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The Economy and Monetary Actions at Midyear: Review and Prospects

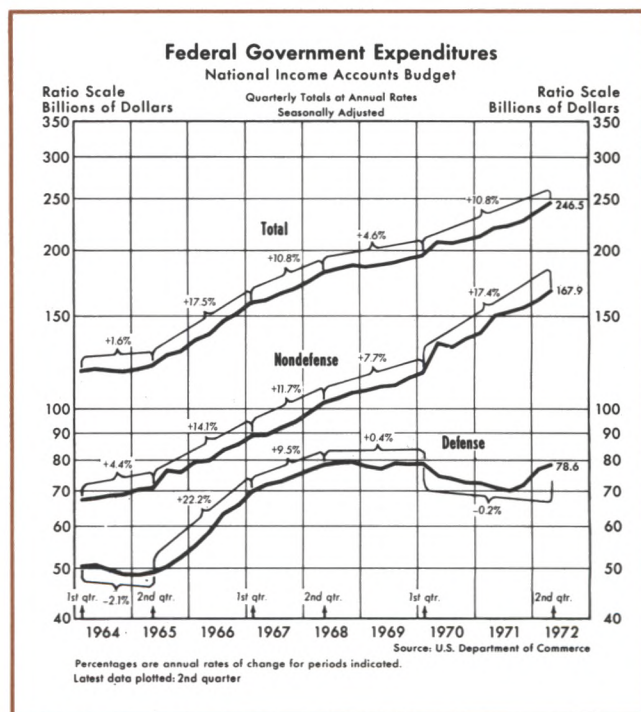
THE COUNCIL of Economic Advisers (CEA), in their Annual Report of last January, projected a rapid advance in GNP for 1972. Real product growth was expected to be strong, and the rate of inflation was projected to decline significantly by the end of the year. This article examines the CEA's projections for 1972 in light of economic developments in the first two quarters. The factors relevant to an assessment of economic prospects in 1973 are also discussed.

Recent Economic Developments

Total spending (GNP) has advanced rapidly since late 1971, largely in response to stimulative monetary and fiscal actions in 1971. Growth in the money stock has been uneven for the last 6 quarters, but has averaged a 6.6 percent annual rate since early 1971. In comparison, money increased at a 4.5 percent rate from early 1969 to early 1971. Fiscal actions have also been expansionary, with Federal expenditures rising at a 12.6 percent rate since first quarter 1971, substantially faster than the 6.8 percent rate of increase in the previous two years.

A significant portion of the recent advance in GNP has been manifested in real product growth, with the associated rate of price inflation being moderate. Real product growth accelerated to a 7.5 percent annual rate from third quarter 1971 to second quarter 1972, more than triple the 2.2 percent increase in the previous year. The rate of inflation, as measured by the GNP price deflator, rose at a 2.8 percent rate from mid-1971 to second quarter 1972, compared to a 4.9 percent increase in the preceding year.

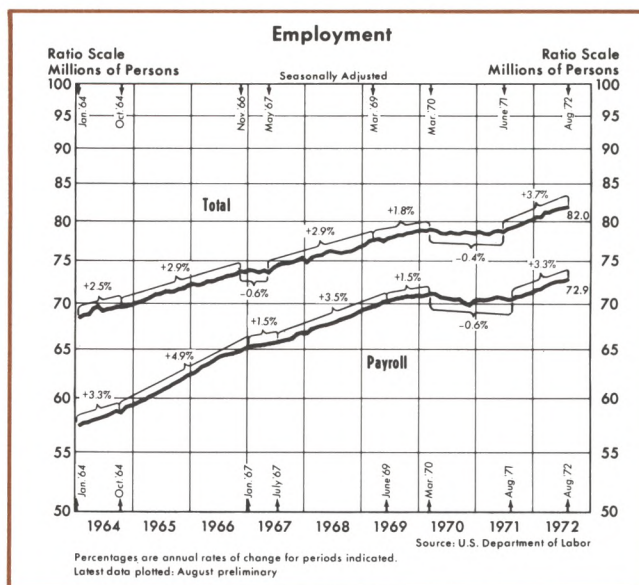
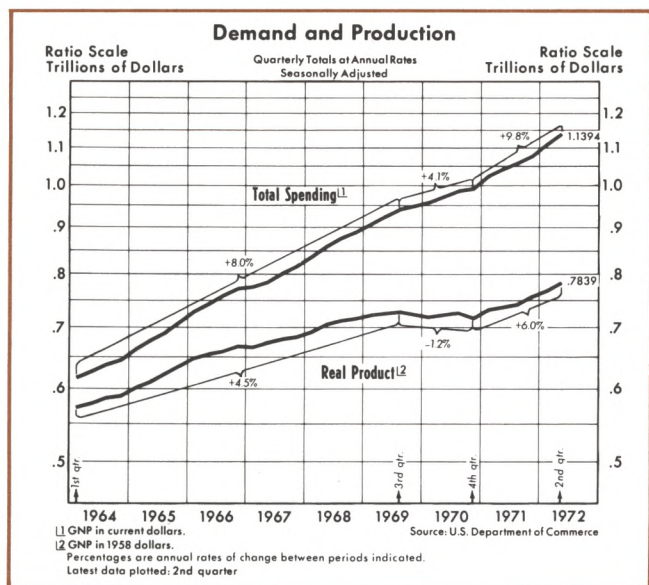
The rapid rise of real product has fostered a strong advance in employment. Payroll employment has increased at a 3.4 percent annual rate since last fall, compared to a 1.1 percent rise in the previous year



and a trend rate of growth of 2.1 percent from 1957 to 1971. The relative strength of these employment gains is noteworthy since the population of working force age is estimated to be growing at about a 1.7 percent annual rate. Total employment in July was 64.3 percent of the population of labor force age, the highest proportion in more than two years.

CEA Projection for 1972

The Council of Economic Advisers projected an increase in GNP from 1971 to 1972 of 9.5 percent, or 10.8 percent when translated into an increase for the year ending fourth quarter 1972. The advance in GNP from 1971 to 1972 was projected to consist of a 3 to



3.5 percent increase in prices and about a 6 percent rise in real product. The rapid advance in real product was expected to yield an unemployment rate of about 5 percent by the end of 1972.

Given developments through the second quarter, the accompanying table shows the magnitudes in the second half of the year which would be consistent with the Administration's goals. Substantial progress was made in the first half of the year toward realizing the CEA goals for the year 1972. Moderated growth of both GNP and real product in the final six months of the year, and continuation of price increases at about the average rate of the past two quarters would be consistent with attainment of the CEA goals.

since late 1971, with money increasing at a 7 percent annual rate from fourth quarter 1971 to second quarter 1972 (see chart on p. 4). Given the assumption of 6 to 8 percent money growth, the CEA's projections of GNP implied an increase in the velocity of money (the ratio of GNP to the money stock) from fourth quarter 1971 to fourth quarter 1972 of between 4.5 and 2.6 percent.

The velocity of money increased at a 4.4 percent annual rate from fourth quarter 1971 to second quarter 1972, compared to a 1.4 percent average rate in the previous three years. Given an increase in money at a 6 percent rate from second to fourth quarter 1972, growth of total spending consistent with the administration's target would imply growth of velocity at a 3.7 percent rate in the second half of the year. This velocity projection translates into a 4 percent increase for the four-quarter period ending late this year. An increase of 4 percent would represent the most rapid advance of velocity for a four-quarter period since 1966.

Outlook for 1973

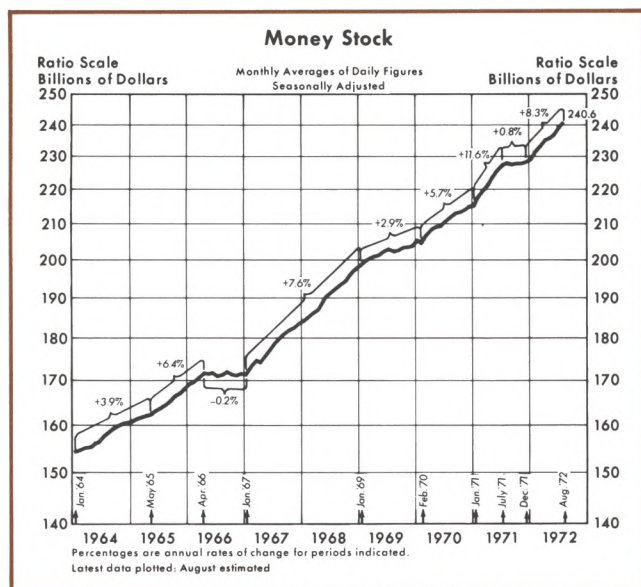
The influence of monetary and fiscal actions on economic activity is largely determined for the rest of 1972 due to the usual delayed response of the economy to aggregative stabilization policy actions taken earlier. To say that such influence is "determined" is not to say that it is known with certainty. Even knowing the path of monetary and fiscal actions up to the present does not mean that the impact of these actions can be assessed with great accuracy. Despite this uncertainty about the remainder of 1972, but because of the lag in

Table I
CEA ECONOMIC PLAN AT MIDYEAR
(Annual Rates of Change)

	CEA Projection IV/1971 to IV/1972*	Realized IV/1971 to II/1972	Projected II/1972 to IV/1972**
Total Spending (GNP)	10.8%	11.7%	9.9%
Real Product	7.2	7.9	6.4
Prices	3.4	3.5	3.3

*Estimated by this Bank.
**Projected to be consistent with the CEA projection of January 1972.

Assumptions about the course of monetary actions in 1972 were not made explicit in the January CEA Report, but a 6 to 8 percent rate of money growth may have been considered an acceptable range at that time. Monetary actions, as measured by growth of the money stock, have averaged within this range



the effects of monetary and fiscal actions, such actions should be designed with an eye toward achievement of economic goals in 1973. Consequently, assessing economic prospects in 1973 takes more the form of a set of goals rather than a forecast. The chief questions to be asked presently concern the feasibility and desirability of such goals.

Some alternative target paths for the economy in 1973 are discussed below. These paths are stated in terms of movements of total spending, prices, and output. These alternative target paths are examined in terms of their feasibility and their implications for monetary growth. The velocity of money is also considered in the examination of these alternatives.

Continued rapid real growth in 1973 — First, consider the possibility of sustaining nominal and real growth at rates that appear to be prevailing in 1972. Continuation of GNP growth within the 9 to 11 percent range through 1973 would represent the highest growth rate for any successive two-year period since 1950-52.

Leaving aside for a moment the means of sustaining this very rapid growth in GNP, what might be the implications for real growth and prices if this rapid increase in GNP were realized? Real product growth of 5 to 7 percent through 1973 would represent the longest period of such sustained rapid growth since the large build-up phase of the Vietnam War in 1964-66. Current rapid real growth has been possible because of the substantial slack that exists in the economy as a result of the slowdown in economic activity from late 1969 to mid-1971.

Strong real output growth is consistent with a steady lowering of the unemployment rate. However, if real output growth beyond a 4 to 5 percent rate is still sought after full employment is approached, inflationary pressures could reappear. Since there is substantial uncertainty concerning the lags between monetary and fiscal actions and real output, considerable care must be exercised to avoid over-stimulating the economy as it approaches full employment.

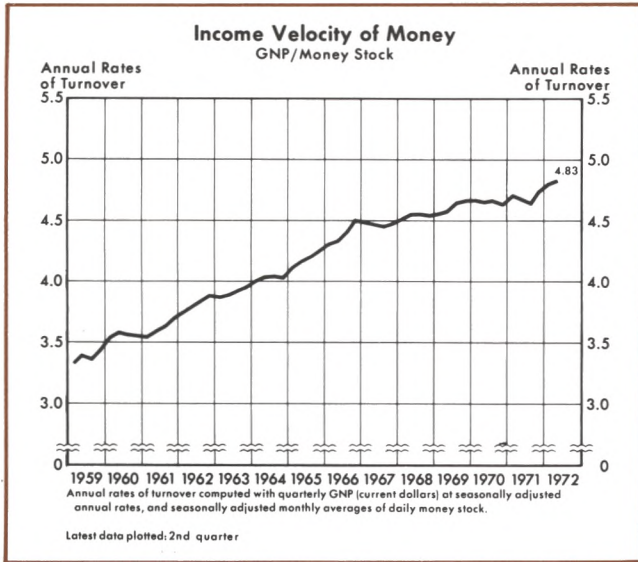
Slowing of nominal and real growth in 1973 — An alternative path would be one of slowing from the rapid 9 to 11 percent nominal growth and the 5 to 7 percent real growth. If it is decided that nominal and real growth should be slowed in 1973, implying more attention to the avoidance of possible inflationary pressures and less attention to promoting high real output growth, what course of monetary actions would be consistent with those objectives?

On the assumption that a 7 percent growth path of GNP for 1973 is deemed consistent with continued slowing of price inflation, and yet is consistent with real growth in the 4 to 5 percent range, it is necessary to consider assumptions about the growth of money and the velocity of circulation. A 7 percent growth path for GNP, when considered along with a slowing in the velocity of money to a 2 percent rate from the recent accelerated rate of about 4 percent, implies monetary growth of 5 percent.

Alternatively, given a 7 percent GNP target, if velocity is assumed to grow faster than 2 percent, required money growth would then be less than 5 percent. Clearly, once goals for GNP are selected, some information has to be brought to bear on the most reasonable assumption about the course of money velocity before a path of monetary growth can be chosen.

Velocity Considerations

Any assessment of the appropriate course for monetary policy in coming quarters requires some assumptions about the future trend of velocity. As illustrated in the accompanying chart, the direction of velocity movements over the business cycle is quite predictable, tending to slow before and during recessions, then accelerate sharply in the early stages of recovery. In the latter stages of recovery, velocity slows somewhat relative to its movement in the early stages. Less predictable, however, are the apparent changes in the trend growth of velocity. Secular trends in velocity are usually considered to be the result of institutional and technical factors relating to the structure of the economic and financial system, and by definition tend to change slowly over time.



Designing the course of monetary policy in coming quarters requires a determination of whether or not the recent acceleration of velocity is cyclical or is indicative of a change in trend. At this time, little firm evidence is available to make a strong case for either alternative. If the recent acceleration of velocity proves transitory, and velocity returns to about the 1 to 2 percent trend rate of 1966 to 1970, monetary growth of 5 to 6 percent would be consistent with a 7 percent advance in GNP for 1973. On the other hand, if velocity resumes its 1953-66 trend rate of about 3.5 percent, required growth of the money stock would be only about 3.5 percent.

Conclusion

The economy has surged forward thus far in 1972, and preliminary indications are that this momentum will carry through the remainder of the year. It now

appears very likely that the CEA plan for 1972 will be realized. Achievement of the CEA's 1972 goals is possible even with some slowing in GNP and real product growth in the second half of the year.

At this time, it is necessary for stabilization authorities to determine a course of action with an eye toward economic goals in 1973 and beyond. Continued real growth at 1972 rates would be accompanied by continued employment gains, but this course must be viewed in light of the inflationary pressures which could emerge as the economy nears the full employment level of activity.

A path of slower growth in GNP would more likely be consistent with the avoidance of renewed inflationary pressure. Monetary actions consistent with the achievement of this somewhat slower growth requires some assessment of the most likely course for the velocity of money. A desire for slower growth in GNP, and an assumption of continued growth in velocity at the 3.5 to 4 percent rate of recent quarters, would imply required monetary growth of about 3.5 percent. A slowdown of velocity growth, on the other hand, would imply required monetary expansion of about 5 to 6 percent, if a 7 percent GNP goal was sought.

The experience of the early recovery periods following a number of postwar recessions suggests velocity increases in excess of 3 percent for a sustained period can occur under current economic conditions. If this is the case, a slower rate of money growth than the 7 percent experienced over the past few quarters could be accompanied by progress toward both full employment and price stability. The more rapid the increases in velocity, the more monetary growth could be moderated to achieve these goals.



Trends and Fluctuations in Monetary Growth

Question — Is a 6 percent rate of growth in the money stock *stimulative*?

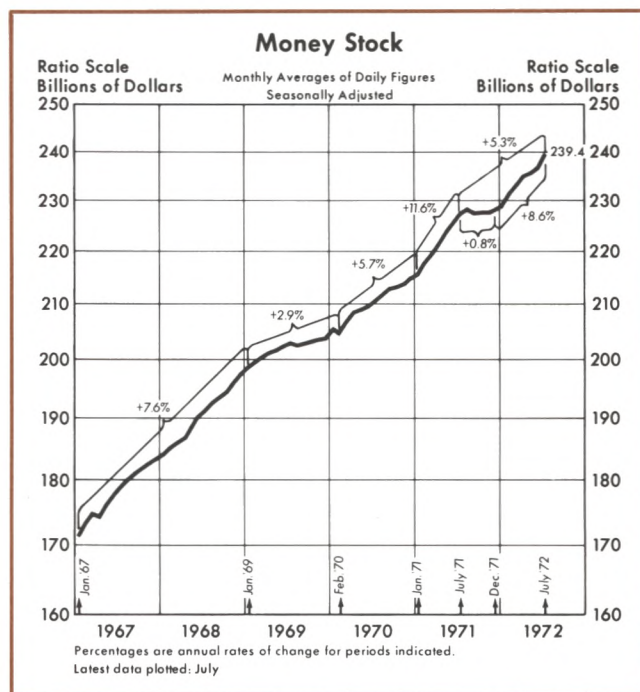
Reply — Not enough information has been supplied to answer with an unqualified yes or no. The information necessary for judging the aggregative effects of a certain growth rate in the money supply is outlined below. The main points are as follows: sustained *trends* in monetary growth tend to be associated with trends in the rate of inflation; substantial *deviations* of monetary growth from its trend tend to be reflected in fluctuations of production and employment.

Essential Information

Duration — An essential piece of information necessary to determine the effect of a certain growth rate of money is the time span over which this growth rate has been experienced, that is, the *duration* of the given growth rate. Monetary analysts generally agree that the growth rate of money for a single month, or even one quarter, does not accurately indicate the degree of monetary stimulus on aggregate economic activity. However, once a certain growth rate has been sustained for at least two consecutive quarters, many analysts consider this observation to be useful information for drawing general implications for the course of economic activity in subsequent quarters.

For example, from June to July 1972 the narrowly defined money stock rose at a 15 percent compounded annual rate. Based on that observation alone, not enough information is available to form an assessment about whether that given growth rate is stimulative or restrictive.

When this observation is taken in combination with the additional knowledge that the growth rate of the money stock for the 12 months ending July 1972 was 5.3 percent, one can make a conditional statement: if the jump in July was a temporary occurrence, a longer-term trend, such as the 5.3 percent growth, is a more reliable indicator of monetary tightness or ease. If, on the other hand, the 15 percent growth rate were to be sustained for several months, it would represent a significant deviation from the prior trend and therefore would have an impact on future economic activity. Even though the magnitude and the time pattern of the impact are not known with certainty, the direction of influence can be ascertained reliably.



Initial conditions — Another piece of information that is required to make a statement about the degree and probable consequences of monetary tightness or ease is the nature of conditions which prevail at the time of the change in the growth rate. These initial conditions encompass the state of economic activity as a result of previous monetary actions as well as other factors. In other words, the analyst must answer the question — what is the prevailing stage in the process of adjustment of prices, output, and employment to all previous monetary injections or withdrawals and to all other factors which influence aggregate economic activity? The prevailing economic conditions may be such that the influence of a given growth rate of money at that point may be swamped, for a period of time, by the force of previous actions.

The answer to a question regarding the stimulus or restraint implied by a change in the growth rate of the money stock involves a separation of the influence of changes in the money stock on the various aggregate measures of the state of the economy. For instance, it is quite possible for a certain growth rate of money, such as 6 percent per year, to be consistent in the short run with rising prices and declining output and employment.

Fluctuations in Money Growth — The Short-Run Impact

For illustration of these points relating to the effects of achieving a given rate of monetary growth, assume that the 6 percent growth rate of money marks a slowing from a prevailing higher trend rate. Historical evidence suggests that, for several quarters following the initial slowing of money, the rate of growth of real production would tend to slow from what it had been and the rate of unemployment would rise. At the same time, however, the rate of price increase would tend to reflect for some time the prior rate of money growth.

Past experience regarding the relation between accelerations and decelerations in monetary growth on the one hand, and fluctuations in both the level of unemployment and the rate of real product growth on the other, is illustrated in the chart entitled "Fluctuations of Money Stock and Economic Activity," p. 8 of this article. The top line in the chart shows the percentage change of money stock in each quarter compared to the corresponding quarter a year earlier for the period 1952 through mid-1972. The second line from the top shows the corresponding percentage changes in real product growth, and the third line — output per person — provides an alternative measure of real aggregate production. The lower line is the measured rate of unemployment. The vertical shaded areas indicate periods of recession as determined by the National Bureau of Economic Research.¹

The patterns in these series show that in most cases the peaks in the rates of growth of real output coincided with, or followed only one or two quarters after, the peaks in the rate of growth of the money supply. There were no instances when the growth of output continued to rise throughout an interval in which the rate of monetary growth contracted. Furthermore, there were no instances in which an accelerating growth in money was not accompanied or followed by a rising rate of production.

The analyst will not find on this chart, nor should he seek, a consistent lead or lag between monetary growth and real economic growth. The effect on output of accelerations and decelerations of money can vary from time to time, depending on the stage of adjustment of the economy to previous monetary shocks. Initial conditions may change and thereby influence the timing of the observed response of output changes to monetary actions. Despite the shortcomings of the

chart as a tool for analysis, it serves as a useful device for illustrating relationships which are consistent with those derived in more detailed studies.

Trends in Money Growth — The Long-Run Impact

The historical relationships between trends in money growth and trends in inflation are illustrated in the chart entitled "Monetary Growth and Prices," p. 9. As is always the case, but is also always worth re-emphasizing, an observed relationship does not necessarily imply causality. However, both the U.S. and foreign experience² are consistent with the proposition that in the long run the *trend* rate of growth of the money supply is the dominant determinant of the *trend* rate of growth of prices.³

The U.S. experience in the past twenty years consists of at least three periods marked by sustained increases in the trend rates of growth of the money stock. The behavior of prices has followed, with a lag of two or more years, a very similar pattern. The chart shows the most recent trend growth of money to have begun at the end of 1966 and continued through the second quarter of 1972. This choice of beginning and ending points shows an *average* annual rate of growth in money of 6 percent in the past five and one-half years. However, it should be remembered that, as with the other basic trend periods indicated on the chart, this period is characterized by several shorter periods of deviations from the underlying trend shown, some of much slower growth in money, and some of much more rapid growth.

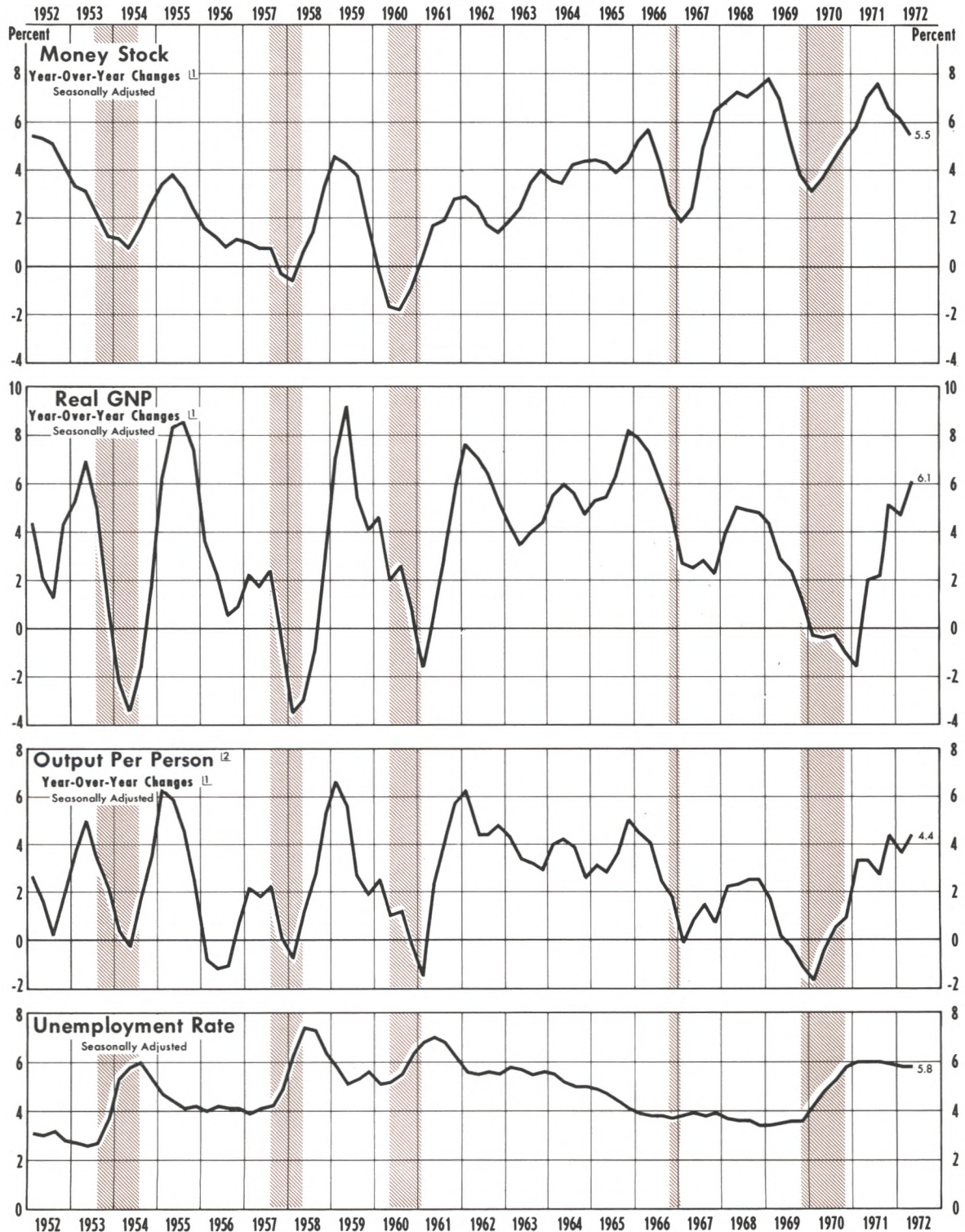
By reference to the accompanying table, one can observe the quarter-by-quarter pattern of monetary growth during the period by looking at the diagonal of this "rate-of-change triangle". Also, alternative breaking points within the past five and one-half

²See the accompanying article entitled "Production, Prices, and Money in Four Industrial Countries," this issue of the *Review*, pp. 11-15. Also see Michele Fratianni, "The Italian Case," and Manfred Neumann, "The German Case," in Karl Brunner et al., "The Monetary Fiscal Approach to Inflation: A Multi-Country Study" (paper presented at the Conference on Secular Inflation, National Bureau of Economic Research, November 5-6, 1971).

³See Leonall C. Andersen and Denis S. Karnosky, "The Appropriate Time Frame for Controlling Monetary Aggregates: the St. Louis Evidence" (paper presented at the Federal Reserve Bank of Boston Conference on "Controlling Monetary Aggregate II: The Implementation," Melvin Village, New Hampshire, September 8, 1972); Milton Friedman, *The Optimum Quantity of Money and Other Essays* (Chicago: Aldine Publishing Company, 1969); Irving Fisher, *The Purchasing Power of Money* (New York: Augustus M. Kelley, 1963); and Knut Wicksell, *Interest and Prices* (New York: Augustus M. Kelley, 1962).

¹The first quarter of 1967, the so-called "mini-recession," is also shaded, even though it was not declared an "official" recession.

Fluctuations of Money Stock and Economic Activity

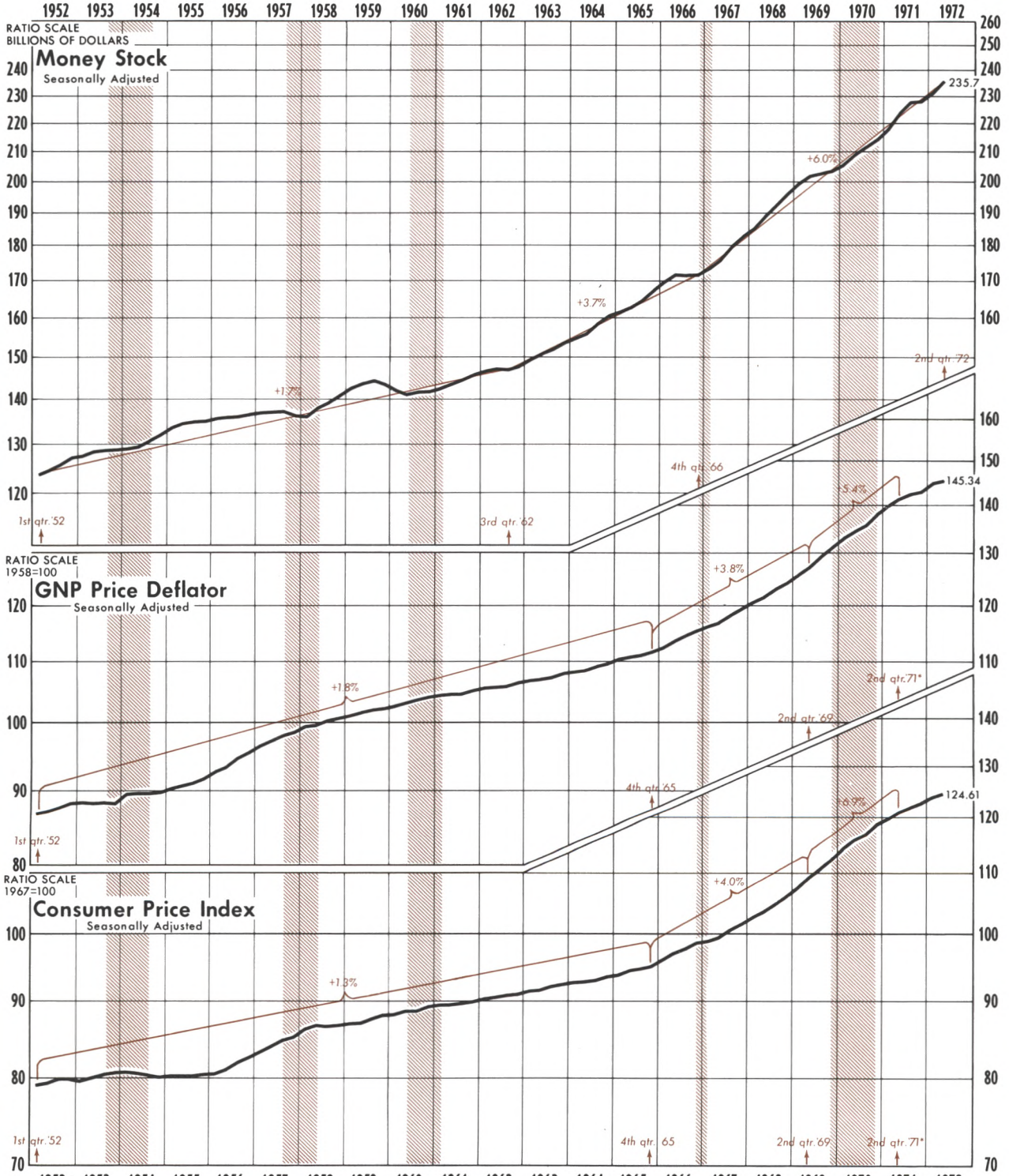


The shaded areas shown in 1953-54, 1957-58, 1960-61, and 1969-70 represent periods of business recessions as defined by the National Bureau of Economic Research. The shaded area in 1966-67 represents an "unofficial mini-recession".

1 Rates of change for corresponding quarters.

2 Total private economy; total output divided by the number of persons employed.
Latest data plotted: 2nd quarter

Monetary Growth and Prices



The shaded areas shown in 1953-54, 1957-58, 1960-61, and 1969-70 represent periods of business recessions as defined by the National Bureau of Economic Research. The shaded area in 1966-67 represents an "unofficial mini-recession".
 *Wage-price control program began in III/1971.
 Latest data plotted: 2nd quarter

TERMINAL QUARTER	MONEY STOCK*																	BILLIONS OF DOLLARS					
	COMPOUNDED ANNUAL RATES OF CHANGE																						
	INITIAL QUARTER																						
	4-66	1-67	2-67	3-67	4-67	1-68	2-68	3-68	4-68	1-69	2-69	3-69	4-69	1-70	2-70	3-70	4-70	1-71	2-71	3-71	4-71	1-72	
1-67	4.0																						173.1
2-67	5.1	6.1																					175.7
3-67	6.6	7.9	9.7																				179.8
4-67	6.4	7.2	7.8	5.9																			182.4
1-68	6.3	6.8	7.0	5.8	5.6																		184.9
2-68	6.5	7.0	7.2	6.4	6.7	7.8																	188.4
3-68	6.8	7.3	7.5	7.0	7.4	8.3	8.8																192.4
4-68	6.9	7.3	7.5	7.1	7.4	8.0	8.1	7.5															195.9
1-69	7.0	7.3	7.5	7.1	7.4	7.8	7.9	7.4	7.3														199.4
2-69	6.7	7.0	7.1	6.7	6.9	7.1	7.0	6.4	5.8	4.3													201.5
3-69	6.3	6.5	6.6	6.2	6.2	6.3	6.0	5.4	4.7	3.3	2.4												202.7
4-69	5.9	6.1	6.1	5.7	5.6	5.6	5.3	4.6	3.9	2.8	2.0	1.6											203.5
1-70	5.8	5.9	5.9	5.5	5.5	5.4	5.1	4.5	3.9	3.1	2.7	2.9	4.2										205.6
2-70	5.8	6.0	5.9	5.6	5.6	5.6	5.3	4.8	4.4	3.8	3.7	4.1	5.4	6.6									208.9
3-70	5.8	5.9	5.9	5.6	5.5	5.5	5.3	4.9	4.5	4.0	4.0	4.4	5.3	5.9	5.3								211.6
4-70	5.7	5.8	5.8	5.5	5.4	5.4	5.2	4.8	4.5	4.1	4.0	4.4	5.1	5.4	4.7	4.2							213.8
1-71	5.8	5.9	5.9	5.6	5.6	5.6	5.4	5.0	4.8	4.5	4.5	4.8	5.5	5.8	5.6	5.8	7.3						217.6
2-71	6.1	6.2	6.2	6.0	6.0	6.0	6.0	5.9	5.6	5.4	5.2	5.3	5.7	6.4	6.9	7.0	7.6	9.3	11.3				223.5
3-71	6.2	6.3	6.3	6.1	6.1	6.1	6.0	5.8	5.6	5.5	5.6	6.0	6.6	7.0	7.1	7.6	8.8	9.5	7.7				227.7
4-71	5.9	6.0	6.0	5.7	5.7	5.7	5.6	5.3	5.2	5.0	5.0	5.3	5.8	6.1	6.0	6.1	6.6	6.4	4.0	0.4			227.9
1-72	5.9	6.0	5.9	5.7	5.7	5.7	5.6	5.4	5.2	5.1	5.1	5.4	5.8	6.0	6.0	6.1	6.5	6.2	4.6	3.1	5.9		231.2
2-72	6.0	6.1	6.1	5.9	5.9	5.9	5.8	5.6	5.4	5.3	5.4	5.6	6.1	6.3	6.2	6.4	6.7	6.6	5.5	4.7	7.0	8.0	235.7
	4-66	1-67	2-67	3-67	4-67	1-68	2-68	3-68	4-68	1-69	2-69	3-69	4-69	1-70	2-70	3-70	4-70	1-71	2-71	3-71	4-71	1-72	

*QUARTERLY AVERAGES OF MONTHLY DATA

year period may be selected. For example, the growth of money from IV/1966 to IV/1970 was at a 5.7 percent rate, and from IV/1970 to II/1972 the growth of money was at a 6.7 percent rate.

While analysts may disagree as to the choice of the exact periods, the charts clearly show an increase in the *trend* rate of growth of the money stock over the past five to seven years. Previous experience suggests that this tendency will eventually be reflected in an upward trend in prices.

Conclusion

An answer to the original question of whether a certain growth rate of the money stock is stimulative is not possible without answering further questions. First, is that growth rate temporary or sustained? Second, what are the initial conditions? An increase in the rate of growth has little stimulative effect on total spending, prices, or output unless it is sustained for at least two quarters. If the new growth rate of money is sustained, the short-run effect on total spending, prices, and output depends on the initial conditions.

Given that a particular growth in money is sustained, past experience suggests the following. First, there will likely be a stimulative effect on total spend-

ing if the sustained money growth rate is more rapid than the previous trend growth rate of money and is greater than the normal variation about that trend. Second, the observed short-run effect on prices and real output growth is strongly influenced by prevailing economic conditions, that is, the current level of capacity utilization, price anticipations, the level of employment, and other factors. If there is "slack" in the economy and price anticipations are low, as in the early 1960s, increases in total spending induced by monetary actions will be reflected primarily in a step-up in real output growth in the short run. If employment, capacity utilization, and price anticipations are high, as in the late 1960s, total spending increases will be manifested less in output growth and more in price increases.

In general, the short-run response of real output growth to changes in the rate of growth of the money stock tends to be greater than the response of prices. However, a change in the *trend* rate of growth of money will eventually produce a corresponding change in the rate of increase in the price level. According to this analysis, reducing the rate of increase of prices from the rate fostered by an accelerated growth of money for an extended period subsequently could involve substantial costs in terms of reduced real output growth.

Production, Prices, and Money in Four Industrial Countries

THERE has been a curious and, from the point of view of the affected countries, an unfortunate uniformity in the economic performance of the major industrial countries of the world over the last few years. These countries have experienced the coincidence of simultaneously accelerating prices and rising unemployment. Starting in late 1970 or early 1971, many of the major industrial countries of the world experienced a uniform slowdown in output, with its adverse effects on the level of unemployment. At the same time, inflation in these countries had generally accelerated. The word "stagflation" has been coined to describe this state of affairs. Fortunately, most of these countries have experienced a recovery in real output growth in the first half of 1972.

Emergence of Stagflation

Real output growth in four of the largest industrial countries (which are also important trading partners of the United States) is illustrated in the chart on p. 14 of this article. For each country (France, Germany, Japan, and the United Kingdom) industrial production exhibited little or no growth in the year-and-a-half ending December 1971. Even the remarkable Japanese economy's growth of industrial output was under 5 percent during this period, in contrast to its more typical post-war growth rate in excess of 15 percent.

While output and employment were stagnant or growing at sharply reduced rates, inflation in these countries had gradually accelerated. In most of the countries, inflation was significantly higher in the last two to three years than in previous years when the rate of growth in output was much closer to capacity levels. Thus, not only did these countries suffer from stagnant output and rising prices, but previously when

output was growing close to capacity rates, price increases were actually less.

Alternative Explanations of Stagflation

What explains this state of affairs? Some commentators have alleged that the classical laws of economics no longer apply in an affluent and alienated society; we have entered an era of permanent inflation relating to a breakdown in the ordering of society. This is reflected in the excessive wage demands of labor, irrespective of the consequences for output and the employment opportunities of recent entrants into the labor force. This pessimistic view of events would assert that we are observing the economic consequences of a basically social phenomenon.

There is an economic explanation, however, which is consistent with the observed facts. This economic explanation, almost classical in its simplicity, has recently been restated and strengthened based on U.S. experience. This approach rests on two propositions about economic relationships: (1) the long-run rate of growth in the money stock is a major determinant of the *long-run* rate of inflation; (2) fluctuations in the rate of growth of money will, in the *short run*, lead to similar fluctuations in the growth of real output. In other words, monetary influences, as measured by rates of change in the money stock, have a major impact in the short run on the level of real economic activity, and in the long run on the rate of inflation.

Evidence on the central role of monetary influences on economic activity is supported not only by U.S. data, but also by data from other industrial countries, including those countries considered in this note. It is not our purpose to reproduce the detailed theoretical structure and empirical evidence which has been de-

Table I

Money Stock Growth (Annual Rates of Change)				Price Increases (Annual Rates of Change)			
Country	Length of Period	Current Period	Previous Period	Country	Length of Period	Current Period	Previous Period
France	(3 years)	6%	7%	France	(2½ years)	5.6%	5.6%
Germany	(4 years)	11	6	Germany	(2½ years)	5.2	2.3
Japan	(3 years)	22	14	Japan	(3 years)	6.8	5.0
United Kingdom	(3 years)	12	3	United Kingdom	(2½ years)	8.2	5.3

veloped to support these propositions. Such support can be found elsewhere, including previous issues of this *Review*.¹

The evidence considered here is presented in the form of charts and tables rather than with the use of more formal and sophisticated statistical procedures. As such, it is limited to comparing the relationships between money and prices, and money and output, without consideration of the important initial conditions in each country which can affect both the time lag and the magnitude of the relationship. In spite of the simplicity of the procedure, the results are strongly suggestive of the validity of the propositions.

Money and Prices

We will first consider the relation between money and prices. Table I shows the average annual rate of growth in the money stock for the four countries through the first half of 1972. With the exception of France, the average growth rate in the money supply in the last three or four years has been at a significantly higher rate than in the previous time period of equal length.²

The table also shows for each country the average inflation rate in the current two- to three-year period versus the previous time period of the same length. Except for France, each country has experienced a significant acceleration in inflation.

In each country the changes in inflation have been in the same direction as changes in the growth of

money. In three countries (Germany, Japan and the United Kingdom) the trend growth rates in money and prices have increased substantially. In one country (France) the trend growth rates in money and prices have remained substantially unchanged between the two periods; the trend growth of money declined slightly while prices increased at a constant 5.6 percent rate. However, this is as strong a confirmation of the relation between money and prices as when the trend growth in money is significantly changed. When the trend growth in money remains stable over time, the trend growth in prices exhibits a very similar pattern.

The relation shown in the table is consistent with the view that the effects of a change in money on prices is distributed over a period of time. The nature of the lag depends upon the unique economic conditions in each country — the history of past inflation, the amount of excess capacity, and the degree and forms of competition in the labor and commodity markets.

Given this uncertainty about the length of the lags, the most that can be said is that a change in the trend growth of money in the last three to four years can be associated with a change in the trend growth of prices in the last two to three years. Because of differences in economic and social structures in each country, the exact length of the time lag between money and prices can be different for each country.

As the link between money and prices is postulated to hold mainly in the long run, one should observe an even clearer relationship with longer time periods than those used in Table I. To confirm this, the relationship between money and prices was compared for the period from the early 1950s to 1970 for all the countries in this Bank's "Ten Industrial Countries" release.³

For each country two time periods are reported. The periods were determined on the basis of signifi-

¹See Leonall C. Andersen and Jerry L. Jordan, "Monetary and Fiscal Actions: A Test of Their Relative Importance in Economic Stabilization," this *Review* (November 1968); Milton Friedman and Anna Schwartz, "A Monetary History of the United States 1867-1960" (Princeton, New Jersey: Princeton University Press, 1963), and *Monetary Trends in the U.S. and the U.K.* (a forthcoming NBER Occasional Paper), chap. 2; Michael W. Keran, "Monetary and Fiscal Influences on Economic Activity — The Foreign Experience," this *Review* (February 1970); and "Selecting a Monetary Indicator — Evidence from the United States and Other Developed Countries," this *Review* (September 1970).

²Each period was chosen on the basis of a significant change in the growth of money.

³Data are drawn from "Rates of Change in Economic Data for Ten Industrial Countries" (Annual Data 1952-71), issued by this Bank (August 1972).

Table II
Long-Term Relation of Money and Prices
(Annual Rates of Change)

	Current Period	Previous Period	Money	Prices
Belgium	1961-70		6.5%	3.5%
		1952-61	3.2	1.3
Canada	1960-70		8.6	3.0
		1952-60	3.5	1.4
France	1963-70		6.5	4.3
		1956-63	12.1	5.9
Germany	1962-70		7.1	3.0
		1952-62	10.6	1.9
Italy	1958-70		14.5	3.9
		1952-58	9.3	2.1
Japan	1962-70		18.3	5.6
		1954-62	14.1	3.7
Netherlands	1960-70		8.5	4.7
		1953-60	4.7	2.5
Switzerland	1958-70		8.5	3.4
		1952-58	4.4	1.2
United Kingdom	1963-70		7.3	5.3
		1954-63	2.4	2.8
United States	1963-70		4.8	3.9
		1952-63	1.7	1.4

cantly different growth rates in the money stock. The years included in the two time periods are listed in the first two columns of Table II, and the growth rates in the money stock are listed in the third column. The corresponding rates of change in prices are listed in the fourth column. In order to take into account, at least roughly, the lag relationship between money and prices, the price data are in each case lagged one year with respect to the money data. For example, in the case of Belgium, the current period is 1961-70, when the money stock grew at a 6.5 percent annual rate. The corresponding annual rise in prices of 3.5 percent is from 1962-71.

Of the ten countries considered, eight countries had an acceleration in the growth of the money stock in the current period relative to the previous period. In all eight countries, there was a corresponding increase in inflation. In two countries, France and Germany, the growth in the money stock decelerated in the current period relative to the previous period. In the case of France, inflation also decreased. However, in the case of Germany, inflation increased in the current period relative to the previous period. Thus in nine of the ten countries the rate of change in prices was in the same direction as the rate of change in money.

The German exception can be explained on the basis of an unusual change in the economic setting in Germany between the 1950s and 1960s. An implicit assumption behind the long-term relation of money and prices is that the capacity of the economy to produce real goods and services grows at a relatively

fixed trend rate determined by the rate of growth in labor, capital, and technology. If the change in the growth of the money supply occurred at a time when there was a change in the growth trend of the economy, then the normal relationship between money and prices would be obscured.

Germany, it seems, did experience such a change in the growth of its capacity. Until 1961, the real growth in the German economy was augmented by the availability of skilled labor from East Germany. When this was curtailed by the erection of the Berlin Wall, the real growth potential of the German economy declined from an average of about 8.5 percent per year to 5.5 percent per year.⁴ Because the decline in the growth of the money stock in Germany paralleled the decline in the growth capacity, the effect of money on prices was blurred in this particular case.

It is interesting to note that the comparisons of Germany in Table I, all of which are drawn from the period since 1961, support the positive relationship between money and prices which has been observed in other industrial countries.

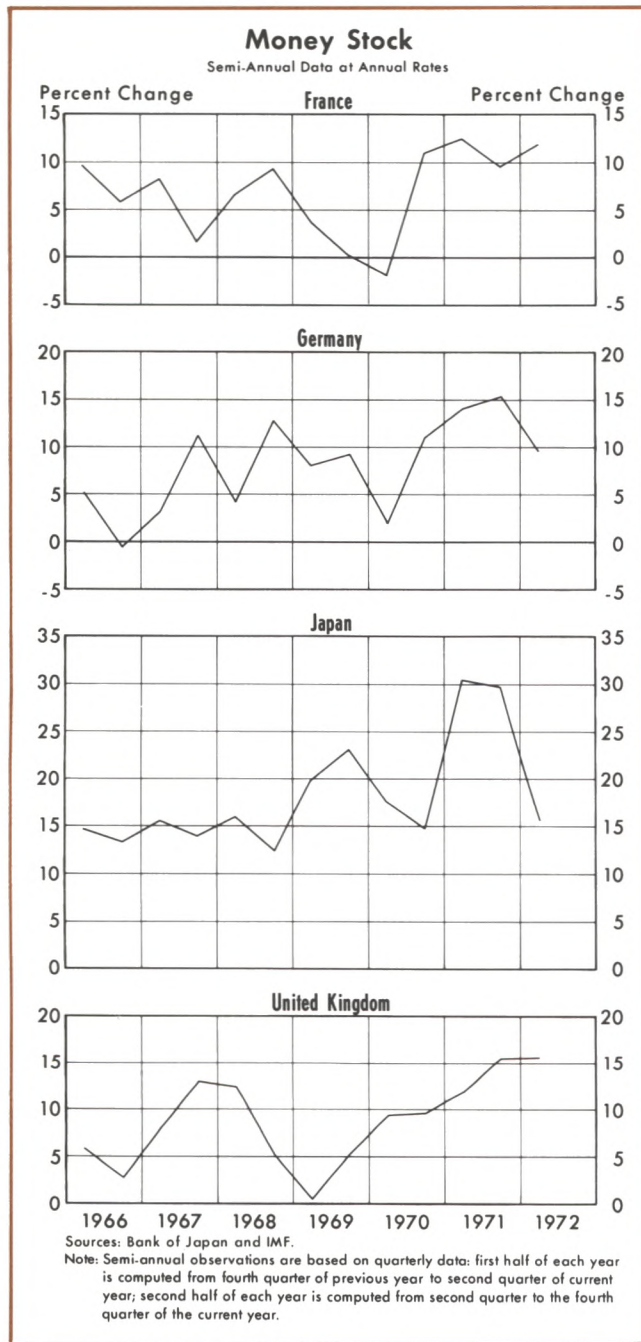
Money and Output

The second proposition concerns the short-term relationship between changes in money and changes in real output. This short-term relationship will necessarily be less predictable than the long-term relationship between money and prices. The reason is that there are more nonmonetary influences on real output than there are on prices. Such obvious ones as strikes and national disasters can have a major effect on the growth in real output in the short run, even to the point of obscuring what would otherwise be a close relationship to changes in money.

More fundamentally, the long-term rate of growth in real output is determined by the rate of growth of labor, capital, and technology. If the economy is already growing at capacity, a short-term acceleration in money is unlikely to call forth much additional growth in real output.

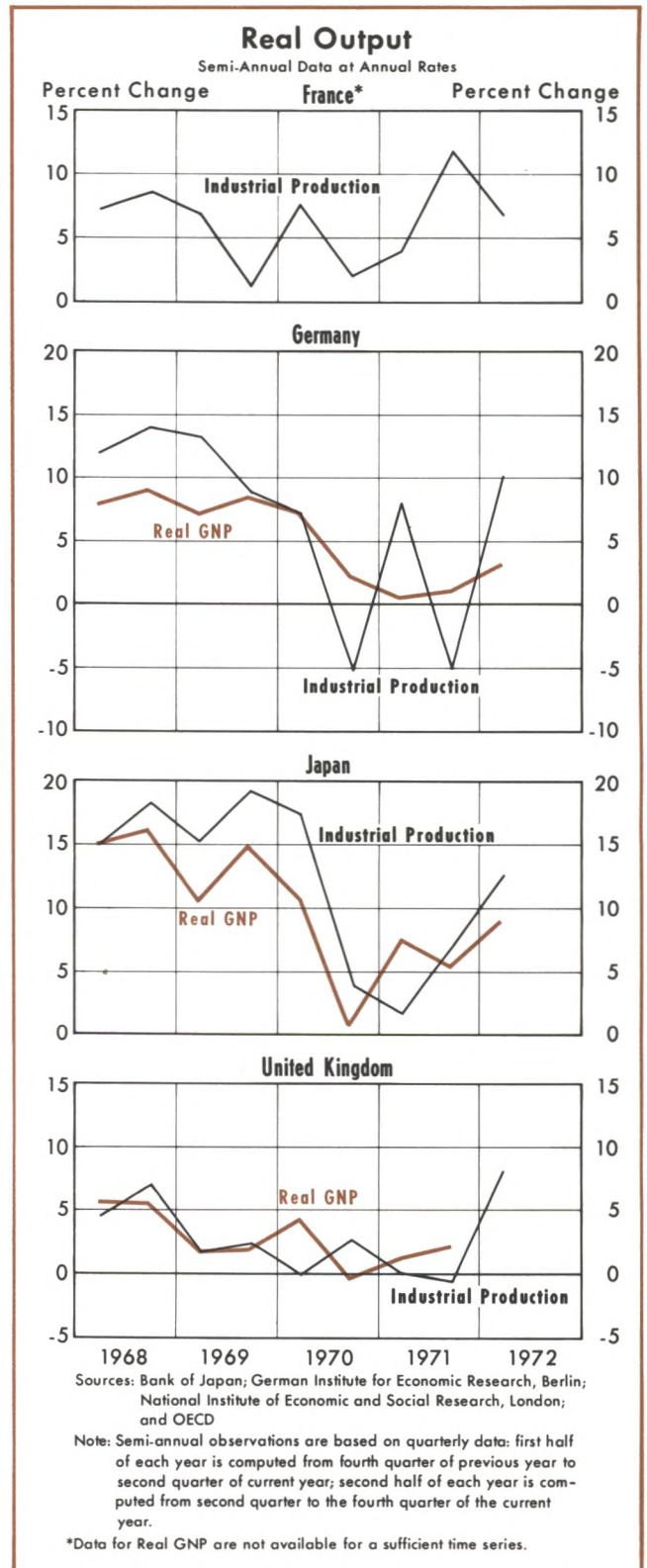
Due to the importance of nonmonetary factors in influencing the short-run growth of real output, only during periods of clear cyclical movements in money can we expect to find a close, corresponding movement in real output. The most illuminating aspect of the recent monetary experience in the four countries con-

⁴The loss of East German labor was only partially compensated for by the increased hiring of unskilled labor from other countries.



sidered is that there has in fact been a clear cyclical pattern in the growth of money. In the last four years money has first decelerated and then accelerated in all four countries. This is clearly illustrated in the chart entitled "Money Stock," where the half-year growth rates in money for France, Germany, Japan, and the United Kingdom are shown.

The effects of cyclical movements in money on real output are illustrated in the chart entitled "Real Output." For each country (except France) there are two measures of real output — industrial production



and real GNP. In each case real output is measured as percentage changes over a half-year period. Real GNP is not plotted in the case of France because current values of that series are not available.

Both measures of real output demonstrate substantially the same cyclical pattern, with the exception of small differences in timing. These exceptions are due to (1) the differences in coverage of the two series and (2) errors in data collection. The industrial production series tends to be quite accurate in terms of its coverage of the industrial sector of the economy. However, it omits other sources of real output such as agriculture and government, which are captured in the real GNP series. On the other hand, development of a real GNP series in these countries is relatively recent; therefore, errors in data collection may be greater. Plotting both series provides a rough range within which one can judge the timing of the cyclical movements in real output.

For each country in this group, real output growth has displayed a systematic cyclical pattern which has followed, with a short lag, the pattern of money growth. In France a cyclical trough in money occurred in the first half of 1970 and a trough in industrial production followed in the second half of 1970. For Germany a cyclical trough in money was observed in the first half of 1970 while that in real output appears to have been in 1971. In the case of Japan the paths of real GNP growth and money growth were very similar, with the troughs in each series occurring in the second half of 1970. The trough in industrial production occurred about one-half year later. Finally, a cyclical trough in money for the United Kingdom appeared in the first half of 1969 and a corresponding trough in real GNP came in the second half of 1970; the recovery of industrial production, however, did not occur until about one year later.

Economic Explanation of Stagflation

It is possible to explain the temporary, simultaneous occurrence of an acceleration in prices and a deceleration in output (stagflation) on the basis of the differential effects of monetary influences on prices and

output. Past experience indicates that it takes a relatively long time period for monetary influences to have their full effect on prices. Thus the current acceleration in inflation among these countries is associated with the acceleration in the money stock over a period of at least three to four years. Since the relationship between money and real output is relatively short term, a temporary deceleration in money, even in a period of general acceleration, can lead to a temporary slowdown in the growth of real output. A companion article in this issue of the *Review* indicates that these same observations have been made for the United States in recent years.

Conclusions

This note has examined the basic contours of the economic performance of four industrial countries during recent years. It has been found that the otherwise confusing and conflicting currents of economic events (falling production and rising prices) in those countries is consistent with the following economic propositions:

- 1) The general trend of accelerating inflation is strongly related to the accelerating trend growth in the money stock.
- 2) Fluctuations in the rate of growth of money will be followed by, in the short run, similar fluctuations in the growth of real output.

It is therefore possible to have both rising prices and falling output for a year or two. The deceleration in the growth of real output which has occurred in each country can be explained by a temporary deceleration in the growth of the money stock. By the same token the most recent acceleration in the growth of real output in most of the countries considered is associated, with some lag, with the acceleration in the growth of the money stock. The rates of inflation that have prevailed in these countries can be attributed to accelerating trends in money growth.



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