

# Commodity Prices and Monetary Policy Reform

By C. Alan Garner

In the 1970s, the United States experienced high and volatile rates of inflation. Although the inflation rate has decreased dramatically in recent years, concern remains about the harmful effects of price instability. Changes in the aggregate price level, particularly when unanticipated, adversely affect economic welfare. Inflation arbitrarily redistributes income and causes uncertainty about future prices, leading to poor resource allocation and reduced real output.

Because of the harmful effects of inflation, the Federal Reserve has sought to stabilize the aggregate level of prices. As part of its stabilization efforts, the Federal Reserve has modified its policy targets and operating procedures in recent years, giving more attention to growth of the monetary aggregates. However, some economists have proposed more extensive changes to constrain money creation and ensure long-term price stability. One set of monetary reform proposals would establish a

closer link between money growth and commodity prices.

This article argues that monetary reforms requiring a close link between commodity prices and money growth are inadvisable. In arriving at this position, the first section of the article sets forth criteria for a desirable monetary system and evaluates the current U.S. system relative to these criteria. The second section shows that a commodity standard would result in inefficient resource use and potential economic disruptions without guaranteeing price stability, thus failing to satisfy the criteria for a desirable monetary system. The third section argues that commodity prices would not make a good policy target within the present monetary system but that they might provide useful information for setting money growth targets.

## **A framework for evaluating monetary systems**

Any discussion of fundamental monetary reform requires a set of desired characteristics

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and an evaluation of the existing monetary system. Countries have tried a variety of monetary systems in the past, but none has been ideal in every respect. The purpose of a monetary system is to promote the smooth and

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efficient functioning of the economy. As the medium of exchange, money lowers the costs of trading goods and services. Money is also a unit of account and a store of value. Because of the various functions of money, several criteria are relevant in comparing monetary systems.

***Desirable characteristics of a monetary system***

One desirable characteristic of a monetary system is that it should ensure reasonable long-run stability of the aggregate price level. The value of money—its purchasing power in terms of goods and services—is inversely related to the general level of prices. Inflation, therefore, reduces the purchasing power of money. Inflation also reduces the real value of financial assets whose value is fixed in money terms. Finally, inflation causes uncertainty about the future price level and so lessens the willingness to make long-term financial commitments. If the inflation rate becomes too rapid, money loses its general acceptability in exchange, thereby reducing the efficiency of the real economy.

To prevent rapid inflation, the monetary system must limit the growth of the money supply. The value of money depends ultimately on its scarcity, which reflects supply and demand conditions. By keeping the money supply from growing more rapidly than

needed for sustained economic growth, the monetary system can ensure that money retains a reasonably stable value. Long-term price stability is also enhanced if people believe that money growth will not be excessive in the future. A credible commitment to price stability by the monetary authorities can help avoid inflationary expectations and their attendant economic uncertainties.

A second desirable characteristic of a monetary system is that it should not divert resources unnecessarily from the real sector of the economy to the monetary sector. Economic welfare depends ultimately on the production and consumption of real goods and services. Any monetary system requires some real resources to operate, but unnecessary use of resources in the monetary sector reduces the amount of goods and services for consumers.

A third desirable characteristic of a monetary system is that it should foster short-run stability of prices, employment, and real output. Unpredictable variations in money growth can cause fluctuations in aggregate spending and output. Unless the economy has substantial unemployed resources, a surge in spending can lead to inflationary pressures. Conversely, a drop in spending can create unemployment and excess capacity. At a minimum, the monetary system should not be a source of disturbances to aggregate spending.

***Evaluating the current monetary system***

The U.S. monetary system is based on fiat money—money not backed by anything of intrinsic value. Examples of fiat money are token coins, Federal Reserve notes, and checkable deposits. Because there is no inherent limit on the supply—or value—of fiat money, individuals hold it only to the extent that they believe their money balances will retain reasonably stable purchasing power.

To ensure long-run stability of prices, the current monetary system requires that the Federal Reserve exercise restraint in creating money. Although money creation depends to some extent on the behavior of depository institutions and the asset preferences of the nonfinancial sector, Federal Reserve policy actions dominate long-term movements of the money supply. Most advocates of a commodity-based monetary system doubt that central banks will exercise adequate restraint. They cite the accelerating inflation of the 1970s as evidence that there must be some institutional constraint on money creation to ensure reasonable price stability. However, rapid inflation is not an inevitable consequence of the current monetary system, and the Federal Reserve has adopted target money growth ranges as an aid in long-run restraint.

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resources from the real sector of the economy. The Federal Reserve can expand or contract the money supply through a series of relatively inexpensive financial transactions. To increase the quantity of money, the Federal Reserve buys securities in the open market, making appropriate bookkeeping entries when the proceeds are added to the reserve accounts of depository institutions. Using these reserves, the institutions can make loans and expand the supply of money. In this process, few real resources are diverted from the production of goods and services.

Moreover, the current system need not result in short-run fluctuations of money and prices that disrupt the smooth functioning of the economy. Because there is no inherent

constraint on the money supply, the Federal Reserve can take whatever discretionary policy actions seem necessary to reduce short-run fluctuations in output, employment, and prices. Indeed, historical evidence shows that output fluctuations have been smaller under the current monetary system than under previous systems. For example, recessions have been much less severe in the postwar period than in earlier years.<sup>1</sup> Although the current monetary system is not solely responsible for this increased economic stability, the monetary system has undoubtedly contributed to the smooth functioning of the economy.

### **Commodity standards**

A monetary system with a commodity standard requires that the money price of some commodity or group of commodities be fixed. Proponents of commodity standards place primary emphasis on the first desirable characteristic of a monetary system, the ability to provide long-term price stability. They believe the system should be governed by rules and institutions that put inherent limits on the growth of the money supply.<sup>2</sup> It is also important, however, to consider the other two desirable characteristics of a monetary system, low real resource costs and the potential for avoiding economic disruptions. A commodity

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<sup>1</sup>The greater stability of the postwar period is partly illustrated by the durations of business cycle expansions and contractions, as determined by the National Bureau of Economic Research. Over the ten peacetime cycles from 1879 to 1914, the average contraction lasted 20 months and the average expansion lasted 23 months. For the six peacetime cycles from 1945 to 1982, the average contraction lasted 11 months and the average expansion lasted 34 months.

<sup>2</sup>Advocates of a commodity standard have generally sought to restrict money creation and stabilize the price level, but Leland Yeager pointed out that some recent proponents of the gold standard prefer a system that would encourage money growth and inflation. See Leland B. Yeager, "Supply-Side Inflationism," *Cato Policy Report*, July/August 1984.

standard fares less well on these criteria. This section describes commodity standards in more detail and examines arguments for and against adopting a commodity standard.<sup>3</sup> Particular attention is paid to the gold standard because of its historical importance and recent interest, but the basic arguments are applicable to any commodity standard.

### *Essential features of a commodity standard*

To fix the price of one or more commodities as required by a commodity standard, there must be supporting legal and institutional arrangements. These arrangements assure that the money supply adjusts as necessary to keep a constant price for the commodities. Under a gold standard, for example, the government would set the price of gold by law. To guarantee that the official price prevails in the market, the government would hold substantial gold stocks and agree to buy or sell gold at this price. The official holdings of gold must be large enough to meet current and prospective demands for gold by the private sector.

Under a commodity standard, supply and demand in the private sector create a natural scarcity of the reserve commodity that limits increases or decreases in the money supply. For example, if the government fixes the dollar price of gold, then the purchasing power of the dollar is determined by the scarcity of gold. Under a gold standard, there is a nonmonetary as well as a monetary demand

for gold. The nonmonetary demand results from use of gold in the private sector for industrial and ornamental purposes. Similarly, the supply of gold is limited by rising production costs in the mining industry. Together, the supply of and demand for gold by the private sector create a natural scarcity that limits the potential for monetary expansion and thereby limits inflation.

The gold standard reached its peak in the United States from 1879 to 1914. The U.S. monetary system was characterized by a fixed dollar price of gold, a fractional reserve banking system with gold as a primary reserve, and free flow of gold between countries in settlement of international accounts. There was no central bank, but the Treasury stood ready to buy or sell gold at the official price of \$20.67 per ounce. Fractional reserve banking reduced the resource costs of the gold standard by

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allowing a larger amount of money to be based on a given amount of gold reserves. Because the gold standard was international, exchange rates between the dollar and major foreign currencies were fixed, and gold moved freely across national boundaries in response to payments surpluses or deficits.

To illustrate the adjustment mechanisms of a gold-standard economy, consider what happens if the prices of consumer goods and services increase. The purchasing power of money and the relative price of gold fall. Over time, the decrease in the relative price of gold discourages new gold production and encourages greater nonmonetary use of gold. Because less gold is sold to the monetary authority, growth of the money supply slows. Slower money growth holds down aggregate

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<sup>3</sup>There are many possible commodity-based proposals for monetary reform. Commodity standards and commodity price targets are representative cases for expository purposes, but some of the recent proposals lie between these extremes. For example, a gold exchange standard was advocated by Robert Mundell, "The Debt Crisis: Causes and Solutions," *The Wall Street Journal*, January 31, 1983. Mundell's plan has a central dollar/gold parity, but the actual dollar price of gold would be allowed to fluctuate in a band around the parity. Such proposals are not discussed explicitly here, but they are subject to the same basic criticisms concerning real resource costs and relative price changes.

spending and puts downward pressure on prices. Also, the initial rise in consumer prices makes exports less competitive and imports cheaper, leading to a trade deficit. Foreign countries with a trade surplus accumulate the domestic currency and convert it to the international reserve asset, gold. The resulting loss

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of gold reserves to other countries further decreases the domestic money supply and, therefore, spending. Similarly, the lower gold price leads to a decline in gold production, which depresses real income and spending by employees and suppliers of the mining industry. All of these mechanisms tend to pull consumer prices back to their original level.

One alternative to the gold standard is a system in which the dollar is backed by a fixed-weight bundle of several commodities.<sup>4</sup> For example, the monetary authority might fix the dollar price of a resource unit containing one ounce of gold, 100 bushels of wheat, and 500 pounds of cotton. In practice, the resource

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<sup>4</sup>In the 1940s, Benjamin Graham and Frank Graham proposed a "commodity-reserve currency." See Benjamin Graham, *World Commodities and World Currency*, McGraw-Hill, New York, 1944; and Frank D. Graham, *Social Goals and Economic Institutions*, Princeton University Press, Princeton, N.J., 1942.

Robert Hall has considered (but not endorsed) a multicommodity plan based on an earlier proposal by Irving Fisher. Hall envisioned a commodity bundle containing aluminum, copper, plywood, and ammonium nitrate. Historically, a weighted average of the prices of these commodities has been highly correlated with the general cost of living. Hall's plan allows periodic redefinitions of the dollar price of the resource unit. See Robert E. Hall, "Explorations in the Gold Standard and Related Policies for Stabilizing the Dollar," in *Inflation: Causes and Effects*, by Robert E. Hall, ed., University of Chicago Press for the National Bureau of Economic Research, 1982, pp. 111-122. Fisher described his plan in his *Stabilizing the Dollar*, Macmillan, New York, 1925.

unit might contain an even wider range of commodities. Under such a multicommodity standard, the monetary authority would permit relative prices between reserve commodities to vary but would buy or sell commodity bundles to maintain the dollar price of the composite unit. In all other respects, a multicommodity standard could function the same as a gold standard.

Most plans to establish a commodity standard in the United States have involved gold. This is not surprising because gold played a role in the U.S. monetary system during most of the period from 1834 to 1973. Some people still have strong emotional attachments to gold, and governments still hold large official stocks. In its 1982 report, however, the U.S. Gold Commission analyzed versions of the gold standard and recommended that there be no fundamental change in the monetary status of gold.<sup>5</sup>

#### *Arguments for a commodity standard*

Much of the appeal of a commodity standard lies in the inherent constraint that it places on money growth. Advocates of the gold standard believe that long-term price stability is more likely to be achieved by automatic mechanisms for monetary control than by the decisions of central banks and government agencies. Moreover, the automatic adjustments of a gold standard might increase the credibility of the nation's commitment to moderate money growth and stable prices.

William Fellner has argued that a credible policy stance can control inflation with less loss of real output and less unemployment

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<sup>5</sup>*Report to the Congress of the Commission on the Role of Gold in the Domestic and International Monetary Systems*, Volumes 1 and 2, Washington, March 1982. For arguments in favor of a gold standard, see Representative Ron Paul and Lewis Lehrman, *The Case for Gold*, Cato Institute, Washington, 1982; and statements by Jastram, Reynolds, and Rothbard in Volume 2 of the Gold Commission report.

than a policy that lacks widespread confidence.<sup>6</sup> According to Fellner, wage and price setting are forward-looking processes that depend crucially on inflation expectations. In turn, inflation expectations reflect the public's confidence in monetary institutions and policies. Therefore, if a commodity standard makes price stabilization policies more credible, expected inflation rates would be lower, the upward momentum of wages and prices would diminish, and inflation might be controlled at a lower cost.

A multicommodity approach has some advantages over a single-commodity standard. Production of the commodities used in a multicommodity standard affects a broader range of industries and a larger percentage of total output and employment than with a single commodity standard. Also, a composite commodity unit would be related more dependably to the aggregate price level than a single commodity such as gold. This is so because relative price disturbances to any one commodity have less effect on the relative price of the bundle to the extent that other reserve commodities experience offsetting price changes.

### *Problems with a commodity standard*

Even if a commodity standard provides automatic adjustment mechanisms, such mechanisms do not guarantee satisfactory economic performance. For example, a gold standard would not do well on the three criteria for evaluating monetary systems. A gold standard might limit money growth and inflation in the long run, but it would also divert resources

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<sup>6</sup>William Fellner, "The Credibility Effect and Rational Expectations: Implications of the Gramlich Study," *Brookings Papers on Economic Activity*, 1979:1, pp. 167-178. Although sympathetic to the gold standard, Fellner does not believe a return to gold is feasible at this time.

unnecessarily from the private sector and create the potential for short-run economic disruptions.

A major disadvantage of a gold standard is that scarce resources are locked up in monetary reserves. Gold is absorbed by official stocks and by any increase in private stocks due to gold's monetary role. If a fiat standard can efficiently perform the basic monetary functions, then gold is released for alternative uses such as ornamentation or the production of other goods and services.

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Another disadvantage of a gold standard is that changes in the relative price of gold could have adverse short-run effects on aggregate employment and output. For example, suppose that a technological innovation creates new industrial demands for gold. Because gold becomes scarcer, its price must rise relative to other goods and services. But the dollar price of gold is fixed because the monetary authority sells gold from its reserves to maintain the official gold price. Gold sales by the monetary authority withdraw reserves from the banking system and cause a drop in the money supply. A fall in the money supply decreases spending on all other goods and services, reducing their dollar prices and raising the relative price of gold. Since many product prices adjust slowly, substantial declines in real economic activity may be required to produce the necessary changes in relative prices. Equally painful adjustments must occur in labor markets, where substantial unemployment could precede wage declines.

In the long run, a change in the relative price of gold would affect the aggregate price level but not real output. Consider, again, the

case of new industrial demands for gold. The fall in prices and wages resulting from the higher relative price of gold would ultimately lead to restoration of full employment and production. However, the aggregate price level would be permanently lower because of the drop in the money supply. Conversely, a major gold discovery would lead to an increase in the money supply and higher aggregate spending. Higher spending would reduce the relative price of gold by raising the dollar prices of all other goods and services—that is, by general inflation. Because of the potential for relative price changes, a gold standard could never guarantee long-run stability of the aggregate price level.

During the years from 1879 to 1914, the U.S. gold standard permitted substantial variation in both prices and real output. Gold did limit long-run movements in the price level. Over periods of many years, price level movements in one direction were typically followed by price level movements in the opposite direction. Empirical evidence suggests that short-run price uncertainty under the gold standard may have been just as great as in recent years.<sup>7</sup>

Furthermore, two of the major forces that helped stabilize money growth and prices under the historical gold standard would not be effective if the United States were to adopt a gold standard now. A major adjustment mechanism under the classical gold standard

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<sup>7</sup>Richard Cooper has shown, for example, that the annual changes in both wholesale prices and real per capita income were more variable under the gold standard than in the postwar period. See "The Gold Standard: Historical Facts and Future Prospects," *Brookings Papers on Economic Activity*, 1982:1, pp. 1-56. For further discussion of the historical gold standard, see Roy W. Jastram, "The Golden Constant, or the Gold Standard and the Behavior of Commodity Price Levels," and Anna Schwartz, "The Past, Current and Prospective Role of Gold in the U.S. Monetary System," both in *The Gold Problem. Economic Perspectives*, by Alberto Quadrio-Curzio, ed., Oxford University Press for the Banca Nazionale del Lavoro and Nomisma, Oxford, 1982.

was the movement of gold between countries to settle international trade imbalances. With the current flexible exchange rate system, though, exchange rates adjust to prevent sustained trade imbalances. As a consequence, there would be no international gold flows to affect bank reserves or the money supply if exchange rates remained flexible.<sup>8</sup> Moreover, expansion or contraction of domestic gold production would have very little direct effect on employment and spending because gold production now accounts for a negligible fraction of GNP in the United States.

In addition, changes in the structure of the gold market have reduced the stabilizing

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response of gold output to a change in the relative price of gold. More than 70 percent of world production now comes from the Republic of South Africa or the Soviet Union. Because gold production is highly concentrated, gold output may not respond to price changes in the expected way. For example, world gold production declined during the 1970s despite a dramatic rise in the relative price of gold. Moreover, a gold standard could

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<sup>8</sup>Any modern U.S. gold standard would probably be a domestic standard with flexible exchange rates. Some proponents of gold have assumed that U.S. adoption of a gold standard would necessarily lead to a world system with fixed exchange rates, but there is no persuasive reason to support this view. The current flexible exchange rate system gives individual countries a substantial degree of monetary independence, whereas a fixed rate system would compel small countries to follow world trends of money growth and inflation. Because countries attach high priority to domestic objectives such as full employment and economic growth, they are unwilling to surrender the policy independence provided by a flexible rate system. At present, there is no movement toward an international gold standard, and any effort at resumption would face serious problems such as the large size of foreign dollar holdings relative to the existing U.S. gold reserve.

inject international politics into the domestic monetary system. The United States might be forced to abandon or modify its monetary standard if the government of South Africa or the Soviet Union tried to manipulate the price of gold for political purposes.<sup>9</sup>

Resumption of a gold standard after a long period under a fiat money system would raise special problems. It would be difficult to determine the proper "reentry price" for gold because the new monetary framework could alter the private sector's demand for and supply of gold.<sup>10</sup> If so, historical prices would not be a good guide to the new equilibrium price, and the selection of an incorrect reentry price could have serious inflationary or deflationary consequences.

Despite claims to the contrary, returning to a gold standard might not substantially increase the credibility of monetary policies designed to achieve price stability. Recognizing the dangers of an incorrect reentry price, the public would not immediately assign high credibility to the new monetary standard. Even after a period of successful operation, there still might be pressures for abolition or modification of the gold standard, as there were during the earlier gold standard period. At its height, the U.S. gold standard was controversial. In addition to an extended interruption of the gold standard from 1862 to 1878, there were several temporary suspensions of gold convertibility. The precariousness of the gold standard, even during its period of widest scope and acceptance, suggests that return to a

gold standard might not substantially improve the credibility of the government's commitment to price stability.

Although preferable to the gold standard in some respects, a multicommodity system also has drawbacks. The major drawback is that storage costs would generally be higher than under the gold standard. Whereas gold is extremely durable, commodities such as wheat, corn, and coal would deteriorate over time. Commodities with a low value relative to their physical volume would require costly warehouse facilities for storage. Moreover, a multicommodity standard would share with the gold standard potential defects such as relative price changes and political manipulation of commodity supplies.

### *Evaluating commodity standards*

A commodity standard does relatively well with respect to the first desirable characteristic of a monetary system, long-run price stability. By linking money creation to the market-determined scarcity of commodities, a commodity standard restrains money growth and inflation. However, the aggregate price level would not be perfectly stable in the long run because of trends in the price of commodities relative to other goods and services. A commodity standard might provide greater price stability than a poorly managed fiat system, but a well managed fiat system could certainly prove superior.

With respect to the other two desirable characteristics, a commodity standard would be inferior to the current fiat system. A commodity standard would divert commodities into the monetary system when these resources could instead add directly to consumer welfare. Furthermore, a commodity standard would permit substantial disruption of economic activity by microeconomic and political factors that influ-

<sup>9</sup>A flexible exchange rate system would not prevent a foreign shock to the gold market from disturbing domestic U.S. production, employment, and prices. A change in the relative price of gold abroad would cause the dollar to appreciate or depreciate relative to foreign currencies, and this would affect U.S. imports and exports.

<sup>10</sup>For additional discussion of the reentry problem, see Henry C. Wallich, "Obstacles to a Return to the Gold Standard," in *The Gold Problem: Economic Perspectives*.



ence relative commodity prices. From a macroeconomic standpoint, these disturbances are arbitrary and harmful.

Therefore, when judged against the three basic criteria, a commodity standard seems worse than the present fiat system. Unless one is extremely skeptical about the ability of central banks to achieve reasonable price stability, there is little reason to accept the disadvantages of a commodity standard.

### **Commodity prices within a fiat system**

Recognizing the problems inherent in a commodity standard, some advocates of monetary reform have proposed a more limited role for commodity prices in the existing fiat system. One proposal is for the Federal Reserve to target commodity prices as a way of ensuring that money growth is consistent with long-run price stability. Commodity prices could become the intermediate target of monetary policy within the current institutional framework because commodity price targets would not require official commodity reserves. Even if commodity prices are not a good policy target, they still might provide useful information for the implementation of monetary policy.

#### *Features of an intermediate target*

An intermediate target is an economic variable that is the predominant determinant of monetary policy actions.<sup>11</sup> The intermediate target value is not itself a policy goal. Instead, the target variable should be so closely related

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<sup>11</sup>For further discussion of intermediate targets, see Gordon H. Sellon, Jr., and Ronald L. Teigen, "The Choice of Short-Run Targets for Monetary Policy: Part 1," *Economic Review*, Federal Reserve Bank of Kansas City, April 1981, pp. 3-16, and Henry C. Wallich, "Recent Techniques of Monetary Policy," *Economic Review*, Federal Reserve Bank of Kansas City, May 1984, pp. 21-30.

to the macroeconomic goal variables that achieving the desired intermediate target value can be relied on to produce the desired macroeconomic outcomes.

A variable used as an intermediate target should have two characteristics. First, the target variable should be closely related to real output growth and inflation, the two primary goals of monetary policy. Second, the target variable should be affected quickly and reliably by open market operations and changes in the discount rate, the two primary instruments of monetary policy. The theory underlying use of intermediate targets is that the channels of monetary policy are so complex and the time lags so long that an intermediate variable between the policy instruments and the macro-

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economic goals is needed as a policy guide. If the target variable is closely related to the policy goals, then maintaining the proper value of the intermediate target will achieve the desired values of the goals. And, if the target variable is reliably related to the instruments of monetary policy, then the Federal Reserve can maintain the value of the intermediate target.

#### *Arguments for commodity price targets*

Several recent proposals have called for using either the price of gold or an index of sensitive commodity prices as an intermediate target of monetary policy.<sup>12</sup> For example, due

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<sup>12</sup>Robert J. Genetski, "The Benefits of a Price Rule," *The Wall Street Journal*, December 10, 1982; Alan Reynolds, "The Trouble with Monetarism," *Policy Review*, 21, Summer 1982, pp. 19-42; and Jude Wanniski, "The Fed: On Target for Snail-Paced Recovery," *The Wall Street Journal*, November 9, 1983

to concern about deflationary pressures, Jude Wanniski in late 1983 advocated easing monetary policy to stabilize the price of gold at \$425 per ounce. He argued that "the price of gold, not the quantity of money, is the best leading indicator of future inflations and deflations." Robert Genetski proposed that movements of sensitive commodity prices be emphasized in adjusting the instruments of monetary policy. Genetski recommended that a monthly "range of discretion" be established for the monetary base. As long as the monetary base remains within the specified range, the Federal Reserve may conduct policy as it sees fit. However, increases in sensitive commodity prices would automatically lower the range of discretion and decreases in commodity prices would automatically raise it. Both Wanniski and Genetski claimed that their proposed commodity price targets would be superior to money growth targets in achieving general price stability.

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*Commodity prices are not likely to satisfy the requirements for a good intermediate target.*

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Although commodity prices have not traditionally been viewed as a policy target, there is some basis for thinking they might meet the requirements for an intermediate target. First, changes in commodity prices are related to monetary policy's goal variables. The percentage change in prices of sensitive materials is one component of the widely followed composite index of leading indicators. Because of the auction character of commodity markets, sensitive commodity prices respond quickly to aggregate supply and demand conditions. Because of this, commodity prices may reflect a broad range of macroeconomic information.

In addition, there are direct linkages from commodity markets to the aggregate economy. Commodity production affects real income and expenditure, and commodity prices influence the costs of other goods and services. Second, there are channels by which monetary policy affects, and could conceivably control, commodity prices. Monetary policy influences real economic activity, thereby affecting the current consumption and industrial use of commodities. Policy actions also influence real interest rates and expected inflation, factors that affect desired commodity holdings.

*Problems with a commodity price target*

In spite of the linkages between commodity prices and macroeconomic variables, commodity prices are not likely to satisfy the requirements for a good intermediate target. Policymakers would have difficulty extracting reliable macroeconomic information from commodity prices because of relative price changes, the same basic problem that plagues commodity standards. Also, precise control of commodity prices would be difficult because the linkages to the instruments of monetary policy are indirect and hard to measure.

Relative price changes would pose severe problems for monetary policy with respect to the first requirement—a close relationship to goal variables. Large fluctuations in the relative prices of commodities are not uncommon. Because market-specific disturbances could lead to changes in the prices of commodities relative to other goods and services, movements in a commodity price index could be a misleading guide to future inflation and future economic activity. Unless policymakers recognized these market-specific disturbances and adjusted the target accordingly, a policy response based on changes in commodity prices could have undesirable effects on aggre-

gate output and prices.<sup>13</sup> Unfortunately, it is difficult to determine whether changes in commodity prices are due to market-specific disturbances or aggregate economic fluctuations. As a result, commodity prices are not closely related to inflation or other monetary policy goal variables.

There is another important caveat concerning the empirical relationship between commodity prices and macroeconomic goal variables. Historical evidence might give a misleading impression of the size of relative price movements under a commodity price target. In the postwar period, commodity prices did not play a major role in monetary policy. A shift toward a policy regime based on commodity prices could alter economic behavior.<sup>14</sup> For example, inflation expectations are a major determinant of commodity prices and would be changed by adoption of a commodity price target. Because of the increased importance of commodity prices in policy implementation, commodity prices would fluctuate less relative to the general price level. As a consequence, historical experience does not provide conclusive evidence on the significance of relative price changes under a commodity price target.

Moreover, the Federal Reserve could not control commodity prices satisfactorily, thus violating the second requirement for a good intermediate target. The channels through

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<sup>13</sup>Brunner emphasized that the relationship between sensitive materials prices and the general price level is apparently nonstationary. See Karl Brunner, "From the 'Upper Tail Theory of Inflation' to the 'Lower Tail Theory of Deflation,'" mimeo, Shadow Open Market Committee, 1984. Further criticism of commodity price rules is found in R. W. Hafer, "Monetary Policy and the Price Rule: The Newest Odd Couple," *Review*, Federal Reserve Bank of St. Louis, 65, February 1983, pp. 5-13.

<sup>14</sup>The general point that a change in the monetary policy regime can alter the behavior of producers and consumers is often called the "Lucas critique." See Robert E. Lucas, Jr., "Econometric Policy Evaluation: A Critique," in *The Phillips Curve and Labor Markets*, by Karl Brunner and Allan Meltzer, eds., Carnegie-Rochester Series on Public Policy, North-Holland, Amsterdam, 1976.

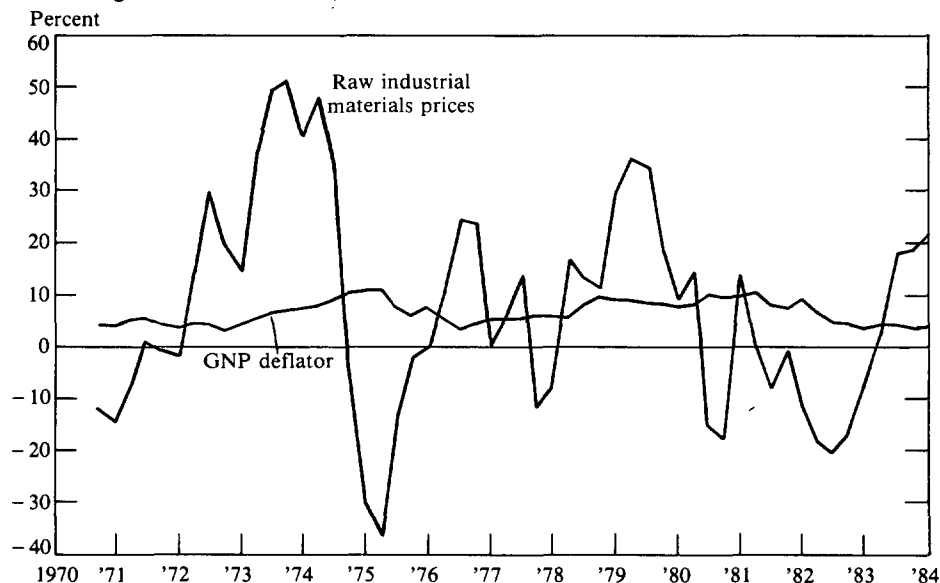
which monetary policy affects commodity prices are complex and circuitous. Policy actions influence current consumption and industrial use of commodities through their effect on the overall level of economic activity. Monetary policy also affects price expectations and interest rates, which influence speculative holdings of commodities. These different effects do not operate with the same time lag, and because of differences in price elasticities and storability, not all commodities are affected equally. Also, price expectations are difficult to measure or control.<sup>15</sup> As a result, it would be difficult for policymakers to produce the desired movements in an index of sensitive commodity prices.

The monetary aggregates seem to satisfy the basic criteria for good intermediate targets much better than commodity prices do. Admittedly, the monetary aggregates are not ideal policy targets. Shifts in the money demand function or changes in the interest sensitivity of private spending can alter the relationship between the monetary aggregates and macroeconomic goal variables. Similarly, changes in the deposit preferences of the non-financial sector or in the willingness of banks to borrow from the Federal Reserve impair short-run monetary control. Nevertheless, both theoretical and empirical studies confirm that money growth is closely related to aggregate spending. Moreover, the Federal Reserve can control money growth better than commodity prices because the policy instruments directly affect the money supply. For these reasons,

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<sup>15</sup>E. C. Hwa found that price expectations had a significant effect on commodity prices during the 1973-75 period but no significant influence before 1973. He concluded that "... the underlying forces that govern price expectations may be very unstable at times ... unless the variability of price expectations can somehow be captured, forecasting commodity prices will be a risky venture." See E. C. Hwa, "Price Determination in Several International Primary Commodity Markets: A Structural Analysis," *International Monetary Fund Staff Papers*, 26, March 1979, pp. 157-188.

**CHART 1**  
**Changes in raw industrial materials**  
**price index and GNP deflator**  
 (Two-quarter changes at annual rates)



the monetary aggregates deserve greater weight than commodity prices in determining how to adjust the policy instruments in order to achieve the desired objectives.

*Commodity prices as an information variable*

Although commodity prices do not satisfy the requirements for a good intermediate target, they may be useful as information variables. An information variable helps policymakers determine the true relationship between the intermediate targets and the goal variables. Many economic variables can serve simultaneously in this capacity. The Federal Reserve assigns primary importance to the growth rates of the monetary aggregates in seeking to achieve long-run price stability and high economic growth. However, if the economic structure changes or if the targets are set incorrectly because of inadequate eco-

nommic knowledge, money growth targets may need to be modified. Commodity prices may help determine when and to what extent such modifications are necessary.

Empirical evidence suggests that commodity prices provide only limited information about the future course of the economy. Although commodity prices are a leading economic indicator, their relationship to the goal variables is

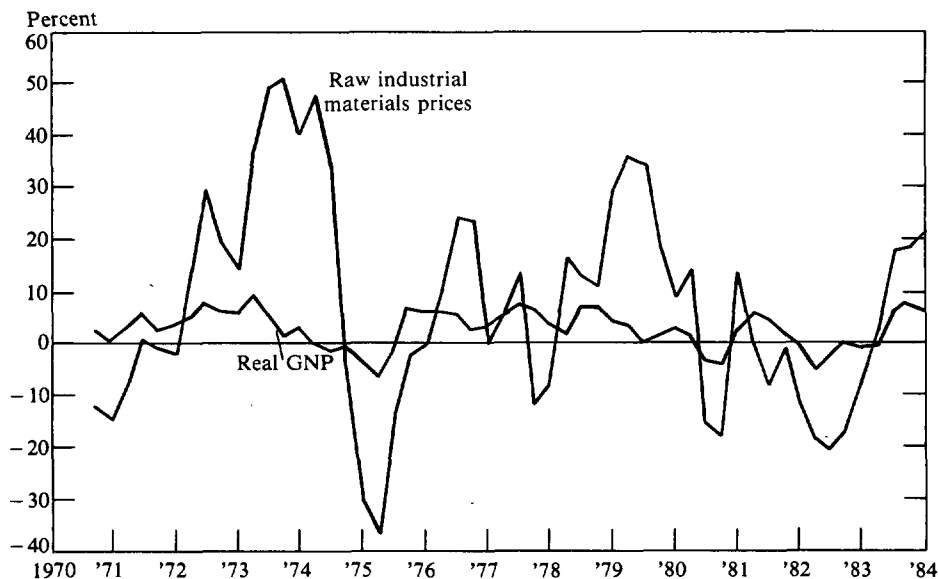
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*The monetary aggregates deserve greater weight than commodity prices in determining how to adjust the policy instruments.*

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not reliable enough to justify a central place in monetary policy. Charts 1 and 2 demonstrate how weak the relationship between commodity prices and the ultimate policy objectives really is. Chart 1 plots percentage changes in

**CHART 2**  
**Changes in raw industrial materials**  
**price index and real GNP**  
 (Two-quarter changes at annual rates)



raw industrial prices and the GNP deflator from 1970 through 1983. Chart 2 plots changes in raw industrial prices and real GNP over the same period.<sup>16</sup> In neither case is the relationship particularly close, and there are clear examples of false signals. For example, Chart 1 shows that the rate of change of sensitive commodity prices increased substantially in 1978 and decreased sharply in 1979 even though the rate of change in the GNP deflator remained quite stable. Similarly, in the second half of 1978, a rise in the rate of commodity price inflation was accompanied by a decline in the growth rate of real output.

<sup>16</sup>The index of raw industrial materials prices in Charts 1 and 2 covers a narrow group of industrial commodities such as tin, zinc, rubber, burlap, and cowhides. Both charts display two-quarter changes expressed as annual rates. The prices of these commodities are believed to be especially sensitive to changes in demand pressures. Genetski used the same index in his discussion of commodity price rules.

Other statistical evidence supports the view that raw industrial prices are at best a weak leading indicator of real GNP. This is confirmed by the evidence in Table 1. The first three rows of Table 1 report correlations of quarterly real GNP changes with contemporaneous and lagged values of quarterly commodity price changes for various sample periods. The correlations are typically small and positive. Other studies have focused on the turning points of economic time series rather than on simple correlations.<sup>17</sup> These studies have found

<sup>17</sup>This approach establishes dates for peaks and troughs in materials price changes and examines the length and regularity of the lead or lag relative to turning points in other cyclical variables. In contrast, the correlation method considers all observations on the relevant variables and assigns no special significance to turning points.

Researchers at the National Bureau of Economic Research developed the turning-point methodology, and Geoffrey Moore has applied it to inflation forecasting. See Geoffrey H. Moore, "Sequences in the Inflation Cycle," *The Morgan Guaranty Sur-*

**TABLE 1**  
**Correlations between changes in commodity prices**  
**and changes in macroeconomic variables**

Macroeconomic Variable	Sample Period	Lag in Commodity Prices				
		0	1	2	3	4
GNP	1955-84	0.32*	0.28*	0.19*	0.10	0.17
GNP	1955-70	0.34*	0.22	-0.04	-0.18	0.03
GNP	1970-84	0.28*	0.27*	0.22	0.12	0.14
GNP Deflator	1955-84	0.04	0.01	-0.02	-0.04	-0.06
GNP Deflator	1955-70	0.21	0.00	-0.08	-0.01	0.04
GNP Deflator	1970-84	-0.20	-0.20	-0.25	-0.32*	-0.38*

\*Significantly different from zero at the 0.05 level.

Note: The sample periods are 1955:Q2-1984:Q1, 1955:Q2-1970:Q1, and 1970:Q2-1984:Q1. The data are quarterly changes at annual rates. Similar results are obtained with two-quarter changes.

that peaks in commodity price changes usually precede peaks in industrial production and troughs in commodity prices usually precede troughs in industrial production. The studies also find that the usefulness of commodity prices in economic forecasting is reduced by occasional false signals and considerable variation in lead times. For the most part, then, the turning-point evidence suggests that commodity prices do provide some useful information about the future course of the economy.

Commodity prices are even less closely related to inflation. The last three rows of Table 1 report correlations of changes in the quarterly GNP deflator with changes in quarterly raw industrial prices. Most of the correlations are small, and only two of the 15 are

statistically significant. The switch from positive to negative correlations between the 1955-70 and 1970-84 periods shows that this is a particularly unreliable relationship on which to base policy decisions. The turning-point studies do provide some support for the view that commodity prices lead movements in the general inflation rate, but again there are false signals and inconsistent lead times.<sup>18</sup>

<sup>18</sup>Further statistical tests support these general impressions. Yeats examined the predictive powers of the Federal Reserve Board Sensitive Price Index. He concluded that this index performed well as an indicator of real variables, such as industrial production and personal income, but did not help in forecasting changes of a broad price index, such as the CPI or the WPI. Neftci tested whether selected "leading" time series improved predictions of industrial production and the unemployment rate. With seasonally adjusted data, crude materials prices did not prove useful; with seasonally unadjusted data, they did. Finally, Brunner tested whether sensitive commodity prices lead movements of the CPI or the GNP deflator. He concluded that they are not a good indicator of impending inflation or deflation.

See Karl Brunner, "From the 'Upper Tail Theory of Inflation' to the 'Lower Tail Theory of Deflation,'" Salih N. Neftci.

vey, April 1980, pp. 12-14, and Geoffrey H. Moore, *Business Cycles, Inflation, and Forecasting*, Ballinger Publishing for the National Bureau of Economic Research, Cambridge, Mass., 1983.

Because their relationship to the goal variables is weak and unreliable, the best policy role for commodity prices is to serve as one of a set of information variables used by policymakers to evaluate economic conditions and to set money growth targets. In this capacity, commodity prices are subordinate to the monetary aggregates but may provide information that improves the Federal Reserve's ability to reduce short-run economic fluctuations and achieve long-run price stability. Commodity prices could at least reveal market-specific supply shocks, which the Federal Reserve may want to accommodate in the short run to prevent undue economic disruptions. More generally, commodity prices may signal cyclical turning points or major changes in inflation expectations, thereby providing information useful in setting money growth targets.

## Conclusion

After a period of high inflation and general economic uncertainty, it is tempting to seek reforms that hold out the prospect of a more

stable price level. The costs and benefits of such proposed changes should be evaluated carefully, however. The costs of commodity standards and commodity price targets are clearcut, but their benefits are questionable. A commodity standard would impose real resource costs on the economy. Commodity prices are not a feasible policy target because they cannot be adequately controlled. Moreover, relative price changes would have adverse effects on the aggregate economy whenever commodity prices have a prominent role in monetary policy. There is little evidence that such a prominent role for commodity prices would improve short-run economic performance. Even in the long run, neither a strict commodity standard nor commodity price targets would ensure greater stability in the aggregate price level. It seems best, therefore, to concentrate on improving current monetary institutions and procedures. One possibility is to employ commodity prices as one of several information variables used to determine the monetary targets most likely to be consistent with the ultimate policy goals.

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"Lead-Lag Relations, Exogeneity and Prediction of Economic Time Series," *Econometrica*, 47, January 1979, pp. 101-113; and A.J. Yeats, "An Evaluation of the Predictive Ability of the FRB Sensitive Price Index," *Journal of the American Statistical Association*, 68, December 1973, pp. 782-787.

# Price Stability and Public Policy

One of the major policy issues of the day is how to consolidate the gains made against inflation while sustaining economic growth. To examine this important issue, the Federal Reserve Bank of Kansas City brought together several leading economists for a symposium on price stability and public policy at Jackson Hole, Wyoming, on August 2 and 3, 1984. Contents of the 227-page proceedings are listed below.

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