Papers on Economic Activity* (3:1970), pp. 411-41, has also developed evidence consistent with this hypothesis.

APPENDIX

The aim of the following simulations of the econometric model of this Bank is to obtain some idea of the costs of stopping inflationary pressures at various stages of build-up. These costs may be measured approximately by the degree and duration of the rise in unemployment accompanying a fall in the rate of price inflation to the JEC's goal of 2 per cent per year. We may allow for the possibility that after taking actions to achieve the Committee's 3 per cent unemployment goal, the cost in terms of inflation will become sufficiently high for policymakers to alter their focus from the unemployment goal to price stability.

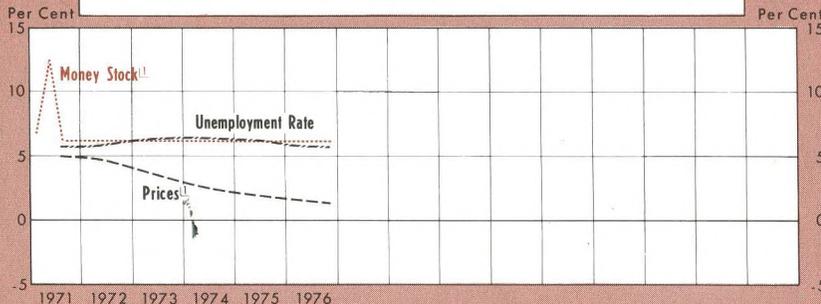
By assuming that inflation costs have become excessively burdensome by 1980 (after 5 years of 3 per cent unemployment and a peak 14 per cent rate of

inflation) to cause a shift from easy to tight money, it is possible to track the movements of the pertinent variables from 1980 to 1985, as the stabilization authorities attempt to achieve a 2 per cent annual price rise by the end of the five-year period. A deceleration in the annual growth rate of the money stock from about 19 per cent in 1980 to a negative 6 per cent in 1985 (see the lower portion of the next chart) is required to slow the advance of prices from 14 per cent in 1980 to 2 per cent in 1985 (because of lags, prices continue to rise from a 14 per cent rate in 1980 to a 16 per cent rate in 1982 before decelerating). Unemployment rises from a 3.2 per cent rate in 1980 to 16 per cent of the labor force in 1985, and real product (not shown on the chart)

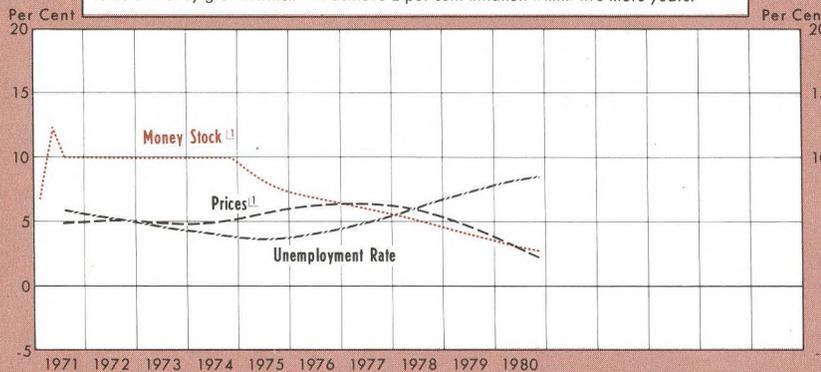
The Unemployment Costs of Subduing Inflation - Now or Later*

Quarterly Data

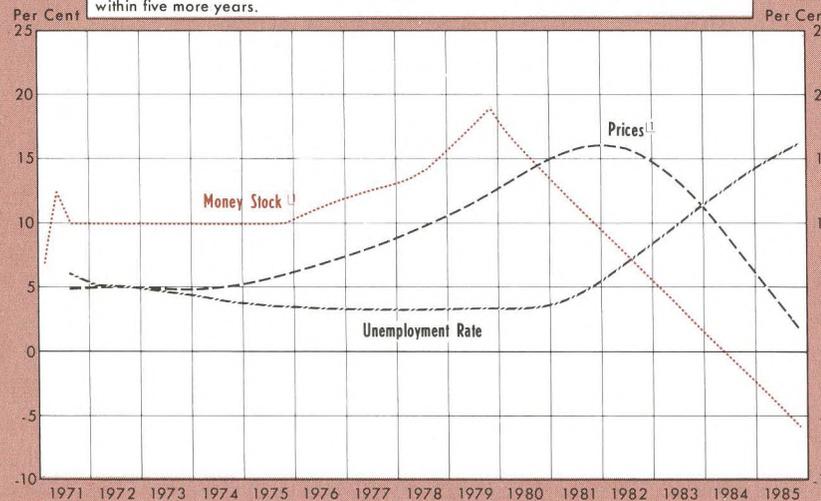
*This St. Louis Model simulation depicts rates of money growth which will reduce inflation below a 2 per cent rate over 5 years beginning in 1971.



*This simulation depicts rates of money growth which will reduce the unemployment rate below 4 per cent by 1975. Then, with inflation accelerating, the simulation illustrates the rates of money growth which will achieve 2 per cent inflation within five more years.



*This simulation depicts rates of money growth which will reduce the unemployment rate below 4 per cent by 1975, and hold it there for five years. Then, with inflation accelerating, the simulation illustrates the rate of money growth which will achieve 2 per cent inflation within five more years.



|| Money stock and the GNP price deflator projections are compounded annual rates of change.
 Note: The above projections are based on actual data through 11/1971. The money stock projection has been smoothed. Government expenditures are estimated through 11/1972 and are assumed to grow at an 8 per cent rate thereafter.

declines in every successive quarter from 1981 to 1985. The severity of such a recession has been matched in recent years only by the experience of the 1930's.

If stabilization authorities decide five years earlier to switch priority goals from unemployment to inflation, and adopt a tight money policy in 1975 (when the unemployment rate is 3.7 per cent and prices are rising at about a 6 per cent rate), it is much less costly to bring prices to the 2 per cent goal over a five-year period. The required deceleration in the rate of growth of money is from a 10 per cent rate in 1975 to a 3 per cent rate in 1980 (see the middle portion of the chart). Unemployment rises to 8 per cent (compared with 16 per cent in the previous simulation), and real output growth never drops below zero. If the money stock is increased at a 6 per cent rate beginning in the third quarter of 1971, prices fall below a 2 per cent rate by 1975 and the unemployment rate does not exceed 6.3 per cent (see the upper portion of the chart).

The clear implication of these results is that it is far better (in terms of lost employment and output) to attack inflation as early as possible in order to halt its momentum and curtail inflationary expectations.

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