

Review

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The Russian Grain Embargo: Dubious Success

CLIFTON B. LUTTRELL

ON January 4, 1980, the President announced an embargo on grain exports to the Soviet Union in response to the Soviet armed invasion of Afghanistan. In announcing the embargo, the President reported:

"The 17 million tons of grain ordered by the Soviet Union in excess of that amount which we are committed to sell under a five-year agreement will not be delivered. This grain was not intended for human consumption but was to be used for building up Soviet livestock herds.

I am determined to minimize any adverse impact on the American farmer from this action. The undelivered grain will be removed from the market through storage and price support programs and through purchases at market prices. We will also use increased amounts of grain to alleviate hunger in poor countries and for gasohol production here at home.

After consultation with other principal grain exporting nations, I am confident that they will not replace these quantities of grain by additional shipments to the Soviet Union."¹

Secretary of Commerce Philip M. Klutznick stated that the embargo was imposed "in order to show the

U.S.S.R. in tangible ways that aggression is costly and will be met with firmness. . . . Thus it was decided that action should be taken to cut off these significant resources and to exert pressure on the U.S.S.R. in this area to convince the Soviet leaders to halt their aggression in Afghanistan and to dissuade them from making new military thrusts in Pakistan and Iran."²

Expected Impact on Soviet Union

Prior to the embargo, Soviet consumption of grain was projected to be 228 million metric tons (MMT) for the July/June 1979-80 marketing year. This figure was approximately 3 MMT less than the previous year's consumption due to the Soviet Union's below average grain crop in 1979-80. Of their projected consumption, the Soviets planned to import 35 MMT.³ U.S. exports of grain to the Soviets in 1979-80 were

¹"Text of Carter Speech on Soviet Ties," *St. Louis Post Dispatch*, January 6, 1980, p. 2E.

²Statement by Philip M. Klutznick, Secretary, U.S. Department of Commerce, in *U.S. Embargo of Food and Technology to the Soviet Union*, Hearings before the Subcommittee on International Finance of the Committee on Banking, Housing, and Urban Affairs, 96th Congress, 2 Sess. (Washington, D.C.: Government Printing Office, 1980), p. 28.

³Klutznick, "Statement," p. 31.

expected to total 25 MMT, valued at about \$2.3 billion and equal to about 11.2 percent of Soviet grain consumption for the year, considerably above the 4.8 percent supplied in 1978-79.⁴

The embargo was designed to limit U.S. grain exports to the Soviet Union to 8 MMT, an amount to which the U.S. was committed under the 1975 five-year grain sale agreement. Following the embargo, USDA officials estimated that the Soviets would be unable to import more than 22 MMT of grain from all sources.⁵

The embargo was expected to have its chief effect on livestock output and the consumption of animal-derived foods rather than on human consumption of grain. The U.S.S.R.'s dependence on U.S. grain resulted from a Soviet decision to improve the people's diets. The Soviet Union had maintained a commitment to increase domestic consumption of livestock and poultry and had achieved a 25 percent increase in meat production during the past decade.⁶ President Carter told Congress that the embargo could cause Soviet meat consumption to drop by 20 percent.⁷ Vice President Mondale expressed a similar view: "We estimate they will have to liquidate substantial numbers of livestock. . . . While this does not affect nutrition levels," he added, "it will undermine the U.S.S.R.'s objective of supplying high-protein meat to the Soviet people."⁸ Similarly, Secretary of Agriculture Bergland reported, "it is possible the grain embargo, if it forces large-scale livestock slaughter in the Soviet Union, may result in long-term change in U.S.S.R. diets."⁹

Soon after the embargo, specific forecasts of its impact on the Soviet livestock industry were made. Based on the assumption that the Soviets would obtain an increase in grain supplies of about 3 MMT from non-U.S. origins in March-July 1980 and reduce their stocks by 3 MMT, feed use of grain in the March-July period was forecast at about 44 MMT, down from a figure of 51 MMT that had been estimated prior to

the embargo.¹⁰ The 7 MMT March-July cutback would reduce the intended 128 MMT level of feeding for the entire 1980 calendar year by 5 percent.

The USDA reported that the cutback in grain availability for 1980 could reduce U.S.S.R. meat production by approximately one million tons. This reduction represents a cutback of about 7 percent in U.S.S.R. meat production, which currently totals about 15 million tons annually. The expected cutback would be somewhat greater than indicated by the 5 percent reduction in grain, because the imported grain was fed mainly to hogs and poultry, which have a relatively high grain-to-meat conversion rate.¹¹ If, as a result of the feed shortage, the Soviets would decide to liquidate herds by increasing current slaughter, they could defer the cutback in meat production until later in the year.

Expected Impact on Grain Trade

The embargo has been in effect long enough to measure its effectiveness in restraining U.S. grain exports and reducing Soviet grain imports. One way is to compare the USDA forecasts of U.S. exports and Soviet imports made immediately prior to the embargo with forecasts made following the embargo.

As shown in table 1, a summary of the forecasts from December 1979 through mid-1980 indicates that, initially, the embargo was expected to have a major impact on Russian grain supplies. However, subsequent revisions indicate that the embargo's impact was much less pronounced than originally expected. For example, in December 1979, net Soviet imports for the July-June 1979-80 year were estimated at 33.2 MMT. Immediately following the embargo, the January 15, 1980 forecast of imports was reduced sharply to 24.4 MMT, or 27 percent less than the pre-embargo total. In succeeding months, however, the estimates were revised upward until the June estimate of 30.4 MMT was only 2.8 MMT or 8 percent less than the pre-embargo estimate. The June estimate indicated that the overall Soviet grain supplies (excluding changes in stocks) would be down only 1.3 percent from the pre-embargo forecast.

The pre-embargo supply of grain for livestock feeding for 1979-80 in the U.S.S.R. was estimated at 128 MMT. This estimate was reduced to 122 MMT, down

⁴Statement by Dale E. Hathaway, Under Secretary for International Affairs and Commodity Programs, U.S. Department of Agriculture, in *U.S. Embargo of Food and Technology to the Soviet Union*, p. 54.

⁵Hathaway, "Statement," p. 53.

⁶Ibid.

⁷Irwin Ross, "Who Broke the Grain Embargo?" *Fortune* (August 11, 1980), p. 125.

⁸*Daily Report for Executives* (Washington, D.C.: The Bureau of National Affairs Inc., January 7, 1980), p. L-5.

⁹Ibid.

¹⁰*Foreign Agriculture Circular* (Washington, D.C.: U.S. Department of Agriculture, January 15, 1980), p. 2.

¹¹Ibid.

Table 1

USDA Estimates of Russian Grain Supplies, Utilization for 1978-79, and Forecasts for 1979-80 (Million Metric Tons)

July-June estimates for	Production	Imports (net)	Production plus imports	Feed utilization
1978-79	237	12.8	249.8	125
Forecasts for 1979-80 as of:				
12/11/79	179	33.2	212.2	128
1/15/80	179	24.4	203.4	122
2/11/80	179	27.5	206.5	125
3/10/80	179	29.7	208.7	126
4/10/80	179	29.7	208.7	126
5/09/80	179	29.7	208.7	126
6/11/80	179	30.4	209.4	126

Source: *Foreign Agriculture Circular* (Washington, D.C.: U.S. Department of Agriculture).

5 percent, immediately following the embargo. By June, however, the estimate was raised to 126 MMT, only 2 percent below the pre-embargo level. The revised estimates of grain for livestock feed were not based on revisions in estimated production. Production estimates remained unchanged at 179 MMT throughout the period from December 1979 to June 1980. While the tight grain supplies in the Soviet Union resulted in a slower growth of herds and flocks than was expected earlier, there was no evidence of liquidation of breeding animals.

Estimates of total United States exports likewise indicated that the impact of the grain embargo was declining each succeeding month. January-February 1980 estimates of total U.S. exports of feed grains, soybeans, and wheat for the marketing year 1979-80 were well below the December 1979 estimates (table 2). For example, estimated exports of feed grain for the 1979-80 marketing year were reduced from 71.1 MMT in December 1979 to 65.9 MMT in January-February 1980, and wheat estimates were reduced from 1,400 to 1,325 million bushels. By July, however, these estimates had been revised upward so that they closely approximated the pre-embargo levels. Corn exports, estimated at 2,400 million bushels, were somewhat less than the pre-embargo estimate, but the July estimate of 71.1 MMT for all feed grains was equal to the pre-embargo estimate. The July estimate for wheat, at 1,375 million bushels, was only 25 million bushels less than the pre-embargo estimate.

Impact on Grain Prices

Grain prices in the U.S. declined sharply immediately after the announcement of the embargo, reflecting the expected decline in export demand for grain (chart 1). The price of cash wheat declined 9 percent, from \$4.39 per bushel on January 4, 1980 to a low of \$4.01 per bushel on January 10. Cash corn dropped 10 percent, from \$2.56 to \$2.30 per bushel, and other feed grains declined by similar amounts.

Following the low point on January 10, most grain prices rose rapidly and regained their pre-embargo levels within less than a month. By February 1, the price of corn was more than 2 percent above its pre-embargo level, at \$2.62 per bushel, and the price of wheat, at \$4.45 per bushel, was also above its pre-embargo level.

While government purchases of both the contracts for grain sales to the Soviet Union and cash grain may have been a factor in the domestic grain price recovery, such copious supplies often tend to suppress prices. Furthermore, by July, the government had resold export rights to 95 percent of the 352 million bushels of corn that it acquired as a result of the embargo.¹²

Monthly movements in grain prices in other non-socialist nations indicated that a decline in world

¹²*Farmers Newsletter* (Washington, D.C.: U.S. Department of Agriculture, August 1980/F-14).

Table 2

Estimated U.S. Grain Exports for 1979-80*

Estimate	Feed grains (mil. metric tons)	Corn (mil. bu.)	Soybean (mil. bu.)	Wheat (mil. bu.)
December 1979	71.1	2,500	825	1,400
January- February 1980	65.9	2,275	815	1,325
March	65.9	2,275	815	1,325
April	69.1	2,400	820	1,325
May	71.0	2,400	820	1,350
June	71.0	2,400	825	1,375
July	71.1	2,400	850	1,375

*Marketing year began October 1 for feed grain and corn, September 1 for soybeans, and June 1 for wheat.

Source: *Agricultural Outlook* (Washington, D.C.: U.S. Department of Agriculture).

grain supplies was expected following the embargo. Apparently, these nations thought that the 17 MMT of grain withheld from the Soviets would be withheld from world markets. By February and March, however, this expectation was reversed as indicated by grain price movements in some major market centers. For example, Canada feed no. 1 rose from \$4.40 per

hundred weight (cwt) in December 1979 to \$4.51 in January 1980 and declined to \$4.31 in March 1980 (table 3). Similarly, Rotterdam pellets (a livestock feed) rose in January (following the embargo) and then declined in February. By February, estimates of a large U.S. wheat crop were coming in and wheat prices declined on a month-to-month basis.

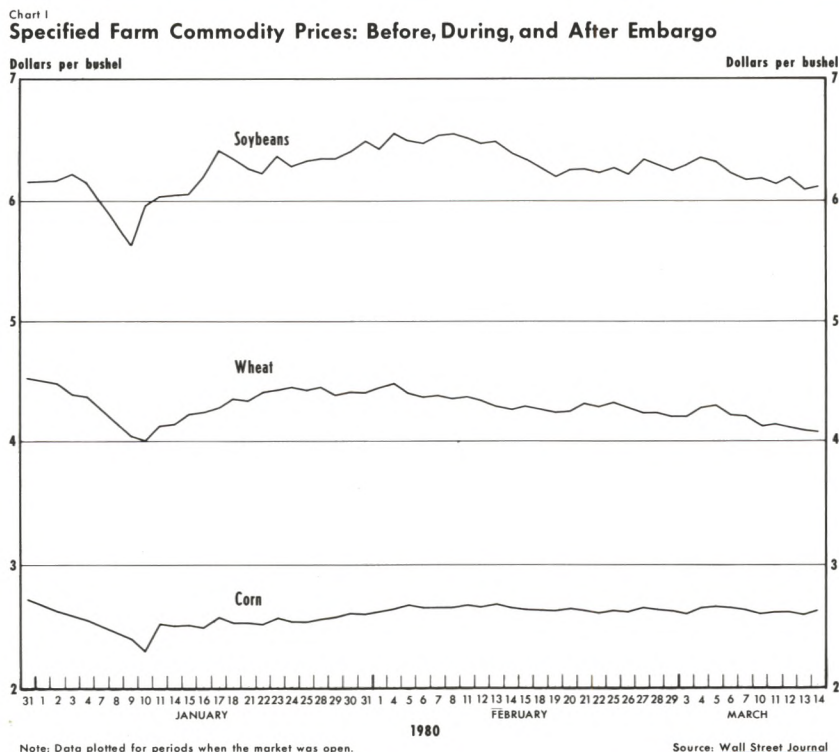


Table 3

Prices of Grain in Specified Markets (in U.S. Dollars at Current Exchange Rates)*

	1979-80			
	December	January	February	March
U.S. No. 2 Yellow corn, \$ per bu.	\$2.93	\$2.69	\$2.89	\$2.80
Canada feed No. 1, \$ per cwt.	4.40	4.51	4.35	4.31
Rotterdam pellets, \$ per cwt.	7.71	8.21	7.85	7.17

*All exchange rates are *monthly averages*.

Source: *FAO Monthly Bulletin of Statistics* (Rome, Italy: Food and Agriculture Organization of the United Nations, May, 1980), vol. 3.

Doubts Expressed About Effectiveness of Embargo

Opposition in the U.S. to the embargo developed shortly after its announcement. The Senate Subcommittee on International Finance of the Committee on Banking, Housing, and Urban Affairs began hearings in late January to "consider whether the embargoes are an effective means of making the Russians pay a price for their invasion of Afghanistan, their effect on the U.S. economy, and prospects for a positive effect upon Russian behavior. . . ."¹³ The American Farm Bureau, while favoring stiff sanctions for the Soviets, expressed doubt during the hearings that the embargo would reduce Russian meat production by more than 3 percent.

Patterns of Trade Changed

While the embargo reduced direct shipments of grain from the U.S. to the Soviets, it did not succeed in greatly reducing the availability of grain to the Russians. Grain is a highly fungible commodity. Not only can one carload be replaced by another carload, but one type of feed grain can be substituted for another. Even wheat, which is largely used for human food, can be substituted for feed grain with relatively moderate losses in value. Furthermore, most animal feeds are to some extent substitutes. Hence, tracing the flow of American grain through various commercial channels to make certain that the embargoed grain or substitute feed would not ultimately reach the Soviets would be virtually impossible. Most feed

grains and wheat are produced throughout much of the world, and the destination points of American grain offer little information as to the ultimate availability of the shipment or of substitute grains to the Russians. Any nation willing to supply more grain to Russia and less to other nations (which, in turn, purchase U.S. grain as replacement) would nullify the embargo. Such nations would not have to be net exporters of grain. Net importers who would be willing to purchase more U.S. grain while simultaneously selling their own grain to the Soviets would reduce the effectiveness of the embargo as much as would net exporters who increase their sales of grain to the Soviets.

If the embargo was effective, it would result in two prices for grain in the international market. A relatively low price would prevail among those nations that cooperate with the U.S. and deny exports to the Soviets, and another higher price would prevail for the Soviets and those nations that sell grain to them. As Robert Gilpin points out, the Soviets can easily switch their purchases of grain to countries that have the incentive to arbitrage the two price situations.¹⁴

Although there is insufficient evidence to determine which nations permitted increased grain shipments to the Soviets following the embargo, the available data indicate certain unusual patterns of trade. Table 4 shows a number of countries that sharply increased grain imports from the U.S. in the first four months of 1980, compared with the first four months of other recent years. For example, the Democratic Republic

¹³Statement by Senator Adlai E. Stevenson, Chairman of The Subcommittee on International Finance, in *U.S. Embargo of Food and Technology to the Soviet Union*, p. 1.

¹⁴Statement by Professor Robert Gilpin, Princeton University, in *U.S. Embargo of Food and Technology to the Soviet Union*, p. 184.

Table 4

**Estimated January-April Imports of Feed Grains by Selected Countries
(Thousands of Metric Tons)**

COUNTRY	1975	1976	1977	1978	1979	1980
Brazil	N.A.	N.A.	0	0	79.6	308.8
Federal Republic, Germany	1,221.0	1,458.0	1,399.3	813.0	376.8	642.6
Democratic Republic, Germany	N.A.	N.A.	106.5	98.4	236.0	1,175.5
Poland	410.0	849.0	403.2	500.7	341.9	756.0
U.S.S.R.	519.0	4,584.0	1,606.1	4,159.0	1,857.6	2,303.0
Spain	1,435.0	849.0	648.7	907.0	871.8	1,649.5
Other	9,707.0	8,397.0	10,383.8	10,060.2	13,226.9	15,152.6
All nations	14,369.0	16,635.0	14,924.1	16,777.6	17,579.9	24,113.9

Source: *Foreign Agricultural Trade of the United States* (Washington, D.C.: U.S. Department of Agriculture), supplemented by verbal communications with USDA staff.

of Germany, which had not previously been a major importer of U.S. grain, suddenly became a major importer in 1980. Other major grain producing nations, such as Argentina, could have sold less grain to other grain importing countries and sold a larger portion of their grain to the Soviets. In effect, this action would allow the Soviets to import Argentine grain, for example, as a substitute for U.S. grain. The data suggest that a world market for grain continued to function, but through new channels of trade, following the embargo's impediment to established channels.

Concept of World Grain Market Ignored

The embargo's major weakness was its failure to recognize the fact that there is a world commercial grain market that continues to function despite government controls and despite trading between governments that often ignores the market price. Since grain continues to move from areas where grain prices are relatively low to areas where prices are relatively high, the only sure way of enforcing a grain embargo on the Soviets would have been to obtain guarantees from each nation that it would not export more grain to the Soviets (produced either in the U.S. or locally) than it would have exported without the embargo.

The apparent failure of the U.S. grain embargo to achieve its stated objective does not mean that it had no impact on U.S. farm income or on the cost of grain to the Soviets. It undoubtedly had some impact on both. It interrupted the efficiency of the market channels from the U.S. to the Soviet Union, thus in-

creasing the grain handling and shipping costs. For example, part of the grain which ultimately reached the Soviet Union was shipped initially through non-Soviet ports before finally entering the Soviet Union; in these cases, this additional step increased shipping costs and commissions for handling the grain. Both the grain consumer and the producer pay for such inefficiencies. Consequently, the U.S. farmer obtained a somewhat lower price for his grain and the Soviets paid somewhat more for their food and feed as a result of the embargo.

SUMMARY

Although the embargo on grain sales to the Soviets was designed with the best of intentions, it had only a negligible impact on Soviet grain supply and on total U.S. grain exports. Estimates of the Soviet grain supply for the year ending in June were only one percent less than the pre-embargo forecasts. Estimates of U.S. grain exports were reduced sharply immediately following the embargo, but rose very soon after it was announced and, by July of this year, were approximately the same as the pre-embargo estimates.

Domestic prices for grain declined sharply immediately following the embargo, but regained most of the loss by early February. The embargo apparently altered world patterns of grain trade, as evidenced by the sharp increase in imports of U.S. grain by some nations following the embargo. Hence, there is evidence that large quantities of U.S. grain were shipped to nations which normally purchase grain from other

sources, thereby permitting these sources to supply grain to the Soviet Union.

Nevertheless, the embargo did have an impact on both the Soviets and the U.S. in that it resulted in

less efficient patterns of trade and less efficient means of marketing. These inefficiencies increased somewhat the cost of food and feed to the Soviets and reduced somewhat the returns to U.S. farmers.



What Happened to the Economy in the First Half of 1980?

ALBERT E. BURGER

THE U.S. economy was subjected to severe strains during the first half of 1980. Beginning in the fall of 1979, the growth of the money stock (M1B) slowed substantially and then declined sharply for three months in early 1980. The price of oil was raised substantially late in 1979, and a major selective credit restraint program was introduced early in 1980. Prices rose sharply, and the long-expected recession occurred with severe effects on specific sectors of the economy, such as autos and housing. In the space of a few months, interest rates soared to record high levels and then plunged as quickly. As market interest rates climbed above Regulation Q ceiling rates and rates set by state usury laws, financial institutions experienced difficulties in holding and acquiring funds and, hence, in performing their traditional roles in the financial system.

When major economic developments occur so rapidly, it is difficult to isolate the basic forces that are driving the economy. Explanations that seem reasonable one week are apparently negated by developments that occur a few weeks later. Now that the first half of 1980 is history, it is possible to present a coherent explanation of economic developments that arose during this period, especially in regard to the role of monetary actions.

Such an explanation requires more than a simple listing of economic events; it demands a framework of analysis that ties diverse economic events together and relates them to policy actions. The first section of this article presents such a framework.

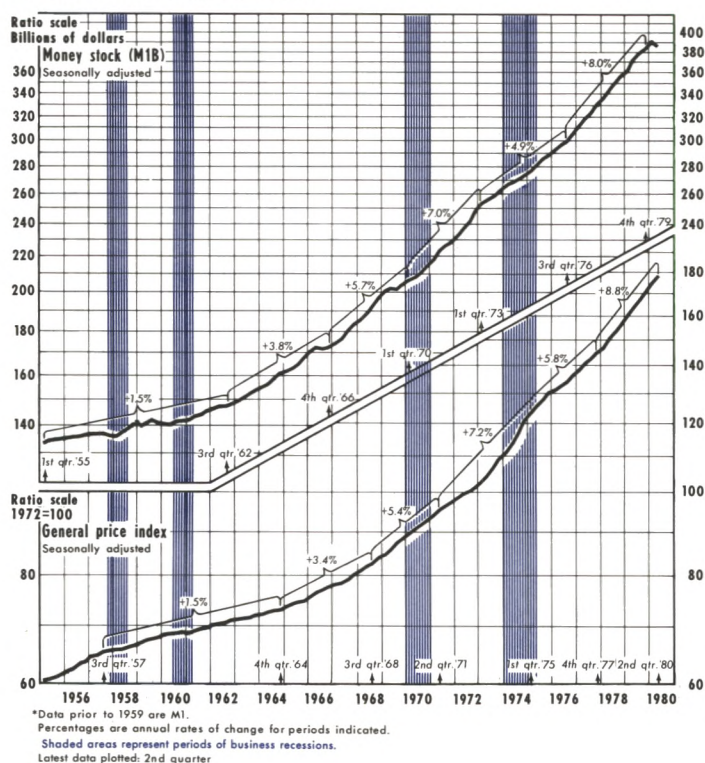
A FRAMEWORK OF ANALYSIS

The analytical framework presented in this section relates inflation and changes in the growth of real output to monetary developments. To explain economic events that have occurred thus far in 1980 as simply as possible, the analysis is presented in summary form and various relationships are illustrated through the use of charts and tables.

Money and Inflation

Inflation refers to persistent increases in prices. Prices denote the rate of exchange between money and various goods and services. Consequently, an analysis of inflation must consider the rate of growth of (1) the amount of money available to the public, (2) the amount of money the public is willing to hold relative to total spending, and (3) the amount of goods and services available to the public (real output). The long-run or trend growth of real out-

Chart 1
Influence of Money on Prices



put is determined by such factors as the growth and quality of the labor force, capital formation, technology, availability of natural resources, etc. This trend rate of growth in real output is essentially unaffected by monetary developments.¹

The trend rate of price increases, for a given growth of real output, depends on the rate of growth of the money stock and the willingness of the public to hold money relative to growth in total spending. Consequently, inflation is frequently referred to as a monetary phenomenon. If the rate of growth of the stock of money exceeds the rate at which individuals are willing to increase their holdings of money, they will attempt to eliminate their excess money balances, and prices will be driven up. In the United States, the long-run or persistent rate of increase in prices has approximated the trend rate of growth of the money stock, as shown in chart 1. When the money stock increased at less than a 2 percent rate for a

prolonged period, as from the middle 1950s to the early 1960s, inflation rose at less than a 2 percent rate. When the trend growth of money moved upward, so did inflation. Since the early 1960s, the long-run average rate of increase in prices has slowed only once—from early 1973 through 1977—when the trend rate of money growth also slowed.

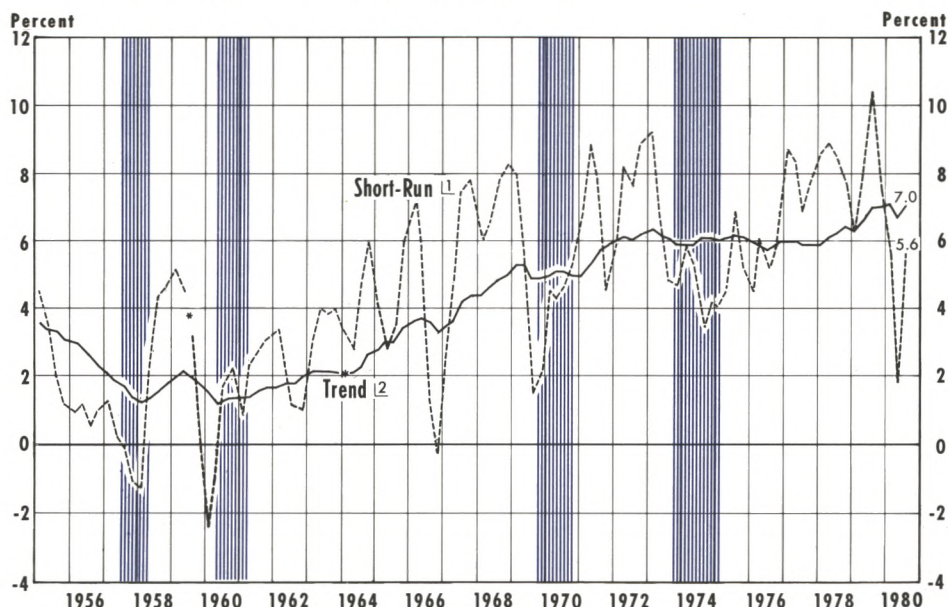
Viewing inflation in this long-term monetary context provides a consistent explanation of the average rate of inflation over the past nine years. From IV/70-IV/79, money grew on average at a 6.7 percent annual rate and inflation averaged 7 percent, as shown in table 1.

However, examination of the data in table 1 reveals sub-periods within the last nine years in which there were wide differences between the growth of money and inflation, including several periods in which money growth slowed substantially while inflation accelerated. These circumstances can be explained within the framework of analysis by showing (1) connections between *short-run* variations in the growth of money and the growth in real output, and (2) the effects of supply-side shocks on the *level* of prices.

¹As the rate of inflation has risen rapidly, relative to past U.S. experience, the complete independence of the trend growth of real output and growth of money has been called into question. See Keith M. Carlson, "Money, Inflation, and Economic Growth: Some Updated Reduced Form Results and Their Implications," this *Review* (April 1980), pp. 13-19.

Chart 2

Rates of Change of Money Stock (M1B)



Shaded areas represent periods of business recessions.

[1] Two-quarter rate of change; data prior to 3rd quarter 1959 are M1.

[2] Twenty-quarter rate of change; data prior to 1st quarter 1964 are M1.

Latest data plotted: 3rd quarter

Table 1

Growth Rates of Money, Prices, and Real Output

Period	Money	Prices	Real output
IV/70 - I/73	7.7%	4.6%	6.3%
I/73 - I/74	5.3	8.2	0.0
I/74 - I/75	3.7	11.6	-4.8
I/75 - III/76	5.5	5.4	5.9
III/76 - IV/78	8.1	7.1	5.0
IV/78 - III/79	8.5	9.1	0.6
III/79 - II/80	2.9	9.4	-2.6
III/79 - I/80	5.6	8.9	1.6
I/80 - II/80	-2.3	10.6	-9.0
IV/70 - IV/79	6.7	7.0	3.3

Money and Real Output

Although changes in the trend growth rate of money have virtually no effect on the trend growth of real output, short-run fluctuations in money growth do affect the short-run growth in real output. Pro-

ducers do not immediately adjust prices to changes in the demand for goods and services that occur when the public attempts to adjust the amount of money held to the amount they desire to hold, given income and interest rates. Consequently, real output bears the initial brunt of the effects of the public's adjustments to a substantial change in the rate of growth of their money holdings.

Fluctuations in short-run money growth relative to trend money growth offer an abridged way of illustrating the severity of short-run monetary developments.² Chart 2 depicts two-quarter growth rates of money relative to a 20-quarter trend. In the past, each time short-run money growth has fallen substantially below trend, output has slowed substantially, many times by an amount large enough to classify that period as a recession.³ In addition, the acceleration of short-run money growth typically provides a temporary impetus to real output growth that moves it above trend. For example, the short-run growth of

²For an alternative way of representing monetary acceleration and deceleration, see William Poole, "The Relationship of Monetary Deceleration to Business Cycle Peaks: Another Look at the Evidence," *Journal of Finance* (June 1975), pp. 697-712.

³Although not classified as a full recession, the 1966-67 period has frequently been referred to as a mini-recession.

money was substantially above trend in 1977 and 1978, as shown in chart 2. Table 1 indicates that real output grew by more than 5 percent during this period, substantially more than any prevailing estimates of the rate that could be maintained over a prolonged period of time. The growth of real output eventually had to return to the rate dictated by labor force growth, capital formation, etc., even if the monetary stimulus remained very strong.

Monetary Policy Objectives and Growth of Money

The primary long-run objectives of monetary policy are to avoid inflation and to encourage growth of real output. When inflation is low and real output is growing at what policymakers consider "an acceptable rate," these two objectives do not conflict. When real output growth is "too low" or inflation "too high," however, these two goals can conflict especially in the short run.

Real output growth can be *temporarily* accelerated above its trend rate by increasing the degree of monetary stimulus. However, if such a policy action is maintained, greater inflation results, which violates the other objective of monetary policy. On the other hand, reducing inflation that is the result of past policy actions (the monetary rate of inflation) is a long-term proposition requiring a reduction in the trend growth of money. If policy actions sharply reduce the growth of money in the *short term*, inflation is not affected, but the growth of real output will decline and the economy may slide into a recession. Consequently, at times when either of the major policy goals is not being met, the Federal Reserve must design its policy actions carefully and enforce them consistently to avoid violating the other policy goal.

Supply-Side Effects, Real Output, and Inflation

Growth of real output can drop suddenly and temporarily for reasons unrelated to decelerated money growth. Supply-side shocks, such as droughts, floods, reduction in the supply of a basic factor input such as oil, or an unexpected sharp rise in the relative price of a factor input, can cause sharp declines in real output.⁴ If money continues to grow at the same rate

that prevailed prior to the supply shock, prices must rise. As the level of prices adjusts upward, inflation soars above the rate dictated by the trend rate of monetary expansion. However, unless the rate of growth of money also accelerates, inflation returns to the rate dictated by the trend growth of money, after the level of prices has adjusted.

Since 1972, the major supply-side shocks affecting the economy have resulted from developments in the energy industry. The periodic sharp increases in energy prices relative to output prices have reduced the productivity of the existing capital stock and labor and, hence, have reduced output. The consequences have been periodic sharp rises in the level of prices and reductions in the growth of real output, as occurred in 1973-74 and 1979.⁵

Monetary Policy Objectives and Supply-Side Effects

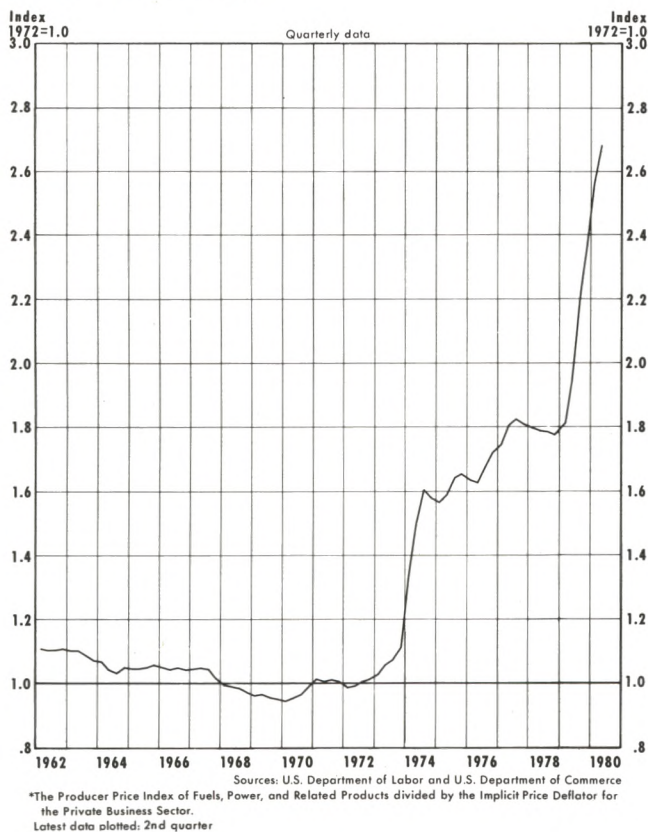
Since supply-side effects definitely influence the measured growth of real output and inflation, they can obscure the ongoing effects of monetary developments on these variables. During the transition period in which the economy adjusts to supply-side shocks, it is important to keep in mind what monetary policy actions can and cannot do in relation to real output and inflation. Monetary policy actions can create more money; they cannot create more oil, grain, cattle, or any other real good or service. The sharp rise in the level of prices accompanying supply-side shocks simply reflects the way a market economy eliminates the shortage of any good. The surge in prices does not represent a rise in the lasting rate of inflation; that rate is still being determined by the cumulative effects of past policy actions on the trend growth of money. Once the level adjustment of prices is completed, the measured rate of inflation slows. This pattern of price movements does not reflect monetary policy actions, but simply indicates that the rate of increase of prices is returning to the rate dictated by monetary expansion.⁶ Attempts to offset the effects of supply-side shocks on real output by sharply accelerating the growth of money only cause prices to rise further.

⁵See Denis S. Karnosky, "The Link Between Money and Prices — 1971-76," this *Review* (June 1976), pp. 17-23.

⁶See Albert E. Burger, "Is Inflation All Due to Money?" this *Review* (December 1978), pp. 8-12.

⁴See Robert H. Rasche and John A. Tatom, "The Effects of the New Energy Regime and Economic Capacity, Production, and Prices," this *Review* (May 1977), pp. 2-12.

Chart 3
Relative Price of Energy*



ANALYSIS OF THE FIRST HALF OF 1980

The two major forces affecting the economy in the first half of 1980 were a major change in the growth of the money stock and a continuation of the supply-side effects of increased energy prices. These two forces both operated to depress real output growth. The monetary developments had little initial effect on reducing the basic monetary rate of inflation, while developments in the energy markets served to raise the level of prices and push the measured rate of price increases considerably above the rate of inflation dictated by the long-term growth in money.

Supply-Side Effects

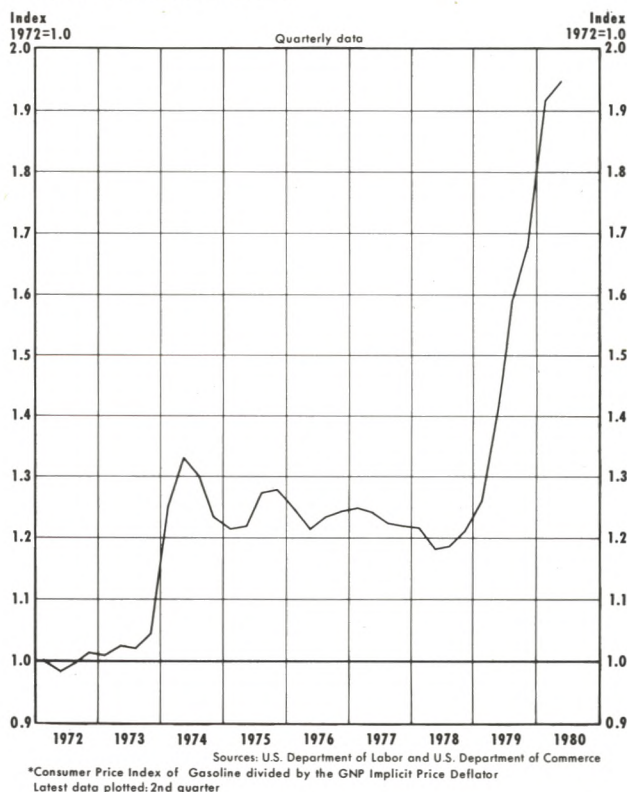
In early 1980, as in 1979, real output growth continued to be restrained by the large ongoing rise in the relative price of energy. The composite refiner acquisition cost of crude oil rose from \$12.93 per

barrel in December 1978 to \$27.85 per barrel in May 1980. This increase is reflected in the sharp rise in energy prices relative to output prices, as shown in chart 3. This rise in the relative price of energy, which was approximately the same as that in 1973-74, was the primary cause of the drop in real output growth from 4.8 percent in 1978 to 1 percent in 1979.⁷ Its effects continued into 1980, constraining real output growth to a 1-2 percent rate.

The impact of the sharp rise in energy prices was not distributed equally across all sectors of the economy, but was most severe for those industries and products which were heavy users of energy, such as automobiles. As shown in chart 4, the relative price of gasoline rose sharply from the end of 1978 through 1980. The retail price of gasoline rose from about 70 cents a gallon at the end of 1978 to \$1.22 per gallon

⁷See Keith M. Carlson, "Explaining the Slowdown of 1979: A Supply and Demand Approach," this *Review* (October 1979), pp. 15-22.

Chart 4
Relative Price of Gasoline*



in April 1980. For someone that owned an auto that averaged 10-12 miles per gallon, this rise in the retail price of gasoline increased his annual expenditure on gasoline by about \$700-\$800. This development triggered a general decrease in demand for autos and a shift in preference toward more fuel-efficient imported autos. Consequently, retail sales of domestically produced passenger cars fell dramatically from a rate of about 9 million units at the end of 1978 to a rate of about 7.5 million units at the end of 1979 and then plummeted to a rate of 5.2 million units in May and June of 1980.

Credit Market Developments

Housing was the other sector of the economy that suffered most severely from developments in the first half of 1980. Housing starts fell from an annual rate of about 1.5 million units at the end of 1979 to an annual rate of approximately 900,000 units in May 1980. The collapse in activity in this market was due primarily to a sharp rise in mortgage costs and greatly reduced availability of mortgage credit. For example, mortgage rates rose from 10.5 percent in April 1979 to 12.9 percent in late 1979 and, finally, to 16.3 percent in April 1980.

The demand for credit, especially short-term credit, surged during the early months of 1980. In January and February, for example, business loans at commercial banks increased at a 24 percent rate, after rising at only a 6.6 percent rate over the previous three months. Part of this large increase in credit demand resulted from anticipations of a program of selective credit controls. Borrowing that would ordinarily have taken place later in the spring took place early in the year, because potential borrowers were uncertain about their ability to acquire funds at a later date. Consequently, as the Federal Reserve sought to constrain the resulting explosion in money and credit, short-term interest rates soared upward by 3 to 4 percentage points in the span of about two months. The rise in market interest rates resulted in a rapid outflow of savings deposits, which forced savings and loans to hold and acquire deposits by issuing money market certificates that bore much higher interest rates than passbook savings. At the same time, savings and loans were frequently constrained on the mortgage rates they could charge due to ceilings set by usury laws. The consequent sharp rise in mortgage rates and reduced credit flow to the housing market led to the severe drop in housing construction that occurred in early 1980.

Monetary Developments

Even if monetary stimulus had continued at the rate that prevailed during most of 1979, the combined effects of the adjustment of the economy to oil price increases, the resulting special structural problems in the auto industry, and the special credit market developments affecting housing would have resulted in a decline in real output in the first half of 1980. However, the degree of monetary stimulus (as measured by growth of money) did change substantially during this period. In October 1979, the growth of M1B began slowing. From October 1979 to February 1980, growth of M1B averaged about 6 percent, compared to its 8.3 percent rate of growth over the first nine months of 1979. If this reduction in the growth rate of money had continued, it would have exerted a moderate restraining effect on real output growth, adding to the downward pressures being exerted by those factors mentioned above.

Beginning in March of this year, however, monetary stimulus moved from moderately restrictive to very restrictive. For three months, March-May, the money stock *declined* at an annual rate of approximately 5 percent. Chart 2 helps place this recent reduction in money growth in historical perspective. It shows that the slower than average money growth from September through February was rapidly pulling money growth in line with its trend rate. The following three-month decline in M1B, combined with the previous slowing, plunged it far below its trend rate. As shown in chart 2, when the growth of money slowed so abruptly in the past, real output and employment likewise slowed substantially. In line with this past experience, industrial production fell very sharply after February, growth of employment came to a halt and then declined sharply, and the unemployment rate rose from about 6 percent early in the year to 7.7 percent in May.

Was the First Half of 1980 Unique?

The events that took place in the first six months of 1980 are not unique, but have become all-too-frequent occurrences. In many aspects, the period from III/79-II/80 represents a compressed version of what occurred in the 1973-74 period.⁸ In both periods, the economy was forced to adjust to oil price shocks that resulted in special problems for autos; at the same time, soaring interest rates created special prob-

⁸See Norman N. Bowsher, "Two Stages to the Current Recession," this *Review* (June 1975), pp. 2-8.

lems for housing. Monetary developments were also analogous in both periods, although they were somewhat more extended in 1973-74 than in the most recent period. The behavior of real output, employment, and prices was also strikingly similar in both periods. Consequently, a brief comparison of what happened recently to real output, employment, and prices with what happened to these same variables in 1973-74 adds to our understanding of the economic events that occurred in the first half of 1980.

Although real growth and employment slowed in 1973 and early 1974, these variables did not evidence a sharp decline until monetary stimulus moved from moderately restrictive to sharply restrictive (I/74-I/75). Prices also behaved similarly in both periods. In 1973-74, as in the three-quarter period ended II/80, prices soared upward, even though the degree of short-run monetary stimulus was markedly reduced.

The behavior of the economy in the first half of 1980 further illustrates that excessive short-run fluctuations in the growth of money in either direction have serious economic implications. In the situation that prevailed from late 1976 through late 1979, sharp accelerations in money growth increased the trend rate of money growth and, hence, were inconsistent with a policy objective of reducing inflation. Since late 1979, a sharp deceleration in money growth, combined with supply-side effects that adversely affected real output, caused a severe slowdown in real output. Slow money growth over the three-quarter period ending II/80 reduced the trend growth of money (the 16- to 20-quarter average) by only about 0.5 percent. Although the monetary deceleration had only a minimal effect on inflation, the effect on the growth of real output was large. Consequently, economic events in the last three quarters further support the proposition that pronounced fluctuations of money growth are inconsistent with a policy aimed at progressively reducing inflation while minimizing the contractionary effects on real output.

What Will Happen Now?

Interpreting what happened to the economy after 1974 is helpful because it gives some indication of what effects alternative monetary developments might have on the economy. The recovery in real output that began in 1975 did not require a very large monetary stimulus. From I/75 to III/76, growth of M1B

averaged 5.5 percent. Real output grew at a rapid pace of 7.5 percent for a year, then slowed to a rate of 3 percent, which was in line with the long-run potential growth rate of real output. Growth of employment was renewed in early 1975 and the unemployment rate began to decline, falling from a peak rate of 9 percent in mid-1975 to 7.5 percent by the end of 1976.

The sharp surge in the growth of money that started in late 1976 stimulated a renewed growth of real output that lasted through 1978, with real growth averaging 4.6 percent. However, after 1978, continued monetary stimulus was no longer able to sustain real growth above its long-run potential.

It is also instructive to note that the surge in inflation in 1973-74 that was caused by supply-side shocks to the economy did not last. The economy adjusted to a new higher *level* of prices, absorbing the energy price increases. Since the growth of money continued at a reduced rate, the rate of inflation fell below a 6 percent rate and this rate was maintained over the next year and a half. Only when the trend rate of growth of money was substantially raised as a result of the persistent 8 percent growth of money that began in late 1976 did inflation again surge upward.

Since May, there has been a very substantial increase in the money stock, offsetting the sharp decline that occurred earlier this year. Such a sharp reversal in the degree of monetary stimulus should act to correct the effects on real output of the earlier decline in money. Consequently, the recent growth of money is consistent with a policy objective of gradually reducing inflation *subject to the constraint* of not inducing a deep and prolonged recession.

The recent rapid growth of money will become inconsistent with both policy objectives if it is maintained for any prolonged period of time. Most economists expect real growth to remain slow for the next few quarters, as the economy continues to adjust to oil price increases and as special structural problems persist in the automobile and housing industries. Maintaining rapid money growth under these circumstances will add little to real output growth, but will erode the small gains that were made against inflation as a result of the three-quarter reduction in money growth from III/79 to II/80.

Rise and Fall of Interest Rates

NORMAN N. BOWSHER

MARKET interest rates have moved over a wide range since mid-1979. In the last half of 1979 and in the first three months of 1980, interest rates rose to unprecedented levels. Rates on highest grade corporate bonds, for example, increased from 9.3 percent in June 1979 to 13 percent in March 1980. Over the same period, yields on 4-month prime commercial paper jumped from 9.7 percent to 16.8 percent, while the prime rate on business loans at large banks rose from 11.5 percent in mid-1979 to 20 percent in early April 1980.

Because credit and interest rates play a crucial role in our economic system, the substantial rise in interest rates had wide implications. Sales of residential housing, which are particularly sensitive to interest rate movements due to the existence of usury rate ceilings in many states, were sharply curtailed. For those business activities that maintained operations, costs rose, in some cases substantially. In fact, some analysts believe that higher interest rates were a major cause of recession.¹ On the other hand, savers received record high returns on funds lent.

¹"A Carter Recession: How Soon, How Deep?" *U.S. News and World Report* (March 31, 1980), pp. 23-29; "The Credit Vise Tightens," *Time* (April 14, 1980), pp. 78-79; and "High Interest Rates Start to Hit Home," *U.S. News and World Report* (March 24, 1980), pp. 23-24.

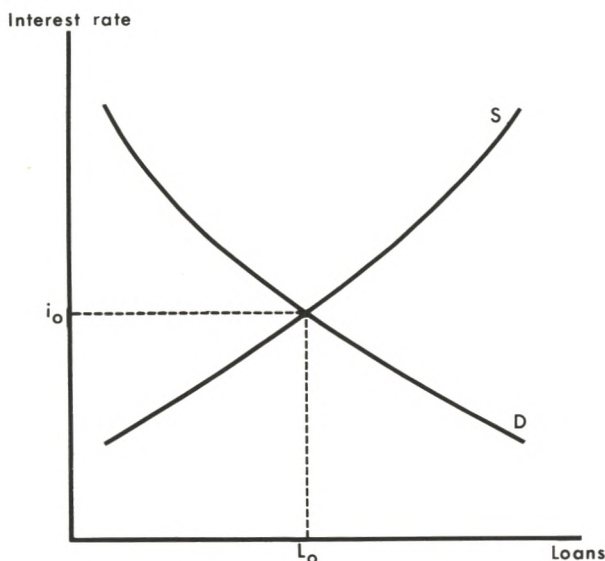
A marked reversal has occurred in the financial markets since early April 1980. Highest grade corporate bond yields decreased from 13 percent in March to 12 percent in September, and yields on commercial paper fell from 16.8 percent to 10.9 percent. Large banks lowered the rate charged on loans to prime business customers from 20 percent in early April to 13 percent in late September.

Since the decline in interest rates occurred at a time when the country was facing two serious domestic economic problems—continued rapid inflation and rising unemployment—there were disparate opinions about its desirability. Some argued that the lower interest rates would stimulate business and consumer spending, while others contended that the campaign to resist inflation and to defend the value of the dollar internationally was being abandoned too soon.²

This article attempts to place the recent fluctuations in interest rate levels into perspective by discussing both the function of interest rates and the economic significance of their levels. In addition, it reviews recent developments that impinge on interest rates.

²See "Inflation-Fighting Must Be No. 1 Priority Despite Deepening Slump, Miller Insists," *Wall Street Journal*, June 5, 1980, p. 8.

Figure 1



Note: The demand (D) for loan funds shows the amount of loans demanded at alternative potential interest rates. The supply (S) of loan funds shows the amount of loans supplied at various rates of interest. In equilibrium, as illustrated in the figure, the amount of loans will be (L_0) and the interest rate will be (i_0).

Interest Rates — Real and Nominal

The rate of interest, which represents the price paid for the use of credit, reflects the interaction between the supply of credit and the demand for credit (figure 1).³ The supply of credit arises from the willingness of income-earners to save, that is, to postpone consumption in the immediate period. The demand for credit arises from private business firms' investment demand (reflecting the marginal productivity of real capital goods), consumers' desire to borrow for consumption purposes, and government borrowing to finance deficits.

Hundreds of different interest rates are quoted simultaneously in financial markets. These *nominal* (or *market*) interest rates, although different from one another, consist of the same three components: the "real" rate of interest, the expected rate of inflation, and a composite of the additional factors which differentiate one yield from another.

The real rate of interest is determined by the marginal productivity of capital in a "riskless" economic

environment. It is the rate of interest that would be observed if inflation was expected to be zero and if there were no special differences (risk, tax advantages, etc.,) among various credit transactions. During the last century, the real rate of interest has generally moved within a rather limited range.

Special terms and conditions accompanying the extension of credit will produce differences among nominal interest rates. Differences in rates due to this source reflect variations in financial risk, length of loans, locality, costs of servicing, tax status, and a variety of other factors.

Because of inflation and inflationary expectations, the market rate of interest can differ considerably from the real rate.⁴ This differential exists because lenders seek to protect the purchasing power of funds lent, and borrowers are willing to pay a higher rate if they expect inflation to enable them to repay the loan with cheaper dollars.

For example, if borrowers and lenders anticipate a 9 percent inflation per year over the period of the loan, they will incorporate this expectation in the nominal rate of interest for the loan. Thus, if the real interest rate is 3 percent, loans will be extended at an annual nominal rate of 12 percent; that is, the 9 percent anticipated inflation will be added to the 3 percent real return.

Studies suggest that market participants tend to extrapolate past experience to estimate future rates of inflation. Although they place primary emphasis on the most recent past, they will reach back several years for evidence.⁵ Regardless of past experience, however, a substantial change in monetary or fiscal policy will alter expectations of future inflation.⁶ Charts 1 and 2 illustrate the relationship between prices and market interest rates for the periods 1972-1980 and 1960-1980, respectively.

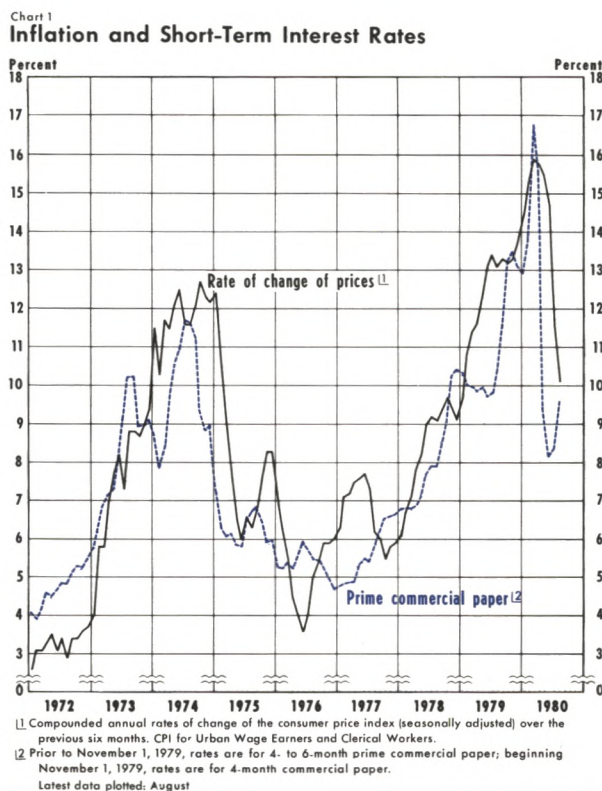
Most of the increase in market interest rates since the mid-1960s resulted from rising inflationary expectations. From 1959 to 1965, annual inflation, as measured by the GNP price deflator, averaged 1.5 percent.

³For a more extended discussion of interest rates, see Armen A. Alchian and William R. Allen, *University Economics* (Belmont, California: Wadsworth Publishing Company, 1972) pp. 426-438.

⁴David H. Resler, "The Formation of Inflationary Expectations," this *Review* (April 1980), pp. 2-12. Also, see "Inflation's Impact on Borrowers and Lenders," *U.S. News and World Report* (March 10, 1980), p. 28.

⁵See Irving Fischer, *The Theory of Interest* (New York: Macmillan, 1930); and William P. Yohe and Denis S. Karnosky, "Interest Rates and Price Level Changes 1952-69," this *Review* (December 1969), pp. 18-36.

⁶Charles Pigott, "Expectations, Money, and Forecasting of Inflation," Federal Reserve Bank of San Francisco *Economic Review* (Spring 1980), pp. 30-49.



If expectations of inflation were based closely on previous actual rates, the expected rate of inflation in the mid-1960s was approximately 1.5 percent. In contrast, from 1973 to early 1980, the GNP price deflator rose at nearly an 8 percent rate, and, in view of the 13 percent rates of increase in both consumer and producer prices in the 18 months ending March 1980, long-run inflationary expectations were probably in the 9 to 10 percent range in early 1980. The acceleration of price increases in late 1979 and early 1980 led to even higher short-run inflationary expectations at the end of March 1980.

Functions of Interest Rates

Interest rates serve a number of significant functions. First, they provide investors with a guide for allocating funds among investment opportunities. As funds are directed into projects that have higher expected rates of return (risk and other factors taken into account), the funds are optimally allocated from the viewpoint of both consumer and investor, since highest returns prevail where effective consumer demand is strongest. Unless an investment opportunity promises a return high enough to pay the market rate of interest, it does not justify the required capital

outlay. The money market, by channeling funds into projects that have an expected return in excess of the interest rate, provides a valuable service to investors, borrowers, and society as a whole.

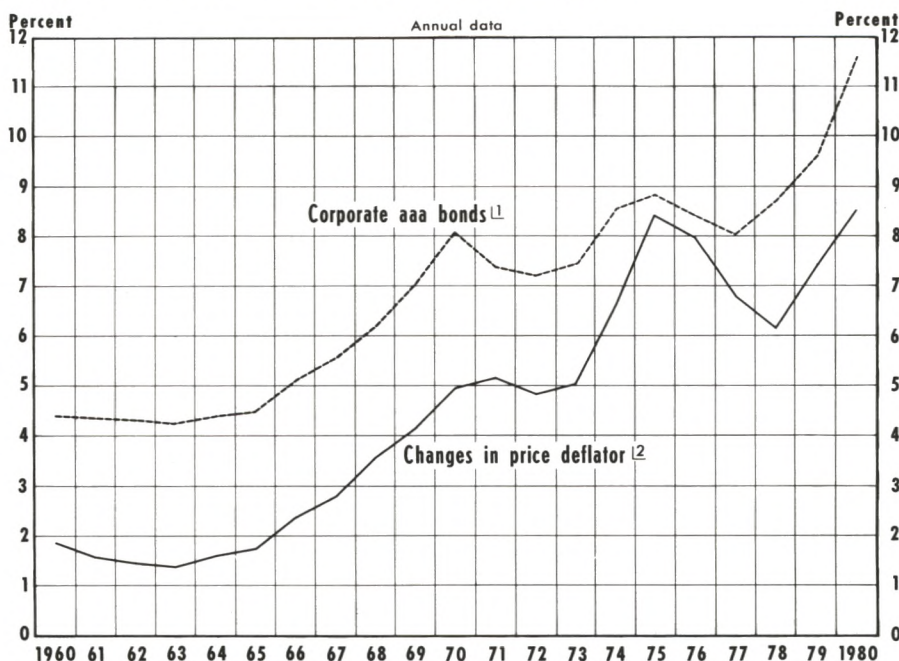
The interest rate also provides a measure of the relative advantage of current consumption compared to saving. By adjusting the available market rate for expected inflation and taxes, an individual can determine the real amount of additional future consumption that can be obtained by postponing current consumption.

Similarly, interest rates help businessmen decide among alternative production methods. Suppose a product can be made either solely with labor or with a combination of labor and machinery. By calculating the capital cost of the machine (the interest rate times the dollar amount invested in the machine), the expected labor-plus-capital cost can be compared with the labor-alone cost to determine the less expensive means of production.

Finally, interest rates that are free of legal restrictions can respond to changing demand/supply situations and, thus, contribute to economic resiliency and high employment. If, for example, a government

Chart 2

Long Term Bond Yields and Price Changes



¹ Annually averaged Moody's Seasoned Aaa bond yields.

² Rate of change of three-year moving average of GNP deflator placed on last year.

Note: 1980 data are averages of first two quarters.

spending program is trimmed, the initial result will be unemployment and idle factories. Everything else being equal, however, reduced government spending will eventually lead to less government borrowing and lower nominal interest rates. At these lower rates, more funds will be demanded by the private sector, thus generating increased private sector jobs.

Major Factors Influencing Interest Rates

As pointed out above, interest rates are determined by the demand for and supply of credit, both of which are affected by specific factors. As these factors change, interest rates change accordingly. The more important factors include saving, business and consumer investment, monetary actions, government deficits or surpluses, and income tax rates.

Saving is the source of credit and, consequently, the amount of savings is one of the prime determinants of the level of real interest rates. As saving increases, downward pressure is exerted on interest rates. Conversely, as individuals and businesses save less, or actually dissave, upward pressure is exerted on interest rates.

Financing business inventories and capital investment constitutes a major credit demand and, because

this demand is quite variable, it contributes materially to changes in interest rates. When economic activity is expanding and the outlook appears favorable, businesses aggressively seek more funds to finance additional production, plants, and equipment. On the other hand, when sales are sluggish and the future seems grim, investment plans are sharply curtailed and the demand for credit falls.

Similarly, consumers demand a substantial amount of credit to finance homes, automobiles, and other durable goods as well as to increase current consumption. This demand for credit also fluctuates widely as business conditions and the economic outlook change and, therefore, contributes significantly to interest rate movements.

Governments can either supply credit by running surpluses or demand credit to finance operating deficits. Since federal government expenditures have exceeded receipts in every fiscal year since 1969, the government has become a large demander of credit, contributing to upward pressure on interest rates. In contrast, the federal government operated at a surplus during the mid-1920s and, despite expanding business investment in that period, interest rates drifted lower on balance.

Expansions or contractions in the stock of money, for example, can temporarily influence real interest rates and permanently affect nominal market rates. If the Federal Reserve System expands the supply of money and bank credit faster than borrowers and lenders anticipate, the additional loan funds temporarily drive both market and real interest rates below what they otherwise would have been. If rapid monetary expansion continues, it will eventually be entirely reflected in a higher rate of inflation and a higher level of nominal interest rates.

People make economic decisions by taking into account all available information that has a significant bearing on the future consequences of their decisions. Hence, in recent years, it is likely that investors and savers began anticipating the longer-run impacts of monetary actions on interest rates sooner than they did in previous periods of marked and sustained change in the growth of monetary aggregates.⁷

Income tax considerations also influence market interest rates.⁸ Since borrowers are allowed to deduct interest payments in computing taxable income, the more relevant after-tax cost of funds is less than the stated contract rate. Lenders must include interest received as taxable income, making their after-tax return less than the contract rate. Therefore, income tax causes market rates to be higher than they would be otherwise. As market interest rates have increased in recent years along with rising inflationary expectations, the absolute impact of taxes has also risen greatly. An example will help clarify this fact.

Assume that federal and state income taxes have placed both the borrower and the lender in the 50 percent marginal bracket. If, as in the early 1960s, market rates were 5 percent, income taxes reduced the return by 2.5 percentage points, leaving a 2.5 percent after-tax interest rate. More recently, as market rates fluctuated around 14 percent, income taxes reduced the return to 7 percent, leaving a 7 percent after-tax yield.

In the mid-1960s, the after-tax real interest rate was about 1 percent (based on a market rate of 5 percent, less assumed inflationary expectations of 1½ percent

and a 2½ percentage point tax liability). Despite the sharp rise in market rates to 14 percent in early 1980, the after-tax real interest rate was lower than the mid-1960 rate and even negative. Assuming inflationary expectations of 9 percent per year and a tax bite of 7 percentage points, the 14 percent market interest rate implies a negative 2 percent after-tax real return.⁹ As the demand to borrow *increases* and the supply of credit *falls*, interest rates tend to surge upward until the *expected* real rate is positive.

Analysis of Interest Rate Rise — Late 1979, Early 1980

Market interest rates, although already high relative to most previous periods in this century, rose sharply from mid-1979 to early April 1980. For example, three-month treasury bill yields averaged 5 percent in 1976, 5.3 percent in 1977, and 7.2 percent in 1978. By June 1979, the yield was 9.1 percent but, by early April 1980, it had jumped to 14.8 percent. Virtually all other interest rates also recorded sharp increases in the late 1979-early 1980 period, with the increase being more pronounced for shorter-term than for longer-term maturities. Many forces combined to drive up yields.

Although personal income continued to rise in late 1979 and early 1980, personal saving declined substantially in that period, placing strong upward pressure on rates. In the first six months of 1979, personal saving grew at an \$83 billion annual rate; in the last six months of 1979, it declined to a \$65 billion rate; and in the first quarter of 1980, it again decreased to a \$64 billion rate. This decline in personal saving occurred for a number of reasons. Tax burdens rose more sharply than income, and inflation rapidly increased the cost of most consumer goods. With expectations of future prices being revised upward, the incentive to consume immediately was strengthened.

In this same period, investment in business plants, equipment, and inventories and in residential structures increased slightly on balance, creating an additional small upward pressure on rates. In the aggregate, gross private domestic investment inched up from a \$385 billion annual rate in the first half of 1979 to a \$390 billion rate in the last half, and then drifted to a \$388 billion rate in the first quarter of 1980. Fixed business investment rose, but this was

⁷See "Rational Expectations — Fresh Ideas That Challenge Some Established Views of Policy Making," Federal Reserve Bank of Minneapolis *Annual Report* 1977, pp. 1-13; and Thomas J. Sargent, "A Classical Macroeconomic Model for the United States," *Journal of Political Economy* (April 1976), pp. 207-37.

⁸John A. Tatom and James E. Turley, "Inflation and Taxes: Disincentives for Capital Formation," this *Review* (January 1978), pp. 2-8.

⁹Tom Herman, "Even Today's Steep Interest Rates Appear Low if Taxes and Inflation Are Taken Into Account," *Wall Street Journal*, April 3, 1980, p. 40.

largely offset by cutbacks in housing and in inventory growth.

Both saving and investment decisions were heavily influenced by accelerated inflation and inflationary expectations. Consumer prices, for example, rose at an average 4.3 percent annual rate from 1960 to 1977, 7.7 percent in 1978, 11.3 percent in 1979, and 18.1 percent in the first quarter of 1980. The rates of increase for producer prices were 3.9 percent, 7.8 percent, 10.9 percent, and 19.3 percent, respectively.

The marked increase in inflation during 1979 reflected both monetary and nonmonetary factors. From the third quarter of 1976 to the third quarter of 1979, the money stock rose at an average 8.3 percent annual rate compared with a 5 percent rate in the previous three years. This acceleration in monetary expansion caused an increase in the trend rate of inflation. Moreover, strong forces pushed the current measured rate of inflation considerably above the trend rate during 1979 and early 1980. Chief among these forces was a substantial increase in the price of oil by OPEC, which caused a major rise in the cost of energy and, in turn, placed large cost-push pressures on many other prices.

Federal government deficits increased in late 1979 and early 1980, placing further upward pressure on rates. Deficits, as recorded in the national income accounts budget, rose from an annual rate of \$9.4 billion in the first half of 1979 to \$12.7 billion in the second half and to \$22.9 billion in the first quarter of 1980.

In early October 1979, the Federal Reserve announced that it would provide only enough money to accommodate production at a gradually reduced rate of inflation. The uncertainty about how this new monetary policy would be implemented contributed to higher market interest rates for a time. Previously, from the third quarter of 1976 to the third quarter of 1979, money (M1B) had risen at an 8.3 percent annual rate. Then, from the third quarter of 1979 to the first quarter of 1980, money growth slowed to a more moderate 5.6 percent pace. In March and April 1980, money actually contracted. The short-run impact of the reduced money growth followed by the actual decline in money was a reduced supply of credit, which placed additional strong upward pressure on interest rates.

Analysis of Interest Rate Decline — After Early April 1980

The financial "crunch" ended in early April 1980. Interest rates, which had been rising sharply, sud-

denly began falling. The three-month Treasury bill yield, which was 14.8 percent in early April, averaged 10.3 percent in September. Other rates followed a similar course and, again, securities with the shortest maturities showed the widest movement.

One of the chief underlying factors responsible for this reversal was the lagged effects of the new monetary policy that was announced in early October 1979. This policy caused money to expand at a slower rate and, initially, placed upward pressure on rates because credit growth slowed. However, the secondary and more powerful effects of this action offset its initial impact after a few months.

One delayed result of supplying money to the market at a gradually slower rate was a dampening of economic activity. With less money being supplied, relative to the demand to hold money, spending gradually moderated. Nevertheless, credit demand continued strong for a time because consumers and businesses were uncertain about how long the pause in spending would continue and how long the Federal Reserve would continue to restrain money growth. As sales, production, and employment began falling, demand for business and consumer credit sharply declined.

Another result of the new monetary policy was its delayed effect on inflationary expectations. Since the rate of inflation is largely determined by the average rate of growth of money over the previous five years, the first few months of a new rate of money expansion has little effect on the five-year average growth trend and, hence, little effect on actual inflation. Moreover, since in the current situation there was uncertainty as to how long the Federal Reserve would maintain the more moderate money growth in view of the rapidly rising interest rates and the expansionary federal budget announced in January 1980, there was little or no downward revision of future inflationary expectations.¹⁰ The February to April 1980 money contraction, however, changed the situation dramatically. Since market participants began to believe that significant steps were being taken to reduce inflation (evidenced by the continued restraint on money growth despite the business downturn and extremely high interest rates), future inflationary expectations diminished.

In mid-March, the government imposed a number of credit controls to restrain credit demand. Since they applied to many new areas (e.g., credit cards

¹⁰The Kiplinger Washington Letter, February 1, 1980.

and money market funds), they were poorly understood. In addition, they were untimely because they were imposed just after the economy began an economic downturn. These controls, combined with other developments, caused consumers to reduce credit demands further which, in turn, contributed to the fall of interest rates after early April 1980.

With inflation still intensifying and interest rates rising in the first quarter of 1980, the Administration and many members of Congress felt that it was mandatory that the government follow a less expansive fiscal policy and, consequently, efforts were made to present a "balanced" budget. Although most analysts still felt that expenditures would continue to exceed receipts in fiscal 1980 and 1981, the concern of public officials and their announced intentions to trim outlays contributed to a reduction in inflationary expectations and in interest rates.¹¹

Interest Rates as a Measurement of Monetary Action

Market interest rate levels and movements have been used as guides to monetary actions, particularly by financial commentators and participants in money and capital markets.¹² High and rising market interest rates generally reflect monetary restriction, whereas low and declining rates indicate monetary ease. However, market interest rates may be rising while the real rates are falling, and it is the real rates that are important in terms of economic activity. Expansions or contractions of money and credit can force the real interest rate, as well as the market rate, to rise and fall, at least temporarily. Such changes in interest rates influence the cost of investing and, hence, the course of economic activity.

Notwithstanding, it is virtually impossible to isolate and interpret the effects of monetary actions on market interest rates. Not only are investment deci-

sions and saving/consumption choices (among other factors that influence interest rates) in constant flux, but monetary actions themselves have an ambiguous impact on rates due to the various lagging effects of these actions.¹³

If the stock of money is expanded unexpectedly, for example, the supply of available funds is augmented, real and nominal interest rates are initially depressed, and the economy is thereby stimulated. If the new course of rapid monetary expansion is continued for approximately a year, further stimulative effects on total demand will occur. At the same time, however, inflation and interest rates will also begin to move upward. If the same rate of money injection is followed for approximately five years, the effects of this expansive monetary action will be fully reflected throughout the economy. Interest rates will have reached a level which exactly reflects the real rate plus the long-run expected rate of inflation. Continuation of the faster monetary growth would have no further effects on real economic activity or the rate of increase of the price level.

Since, at any one time, market interest rates reflect the monetary actions taken over various past periods, they have been a less reliable guide to monetary actions than rates of growth of the monetary aggregates.¹⁴ More often than not over the past 60 years, when monetary expansion has been relatively rapid long enough to stimulate economic activity, interest rates have risen rather than declined. The chief reason is that inflation and inflationary expectations also increase when monetary expansion is substantial enough to drive the economy at a quicker pace. The greater activity and the revised inflation outlook raise the demand for credit even faster than the monetary expansion increases the supply. Similarly, when monetary contraction is continued for more than a few months, interest rates usually fall—not rise—since the monetary contraction eventually causes an even larger decline in credit demand by depressing total nominal demand for goods and services.

From this analysis, it can be concluded that from the third quarter of 1976 to the third quarter of 1979 monetary actions were expansive because money was increasing at a relatively rapid rate. During this pe-

¹¹The Kiplinger Washington Letter, March 21, 1980.

¹²At times, the Federal Reserve System has also used interest rates as a measure of monetary action. For example the 66th Annual Report of the Board of Governors of the Federal Reserve System states that, "Monetary policy in 1979 sought to curb inflationary pressures. . . . Early in the year, when . . . incoming economic data provided some indications of softening in economic activity, the Federal Reserve avoided measures that would have led to a marked rise in interest rates or would have severely reduced the availability of credit. But expenditures for goods and services strengthened as the year progressed, in part because of heightened inflationary expectations. Consequently, the System adopted a progressively less accommodative stance, allowing the federal funds rate to rise and increasing the discount rate in several steps." Board of Governors of the Federal Reserve System 66th Annual Report, 1979, p. 14.

¹³Michael J. Hamburger, "The Lag in the Effect of Monetary Policy: A Survey of Recent Literature," *Monetary Aggregates and Monetary Policy*, Federal Reserve Bank of New York (October 1974), pp. 104-113.

¹⁴William Poole, "Optimal Choice of Monetary Policy Instruments in a Simple Stochastic Macro Model," *Quarterly Journal of Economics* (May 1970), pp. 197-216.

riod, business activity increased and inflation intensified in response to the monetary stimulus. The higher interest rates reflected the greater economic activity and rising inflationary expectations that the monetary expansion fostered.

From the third quarter of 1979 to February 1980, monetary actions, as measured by money growth, gradually became less expansive. Since interest rates rose in this period, the two measures of policy temporarily gave similar signals of restraint as they frequently do around cyclical turning points in business activity.

From February to June 1980, money contracted — an indication that monetary actions were extremely restrictive. Until early April, interest rates continued to increase but then fell sharply, indicating to some people that a shift toward monetary ease had occurred. Business activity, however, declined sharply and inflation slowed after the first quarter of 1980. This decline in business activity and some downward revision in inflationary expectations were largely responsible for the fall in market interest rates.

Conclusions

Market interest rates have been moving gradually upward since 1976. One principal cause of the rise in rates over the longer period was an upward revision in inflationary expectations caused both by monetary developments and by an increase in oil prices by the international cartel. In addition, income tax implications for both borrower and lender and the continuously heavy borrowing by the government to finance operating deficits contributed to higher yields.

From mid-1979 to the end of March 1980, interest rates surged to unprecedentedly high levels. The main reasons for this rise were the slowing of money growth by the Fed, the acceleration in private borrowing (perhaps in *anticipation* of credit control restrictions), and the increase in government borrowing.

From September 1979 to June 1980, money (M1B) expanded at an average 3 percent annual rate, down from the rapid 8 percent average of the previous three years. Such a marked and sustained slowing in monetary growth temporarily placed strong upward pressure on interest rates. As the effects of this slower money growth were reflected in reduced spending and as the public gained confidence that a slower growth path for money might be continued, inflation and inflationary expectations began to recede. These developments, combined with the imposition of the credit restraints, caused market rates to fall abruptly after early April 1980.

A *marked* shift in monetary policy toward restraint, such as the one that occurred from September 1979 to June 1980, has mixed implications for the economy and future interest rates. On the one hand, the expected rate of inflation is reduced, at least temporarily. In addition, economic activity is depressed much more drastically during the transition to more stable prices than it would be if money growth were slowed gradually. This dramatic decline in economic activity pushes down interest rates. On the other hand, the lower sales, production, and employment during the adjustment period increase the chances that high monetary growth may be resumed and inflation may accelerate in the future. This would lead to an increase in interest rates.

