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The Gold Standard: Historical Facts and Future Prospects

GOLD is a hardy perennial. It provides a psychological and material safe haven for people all around the world, and its invocation still produces deep-seated visceral reactions in many. It is not surprising, then, that when economic conditions are unfavorable, proposals to strengthen the role of gold in the monetary system find an audience much wider than the "gold bugs" who have always seen the demise of the gold standard as the negative turning point in Western civilization.

The early 1980s is one of these periods. A number of proposals have been put forward to reinstitute some monetary role for gold, varying from window dressing to a full-fledged revival of the gold standard. These proposals are being treated with a seriousness that would have been astonishing twenty, ten, or even five years ago. An official examination of the subject was undertaken by the Gold Commission, which was established by President Reagan in June 1981 and issued its contentious report in March 1982; and several bills have been submitted to Congress with the objective of reviving a monetary role for gold.[1]

1. Establishment of the Gold Commission was not at President Reagan's initiative, however. He was responding to a statutory requirement to study U.S. policy on the role of gold in the domestic and international monetary systems. In 1980 President Carter signed an act to increase U.S. quotas at the International Monetary Fund, to which this requirement had been added as a rider by Senator Jesse Helms.

With much disagreement among its members, the Gold Commission recommended against restoration of any formal monetary role for gold. In its one positive recommendation, the majority of the commission favored issuance of gold coins by the U.S. Mint, denominated by weight, sold at market prices, and exempt from capital gains taxation. See *Report to Congress of the Commission on the Role of Gold in the Domestic and International Monetary Systems* (Government Printing Office, 1982).

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This paper first offers a review, necessarily brief, of the heyday of the historical gold standard, focusing on those features that today are alleged to be the advantages of a gold standard. The paper then provides an examination of the leading proposals for reviving gold at the present time and addresses problems with and consequences of their implementation. Finally, since interest in reviving gold lies primarily in a desire to eliminate inflation and preserve a noninflationary environment—a point on which the historical gold standard offers little comfort—a final section of the paper considers other proposals for commodity standards that go beyond reliance on the single commodity, gold, to stabilize the general level of prices.

Before turning to the history of the gold standard, however, I examine briefly the stated and sometimes implicit objectives of those who advocate an important monetary role for gold. The primary emphasis, as noted above, is the restoration and maintenance of price stability; it is this motive, I believe, that gives gold such wide support. If the monetary side of the economy is somehow restrained by gold, the argument runs, the economy cannot inflate and prices will be stabilized. That is ultimately an empirical question, which can be addressed scientifically. But there seem to be other motivations as well. Some see restoration of gold as a way to reestablish fixed exchange rates among major currencies. To accomplish this result, all the relevant countries would have to restore a monetary role to gold in the required fashion. Action by the United States alone would not accomplish this objective; currencies could float against the U.S. dollar even if it were tied to gold.

Finally, and perhaps most fundamentally, many advocates want greater automaticity in management of the economy, and especially monetary policy, as an objective in its own right even if the automaticity results in greater economic instability. Such underlying philosophical differences in preferences do not readily lend themselves to economic or other empirical analysis, although they derive in part from a supposed association of large government discretion in economic (and other) management with a loss of individual freedom. I am not aware, however, that this last association has been made in arguing for a return by the United States to a gold standard, at least since Americans have once again been permitted to buy and sell gold freely.[2] But to the extent that

2. The point was made explicitly twenty years ago by Arthur Kemp, however, who observed that the ability to carry wealth, especially gold coins, has provided individuals

such philosophical views govern, historical evidence on economic performance under the gold standard is of secondary importance, if that. It is to the historical record, nonetheless, that I now turn.

History of the Gold Standard

While gold has been used as a store of value and as a means of payment since ancient times, the international gold standard proper dates only from the 1870s.[3] It lasted until 1914, and then had a brief revival in the late 1920s. Britain, it is true, was on a full legal gold standard from 1816, and on a de facto gold standard after 1717, when Sir Isaac Newton, by then a famous personage and Master of the Mint, did not depreciate gold enough when he set the official silver price of the gold guinea at 21 shillings and thereby inadvertently continued to drive the newly re-minted full-bodied silver coins out of Britain—an illustration of Gresham's law—leaving only worn silver coins to circulate as means of payment along with the overvalued gold coins. This error in judgment established the gold standard in practice; it was codified into law following the Napoleonic wars in what became in the nineteenth century the world's leading economic and military power. That in turn influenced others, especially Germany and later Japan, to turn to the gold standard, which was seen as part of the syndrome of British success. So the gold standard as it has come down to us in textbooks, though not the monetary use of gold, was in a sense an accident of history.

Until the late nineteenth century most countries were on a bimetallic standard, interspersed with occasional periods of inconvertible paper (as in the United States in the 1780s and the 1862–78 period, or in Britain from 1797 to 1821). Some countries, such as China and Mexico, were on silver alone and remained so into the twentieth century. Holland and

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with the opportunity to escape from political tyranny throughout history. See Kemp, "The Gold Standard: A Reappraisal," in Leland B. Yeager, ed., *In Search of a Monetary Constitution* (Harvard University Press, 1962), pp. 137–54, especially pp. 152–53. This volume, incidentally, offers an excellent sampling of the debate twenty years ago on sound versus unsound money and the desirable degree of discretion to leave in the hands of the monetary authorities—with a heavy majority of the contributors being against much, if any, discretion.

3. The oldest known gold coins date from the sixth century B.C. See Brian Kettell, *Gold* (Ballinger, 1981), pp. 20–21.

Belgium even switched from bimetallism to silver alone in 1850 on the grounds (following the California gold discoveries in 1848) that gold was too unstable to provide the basis for the currency. The United States adopted a de facto gold standard with resumption of specie payment on the Civil War greenbacks in 1879 (some would say it was formal, since the standard silver dollar was dropped from the coinage in the "crime of 1873"); it moved formally with the Gold Standard Act of 1900.

What were the features of this gold standard? Arthur Bloomfield, perhaps the leading American authority on the gold standard, characterized it in this way: "The national monetary unit was defined in terms of a given quantity of gold; the central bank or treasury stood ready to buy and sell gold at the resulting fixed price in terms of the national currency; gold was freely coined and gold coins formed a significant part of the circulating medium; and gold could be freely exported and imported."[4] These conditions in turn implied nearly fixed exchange rates between the currencies of countries on the gold standard, assured by the possibility of profitable gold arbitrage whenever exchange rates reached the gold export or import points, determined by mint charges (if any) and the costs of shipping gold.[5]

How did this system fare in terms of economic performance? The idealized gold standard as it appears in textbooks conveys a sense of automaticity and stability—a self-correcting mechanism with minimum human intervention, which assured rough stability of prices and balance in international payments.

The actual gold standard could hardly have been further from this representation. As noted above, the major countries of the world were on the gold standard proper only from the 1870s to 1914, and briefly between the two world wars. The first period went down in history as the Great Depression—until, that is, the second period came along to exceed it in depth and severity.

With a dose of nostalgia, the gold standard period looks somewhat

4. Arthur I. Bloomfield, "Gold Standard," in Douglas Greenwald, ed., *Encyclopedia of Economics* (McGraw-Hill, 1981), p. 452.

5. Variations in exchange rates were thus influenced by the gradual decline in shipping costs, by interest rates, and by changes in mint charges. In the 1880s the range for fluctuation in the pound-dollar rate of exchange was about 1.3 percent; that between the British pound and the French franc was about 0.8 percent. See Oskar Morgenstern, *International Financial Transactions and Business Cycles* (Princeton University Press, 1959), p. 177.

Table 1. Economic Variables in the United States and the United Kingdom under the Gold Standard and since World War II

Measure	*United Kingdom*		*United States*	
	Gold standard, 1870–1913	*Postwar, 1946–79*	*Gold standard, 1879–1913*	*Postwar, 1946–79*
Average annual change in wholesale prices (percent)[a]	−0.7	5.6	0.1	2.8
Standard deviation of price change (percent)[b]	4.6	6.2[c]	5.4	4.8[c]
Average annual growth in real per capita income (percent)	1.4	2.4	1.9	2.1
Coefficient of variation of annual percentage changes in real per capita income (ratio)[d]	2.5	1.4	3.5	1.6
Average unemployment rate (percent)	4.3[e]	2.5	6.8[f]	5.0
Average annual growth in money supply (percent)[a]	1.5	5.9	6.1	5.7
Coefficient of variation of growth in money supply (ratio)[d]	1.6	1.0	0.8	0.5

Sources: Michael David Bordo, "The Classical Gold Standard: Some Lessons for Today," *Review of the St. Louis Federal Reserve Bank*, vol. 63 (May 1981), p. 14, and calculations from George F. Warren and Frank A. Pearson, *Gold and Prices* (Wiley, 1935), pp. 13–14, 87; B. R. Mitchell, *Abstract of British Historical Statistics* (Cambridge University Press, 1971), pp. 367–68; Council of Economic Advisers, *Economic Report of the President, January 1982;* and International Monetary Fund, *International Financial Statistics*, various issues.

a. Calculated as the time coefficient from a regression of the log of the variable on a time trend.

b. Calculated as the standard error of estimate of the fitted equation $\ln P_t = a \ln P_{t-1}$, where P_t is the wholesale price index in year t.

c. 1949–79.

d. Calculated as the ratio of the standard deviation of annual percentage changes to their mean.

e. 1888–1913.

f. 1890–1913.

better to us than it did to contemporaries. Economic growth during the late nineteenth century was very respectable, although in per capita terms it falls short of the 2.1 percent achieved in the United States during the thirty years between 1950 and 1980. Variability in income growth was substantially higher under the gold standard than it was after World War II, and average unemployment was also considerably higher (see table 1). Moreover, the last third of the nineteenth century was a period of unprecedented controversy over the monetary standard in the United States, first over the resumption of gold convertibility at a fixed

rate for the Civil War greenbacks, then over the monetary role of silver. Legislation was almost constantly before Congress to change monetary relations. Some of the legislation passed into law. The Bland-Allison Act of 1878 authorized the U.S. Department of the Treasury to buy $2 to $4 million in silver each month, and the Sherman Silver Purchase Act of 1890 raised this figure to nearly $6 million and made the purchases of nearly all U.S. output obligatory. The Silver Purchase Act was repealed in 1893 following a sharp decline in the world price of silver and a sharp increase in calls on gold at the Treasury. A National Monetary Commission was established following the "panic of 1907," and the Federal Reserve Act passed in 1913.

The year 1896 saw the only U.S. presidential campaign devoted to the issue of the monetary standard, following William Jennings Bryan's nomination on the basis of his famous "cross of gold" speech. Most of the attempts to alter monetary relations and to dislodge the United States from a gold standard failed. But the point is that the issue was a source of continual turmoil and uncertainty, not serene stability.[6]

There was less monetary debate in Britain during this period—that had taken place in 1815–20, surrounding the resumption of specie payment after the Napoleonic wars. But even Britain was not immune from concerns about the monetary system, and established the Royal Commission on the Depression of Trade and Industry in 1886 and the Gold and Silver Commission in 1887, to both of which Alfred Marshall gave important testimony. There were international conferences on the monetary standard (mainly an effort to preserve bimetallism) in 1878, 1881, and 1892, although Britain attended without enthusiasm.

So much for the political agitation. What about economic developments? The late nineteenth century was no doubt a period of rapid growth, especially in manufacturing. There was a sharp decline in both inland and ocean transportation costs and a great increase in international trade. But it was also a period of great distress, with large-scale emigration from Europe, and one in which there was great labor strife and formation of labor unions.[7]

6. An excellent discussion of this period, brief but well-documented, can be found in Arthur Nussbaum, *A History of the Dollar* (Columbia University Press, 1957).

7. During the 1880s, for instance, no less than 80 percent of the natural increase in British population emigrated, and one-third of the natural increase in Germany. Calculated from B. R. Mitchell, *European Historical Statistics, 1750–1970* (Columbia University Press, 1975), pp. 20, 24, 138, 139.

PRICE MOVEMENTS

Price stability was not attained, either in the short run or in the long run, either during the period of the gold standard proper or over a longer period during which gold held dominant influence. In fact, in the United States short-run variations in wholesale prices were higher during the prewar gold standard period than from 1949 to 1979. The standard deviation of annual movements in prices was 5.4 percent in the earlier period and only 4.8 percent in the latter period (see table 1).[8] It could be argued that such short-run variations are of little economic consequence—it is the long-run trend that is important for contracts and other economic transactions, and the trend was upward in the postwar period. However, current efforts to explain the costs of inflation focus inter alia on the confusion of signals that is introduced when the general level of prices is changing, so that buyers and sellers, with imperfect information, cannot clearly distinguish the relative price movements that are important for resource allocation. This argument applies with even more force to short-term fluctuations in price levels than to long-term movements.

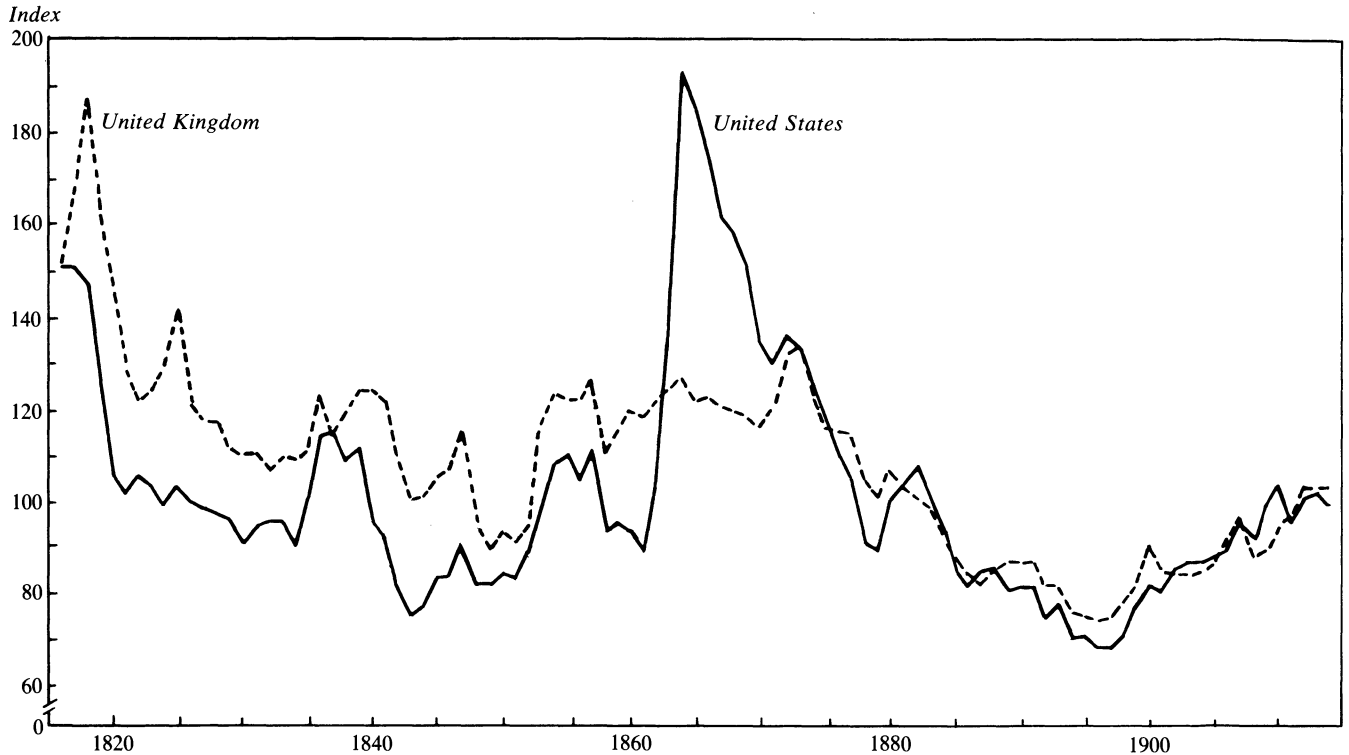
However, the gold standard did not assure price stability in the long run either. Price "stability" in the sense of a return to earlier levels of prices was obtained over longer periods only by judicious choice of the years for comparison. If one chooses 1822, 1856, 1877, late 1915, and 1931, for instance, the U.S. wholesale price level indeed appears unchanged. But between these dates there were great swells and troughs (see figure 1).

Table 2 shows cumulative price movements from peak to trough (excluding the U.S. Civil War) in four countries during the century from 1816 to 1913. Although each country had its distinctive national developments, the parallelism among price movements is striking.[9] Prices

8. These standard deviations are calculated as the standard error of estimate of the fitted equation, $\ln P_t = a \ln P_{t-1}$, where P_t is the wholesale price index in year t. This statistic for Britain showed a higher standard error for the more recent period than for the gold standard era, 6.2 percent versus 4.6 percent. Moreover, if price changes are measured over five-year intervals, as from $\ln P_t = b \ln P_{t-5}$, the standard error is higher in the more recent period for both the United States and Britain. The standard errors for the United States and Britain, respectively, are 13.7 and 11.3 percent in 1884–1913 and 21.0 and 37.8 percent in 1953–79.

9. The indexes are dominated by tradable goods, so under fixed exchange rates, and except for changes in import tariffs, that would ensure close correspondence in the latter part of the period when transport costs were low.

Figure 1. Wholesale Price Indexes in the United States and the United Kingdom, 1816–1914[a]



Source: George F. Warren and Frank A. Pearson, *Gold and Prices* (Wiley, 1935), pp. 13–14, 87.
a. 1910–14 = 100.

Table 2. Wholesale Price Indexes for the United States, the United Kingdom, Germany, and France, Selected Years, 1816–1913

Year and period	*United States*	*United Kingdom*	*Germany*	*France*
Indexes (1913 = 100)				
1816	150	147	94	143
1849	82	86	67	94
1873	137	130	114	122
1896	64	72	69	69
1913	100	100	100	100
Changes (in percent)				
1816–49	−45	−41	−29	−33
1849–73	67	51	70	30
1873–96	−53	−45	−40	−45
1896–1913	56	39	45	45

Sources: Data for the United States and the United Kingdom are from Warren and Pearson, *Gold and Prices*, pp. 87–88; data for Germany and France are from B. R. Mitchell, *European Historical Statistics, 1750–1970* (Columbia University Press, 1975), pp. 736–39.

declined 30 to 45 percent from the highs of the post-Napoleonic period, rose about 50 percent until the general establishment of the gold standard in the 1870s, fell about 50 percent again until the gold discoveries of the late 1890s, then rose sharply in the two decades before World War I. This is hardly a pattern of stability, even long-term stability, although there were prolonged periods of price decline as well as of price rise. But the full swings are so long in duration—forty to sixty years—that they can hardly have offered much comfort for any but the longest term financial contracts, and then only because of the accidents of war or discovery.

Although *we* know that the price level of 1822, during a period of secular price decline, would be restored by 1856, a period of price increase, and again by 1877, a period of decline, did the *contemporaries* know it? That is what is relevant. Several points can be made on this score, although some puzzles remain. Indeed, even the idea of a price index was in its infancy. Laspeyres, whose name is still used on base-weighted index numbers, published his ideas in 1864. At about the same time, Stanley Jevons (credited by Irving Fisher as the originator of index numbers) was making the distinction between short-term and long-term fluctuations in the general level of prices. The idea of a general level of prices had been around for a long time, but refinement and regular

measurement had not yet occurred. Jevons was certainly aware of them, and of their reciprocal, the value of gold, when he raised the question in 1875 of whether "having regard to these extreme changes in the values of the precious metals, it is desirable to employ them as the standard of value in long lasting contracts."[10] And in his testimony before the Royal Commission on the Depression of Trade and Industry in 1886, Alfred Marshall proposed that the government "should publish tables showing as closely as may be the changes in the purchasing power of gold, and should facilitate contracts for payments to be made in terms of units of fixed purchasing power." In the same evidence Marshall alludes to a "search for a better and more stable currency than our present."[11] From these remarks one may infer that there was not a generally accepted index of the purchasing power of (gold) money, and that contracts written in money terms were not stable in terms of purchasing power over goods other than gold, presumably even after allowing for adjustments in the interest rate (to which Marshall does not allude).

What is perhaps more to the point, however, is that the financial community—both borrowers and lenders—apparently thought that the long-term price level was roughly stable from its present level, adjusted slightly on the basis of recent past experience, but they were continually fooled. Long-term interest rates in the United States, as measured by railway bonds with original maturities from twenty to one hundred years, fell steadily from 9.5 percent in 1857 (the first year of the series), to 6.6 percent in 1877, 4.3 percent in 1896, and 3.8 percent (the low point) in 1902, rising again to 4.3 percent in 1913.[12] This pattern of secular decline followed by secular rise is roughly the same as that of the price level, which implies that real interest rates on forward-looking contracts such as bonds showed great swings. Ex post, creditors gained at the expense of debtors in the fourth quarter of the nineteenth century (the rise of populism and strong antibank feeling during that period shows that the

10. W. Stanley Jevons, *Money and the Mechanism of Exchange* (D. Appleton, 1875), p. 326. His "Serious Fall in the Value of Gold Ascertained, and Its Social Effects Set Forth" appeared in 1863 and his "Variation of Prices" in 1865.

11. *Official Papers by Alfred Marshall* (London: Macmillan, 1926), pp. 10, 15.

12. Frederick R. Macaulay, *The Movement of Interest Rates, Bond Yields and Stock Prices in the United States since 1856* (National Bureau of Economic Research, 1938), pp. A108–A109.

debtors were very much aware of it) and lost in the first quarter of the twentieth century. Real ex post rates of return on twenty-year bonds purchased in 1872 (a price peak) and held until maturity were 10.4 percent, compared with a nominal yield of 7.5 percent; similar bonds purchased in 1896 (a secular price trough) and held until maturity yielded only 1.2 percent in real terms, compared with a nominal yield of 4.3 percent (figure 2).

Yields on British consols followed roughly the same pattern as prices; they declined gradually from a postresumption high of 4.42 percent in 1820 to a low of 3.02 percent in 1852, rose to a local high of 3.41 percent in 1866, declined gradually and slowly to a low of 2.45 percent in 1897, then rose to 3.39 percent in 1913 (and up to 4.43 percent in 1925, when the gold standard was resumed in Britain).[13] Calculations of real rates of return are more arbitrary for perpetuals, but for holding periods of twenty to twenty-five years, as in the United States, real rates of return varied much more than nominal rates of return. It is thus not true, as is sometimes claimed, that a gold-based unit of account offers a stable basis for long-term contracts and "eliminates entirely windfall losses and windfall gains among debtors and creditors."[14] Variations in real short-term interest rates were even greater over the period 1879–1913, moving from a high of 11.5 percent (May 1891 to May 1894) to a low of −2.3 percent (June 1897 to November 1900).[15]

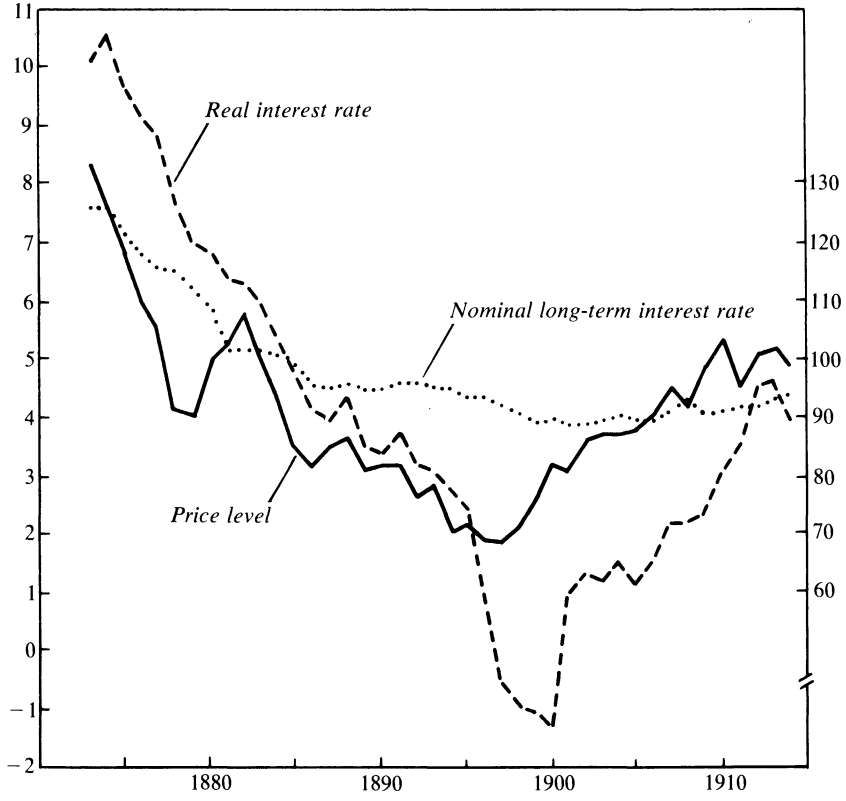
If the relevant public really expected the long-term price level to be stable, long-term interest rates should be *negatively* correlated with the price level, high levels giving rise to expectations of a subsequent fall in prices, which would be reflected in a lowering of nominal long-term interest rates; the reverse effect would take hold when the price level was low relatively to historical levels. Instead, long-term interest rates are positively correlated with the price level, both in Britain and in the

13. See George F. Warren and Frank A. Pearson, *Gold and Prices* (Wiley, 1935), p. 403.

14. Jude Wanniski, *Business Week,* December 7, 1981, p. 27.

15. See Lawrence H. Summers, "The Non-Adjustment of Nominal Interest Rates: A Study of the Fisher Effect," Working Paper 836 (National Bureau of Economic Research, 1982), p. 18. Summers averages real commercial paper rates over the economic cycles as defined by the NBER, using monthly Warren and Pearson wholesale prices to deflate nominal interest rates. In a variety of statistical tests, he finds no statistically significant effect of inflation on interest rates.

Figure 2. U.S. Wholesale Prices, Long-Term Interest Rates, and Long-Term Real Interest Rates for a Twenty-Year Holding Period, 1873–1914[a]



Sources: Warren and Pearson, *Gold and Prices*, pp. 13–14; and Frederick R. Macaulay, *The Movement of Interest Rates, Bond Yields and Stock Prices in the United States since 1856* (National Bureau of Economic Research, 1938), pp. A108–A109.

a. The nominal interest rate is the yield on American railroad bonds.

United States. The data suggest that the public did not correctly foresee the long-term price changes that were to take place, and they adjusted their expectations (as reflected in interest rates) only slowly to the price movements that had actually taken place.[16] Nominal interest rates, in

16. Keynes called the movement of long-term interest rates in parallel with prices the "Gibson paradox," after a person who made the observation and tried unsuccessfully to explain it in the 1920s. Keynes' own explanation ran in terms of a tendency of the market rate of interest to lag behind changes in the natural rate of interest—that is, the rate required to equate savings with investment, with the consequence that a decline in the

other words, did not adjust adequately to correct for rates of inflation; on the contrary, on balance they adjusted with such long lags that the correction turned out to be perverse.

In view of another claim that is sometimes made for the gold standard, that it is conducive to long-term contracts (British consols being the extreme manifestation of long maturities), it is worth noting that, while high-quality bonds could typically be floated in the United States for twenty-five or thirty or sometimes even one hundred years, mortgage loans in the nineteenth century were typically very short, averaging about four years for farm mortgages.[17]

INCREASE IN MONETARY GOLD SUPPLIES

Prices were not stable under the gold standard in part—but only in part—because the stock of gold varied substantially in its rate of growth.

The general level of prices in terms of currency can be written as a product of the currency price of gold and the terms of trade between gold and commodities: \$/goods = (\$/gold)(gold/goods). Under a gold standard the currency price of gold is fixed (indeed, the currency is defined in terms of gold). The price level will be stable only insofar as the terms of trade between gold and other goods is stable. But stability in the terms of trade is unlikely in the presence of substantial variations in the supply of gold, except insofar as the public's demand for gold is perfectly elastic in terms of other goods—a claim even nonmonetarists would decline to make.

Variations in the growth in monetary gold were due mainly to fluctuations in gold production, but to some extent also to variations in nonmonetary demand for gold. As a consequence of new production from California and Australia, the stock of monetary gold doubled

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natural rate would lead to a depression in economic activity and a decline in prices, whereas a rise in the natural rate (ahead of the market rate) would lead to a long-term investment boom and a secular rise in prices. He attributed more of the great secular swings in prices to this factor than to purely monetary factors, on the grounds that basically, through a variety of channels, the supply of money (or efficiency in its use) responds to the demand for it. See John Maynard Keynes, *A Treatise on Money* (London: Macmillan, 1930), vol. 2, pp. 198–208.

17. Based on specific questions in the 1890 census, reported in Douglass C. North, *Growth and Welfare in the American Past* (Prentice-Hall, 1966), p. 141.

Table 3. World Gold Output and Monetary Stocks[a]
Millions of fine ounces

Period	Production	Additions to monetary gold stock	Monetary gold in stock	
			Percent increase	End-of-period stock
1493–1600	23.6	n.a.	. . .	. . .
1601–1700	29.3	n.a.	. . .	. . .
1701–1800	61.1	n.a.	n.a.	39
1801–39	19.8	7	18	46
1840–49	14.7	6	13	52
1850–59	60.4	46	88	98
1860–69	61.0	30	30	128
1870–79	54.6	22	17	150
1880–89	51.4	17	11	167
1890–99	95.1	59	35	226
1900–09	173.2	104	46	330
1910–19	213.8	122	37	452
1920–29	180.5	98	22	550
1930–39	256.5[b]	205	37	755
1940–49	260.1[b]	228	30	983
1950–59	268.3[b]	166	17	1149
1960–69	388.2[b]	30	3	1179
1970–79	339.2[b]	−49	−4	1130
1980	29.2[b]	4	. . .	1134

Sources: Data for 1493–1929 were computed from Warren and Pearson, *Gold and Prices*, pp. 92–93, 121, 125. Gold production data for 1930–66 are from Fred Hirsch, "Influences on Gold Production," *International Monetary Fund Staff Papers*, vol. 15 (November 1968), p. 486; since 1967 from Bank for International Settlements, *Annual Report*, various issues. Data on monetary gold after 1930 are from estimates by the International Monetary Fund and from IMF, *International Financial Statistics*, various issues.

n.a. Not available.

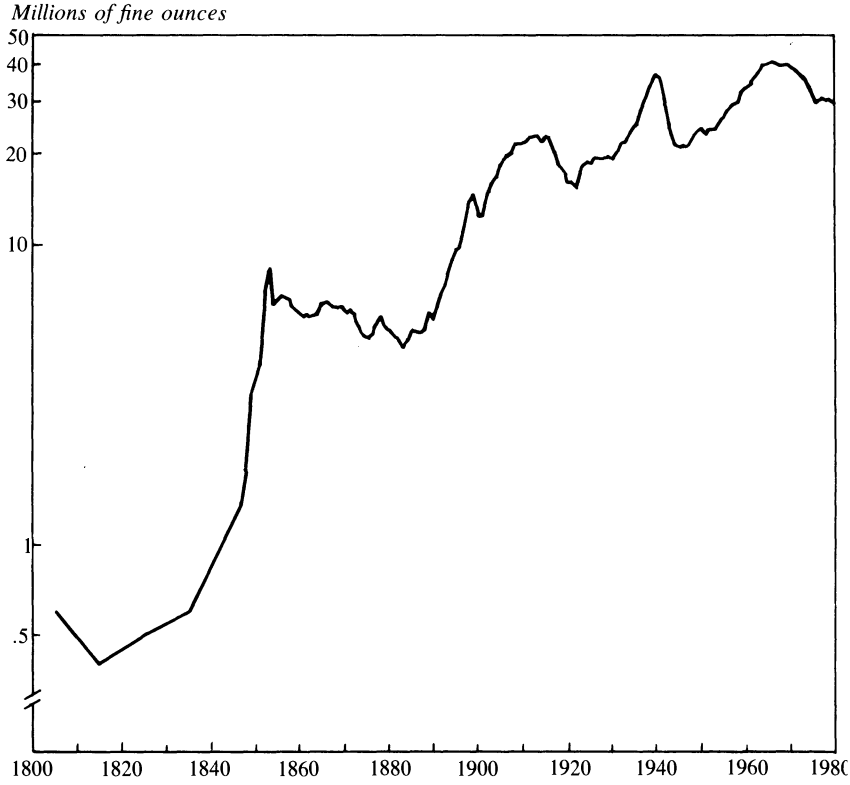
a. The dollar value before 1933 can be calculated by multiplying by $20.67; 1934–68, by $35. For metric tons, divide by 32,151.

b. Excluding the Soviet Union.

between 1848 and 1859, after having shown negligible growth in the preceding two decades.[18] It took until 1895 to double again—a period of thirty-six years—whereupon it again doubled in the nineteen years to 1914 as a result of sharp increases in gold production in South Africa, Canada, and Alaska during the late 1890s (which was partly the result of new discoveries, partly the result of improved extractive techniques). Table 3 shows world gold production (and also in figure 3), increases in

18. MIT President Francis Walker called it "the greatest financial storm of two centuries." See Francis A. Walker, *International Bimetallism* (Henry Holt, 1897), p. 129. Walker's little book gives an excellent history of the monetary use of metals and, in particular, of the interaction between silver and gold.

Figure 3. World Gold Production, 1805–1980



Sources: Same as table 3.

monetary gold, and estimated monetary gold stocks. Although major developments do not always appear at the beginning of each decade, table 3 clearly shows the great variation in additions to monetary gold stocks over the decades, from a low of 11 percent during the 1880s to a high of 88 percent during the 1850s. The clear correlation with price movements during the century led a number of observers—Cassels, Kitchin, Keynes, Warren and Pearson, among others—to generalize the relation. Warren and Pearson, for instance, argue that, on the basis of history during the preceding century, prices rose whenever the rate of growth in monetary gold exceeded the rate of growth of total output (or physical production, as they call it), and fell whenever the growth in gold fell short of the growth in production. The key rate of growth was

reckoned by many authors to be between 2.5 and 3 percent. If gold stocks did not increase this rapidly, prices were bound to fall.[19]

The general relation between the quantity of money and the level of prices had been part of background knowledge at least since David Hume's famous parable in 1752 involving a hypothetical destruction of four-fifths of England's money supply, leading to a decline in prices and an improvement in the balance of trade. With this "model" of the economic system in mind, the tenfold increase in annual new gold supplies that took place between the late 1830s and the mid-1850s and the not quite so sharp increase in the decade spanning the turn of the century should have affected prices through expectations, in the currently voguish rational expectations view of the world. Yet the impact on prices of these sharp increases in gold production (which, as noted, also represented a sharp increase in the rate of growth of monetary gold stocks) was more gradual, delayed, and spread over a long period of time. Whereas world monetary gold stocks grew 90 percent between 1849 and 1859, and 45 percent between 1895 and 1905, wholesale prices in the United States rose only 24 percent and 29 percent during the two periods, respectively, and prices in Britain rose 28 percent and 16 percent in the same two periods.[20] Warren and Pearson reckon a delay of about thirteen years before the full impact of increased gold supplies is felt on prices.[21] Why the prolonged period of adjustment? Several explanations are possible. First, the public may not have known the full magnitude of the increases. That is almost certainly true, since statistical information was much scarcer then than it is today. But the public might just as well have overestimated the true extent of the increase, given the enormous publicity and excitement that attended the gold discoveries in each period.

Second, based on quantity theory reasoning it is the total money supply that counts, not a single component of it. Allowance for monetary silver and bank notes reduces the rate of increase in money brought about by the new gold supplies, but not by enough to bring the figures into correspondence.[22] This is especially true for Britain, where silver

19. See Warren and Pearson, *Gold and Prices*, pp. 94–97.

20. U.S. prices rose more sharply between 1849 and 1855—by 36 percent—and then fell again.

21. Warren and Pearson, *Gold and Prices*, p. 132.

22. Laughlin reckons gold to be 72 percent of the British money supply (gold, silver,

coins were of relatively minor importance; but they were also temporarily of less importance in the United States during the 1840s, full-weight coins having been largely exported as a result of the Currency Act of 1834. The allowance for bank deposits takes us further from the explanation in the later period; as shown below, they grew more rapidly than gold. But such deposits should perhaps not be counted because, like credit cards today, they were not yet recognized as money.

Third, the public may have believed, contrary to the Hume hypothesis, that new money "stimulates trade," that as a consequence of the new gold production, output of other goods would be increased as well, and therefore that prices would not rise proportionately with the increase in the money stock. This third interpretation is consistent with Fetter's puzzled observation that there was very little contemporary comment on the likely impact of new gold on prices until the 1860s, that is, until after the increase in prices had been observed (recall that the work of Jevons and Laspeyres took place in the 1860s).[23] And certainly the debates of the 1880s and early 1890s over the monetary standard suggested the widespread belief that increased money would stimulate trade; it was not argued that more money would merely increase prices. This interpretation might also help to explain the failure of long-term interest rates to rise (at all in the first period, commensurately in the second) following large increases in gold production.

As noted above, gold was not the only source of money. During 1879–1913 monetary gold in the United States grew by a factor of 3.5, whereas the money supply (as it is now calculated, including time deposits) grew by a factor of about 8.4; bank deposits accounted for the difference, growing by a factor of 9.8 during this period.[24]

Table 4 shows the growth in various forms of money in eleven

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and uncovered notes) in 1895, 37 percent of the U.S. money supply, and 38 percent of the world money supply (most of the silver being in China and India). Gold can be estimated as about one-third of the world money supply in 1848, although the ratio would be much higher in Britain and the United States (before the coinage under the Bland-Allison Act). Monetary silver was also growing during these periods, rapidly from 1895 to 1905, but most was then going to the Far East. See J. Laurence Laughlin, *The History of Bimetallism in the United States* (Greenwood Press, 1968; originally published in 1896), pp. 205–06.

23. Frank W. Fetter, *Development of British Monetary Orthodoxy, 1797–1875* (Harvard University Press, 1965), pp. 240–46.

24. See Milton Friedman and Anna J. Schwartz, *A Monetary History of the United States, 1867–1960* (Princeton University Press, 1963), table A-1.

Table 4. Comparative Evolution of Money and Reserve Structure, Selected Countries and Years, 1885–1928

Billions of U.S. dollars

Money supply and reserves	*Three countries*[a]		*Eleven countries*[b]		
	1885	*1913*	*1885*	*1913*	*1928*
Money supply	6.3	19.8	8.4	26.3	50.4
Gold	1.4	2.0	1.8	2.7	0.1
Silver	0.7	0.6	1.0	1.2	0.3[d]
Credit money	4.1	17.2	5.6	22.4	50.0
Currency[c]	1.6	3.8	2.3	5.9	13.0
Demand deposits	2.6	13.3	3.3	16.5	37.0
Monetary reserves	1.0	2.8	1.6	4.5	10.6
Gold	0.6	2.1	0.9	3.2	7.9
Silver	0.4	0.6	0.6	0.8	0.4[d]
Foreign exchange	. . .	0.1	0.1	0.5	2.3
Total gold and silver	3.1	5.4	4.3	7.9	8.7
Gold	2.0	4.1	2.7	5.9	8.0
Silver	1.1	1.2	1.6	2.0	0.7[d]

Sources: Robert Triffin, "The Evolution of the International Monetary System: Historical Reappraisal and Future Perspectives," Princeton Studies in International Finance 12 (Princeton University, 1964), pp. 56, 62, for all series with the exception of foreign exchange held as monetary reserves in 1913, which was taken from Peter H. Lindert, "Key Currencies and Gold, 1900–1913," Princeton Studies in International Finance 24 (Princeton University, 1969), pp. 10–11, 23, and the holdings of silver by the United States in 1928, which was taken from U.S. Bureau of the Census, *Historical Statistics of the United States, Colonial Times to 1970* (Government Printing Office, 1975), pt. 2, p. 994.

a. United States, United Kingdom, and France.

b. United States, United Kingdom, France, Germany, Italy, Netherlands, Belgium, Sweden, Switzerland, Canada, and Japan.

c. Including subsidiary (nonsilver) coinage.

d. United States only.

industrial countries between 1885 and 1928. Monetary gold grew 120 percent during 1885–1913, while monetary silver grew only 25 percent in these countries. The major change, however, was in demand deposits, which increased by 400 percent, rising from 39 to 63 percent of the money supply as it is now defined. The financial system apparently responded, with a lag, to the perceived shortage of money during the 1880s and early 1890s with institutional innovation. This factor, to the extent that it influences prices, compounds the puzzle raised above about the impact of sharp increases in gold production on the price level: the impact on prices should have been even greater than the increase in gold stocks alone would suggest.[25]

25. It is of interest to note, however, that contemporaries did not consider demand deposits to be part of the money supply; their inclusion is long after the fact. Both Jevons

The central lesson to derive from this brief review is that the supply of monetary gold was highly erratic even during the heyday of the gold standard. The one feature the gold standard did secure was stability of exchange rates among major currencies, except for those that remained on silver. Under the gold standard, price stability and other domestic objectives were, when necessary, relinquished to preserve stability in exchange rates.

THE INTERWAR PERIOD

There is no need to examine closely the brief restoration of the gold standard during the late 1920s. The experience was so brief and unsatisfactory that it provides no basis for an assessment of the gold standard in more normal times. Most European countries called in the gold still held by their publics before the First World War and concentrated it in the hands of the central banks. The restored gold standard was a gold *bullion* standard, such as had been recommended by Ricardo over one hundred years earlier, whereby the monetary authorities bought and sold gold at a fixed price only in large quantities, and did not coin the gold. Moreover, to conserve gold further (for it was recognized that at the much higher postwar price and activity levels the prewar gold standard regime could not be restored), there was strong encouragement toward a gold *exchange* standard, whereby the monetary authorities of countries would hold, instead of gold, currencies that were convertible into gold, notably sterling. With considerable deflation, Britain returned to gold convertibility in 1925 at the prewar gold parity (85 shillings per ounce). France returned to convertibility in 1926 at a parity one-fifth of the prewar parity. It is widely considered that these parities overvalued the pound and undervalued the French franc, in each case putting considerable strain on the pattern of international payments and, through them, on domestic economies. Britain remained depressed throughout the 1920s, with unemployment never dropping below 10 percent after

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and Marshall considered demand deposits to be fundamentally different from money, because, as Marshall put it, in contrast to a bank note, "a cheque requires the receiver to have formed some opinion for himself as to the individual from whom he receives it." *Official Papers*, p. 35; also Jevons, *Money*, pp. 336f. By 1911 Irving Fisher treats demand deposits as money, but with different attributes (including velocity) from other forms of money. Should contemporaries have reasoned otherwise, or is the concept of money so slippery that it can only be determined long after the fact?

1920. The system was supported for a while by international lending, but it collapsed in 1931–33 under the impact of the world depression, to which the fragile restoration of the gold standard contributed. There is probably not that much to be learned from this period about a gold standard, except that "incorrect" exchange rates can put great strains on national economies and, if they are important, on the system as a whole.[26]

It is perhaps worth observing, in the light of subsequent events, two prophesies in this period that concerned the role of gold. Joseph Kitchin, on the basis of his extensive study of the supply of gold during the nineteenth century and its relation to the price level, testified before the Royal Commission in 1926 with respect to prices in England (on a base of 1913 = 100) that "it would seem evident from a study of the chart that they may go a considerable way toward 90 in the next few years."[27] Prices were then at 143; by 1932 they were at 93.

The second is an observation by Keynes in January 1929, that new gold production could add only about 2 percent a year to monetary gold stocks, against a normal requirement of about 3 percent, thus necessitating economy of gold to the extent of 1 percent a year. But in recent years one legislature after another had stipulated a minimum gold backing for the currency outstanding, a provision that made no sense to Keynes in a regime (such as prevailed everywhere outside the United States) in which currency was not readily convertible to gold. These requirements, Keynes reckoned, denied the use of two-thirds to three-quarters of monetary gold for meeting external drains, and thus introduced a great source of fragility into the system: "It is not much with which to meet all the chances and fluctuations of economic life. It follows that a very little upsets them [the central banks] and compels them to look for protection by restricting the supply of credit . . . raising of rates all round helps no one until, after an interregnum during which the economic

26. An exhaustive treatment of this period can be found in William A. Brown, Jr., *The International Gold Standard Reinterpreted, 1914–1934* (National Bureau of Economic Research, 1940). Brown contends that the key to the pre–World War I gold standard was the preeminence of Britain as a market for goods and as a source of savings, and of London as a bank-clearing center and a source and repository of short-term credit. This preeminence was lost in the 1920s. Thus Brown argues that while the form of the gold standard was restored, its substance was not.

27. Warren and Pearson, *Gold and Prices*, p. 95.

activity of the whole world has been retarded, prices and wages have been forced to a lower level."[28] This is exactly what happened.

THE SUPPLY OF GOLD IN THE LATE TWENTIETH CENTURY

As table 3 makes clear, gold production in the non-Communist world rose during the 1930s (stimulated in part by higher gold prices), receded in the 1940s, and rose gradually to an all-time high in the 1960s. New gold production is supplemented from time to time by sales from the Soviet Union, which is assumed to be the second largest gold producer, after the Republic of South Africa. Sales by the USSR are largely keyed to its own requirements for foreign exchange, which in turn are influenced mainly by harvest conditions. But the Soviet Union also pays attention to market considerations. It withdrew from sales altogether in the late 1960s, when it became clear that something dramatic would probably happen to gold. After attempting for several years to prevent market prices from rising above the official price of $35 an ounce, the United States also ceased selling into the London market through the "gold pool" in 1968 and the market price started its long rise. The Soviet Union again in 1981 reduced its sales of gold (despite large needs for foreign exchange) and allegedly tried to borrow against gold collateral to avoid further depressing the market price.

The principal source of monetary gold to most countries of the world since the Second World War was neither new production nor Soviet gold sales, however, but a redistribution of gold held by the United States. Total monetary gold stocks grew about 200 million ounces ($7 billion at the official U.S. price of $35 an ounce) between 1945 and 1969, whereas the United States sold over 250 million ounces during the same period. Thus the "world" demand for gold was satisfied to a large degree from the United States, which in 1945 held 59 percent of the world's monetary gold. Even so, the holdings of dollars by foreign monetary authorities rose during this period by $13 billion, dollars being fully convertible to gold by monetary authorities at the U.S. Treasury, so the demand for

28. "Is There Enough Gold?" *The Nation and Athenaeum,* January 19, 1929. Also reproduced in Donald Moggridge, ed., *The Collected Writings of John Maynard Keynes: Activities 1922–1929, The Return to Gold and Industrial Policy,* vol. 19, pt. 2 (Macmillan, 1981), pp. 775–80.

international reserves outside the United States was satisfied nearly as much in that way as with augmented gold holdings. Robert Triffin early pointed out the nonsustainability of a system in which dollars provided major additions to international reserves, gold reserves grew only slowly (and U.S. gold reserves declined), and the dollar remained convertible to gold.[29] Official gold convertibility of the dollar was in fact suspended in August 1971.

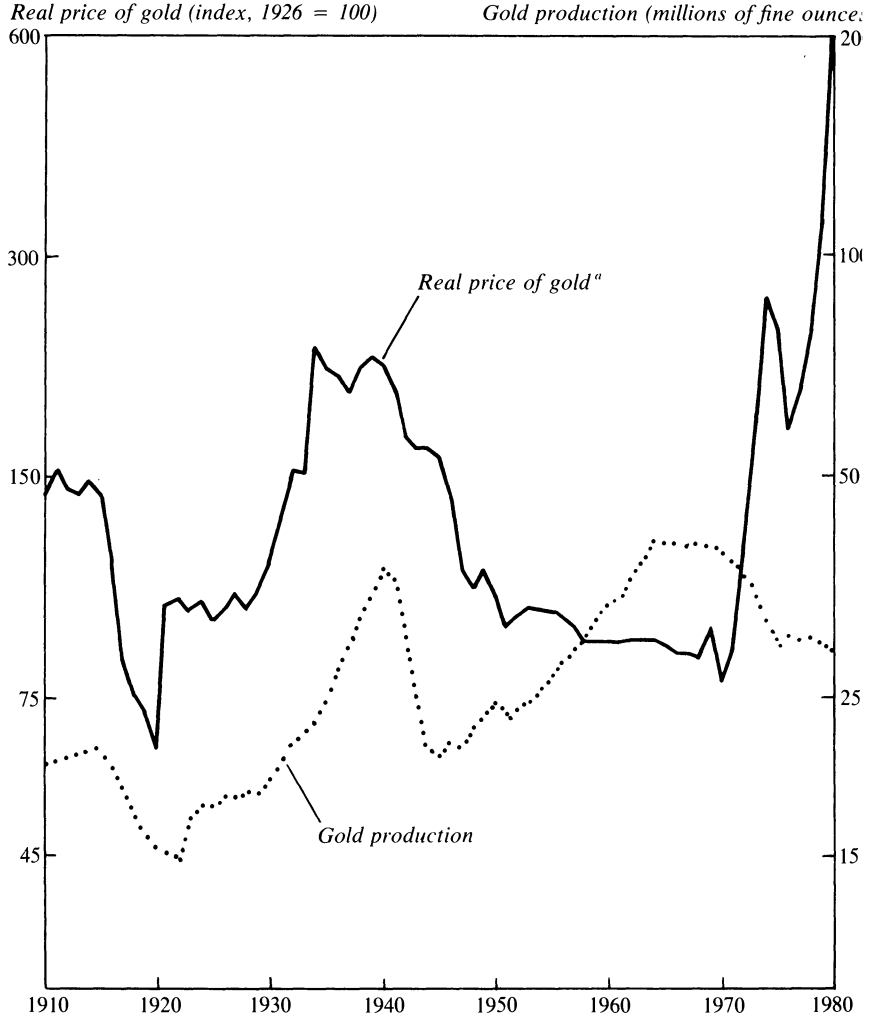
World gold production declined steadily during the 1970s, despite a sharp rise in both the nominal and the real price of gold (see figure 4). Gold prices have been so erratic that it is difficult to know what price has been used for planning decisions on production, reopening old mines, and developing new mines. The market price of gold briefly reached $800 an ounce in early 1980, but declined rapidly again from that peak. For the sake of round numbers, and without too much injustice to the truth, one can assume that the "planning" price of gold has risen tenfold in the 1971–81 decade, from $35 an ounce (official price) to $350 an ounce. In real terms, using the U.S. GNP deflator as a rough and ready indicator of world inflation rates, this represented a rise by a factor of five.[30] This increase was not smooth, but tended to come in bursts; in late 1978, for instance, the market price of gold was about $225, a fourfold increase in real prices during the 1970s up to that point.

Despite this sharp increase in real prices, gold production has declined. South African production, in particular, declined by one-third between 1970 and 1980 (see table 5). This performance marks a sharp contrast with the last major increase in the real price of gold—during the 1930s, when world gold production rose substantially. Either production lead times must be substantially longer today (gold having experienced a steady but gradual decline in real prices since the Second World War), or South Africa is supressing production that would be profitable at today's prices. It is said that marginal mines have been brought into

29. See especially Robert Triffin, *Gold and the Dollar Crisis* (Yale University Press, 1960); the argument had been advanced earlier in articles.

30. This price was about 75 percent higher, in real terms, than the maximum real price of gold (measured in British prices) in the century before World War I, which occurred in 1896. The likely instability in the real long-run price of gold is discussed in William Fellner, "Gold and the Uneasy Case for Responsibly Managed Fiat Money" in *Essays in Contemporary Economics Problems* (Washington: American Enterprise Institute, 1981), pp. 97–121. This interesting paper came to my attention after my own essay was written.

Figure 4. World Gold Production and the "Real" Dollar Price of Gold, 1910–80



Sources: Based on the figure presented in Fred Hirsch, "Influences on Gold Production," *International Monetary Fund Staff Papers*, vol. 15 (November 1968), p. 416. Data before 1966 are from the same source, pp. 486–88. Data from 1967 to 1980 are as follows: gold production—Bank for International Settlements, *Annual Report*, various issues; gold prices—International Monetary Fund, *International Financial Statistics*, various issues; U.S. producer price index—Council of Economic Advisers, *Economic Report of the President, February 1982*.

a. Average of daily London fixing prices deflated by the U.S. producer price index for finished goods.

Table 5. New Gold Supplies, Selected Years, 1965–80
Millions of fine ounces[a]

Country or region	*1965*	*1970*	*1975*	*1980*
South Africa	30.5	31.1	22.2	21.0
Canada	3.6	2.3	1.6	1.5
United States	1.7	1.7	1.0	0.9
Other	5.2	4.4	5.0	5.8
Total non-Communist world	41.0	39.5	29.8	29.2
Addenda				
Gold sales by the Soviet Union	15.7	1.6	4.7	2.8
Gold sales by the International Monetary Fund[b]	. . .	. . .	. . .	2.1

Source: Bank for International Settlements, *Annual Report*, various issues.
a. Gold is measured in troy ounces, equal to 31.104 grams, or about 10 percent heavier than an avoirdupois ounce.
b. Gold sales by the International Monetary Fund began in 1976.

production during the 1970s and production has been cut in the more profitable mines.[31] If so, considerable central direction of South African gold mining is implied, or at a minimum a strongly oligopolistic structure combined with expectations that real gold prices will decline in the future.

South Africa estimated its gold reserves in 1979 at 530 million ounces, 51 percent of the world total and 64 percent of the total in the non-Communist world (implying world reserves of about 1,040 million ounces).[32] This would imply non-Communist world production at current rates for another twenty-seven years. Numerous allowances must be made with respect to this sort of calculation. "Reserve" figures are conceptually tricky—they imply a known geology, price, technology of extraction, and costs. But they give a rough idea of informed judgment on the remaining gold to be extracted.

An approximate estimate of nonmonetary gold in the world would be about 1,500 million ounces, derived by subtracting monetary gold holdings from known and estimated gold production over the centuries. This is about one-third higher than monetary gold holdings (excluding those in the Soviet Union). Current new production, virtually none of which has gone into monetary gold holdings for over a decade, amounts to 2.7 percent of monetary gold holdings and about 1 percent of the total

31. See Federal Reserve Governor Henry Wallich, "Are There Alternative Ways of Fighting Inflation?" remarks at Cornell University, October 28, 1981, p. 10.

32. Data provided by the Embassy of the Republic of South Africa, Washington, D.C. Recent CIA estimates place Soviet gold stocks at 1,800 metric tons.

outstanding gold. It is unclear how sensitive the huge nonmonetary holdings are to gold prices and to price expectations.

Contemporary Proposals for Restoring Gold to a Monetary Role

Proposals for reinstituting a monetary role for gold cover a wide range, from reestablishing gold backing for the currency at an official price to full-fledged restoration of a gold currency. I will discuss these proposals under two broad headings: gold backing of all kinds without convertibility; and proposals calling for some form of gold convertibility, ranging from foreign monetary authorities' holdings to all holdings of dollars. I address only proposals for the United States, although as noted above, a desire to restore fixed exchange rates represents part of the interest in gold, and that requires other countries to reintroduce gold as well. But so far there has been little interest from other countries in moving toward gold convertibility.

It is worth recalling at the outset that the United States had full gold convertibility for the dollar from 1879 to 1933 (with export restrictions imposed briefly during World War I); gold convertibility for foreign monetary authorities from 1934 to 1971; and gold backing for the currency from 1879 to 1968.[33] The only country that maintains any formal monetary role for gold (apart from holding gold among central bank assets) is Switzerland, about which more will be said below.

GOLD RESERVE REQUIREMENTS

The idea behind gold backing without convertibility is to limit the growth in the supply of money and presumably also to bolster psychological support for the currency by those who still attach a monetary significance to gold and do not fully comprehend that, ultimately, money is a social convention.

33. In 1933 the gold coins and gold certificates in the hands of the public were all called in. The Banking Act of 1934 established the requirement that the Federal Reserve Banks should hold 35 percent in gold against their deposit liabilities and 40 percent against outstanding notes. In 1945 these requirements were reduced to a uniform 25 percent against both deposits and notes. In 1965 the reserve requirement against deposits was eliminated, and in 1968 the reserve requirement against notes was eliminated.

The most limited proposal for gold backing calls for stipulating that the currency in circulation must be backed by the existing official gold stock of the United States at its current official price of $42.22 an ounce, and that the allowable growth in outstanding currency should be limited to 3 percent a year after a transition period, assured by revaluing the existing gold stock by 3 percent a year.[34] For the indefinite future, this proposal amounts only to a monetary rule in thin disguise; gold plays no essential role. One might just as well back the currency with the Washington Monument or the Statue of Liberty, endowing each with an initial value and stipulating that the value should increase at the fixed rate of 3 percent a year. Such a proposal will not be considered further here.

Gold backing for all or some portion of the money supply could also be required at a fixed price of gold, or at the market price of gold, which fluctuates substantially. If the gold backing requirement does not bind—that is, if the value of the monetary gold exceeds the requirement for gold reserves, we would be in the realm of discretionary monetary policy, as at present. When the reserve requirement does bind, the monetary authorities would have to buy gold in order to increase the money supply. Unlike under a regime of convertibility, the purchase would be at the discretion of the monetary authorities.

This kind of arrangement poses difficult but not insuperable technical problems over the valuation of monetary gold, because in general the market price must deviate from the official price if orderly monetary growth is to be maintained (otherwise the permissible monetary base would fluctuate—wildly, in recent experience—with the market price of gold). For example, the Treasury could buy gold necessary for increasing the money supply at market prices, and resell it to the Federal Reserve banks at the fixed official price, absorbing the difference as an expenditure (or, if the official price were above the market price, as a receipt).

But the key point is that this would be a discretionary regime, not an automatic one, unless in addition a rule governing monetary growth were also imposed. It would involve extra discipline only insofar as

34. Robert E. Weintraub, "Restoring the Gold Certificate Reserve," appendix to a study prepared by the Subcommittee on Monetary and Fiscal Policy of the Joint Economic Committee, *The Gold Standard: Its History and Record Against Inflation*, 97 Cong. 1 sess. (GPO, 1981), pp. 21–24.

directors at the Office of Management and Budget and their superiors balk at budgeting for gold when market prices are considerably higher than the official price, or the secretary of the Treasury balk at the balance-of-payments implications of gold purchases. A rough idea of the magnitudes is suggested by the fact that a 4 percent growth in the official U.S. gold stock—implying a 4 percent growth in that component of the money supply covered by gold reserves, if the reserves are binding—would involve a gross expenditure of $4.2 billion if the market price were $400 an ounce, and a net expenditure on the budget of $3.75 billion if the gold were resold to the Federal Reserve at the present official price. If the official price were increased, say, to $200 an ounce (with a corresponding increase in the required gold reserve, to keep it binding), the gross expenditure by the Treasury for 4 percent growth would be the same, and the net expenditure would be reduced to $2.1 billion. Obviously official U.S. purchases of the 10.6 million ounces a year required for 4 percent annual growth, amounting to 35 percent of current world gold production, would very likely drive up the market price of gold considerably.

In short, gold backing by itself does not provide monetary discipline. The United States had backing for many years, and during most of that period the gold reserve requirements were not binding. The gold reserves would have permitted much more rapid growth than what actually took place. On the occasions when the reserve requirement became binding, it was lowered, and eventually removed. The national debt ceiling provides an analogous restraint on U.S. government borrowing; it is there in principle, but in practice it is regularly overridden by other considerations, even by "conservative" Congresses.

Switzerland is the only country that currently requires gold backing for its bank notes, in a ratio of 40 percent. (Switzerland ceased to provide for convertibility of those notes into gold in 1954, the year the London gold market reopened.) Swiss official gold holdings grew only 7 percent during the inflationary decade of the 1970s, but the Swiss money supply grew by 65 percent. How was this possible? Switzerland entered the period with ample gold holdings relative to the required backing, more than double the legal requirement in 1970. The ratio fell steadily through the decade to 53 percent in 1981, still well above the required 40 percent. The restraint in Swiss monetary expansion has been discretionary, not conditioned by a binding gold reserve requirement.

What will happen when the reserve requirement becomes binding? Switzerland would have two options, apart from relaxing the requirement itself. It could raise its official price of gold (which still stands at 4,596 Swiss francs a kilogram, about $80 an ounce at current exchange rates), which is well below the market price, and which can be changed by simple government decree (after consultation with the Swiss National Bank). Or Switzerland could buy sufficient gold at market prices, something that country could probably do without greatly affecting the market price of gold. Either action would be discretionary in nature.

GOLD CONVERTIBILITY

Gold convertibility exerts its discipline in quite a different way. The proposals involving convertibility vary, some calling in effect for full convertibility of all Federal Reserve notes and 100 percent gold money thereafter. Bank notes could be issued by private banks, but they would in effect be depository receipts for gold.[35] Others are more limited, for example, calling for restoration of the pre-1971 gold convertibility for foreign monetary authorities.[36]

Although the modus operandi would vary substantially from one proposal to another, the underlying idea is the same: whenever some substantial group of dollar holders became dissatisfied with monetary developments and unsure about the future value of the dollar, they could and presumably would convert their dollars to gold. These conversions in turn would require the Federal Reserve to defend its gold reserves by tightening credit conditions or otherwise persuading the relevant public that gold conversions were unwarranted. The system in principle would be symmetrical: as gold reserves increased, the money supply would expand; this feature has not been emphasized by most proponents of gold convertibility. Moreover, historically central banks have often offset ("sterilized") the expansionary effects of gold inflows, as the United States did during the late 1930s and again during the late 1940s.[37]

35. See H. Res. 391, a bill submitted to Congress by Representative Ron Paul in January 1981.

36. I leave aside suggestions that gold convertibility be reestablished only for residents of the United States on the grounds that it would always be possible for foreigners to arbitrage around such restrictions in the absence of a comprehensive set of exchange controls.

37. Offsetting actions by central banks, in periods of contraction as well as periods of expansion, even took place often in the heyday of the historical gold standard. See Arthur

Sterilization obviously would not be possible when gold (or gold certificates) is the sole form of money.

Since new gold production is small relative to outstanding gold stocks, the requirement for convertibility, it is argued, will automatically limit the rate of money creation, hence inflation, since there is a natural limit to how rapidly gold reserves can grow. Too rapid monetary growth would lead to conversion, which in turn (to preserve convertibility) would necessitate monetary retrenchment.

Note that most proposals for convertibility—those that fall short of a move to 100 percent gold money—provide for some elasticity to the supply of money, so long as the relevant public is not of a disposition to convert dollars into gold. This feature indeed could conceivably be a source of instability, since in periods of high "animal spirits" in the business and financial community outstanding Federal Reserve credit could rise substantially, only to be sharply reduced as the buoyant spirits give way to pessimism and a period of heavy conversion sets in, leading to a drop in Federal Reserve credit below its historical trend under the regime.

There is no doubt that a regime of gold convertibility could be made to function technically. But could it function politically? That is, could the political authorities resist the pressures they would be under to take countervailing action in periods of distress, either too rapid expansion or too rapid contraction? That would depend in part on how serious the distress was, which in turn would depend in part on the credibility of the monetary regime itself: expectations of long-run price stability will reduce the inertial character of inflationary impulses to the U.S. economy, and hence improve the ability of the economy to absorb both monetary and real shocks with reduced cost in terms of lost output and employment. The argument, in short, is that a constrained monetary standard will dissuade the government and the public alike from believing they can "inflate" out of economic difficulties, and a gold standard would provide a constrained monetary standard.

Or would it? Can convertibility be credibly established? Or would the public believe that a restored gold standard is bound to be a fair weather vessel, likely to capsize and be abandoned in the first serious storm?

One difficulty with the credibility of a requirement for convertibility

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I. Bloomfield, *Monetary Policy Under the International Gold Standard: 1880–1914* (Federal Reserve Bank of New York, 1959).

of U.S. dollars into gold is the already huge volume of liquid dollar assets around the world. Federal Reserve liabilities at the end of 1980 were $158 billion; the U.S. money supply was $415 billion (M1) or $1,656 billion (M2); foreign monetary authorities held an estimated $240 billion in liquid dollar claims ($157 billion directly in the United States and the remainder in various "Eurodollar" centers around the world), and other foreigners held an additional $700 billion, give or take several tens of billions, in dollar deposits (other than European interbank deposits) outside the United States. U.S. gold reserves, by contrast, amounted to only $11.1 billion at the official price of $42.22 an ounce, and $111 billion at $422 an ounce (which has no virtue beyond being ten times the U.S. official price and roughly equal to the market price at the end of 1981; the market price fell substantially below that in early 1982).

Full convertibility would hardly be credible, given the relation of assets to potential claims. Of course, not all outstanding liquid dollar claims would formally be convertible into gold; presumably the convertibility requirement would strictly apply only to Federal Reserve liabilities. But that provides no comfort, since the financial system functions on the supposition that all liquid dollar claims can, on short notice, be converted into claims on the Federal Reserve, either federal funds or currency. To deny or repudiate this more general convertibility is tantamount to a breakdown in the financial system, both domestic and international. Moreover, a major strength of the international financial system at present is that for large holders (that is, leaving aside bank notes) it is a closed system, so funds can be moved around in it but cannot be withdrawn from it, except by the Federal Reserve System. This feature served the international economy well in "recycling" the large OPEC surpluses during the last decade; it would be altered by gold convertibility, which would provide a potential leakage to the system at the initiative of dollar holders, and thus could threaten the system as a whole with a convertibility crisis, as in 1931.

With too little gold relative to the potential for conversion, a gold convertibility system would be seen as a fair weather system; expectations about future economic developments would not be changed radically; and the real costs of monetary adjustment would continue to be high, casting further doubt on the political sustainability of a gold convertibility regime.

A straightforward way to deal with these problems is to set a price of

gold sufficiently high that there cannot be any doubt about the ability of the United States to sustain even large-scale conversion, at least for some time. If $422 an ounce will not be persuasive, perhaps $844 an ounce would be, and $1,288 an ounce certainly should be (the last figure would result in a valuation of $333 billion on the existing U.S. gold stock).

But with a much higher price, another, equally acute, problem arises: not only would new gold production increase substantially, but sales from the large existing gold stocks and hoards would take place. The U.S. authorities would find themselves flooded with gold. Consider the privately held stocks first. Much of the estimated 1,500 million ounces of privately held gold no doubt is held for traditional reasons, partly for ornament, partly as precautionary protection against untoward political or economic events. But much of it, especially during the 1970s, was also acquired as an investment. With a credibly high official price of gold, the prospect for further capital gains on these investments would vanish, and gold as an investment would lose its luster, except to a small degree for portfolio diversification against remote contingencies. Thus there would be large-scale dishoarding. Even some central banks might sell their gold under these circumstances, and for similar reasons: prospective earnings on alternative assets would be much higher.

It is unclear what the supply schedule is for new production, although it is presumably upward sloping with respect to the price of gold in terms of other goods and services. In any case, as noted above, production is not determined simply by marginal costs today, but rather is subject to oligopolistic manipulation by the two major suppliers, South Africa and the Soviet Union, which are large enough to face a downward sloping demand schedule for gold. With a high and credible U.S. official price of gold, in contrast, the demand schedule becomes perfectly elastic even for large producers, and there would then be no reason for them not to produce as much gold as it is economical to produce.

Thus there would be a flood of gold into the United States, on a more modest scale if convertibility were limited to foreign monetary authorities, on a vast scale under full convertibility. What should the United States then do? To monetize the gold would be strongly expansionary.[38]

38. It is for this reason that Sir Roy Harrod over the years favored an increase in the official price of gold. See, for example, his *Reforming the World's Money* (London: St. Martin's Press, 1965), chap. 3.

This expansion would presumably endure until the price level had risen sufficiently to reduce new gold production to the point at which it just satisfies the secular growth in demand for gold. That prolonged adjustment hardly satisfies the expectation of price stability sought by advocates of gold convertibility. The monetary authorities could sterilize the monetary impact of the additional gold, as they did at various times past. But then that would mean a return to a world of discretionary monetary policy much as what prevailed from 1934 to 1971, a period during which reliance was placed on the monetary authorities, not gold convertibility, for monetary restraint.

With large holdings of (sterilized) gold in official hands, there would be ample room for monetary expansion without threatening convertibility, and when that room was exhausted many years later, people would rightly wonder why suddenly this constraint of gold supply, which had not been operative for many years, should induce a rush to convert, provoking a restrictive monetary policy. They would simply remove it.

Is there a price that just balances between these conflicting considerations—too low a gold stock to make continued convertibility credible, or such a high gold stock that it would exert no monetary discipline and de facto would be a regime of discretionary management? Conceivably there could be such a price, one that would persuade hoarders to disgorge enough gold such that a combination of the higher price and the enlarged quantity of monetary gold would make the system credible but not too undisciplined. But my guess is that there is no such price. The relevant public would be skeptical about continued convertibility up to quite a high price, and only then would be won over; but the price that would be persuasive would be too high to provide the discipline.

Whether there is such a price is irrelevant, however, because there is no way of finding it. Any guess, however well informed or rationalized, would obviously be seen to be a conscious policy choice. And therein lies the problem of a restored gold standard as a source of discipline and automaticity: once the price is recognized as a discretionary variable, the discipline that a gold standard could conceivably exert would be lost.

One proposal deals directly with the difficulties of choosing a price by allowing the market to determine the price in the first instance, and then allowing the price to change (again, determined by the market) in periods of great stress. In particular, the starting official price would be the average market price in the five days preceding restoration of

convertibility, following six months' notice of the intention to introduce a regime of convertibility. The official price would then be fixed indefinitely at this level, unless gold reserves dropped below 25 percent of the target level of gold reserves (set by the ratio of gold reserves to Federal Reserve liabilities on the day before resumption of gold convertibility) or rose above 175 percent of the target level. In either of these events, a "gold holiday" would be declared for ninety days to allow the private market to set a new price. During gold holidays the government would not engage in either purchases or sales of gold, nor would the Federal Reserve be permitted to alter the monetary base by more than 1 percent.[39] Within 50 and 125 percent of this target, monetary policy would be discretionary, but the degree of discretion would be reduced as the outer limits were approached. For instance, if gold reserves are above 125 percent of target, the monetary base must be increased by 1 percent a month, and this rises to 2 percent a month if reserves are above 150 percent of target. Below 50 percent of target, the monetary base must be reduced by 1 percent a month.

This scheme, like the adjustable peg system of exchange rates, would provide strong incentives to speculate for or against gold as the highly visible reserve level approached the critical boundaries, which, combined with the mandatory adjustments in monetary base, would introduce a strong source of instability into the monetary system. Moreover, while the method for choosing the official price would ensure that the "market" accepted that price at the outset, the same method would lend itself to manipulation by large holders of gold, and in particular to manipulation by South Africa and the Soviet Union, the principal sources of new gold. They would have a strong interest in as high an official U.S. price as possible, and therefore would surely take all possible steps to withhold new gold supplies from the market during the critical six-month period after the announcement. Although the price of gold is primarily an asset price because it is the price that persuades the public to hold existing stocks of gold throughout the world, even relatively small

39. See S.6, "Gold Reserve Act of 1981," submitted to Congress by Senator Jesse Helms in *Congressional Record,* daily edition (January 5, 1981), pp. S22–26. The basic idea derives from a proposal by Arthur Laffer, "The Reinstatement of the Dollar: The Blueprint," A. B. Laffer Associates, February 29, 1980. Laffer likens his proposal to that made by the United States in 1972 for management of exchange rates around target levels of international reserves.

changes in the stock relative to changes in demand can have a substantial impact on price. Thus, at the margin, withholding supplies would raise the price. Expectations by the public concerning future sales by these countries would have no influence on current market prices, since after resumption day the United States would provide a perfectly elastic demand at the indicated price, so such sales would not be expected to depress future market prices.

Finally, shifts in market sentiment about gold or the dollar could under this regime trigger prolonged monetary contractions or expansions. With no distinction among different sources of disturbance, this feature could result in greater monetary instability rather than achieving its stated purpose of greater stability. For instance, another disturbance in the oil market resulting in much higher oil prices would require severe monetary contraction if either the public or the oil-exporting countries decided to acquire gold, but no contraction if they did not decide to acquire gold, and that decision in turn would be heavily influenced by the political circumstances surrounding the disturbance, not merely (or even mainly) by monetary conditions in the United States. This proposal would certainly not offer the prospect for long-run price stability that many proponents of the gold standard desire, and that Laffer ("price stability would return in short order") claims for it.[40]

Another approach may be possible to deal with the excess of outstanding dollar holdings over existing U.S. gold reserves, and the difficulties that poses for determining an appropriate price for gold. Some of the outstanding dollars might be "locked up" in a substitution account under the auspices of the International Monetary Fund to reduce the contingent claims on U.S. gold. If enough dollars were converted to SDR (special drawing rights) claims on the substitution account, usable only

40. Laffer, "Reinstatement of the Dollar." Laffer makes much of the analogy between his proposal and the official U.S. proposal of 1972, described in the *Economic Report of the President, January 1973,* concerning an exchange rate regime. But the underlying purposes of the two proposals are completely different. The 1972 proposal was designed to introduce greater symmetry of adjustment between countries in deficit and those in surplus into a system that presupposed national autonomy in monetary policy and was designed to accommodate that autonomy as much as possible, while still preserving the alleged advantages of temporarily fixed exchange rates. The Laffer-Helms proposal, in contrast, is designed to impose severe limits on autonomy in national (at least U.S.) monetary policy.

to finance payments deficits, perhaps U.S. gold valued at, say, $422 an ounce would represent a credible reserve.

There are two difficulties with this idea. First, most of the outstanding dollars outside the United States are in private rather than official hands and could not be placed into a substitution account without first driving them into official hands, presumably by creating prospects for a weak dollar. Such an exercise would itself be hazardous and would threaten the objective of monetary stability that motivates consideration of a restored gold standard.

Second, at present, for a variety of reasons, many official holders of dollars would be reluctant to exchange them for SDR-denominated claims in a substitution account, even claims that provide considerable liquidity to each holder in case of balance-of-payments need. The terms of the substitution account would have to be very attractive to induce many developing countries to participate in the scheme. The process of negotiation over these terms and even the negotiated outcome would very likely cast doubt on the determination of the community of nations to restore global monetary stability or to help the United States restore the stability of the dollar.

I conclude this discussion of gold convertibility regimes by noting that neither history nor logic offers compelling reason to expect gold convertibility to lead to stable prices. Exchange rates could be stabilized only if other countries also introduced gold convertibility and if maintaining that convertibility became (as it was in the late nineteenth century) the principal objective of policy. But if countries were willing to do that, they could do it without the intermediation of gold.

There is another disadvantage to reinstituting gold in a monetary role that is in any way linked to the market for gold, directly or indirectly. As has already been noted, the principal producers of gold in the world, together accounting for nearly 80 percent of world production, are South Africa and the Soviet Union. Both countries exercise considerable discretion in the amount of gold they actually put onto the market rather than allow competitive market incentives to prevail. Both are, in very different ways, at political odds with other members of the community of nations. Restoring gold convertibility would provide a windfall of considerable magnitude to those two countries. They could sell all they wished without depressing the market, and every $100 per ounce in the

price is worth about $1 billion annually to the Soviet Union on its current estimated gold production and $2.2 billion to South Africa. For the reasons given above, a credible regime of gold convertibility would require a substantial increase in price above the current market level. An ill-conceived attempt to avoid this price increase and to rely on new supplies to provide for limited monetary growth would place the monetary system of the United States hostage to political decisions in one or both of these countries.

NO ESCAPE FROM DISCRETION

The choice of a price for gold plays a central role in the viability of any restoration of gold to a monetary role. Yet the choice of a price, while crucial, is unavoidably arbitrary and is known to be arbitrary. So long as this is so, a rule based on a supposedly fixed price of gold cannot be a credible rule. If gold were to become unduly constraining, its price could be changed, and that would be widely known—indeed, it is intrinsic to the process of setting a price in the first place. In this respect, the situation today is fundamentally different from the situation in the nineteenth and early twentieth centuries. Then the dollar price of gold was historically given and not open to question (except for minor adjustments on several occasions to preserve the relation to silver). The price was not conceived as a policy variable. Now it is, indeed must be. Yet gold ceases to provide monetary discipline if its price can be varied. So long as the price of gold is a policy variable, a gold standard cannot be a credible disciplinarian. It provides no escape from the need for human management, however frail that may seem to be.

Other Commodity Standards

The failure of the gold standard to achieve price stability was well understood by many who lived through it, and provoked thought about what arrangements might produce greater stability. Most of the public debate in the nineteenth century focused around the alternative of silver (which conceptually had the same disadvantages as gold), of bimetallism, and of using paper currency elastically to supplement gold in periods of stringency. In the twentieth century serious proposals have arisen for broadly based commodity money, for a "tabular" standard that alters

the definition of money according to the movement of some commodity price index, and for monetary policy to be keyed formally and directly to a price index. Each of these ideas had nineteenth-century antecedents.

BIMETALLISM AND SYMMETALLISM

Bimetallism endows two metals, gold and silver, with full monetary status at a fixed price. Because variations in supply and in nonmonetary demand are unlikely to be perfectly correlated, this system can generally be expected to provide greater price stability in the long run than monometallism, provided the monetary authorities do not run out of either metal—that is, provided they hold reserves large enough to maintain the fixed price between the metals so that both of them stay in circulation. Variations in the relative supply of gold and silver plagued bimetallism over the years. It was Newton's overpricing of gold at the English mint that failed to retain the recently reminted silver coins and inadvertently placed Britain on the gold standard. The gold value of the U.S. dollar was adjusted in 1834 to correct for the previous undervaluation of gold, and overdid it (the silver-gold mint ratio was changed from 15:1 to 16:1), leading to an overvaluation of gold and the export of silver. Generally speaking, French coinage was sufficiently important during the nineteenth century to keep the price of silver relative to gold around France's official mint ratio of $15\frac{1}{2}$:1, but this was after the Nevada discoveries of 1859 and the decision of Germany to switch from silver to gold in 1871, followed by Scandinavia, France was unable to hold the ratio and abandoned unlimited coinage of the silver five-franc piece in 1874.

Alfred Marshall pointed out the difficulties in maintaining a fixed price between any two commodities over time, and suggested that "true bimetallism" should define the currency in terms of fixed quantities of the two metals, leaving the relative price free to vary. Marshall favored a symmetallic standard, as Edgeworth called it, over a monometallic one. At first he shied away from actually recommending it on the grounds that a change in the monetary standard would be too disruptive to justify the modest gains from it, but as agitation over the standard mounted, he began to advocate it.[41]

41. Marshall, *Official Papers,* pp. 14–15, 30–31.

COMMODITY RESERVE CURRENCY

A logical extension of Marshall's proposal would be to enlarge the list of commodities, fixed in quantity, in which the monetary unit is defined and against which it is issued. This was done by Benjamin Graham and his unrelated namesake, Frank Graham, in the 1930s. Benjamin Graham proposed that the dollar be defined in terms of a fixed-weight bundle of twenty-three commodities (reduced to fifteen in his international variant) and that the Federal Reserve issue notes against warehouse receipts for the bundle thus defined.[42] His proposal was to supplement the existing monetary system with commodity money. Frank Graham would have included a much longer (but unspecified) list of commodities in his commodity bundle, and he would have substituted commodity money for all other forms of money, at least in terms of future growth. At the margin, he favored what was called 100 percent money; in effect all new currency and demand deposits would represent warehouse receipts for the commodity bundles. He recognized that this preferred variant was not realistic and he was willing to settle for less.[43]

Benjamin Graham selected his proposed commodities on the basis of their economic importance and their storability. Commodity production was monetized under the scheme, but the relative prices of commodities were left free to vary; only the average price level was held constant in terms of dollars. Graham was motivated in large measure by antidepression considerations; he felt that support for primary commodity prices in times of economic slack would help stabilize overall economic activity. By the same token, release of commodities (demonetization) would help to limit booms, both by supplying commodities out of stocks and by contracting the money supply. His scheme in effect would provide

42. Graham's short list comprised wheat, corn, cotton, wool, rubber, coffee, tea, sugar, tobacco, petroleum, coal, wood pulp, pig iron, copper, and tin. At 1937 prices, coal and wheat were the most important (over 13 percent each), tea and tin the least (2.1 percent each). See Benjamin Graham, *Storage and Stability* (McGraw-Hill, 1937); and *World Commodities and World Currencies* (McGraw-Hill, 1944), p. 45. The scheme was originally proposed by Graham in 1933. W. Stanley Jevons suggested a "multiple legal tender" that could be interpreted as a commodity standard in the same vein, but he actually proposed indexation of contracts by a commodity price index, without distinguishing between the two. See Jevons, *Money*, p. 327.

43. See Frank D. Graham, *Social Goals and Economic Institutions* (Princeton University Press, 1942).

perfectly elastic demand for the commodities (taken as a bundle) included in the monetary unit in times of depressed economic activity, and perfectly elastic supply (so long as physical stocks lasted) in times of boom.

Stabilizing the price level of a limited bundle of storable commodities will stabilize the general price level only if the terms of trade between the commodities in question and manufactured goods (and services, if the "general" price level is taken to be the consumer price index) are unchanging over time.[44] Apart from both the improbability of satisfying this condition and the resources tied up in the monetized commodities (reckoned by proponents to be about 3 to 4 percent annually of the value of the stored commodities)—a factor that also applies to gold, although on a smaller scale—it is unclear why there has not been more enthusiasm for commodity-reserve proposals. Such proposals have found little interest beyond intellectuals. I suspect that conservatives really want gold, for reasons of history and sentiment, whereas nonconservatives prefer managed money.[45] Also, the schemes are basically too complicated to appeal to a wider public.

Benjamin Graham pointed out in 1961 that between the Commodity Credit Corporation and the strategic stockpile, the U.S. government

44. In the United States the price of crude materials—including oil—rose by 201 percent between 1947 and 1980; wholesale prices of finished manufactures, by 265 percent; and prices of services (in the consumer price index), by 429 percent.

45. It is of interest, though, that F. A. Hayek viewed commodity money favorably; see his "A Commodity Reserve Currency," *Economic Journal,* vol. 53 (June–September 1943), pp. 176–84.

Keynes and Friedman both opposed it. Keynes, though highly supportive of stabilization schemes for individual commodities, opposed a commodity reserve currency on the grounds that it would have the same disadvantages as a gold standard in failing to persuade organized labor that they should keep their demands for money wages in line with the increase in efficiency wages (that is, productivity). He considered the risk of excessive money wage demands as one of the major obstacles to maintenance of a full employment economy. See his 1943 letter to Benjamin Graham, reprinted as an appendix to B. Graham in Yeager, ed., *In Search of a Monetary Constitution,* pp. 215–17.

Milton Friedman also opposed a commodity-reserve currency on the grounds that a full commodity-reserve currency, lacking the mystique and historical legitimacy of gold, would in time become financially burdensome because of the real costs associated with it. This in turn would result in dilution of the concept, through various economies, which would lead in effect to discretionary policy, which he also opposed. It is therefore dominated both by a gold standard, with its mystique, and by a properly managed fiat money, which Friedman favors. See his "Commodity-Reserve Currency" in *Essays in Positive Economics* (University of Chicago Press, 1953), pp. 204–50.

during the 1950s acquired enormous reserves of both agricultural and nonagricultural commodities valued at $16 billion (over 10 percent of the money supply in 1960). Part of these acquisitions were even monetized through the federal budget deficit and the Federal Reserve's acquisition of Treasury bills. So the costs were incurred anyway, but in the name of other objectives and sometimes with a destabilizing rather than a stabilizing influence on price movements.[46]

The idea of a commodity currency was revived in 1964 in an international context by Albert Hart, Nicholas Kaldor, and Jan Tinbergen. They proposed an International Commodity Reserve Currency (ICRC) in lieu of an increase in the price of gold or reliance on a world fiduciary money as a solution to the problem of growing reliance on the U.S. dollar as a reserve currency and increasing dissatisfaction with that arrangement.[47] They were flexible on the composition of the ICRC, suggesting thirty commodities for illustrative purposes only. The commodities should be chosen for their importance in international trade, and with that in mind the composition of the ICRC should be reviewed and if appropriate altered at five-year intervals. (They do not address the question of the *relative* price changes that would occur when individual commodities are greatly increased or reduced in importance following these reviews, and are consequently purchased or sold from stocks.) This scheme is not designed to stabilize national price levels because countries are free to pursue autonomous monetary and exchange rate policies, but rather is intended to stabilize the "real value" of the international unit of account. Curiously, their proposal also includes parallel treatment of gold, which would not be included in the ICRC bundle. The International Monetary Fund was thus to be left the task of stabilizing the price of gold in terms of the ICRC, reminiscent of bimetallism. Given sponsorship of the proposal by the United Nations Conference on Trade and Development, one can assume that it was designed to appeal to developing countries by providing demand for primary products in the bundle; but, as with the Graham proposal,

46. See Benjamin Graham, "The Commodity-Reserve Currency Proposal Reconsidered," in Yeager, ed., *In Search of a Monetary Constitution,* pp. 185–214.

47. See A. G. Hart, Nicholas Kaldor, and Jan Tinbergen, "The Case for an International Commodity Reserve Currency," in Nicholas Kaldor, *Essays on Economic Policy,* vol. 2 (Norton, 1964), pp. 131–77; also A. G. Hart, "The Case as of 1976 for International Commodity-Reserve Currency," *Weltwirtschaftliches Archiv,* vol. 112, no. 1 (1976), pp. 1–32.

relative prices are left free to vary, so there is no perfectly elastic demand for any particular commodity.

INDEXATION

The complexities of a multiple-commodity standard can be avoided by the simple expedient of indexing all dollar-denominated contracts by a suitably broad price index, provided the supply of money is limited. The basic idea goes back at least to Joseph Lowe, who suggested in 1822, long before price indexes were constructed, that contracts be adjusted for changes in the general value of commodities. The idea was promoted a decade later by George Poulett Scrope, who is sometimes credited with inventing the "tabular standard," since he mentions the possibility of adjusting the legal tender as well as contracts. Writing in 1875, Jevons proposed that indexation of contracts be adopted on a voluntary basis at first, but that later it might be made compulsory for all contracts in excess of three months, indirect evidence that the real value of deferred payment was not preserved under the gold standard. He argued that indexation would represent an easy change; all that was necessary was a dispassionate government office to collect and collate the price information, publishing its results fully so they would be subject to public review and criticism.[48] Marshall also advocated indexation, and urged the Royal Commission on the Depression of Trade and Industry to attend to developing a purchasing power index, or government unit, as he called it. He believed that once it was understood it would be popular in contracts; unlike his proposal for symmetallism, about which he was somewhat diffident, he considered indexation on the urgent and active agenda for reform.[49] In fact, the British government did not publish a consumer price index until 1914, nearly thirty years later; the U.S. government did so in 1919.

THE TABULAR STANDARD

Indexation can be carried a step further, to include money itself, along with some link to the supply of money. This is known as the tabular

48. Jevons, *Money,* p. 331; characteristically, Jevons also discusses Lowe, Scrope, and other antecedents. See also Frank Fetter, *British Monetary Orthodoxy,* p. 139; and Joseph A. Schumpeter, *History of Economic Analysis* (Oxford University Press, 1954).

49. Marshall, *Official Papers,* p. 12.

standard, and is alluded to by Scrope in 1833, described by Jevons in 1875, advocated by Irving Fisher in 1920, and recently revived by Robert Hall.[50] Fisher proposes that the definition of the dollar in terms of gold (he was writing during the gold standard period) should be indexed to the cost of living. Contracts would be written in terms of dollars, without indexation, but indexation would be automatic by adjusting the dollar. If, for example, the relevant price index fell, the number of grains of gold that defined the dollar as a unit of account would be reduced by a corresponding amount. In other words, for purposes of settling debts, the goods value of the dollar would be preserved, since more gold would be required to settle a given debt denominated in dollars. The reverse adjustment would take place if the relevant price index rose.[51]

This scheme amounts to full indexation of all contracts, including gold-convertible paper money, against changes in the real value of gold, with gold remaining the formal basis of the dollar. In addition, Fisher would have adjusted the gold money supply in parallel with adjustments in the gold value of the dollar. If prices fell, for instance, the gold content of the dollar would be reduced, that is, the dollar price of gold would be raised, and gold would flow into the Treasury (against the issuance of gold certificates) from private hoards, from abroad, and eventually from new production. The reverse would occur if prices rose. Fisher would have reinforced this natural influence by issuing new gold certificates against the capital gains on existing Treasury stocks of gold, or retiring gold certificates in the event of rising prices, although this was not an essential part of his proposal.[52]

Robert Hall has recently revived the ideal of a tabular standard (without endorsing it), but he would substitute for the role of gold in Fisher's standard a weighted average of four commodities (ammonium

50. See Jevons, *Money;* Irving Fisher, *Stabilizing the Dollar* (Macmillan, 1920); and Robert E. Hall, "Explorations in the Gold Standard and Related Policies for Stabilizing the Dollar," in R. E. Hall, ed., *Inflation,* forthcoming.

51. Irving Fisher, *Stabilizing the Dollar.* Fisher observes in the preface that most of his ideas were conceived before the First World War, in other words during the heyday of the gold standard. Some of Fisher's comments on the disasters of the gold standard can be found on p. 117.

52. Ibid., appendix I. To avoid the problem of constant reminting, Fisher would have retired all gold coins and moved to a convertible gold bullion standard. According to him, "gold" in circulation was overwhelmingly in the form of gold certificates, yellowbacks, with most of the monetary gold already in the hands of the Treasury.

nitrate, copper, aluminum, and plywood, ANCAP for short) whose price index has tracked very closely the U.S. consumer price index over the past thirty years.[53] The dollar would be defined in terms of a specified combination of physical quantities of these commodities, and they would be legal tender in settlement of debts. Fiat money would presumably disappear, and bank notes could be issued freely, fully redeemable in ANCAPs. When the consumer price index rose, the dollar would be redefined to contain more ANCAPs. In this way, contracts with deferred payment written in terms of dollars would involve repayment that was constant in terms of purchasing power, as measured by the consumer price index. Unlike the Grahams, Hart-Kaldor-Tinbergen, and Fisher, Hall would not require or even permit the government to engage in purchases or sales of the commodities comprising ANCAP. The government would simply define the dollar in terms of ANCAPs and would endow them with the attribute of legal tender, so that private and government debts in effect would be settled in ANCAPs or paper claims to them. Private arbitrage, which would involve some physical storage of the commodities in ANCAP, would ensure that a paper dollar or dollar demand account remained equal in value to the current ANCAP definition of the dollar.

Hall suggests that this would be a perfectly workable arrangement, but sees no advantage in it over a well-managed fiat money. He prefers a system whereby monetary policy would be keyed to deviations of the consumer price index from its target values (ultimately, after a transition period, zero change): for each percent the consumer price index is above its target the Federal Reserve would engage in open market sales with a view to raising the Treasury bill rate by 0.1 percent; and it would act similarly each month that the consumer price index exceeded its target, so the effect would be cumulative.[54]

53. Robert Hall, "Explorations in the Gold Standard."

54. Robert E. Hall, "A Free-Market Policy to Stabilize the Purchasing Power of the Dollar" (Hoover Institution and Stanford University, December 1981). To work, this proposal assumes that the response of the price level to changes in the supply of money is reasonably rapid; long response lags could lead to explosive oscillation of both money and prices. Hall's proposal was anticipated in 1832 by Charles Jones, who "advocated a policy of price stabilization by a national bank of issue through open market operations, buying public debt when a twenty-commodity price index fell, and selling public debt when the price index rose." See Fetter, *Development of British Monetary Orthodoxy*, p. 139.

Conclusions

Consideration of the gold standard involves three quantities: gold; paper money (including demand deposits) called dollars; and some composite of goods and services in which members of the public are directly interested, for example those used to construct the consumer price index, a composite that we can call goods. There are three "prices" linking these three quantities: the dollar price of goods, the dollar price of gold, and the gold price of goods, or the commodity terms of trade between gold and other goods. Because any one of these relative prices can be derived from the other two, only two of them are independent: (dollar/goods) = (gold/goods) × (dollar/gold) or $(\$/G) = (A/G) \times (\$/A)$, where G stands for goods and A stands for *aurum* (or ANCAP). Inflation involves the first of these three prices, $\$/G$. In attempting to limit inflation, advocates of the gold standard would fix the third price, the dollar price of gold (or, equivalently, the gold content of the dollar). This can be done if the government has a sufficiently large stock of gold relative to the stock of dollars outstanding and if, when necessary, it devotes control of the supply of dollars to that objective. Alternatively, it can be done by going to a pure metallic currency, in which "dollars" *are* gold. These advocates contend that by fixing the dollar price of gold, $\$/A$, they will stabilize the dollar price of goods, $\$/G$. Both history and logic refute this contention, however, because in general the relative price between gold and other commodities, A/G, is variable over time. To be sure, there is some feedback from A/G to the supply of gold, because this price influences the cost of extracting gold. But this influence occurs only with long lags, and even then it is weak because gold is an exhaustible resource, not in perfectly elastic long-run supply. It would be necessary to argue that in the long run both discovery and technical change adapt so as to assure a fixed terms of trade between gold and goods. Certainly this price, A/G, in fact showed great variation in the nineteenth century, and it also showed a great change during the 1970s when gold prices rose much more than goods prices did (A/G fell by about 80 percent). In short, A/G is too variable to permit $\$/G$ to be stabilized by fixing $\$/A$.

The Graham and the Fisher and Hall schemes seek to control the dollar price of goods directly. The Graham plan would do so by buying and selling a bundle of goods against dollars at a fixed price, with a

sufficiently broadly defined bundle so that its price is highly correlated with all goods. Even so, it is necessary to be concerned with long-run divergences in the relative price between their suggested composites and goods more generally. Frank Graham would also control tightly the quantity of dollars by making commodity bundles the exclusive source of (additional) money.

The tabular standard of Fisher and Hall would define the dollar as some commodity or composite commodity, then would adjust the definition of the dollar at regular intervals to ensure dollar price stability of a large bundle of goods and services, such as the consumer price index: $\$/G$ can be stabilized (to be sure, as Hall points out, not always without economic hardship) by adjusting $\$/A$ to offset exactly changes in the real price A/G, which under a commodity standard is the sole source of instability in the general level of prices.

In summary, if stabilizing the dollar price of commodities is the objective, fixing the dollar price of gold is not the way to achieve it. Direct action on the dollar price of goods is more likely to be successful. But as was noted at the beginning of this paper, an objective—perhaps the dominant one—of the advocates of a restoration of gold is to reduce greatly or even eliminate discretion in the hands of the monetary authorities. It is noteworthy that all of the commodity-based proposals except that of Benjamin Graham sharply reduce or eliminate altogether discretion in monetary management.[55]

Seen this way, these proposals, taken together, raise the interesting philosophical question of why one should think that experts are more clever at devising operational, nondiscretionary monetary regimes than they are at monetary management within a discretionary regime. If the desire for a nondiscretionary regime is really simply another way—misguided, as shown above, in the case of gold—of assigning priority above all others to the objective of price stability in the management of monetary policy, that can be done directly by instructing the Federal Reserve unambiguously to take whatever action is necessary to ensure price stability. If collectively we are ambivalent about that priority, that is the principal source of the problem, not the nature of the regime.

55. In this respect, the proposal of Helms and Laffer is a compromise: it retains discretion in monetary management within a range, but increasingly limits that discretion as the official supply of gold continues to shrink or to rise. In doing so, it gives gold a major signaling or thermostatic function, but thereby ignores the function of gold as a commodity and the false signals that it might send.

Comments and Discussion

Rudiger Dornbusch: Irving Fisher, in considering the gold standard, thought its instability was all too apparent by 1920 and that gold was poorly suited as the cornerstone of a system of price stability. It is true that he also discounted other programs, particularly municipal slaughterhouses, state bakeries, destruction of trade unions (with some reluctance, I think), repeal of the tax on margarine, and bolshevism.[1] Fisher recognized what is at work once again today: ". . . any price disturbance gives a hearing to all manner of reform movements, whether *apropos* or irrelevant, and whether good or bad or indifferent. . . . Reckless radicalism rides in on the wave of high prices. . . ."[2]

Richard Cooper's paper addresses the gold standard question in an informative and uncontroversial manner. His analysis of the historical evidence cannot be faulted either in his treatment of facts or in the richness of anecdote. His treatment of the policy options is congenial, and I entirely share his conclusion that we are probably worse at building foolproof mechanisms to guard against any and all contingencies than we are, and have been, at managing money in the public interest. Below I reinforce some of the points he makes.

The gold standard era is thought of as a period of price stability. This is certainly the view taken by many proponents of the present day. In testimony before the Gold Commission price stability under the gold standard was given as *the* characteristic of nineteenth century experience. But as Cooper's paper shows, price stability was most assuredly not the rule, and it is worth asking what leads to the widespread misinformation on this point.

1. Irving Fisher, *Stabilizing the Dollar* (MacMillan, 1925), pp. 79–80.
2. Ibid. pp. 74–76.

Although wholesale prices varied considerably over the years in question, the consumer price index published by the U.S. Bureau of Labor Statistics shows little variation and in fact remains entirely unchanged for spans of several years. This is the fact widely quoted and taken in support of the price stability claim. But it is also clear that statistics on nineteenth century retail prices are very poor, indeed. For the period from 1880 to 1890, for example, the BLS index of consumer prices used the wholesale prices of food and clothing, assumed that rent, which accounted for nearly 20 percent of the index, was constant throughout the period, and assumed that the prices of other items in the index moved at the same rate as the average for rent, food, and clothing.[3] There is little reason to believe that the wholesale price index does not tell a better story of what was happening to prices.

In fact, this is more plausible in view of the substantial political agitation over trends in price levels. Once more I quote Irving Fisher: "It was during falling prices that such money-lenders as Hetty Green and Russell Sage made their fortunes. After 1896 and up to the present this would have been impossible. For even had they saved every penny of interest and compounded it, they would have had only their labor for their pains and less actual purchasing power in the end than when they began! Because of our shrinking dollar no one could have accumulated fortunes by simple saving and investment at interest since 1896.

"Hence it is that a new class of rich now inhabit the palaces of Fifth Avenue. The 'bloated bondholders' could not keep up the old magnificence under the growing strain of high prices. They have given place to the 'profiteers.' In these two phrases the great untutored public shows a curious intuitive sense for the truth which it cannot quite comprehend. It knows at least 'who got the money.' "

And Fisher further states: ". . . recently a visitor in Kansas could find no populist. The reason given was that 'there is too much money now for populism'."[4]

While there can be little question that the trend in price levels gave rise to political discontent climaxing in the Democratic convention at Chicago in 1896, there is also a question of the predictability of prices in

3. See Ethel D. Hoover, "Retail Prices After 1850," in National Bureau of Economic Research, *Trends in the American Economy in the Nineteenth Century* (Princeton University Press, 1960), pp. 141–90.

4. Fisher, *Stabilizing the Dollar*, pp. 59, 68.

the short term. The short and medium run is the time span in which the balance between real uncertainty and transactions costs, in a broad sense, is effectively resolved by fixed money contracts. But such arrangements, of course, presuppose short-term stability and predictability in price levels. There was very little of that in the late nineteenth century. Anyone who in the early 1890s extrapolated the path of prices and purchased a long-term bond would have been rudely surprised by the gold discoveries of the later part of the decade. Anyone making one- or two-year contracts could be confronted by large changes in the real value of the contract. It is unclear whether, even with today's uncertainties, prices are not more predictable over a one- or two-year horizon than they were in the late nineteenth century.

The second feature of the gold standard that I wish to discuss is the automaticity of the system as a regulator of the money supply. There is little question that the gold standard at *no* time functioned automatically with the Federal Reserve practicing a 100 percent marginal reserve. It came closest under Peel's Act in Great Britain, when the Issue Department of the Bank of England traded bullion for notes on a 100 percent reserve ratio at the margin. But the Banking Department greatly benefited from monetary tightness during periods of bullion outflow, increased credit, and reduced its own reserve position, thus partially sterilizing the bullion flow. Then, once a panic came, the Bank's reserve position was defended by selling consols in the period of tightest credit. Before the discretionary principle of discounting freely during a crisis became an almost automatic ritual, there was a succession of crises associated with the poor discretionary performance of the Bank. Friedman's "too late and hence too vigorously" certainly applies much more to nineteenth century central banking than it does today.[5]

In the United States, too, the gold standard did not bring automaticity to monetary control. Managing the gold standard was hard work and, more than once, doubts about the United States staying on gold created havoc in financial markets. Especially in July 1896, after the adoption of the free silver platform by the Democrats, there were massive capital outflows and bullion drainage reducing the U.S. Treasury reserve below the danger point. On that occasion the monetary system was rescued

5. For a discussion see Rudiger Dornbusch and Jacob Frenkel, "The Bank of England and the Crisis of 1847," forthcoming in M. Bordo and A. Schwartz, *A Retrospective on the Gold Standard.*

not by monetary contraction or the conventional debt-financed gold purchases but rather by a voluntary exchange control board organized by J. Pierpont Morgan and a syndicate of bankers.[6] Keynes certainly was right in noting that "experience—an experience covering much ground and subject to scarcely any exceptions—shows that, when severe stress comes, the gold standard is usually suspended."[7]

The case for a return to gold as a means of achieving domestic macroeconomic stability is poor. A better case might be that the gold standard represents an acceptable way to return to international stability of exchange rates and to increased macroeconomic harmony among industrial countries. Many of the protagonists of the gold standard would see this as one of the chief virtues of a return of gold. But after 1925, 1929, and 1933, that case too is very weak. There is no reason to believe that countries today are more prepared to live by an international macro rule than they were in the 1920s or 1930s. The one important difference is that now we believe we know how to achieve stability, and it certainly is not by going along with the rest of the world, whatever may be happening there. But it is also true that there is no longer a hegemony in the international system such as the United Kingdom had in the nineteenth century. Now a group of less-developed countries or of oil producers can make waves that we would want to be able to offset through active management rather than to be splashed by while adhering to the rules of the game.

Cooper has emphasized the difficulty, or impossibility, of finding a sensible transition policy to a gold standard. Any price that is too low leads to an immediate abandonment as the U.S. Treasury is cleaned out, or else to a beginning of managing gold demand—transactions charges, bullion size, Roosa bonds. The problem is aggravated by a lack of knowledge about prospective monetary demand for gold in other countries. If most industrial countries moved to a gold standard, thereby immobilizing large stocks of now privately held gold, that implies one price. If rates remain flexible, an entirely different price is warranted. If large countries abandoned the gold standard, there would be world inflationary pressure. If they moved onto gold, there would be world deflationary pressure. Any question of the instability of velocity in the

6. See Matthew Simon, "The Hot Money Movement and the Private Exchange Pool Proposal of 1896," *Journal of Economic History*, vol. 20 (March 1980), pp. 31–50.

7. John Maynard Keynes, *A Treatise on Money*, vol. 2 (MacMillan, 1930), p. 299.

United States is magnified when we think of a gold standard because we certainly lose the possibility to easily redefine the monetary aggregates.

The Gold Commission has voted against resumption of specie payments and it is therefore appropriate to ask what should be done with the U.S. holdings of monetary gold. The United States presently owns about 264 million ounces of gold, which, at $275 an ounce, is worth nearly $75 billion. One option is to schedule a series of sales, liquidating the inventory and using the proceeds to reduce the budget deficits or expand socially more productive programs than gold storage. The arithmetic of such a move would certainly be attractive since it allows a sizable reduction in the public debt outstanding and hence in the debt service.

An interesting question arises if a $75 billion gold sale were to be carried out: would interest rates rise or fall? Those who believe that the public debt, relative to other assets, leads to high interest rates would think a Treasury gold sale causes large crowding in as it reduces the relative supply of debt. But more properly one would have to know whether gold is more nearly the Dow Jones, Treasury bills, or M1 in the minds of portfolio holders. The size of the transaction would be sufficiently important to make this a serious question.

A separate issue is whether the Treasury or the Federal Reserve has good reason to maintain a gold inventory and what the cost-benefit considerations might be. An argument has been made that the Federal Reserve should hold gold for possible use in exchange market intervention. Because gold does not now have a monetary use and because anything that can be done with gold can also be done with paper, I find no plausible reason for gold hoarding on this account. I find the argument all the more difficult to understand in a world in which it is not clear whether dollars and gold or yen and gold are relatively closer substitutes. One would have to answer that question before deciding whether to buy or sell gold in an attempt to, say, appreciate the dollar.

Does the hoarding of gold involve intolerable waste in government? If the gold were sold and the public debt reduced, the government would have lower interest burdens and the taxpayer would have lower taxes matching the reduced interest payments. In portfolios, gold would replace Treasury bills, which would be largely offsetting. But the decline in the real price of gold that would accompany demonetization would lead to an increased rate of depletion of the existing stock and to a

redirection of existing resources from gold digging to alternative activity. If such a reallocation could be achieved, demonetization clearly would be a gain from the social point of view. But until the stock of gold has been depleted by industrial and private use, it would displace other assets, possibly capital, in portfolios.

If gold is being dismissed as a framework for monetary stability, are there other commodity programs that are more promising? One proposal advanced by Robert Hall is a plywood standard. Noting that the average prices of a small number of commodities track the general price level fairly well, Hall concludes that stabilizing the price of this bundle would lead to substantial aggregate price stability. The proposal raises the following question: does the policy conflict with Goodhart's second law so that attempts to control the price of the bundle would destroy its correlation with other prices? More important, the proposal is certainly in conflict with the Lucas critique. The observed correlations surely are not invariant with the monetary regime.[8]

Robert E. Hall: Cooper's paper is a carefully researched, fully documented study of the history of the late nineteenth and early twentieth century gold standards and contemporaneous proposals for change and improvement. On the central policy question, it reaches the same conclusion that every sensible modern economist makes—the purchasing power of gold is so unstable that fixing the gold content of the dollar is undesirable. Cooper's only bow in the direction of the gold standard is his point that there might be some logic in keeping a gold link if one were already in existence. But he is adamant that the return to a gold standard after so many years on a pure fiduciary standard has nothing to recommend it.

Because the professional consensus is so overwhelmingly coincident with Cooper's judgment, it is worth asking why serious economists are interested in the issues raised by the gold standard. I have two answers. First, as Cooper notes, the instability of prices under fiduciary monetary systems invites consideration of alternatives. The illusion that prices

8. Robert E. Lucas, Jr., "Econometric Policy Evaluation: A Critique," in Karl Brunner and Allan H. Meltzer, eds., *The Phillips Curve and Labor Markets*. Carnegie-Rochester Conference Series on Public Policy, vol. 1 (Amsterdam: North-Holland, 1976), pp. 19–46.

were stable under the gold standard has drawn some support to the resumption of a gold link to the dollar. Cooper is effective in disposing of the illusion. Second, there is an important recent movement on which Cooper is silent: monetary deregulation. How can we stabilize prices at the same time as we grant complete freedom to banks and other institutions to create money and other financial instruments? One of the answers is to adopt a gold definition of the dollar. If every financial instrument denominated in dollars is in effect a promise to pay gold, full deregulation is compatible with determinate (but perhaps not stable) prices. I regret that Cooper did not pursue this aspect of the gold standard.

With respect to the goal of price stability, Cooper points out that discretionary policy in a fiduciary monetary system is perfectly capable of stabilizing prices. All we have to do is instruct the Federal Reserve to aim for a price target and not think about anything else. Although that authority has been accused of paying more attention to politics than to prescribed economic goals in the past, its recent behavior shows convincingly that it can pursue a single-minded target without regard for what else is happening in the economy. A long propaganda siege from the monetarists has convinced the Federal Reserve to look only at the money stock. An equal amount of browbeating from economists believing in price targets for monetary policy might swing the Federal Reserve to that form of single-mindedness. There is nothing new about the idea—it was pushed hard by Lloyd Mints in the 1930s.

Surprisingly, in its brief comment on the issue of rules versus discretion, the paper does not mention the dynamic inconsistency problem pointed out by Kydland-Prescott and others. In discretionary policies there is always a temptation to create an inflationary surprise in any given year, even though social welfare would be greater in the long run if such inflationary surprises were prohibited. The answer is some kind of precommitment to a policy without surprises and a framework for executing policy in which nobody is exposed to the temptation to create an inflationary surprise. Again, the gold standard is one of the answers to this problem.

Among the economists who take the need for precommitment seriously (including myself), there is no agreement today on the most desirable form of precommitment. The standard answer of the postwar era has been constant money growth. But instability of money demand

has cast serious doubt on the wisdom of this monetarist prescription. More important, money growth rules are in direct conflict with free-market principles that call for a noninterventionist policy with respect to money-issuing institutions.

The bimetallic standard of the seventy years before the Civil War in the United States is a good example of lasting precommitment; I am sorry that Cooper did not include this period in his historical review. The U.S. Constitution calls for the creation of a monetary unit in the same sentence as it calls for a system of weights and measures, and this is precisely what Congress did when it created the dollar in 1792. The gold and silver content of the dollar was regarded as fixed in exactly the same way as the length of the yard. Discretionary changes in the dollar's definition were unthinkable. This mentality is precisely what we have in mind in advocating precommitment.

Cooper shows that a gold definition of the dollar would not stabilize the dollar's purchasing power. Recent experience is not very encouraging on the desirability of precommitting to fixed money growth. There is remarkably little agreement, though, on what is a good form of precommitment. Perhaps the only idea that is going anywhere is that the Federal Reserve be instructed to manipulate its instruments so as to keep nominal GNP on a predetermined growth path.

One of the most interesting parts of Cooper's paper delves into nineteenth century monetary thought. He notes that the thinking of the nineteenth century was behind the times because it neglected deposits and dealt entirely with coins and notes. But Cooper makes a similar mistake. A growing literature associated with work by James Tobin, Fischer Black, and Eugene Fama shows that there are no important differences between banks and other financial intermediaries. What differences there are today are related to regulation and will disappear as deregulation proceeds. We need to become accustomed to discussing the issues of the determination of the price level without relying on the concept of money as a special financial instrument. Fama is particularly insistent on conducting the discussion without using the term money at all.

I am so impressed by what Cooper put in his paper that I have spent all of my time on the issues that he did not cover. I commend this paper to all readers as an extraordinarily thorough review of the facts about the gold standard.

General Discussion

A major focus of discussion was the comparative value of fixed decision rules—such as strict adherence to a gold standard—versus discretionary policymaking. Several discussants observed that the advent of discretionary policy had reduced fluctuations in real economic activity. Lawrence Summers noted that financial panics and consequent drops in real output occurred frequently under the regime of fixed monetary precommitments. Franco Modigliani added that the fixed monetary rule under which the Federal Reserve currently operates has resulted in, or at least been accompanied by, great instability in the real economy. William Fellner, however, argued that episodes of discretionary policies may give rise to an unwanted aftermath. The aftermath is attributed to fixed-rule policies that supplant the discretionary regime, whereas properly the blame should be attached to the discretionary policies that preceded them. Richard Cooper noted that the gold standard could not strictly be counted as a fixed-rule regime in any case, as it permitted considerable discretion. Charles Holt suggested that, nonetheless, a principal attraction of the gold standard for its proponents is that it limits the discretion of government authorities. The money supply is fixed by available stocks of gold and impersonal market forces, a mechanism that proponents regard as more reliable than government authorities, who should be left only with the task of national defense. Cooper agreed that there is such a philosophical basis to the views of some gold standard advocates. They are willing to accept greater economic instability in return for less government discretion. William Nordhaus endorsed government sale of its present gold stock on the grounds that this would remove the discretion of future governments to go back to the gold standard.

Stanley Fischer pointed out the practical limitations of government precommitments such as a fixed gold standard. While it may be desirable to adhere to precommitments for some period, government authorities cannot commit forever. Christopher Sims agreed that precommitment is important but suggested that real precommitment that lasts and is convincing comes from policy discussion and political consensus. He doubted that precommitment could be embodied in simple numerical rules and argued that the public's distaste for inflation represents the

real precommitment in the current policy situation. Stephen Goldfeld noted that the real test of a commitment is whether in some painful period it is observed or abandoned. Policymakers can be quite ingenious in avoiding the constraints implied by precommitments; therefore analysts hoping to model policy reactions must focus on the political process in which economic policy is actually made and rules implemented. James Tobin emphasized that it is difficult to make some kinds of precommitment credible. A local police force could announce that it would refrain from rescuing intrepid mountaineers who insisted on climbing particularly dangerous peaks; but it is doubtful that such a commitment would be believed. Thus the impact of such precommitment is doubtful. Furthermore, it is questionable whether, in the first place, society should want commitments that it would prefer not to honor.

Sims noted the great difficulty in devising an optimal rule even if policymakers wanted to precommit themselves to one. If the form of the rule matters, then in framing it one needs models of the economy that are better than the ones now available. Some rational expectations models avoid this problem by suggesting that the form of the rule does not matter much, just so long as there is a rule. But the present unfavorable experience with a simple monetary rule led Sims to reject that sanguine view.

There was little defense of the gold standard among participants. A few of the discussants suggested, however, that the historical evidence might not be as damning as suggested by Cooper. Alan Greenspan noted that the greater variability in prices under the gold standard might be attributable to agricultural fluctuations caused by variations in weather. Since agriculture predominated in the gold standard era while administered industrial prices were much more important in the later period, the lower price variability in the later period may be due to evolution in the economy's industrial structure. Charles Holt concurred with this view and added that there was only a weak commitment in the gold standard era to the rules that maintain economic stability. In rebuttal Modigliani pointed out that if one were willing to purge the gold standard era of fluctuations due to agriculture, one should purge the later era of price fluctuations due to oil. This would show the postwar period to be one of fantastic stability. Walter Salant remarked that prices both fell and rose for extended periods during the gold standard era while they had no extended declines in the postwar period. The fact that prices could move

in both directions might have helped prevent long-run expectations about the price level from becoming biased toward inflation, although this fact may not have been related to the gold standard.

Martin Baily argued that a gold standard contains an inherent element of instability. If the government firmly commits itself to maintain a fixed relation between the dollar and gold, and if the commitment is believed, interest-bearing dollar assets must be preferred, as assets, to gold; one would choose to hold gold only if there were some likelihood that the government would not honor its commitment. Hence the demand for gold and its equilibrium price must depend on how many people at a particular moment think the government will go back on its commitment. Robert Hall agreed that, with a credible gold standard, no gold would be held by the public as a store of wealth or a monetary reserve, and gold would not change hands in transactions. The relative price of gold would be determined by the nonmonetary demand for gold and the supply of gold.