# BANK OF SAN FRANCISCO



# Gold as a Private Hedge Against Inflation

By Michael W. Keran and Michael Penzer

On December 31, 1974, American citizens were, for the first time in 41 years, legally permitted to buy, sell and hold gold bullion. The extent to which they exercise this privilege will depend largely on their private views concerning the future rate of increase in the price of gold and the variance in this rate of change. In other words, will the price of gold increase faster than the general price level, and will variations in its price be suffi-

ciently narrow so as not to expose holders to undue risks? The purpose of this article is to examine the role of gold as a private hedge against inflation. This will be done by analyzing the factors which have determined the price of gold during both the distant and more recent past, in order to come to some conclusion regarding gold's possible role as an inflation hedge during 1975 and beyond.

### **Gold Prices**

Whether or not gold proves to be a good inflation hedge for the private U.S. citizen obviously depends upon the amount of appreciation in the dollar value of his gold holdings between the time that he buys the gold and the time that he sells it (Chart 1). In this regard, our primary criterion for evaluating gold's performance as an inflation hedge is the degree to which the price of gold moves with the general price level (either up or down). The question of whether gold is a good investment depends upon factors other than its role as an inflation hedge, mainly the return available on alternate investments. We will consider both issues here.

Timing one's purchase obviously is very important. For example, someone purchasing gold in 1929 and legally entitled to hold it beyond 1933<sup>1</sup> would have seen each ounce of his gold investment increase by 69.5 percent, from \$20.65 in 1929 to \$35.00 on January 31, 1934, when the Roosevelt Administration officially revalued gold. During the same interval the value of other U.S. goods declined by about 30 percent as measured by the wholesale price index. Hence, a gold purchase in 1929 would have been an unusually good investment because while most prices were falling, the gold price rose in succeeding years (Chart 2a).



Chart 2 (a)



On the other hand, if our hypothetical gold buyer had purchased gold in February 1934, after gold's official price had been raised, and if he held his gold until 1968, he would have gained only a 12-percent rise in price, compared with a 165-percent rise in wholesale prices (Chart 2b). Hence, during this 34-year period, gold would have been no hedge against inflation; indeed, our buyer would have lost more than one-half of the purchasing power of his gold.

Finally, if our buyer had purchased bullion in 1968, his gold investment would have been a good inflation hedge by the end of 1969, no hedge at all by year-end 1970 and 1971, and an excellent hedge by year-end 1972, 1973, and 1974 (Chart 2c). Nevertheless, there is no assurance that gold purchased now would continue to be a good inflation hedge. Gold purchased on December 30, 1974 at the London afternoon gold-fixing price of \$195.25 per ounce, a record until that time, fell by \$25.75 per ounce over the next week. *Ex post*, we see the necessity of timing one's gold purchases well if one desires to hold gold as a worthwhile inflation hedge.

As Chart 3 demonstrates, the variance in gold prices has increased as the price of gold has increased.<sup>2</sup> Hence, the risk of buying high and selling low has increased through time; this risk, of course, is one of the costs of holding gold, of which more shortly.

In the most recent period, when gold prices have shown their most dramatic increases, prices of other internationally-traded goods have also risen very sharply. As Chart 4 demonstrates, world export-price indices for all commodities — and primary commodities in particular — increased substantially between the first quarter of 1971 and the first quarter of 1974 (latest data available). During this three-year period, gold prices rose by nearly 290 percent, while export prices of all commodities rose by more than 50 percent, and those for primary commodities increased by more than 160 percent. Hence, the gold price has been moving in the same direction as the prices of all other internationally-traded goods.





### **Costs and Benefits of Holding Gold**

Before proceeding further in an analysis of gold as a commodity investment, we need to be aware of the essential difference between this and other commodities, and the many costs (as well as benefits) incurred in buying, selling and holding gold. Because of its historical monetary role, gold cannot (yet) be treated like any other commodity, whether it be soybeans, pork bellies or steel scrap. Even now, despite official U.S. efforts to demonetize gold, it is still regarded by many nations, including the United States, as an integral part of their international reserves.

Besides being a possibly good hedge against inflation, gold ownership may bestow other benefits. These include the psychological satisfaction from holding a metal which historically has provided security in times of trouble and uncertainty, as well as the enjoyment of gold's intrinsic physical properties. However, these benefits must be matched against the possible costs of gold ownership. There is an opportunity cost in terms of the benefits that could be obtained from holding other goods instead of gold - from holding, for example, other commodities, foreign currencies, and interestbearing financial assets. The prices of all commodities, industrial commodities, and metals and metal products each increased faster than the gold price between 1934 and 1973 (Table 1), so that a basket of various commodities held during that périod would have been a better inflation hedge than the single commodity gold. By November 1974, only the prices of metal and metal products continued to remain above those for gold. Thus, depending on the period chosen for comparison, investments in other commodities may be better inflation hedges than gold.<sup>3</sup>

Foreign currencies may at times be a better hedge than gold against increases in the U.S. general price level. Since various currencies were allowed to float against the U.S. dollar in June 1970, the dollar has depreciated against some currencies (Table 2), and appreciated against others. While each dollar now buys 80.8 percent less gold than it did in May 1970, the dollar also buys less foreign currency — in particular, 48.5 percent fewer Swiss francs and 41.9 percent fewer German marks. One must thus conclude that gold has been a better inflation hedge than foreign currency in that particular time span, May 1970 to December 1974. This is because the current inflation is worldwide in nature, so that even a "strong" currency (such as the German deutschemark) has experienced record inflation rates by recent historical standards. In such an environment, a commodity will always be superior to currency. However, when the current bout of worldwide inflation ends, that particular advantage of gold should also end.

Interest-bearing financial assets are another alternative to gold. While interest rates rose to record levels in 1973 and 1974, they still did not compensate investors for inflation because the nominal rate of interest — which included an inflation premium over and above the real interest rate — was less than the actual inflation rate. As a result, investors were attracted to commodities, such as gold, during this period. Nevertheless, financial assets in certain recent periods have been a better

### Chart 4



store of value than gold. For example, if a conservative U.S. investor had placed the equivalent of \$1 million in West Germany in 1949 at an average yearly rate of 6.75 percent, he could have repatriated \$8.8 million by June 1974. In comparison, \$1 million invested in gold at \$35 per ounce in 1949 would represent today a value of \$4.5 million, less storage charges over a period of 25 years.<sup>4</sup> In this example, the investor in deutschemarks benefited not only from the compound interest on his investment, but also from the appreciation of the West German mark.

There are many other risks and costs involved in holding gold besides the opportunity costs involved in not holding other commodities, foreign currencies, or paper assets. For example, gold prices fluctuate widely, especially in the short-run, as speculative activity develops in a thin market because of the relatively small demand for use in the arts and industry in relation to current supply (Chart 3). Moreover, the extent of speculative buying is a function of the current price and the expectation that the gold price will rise by at least the cost of owning and holding gold. If this expectation is not realized, the price must fall enough to create a new expectation of a rise. These changes in speculators' expectations result in gold prices fluctuating more than the prices of other commodities.

The illiquidity of gold investment and the large variance in gold prices represent real costs of ownership. If circumstances require the quick sale of a gold asset, such a sale is more likely to occur in a down market than is the case with alternative investments. Moreover, buying and holding gold include costs of fabrication, packaging, shipping, handling, storage, insurance and state sales taxes. Such costs may boost the cost of the typical purchase to more than 20 to 30 percent above the freemarket price for gold bullion. In addition, transaction costs of between 6 and 15 percent may be charged for trading by dealers; usually, these costs are higher for small than for large transactions. As a result, the free-market price would have to rise more than 20 percent before the purchaser could recover his total buying and selling costs. Because of the risks associated with counterfeiting, he would also have to pay assay costs whenever he decided to sell his holdings. Thus, holding gold as an asset in one's portfolio requires much expertise. Those who are tempted to view gold as a good inflation hedge ignore the fact that it may not be better than other hedges and that there are many costs involved.

### Gold During the Greenback Period

Besides the recent (1968-74) experience, one other period in American history had no officially-fixed price of gold in terms of the U.S. dollar; namely, the Greenback Period from 1862 to 1879.<sup>5</sup> The average monthly price of gold varied widely during this period, but by 1879, the United States was back on the gold standard at the pre-Civil War parity. The price level rose throughout the Civil War, then dropped 50 percent between 1865 and 1879, with the price of gold in greenbacks moving in parallel. A unit of gold in greenbacks that was worth a dollar before the war was worth \$2.50 in 1865, before beginning to decline. Given this historical perspective, anyone wishing to make a good investment would have been well-advised to trade his greenbacks for gold at the beginning of the Civil War and then to trade back in 1864 when the gold price was at its height.

Different supply and demand factors operated during the 1862-79 period than during the more recent (1968-74) period. A century ago, the price of gold was essentially the dollar-pound exchange rate. With the United Kingdom on the gold standard, the Bank of England stood ready to settle transactions at the rate of one pound sterling per unit of gold. Hence, the gold price in terms of greenbacks was determined by the demand and supply for greenbacks vis-a-vis the pound sterling. Although gold was traded on the New York Stock Exchange, its price in terms of greenbacks reflected changes in the day-to-day value of greenbacks vis-a-vis British pounds in the foreignexchange market. Today, no country operates on a gold standard; instead, all major currencies float against each other, and the gold price also floats freely in its own market. Nevertheless, one implication may be drawn from the experience of a century ago: if the price of gold is not fixed by government action to a given currency, then gold is a good investment only during inflation and is a very bad buy during deflation.

### **Gold Price Determinants - Supply**

In order to evaluate gold's future value as an inflation hedge, we need to consider those supply and demand factors which resulted in generallyrising gold prices during the past seven years and, in particular, during the past four years. While part of the recent price increase may be traced to a stock-adjustment process which occurred when the gold price was set free, most of the increase reflects changing supply-and-demand forces which have implications for the future price of gold.

Stock and flow determinants affect both the supply and demand sides of the gold market. On the supply flow side, free-world output decreased from 1,288 metric tons in 1970 to an estimated 1,034 metric tons in 1974, a drop of almost 20 percent in four years (Table 3). South Africa, the dominant producer, accounted for more than 90 percent of the production decline. Labor problems, a shortage of skilled technicians, and occasional operational difficulties contributed to the lower South African output. This decline also reflected the perverse short-run elasticity of supply in response to higher gold prices; gold producers have been either encouraged or required to transfer men and equipment to mining poorer-quality veins, in an attempt to conserve higher-quality ore, and hence to extend the life of the mines. A downward-sloping flow supply curve is implied by South Africa's emphasis on long-run rather than short-run production considerations, which depend on that producer's expectations regarding long-run prices and mining costs. This policy assumes that incentives to increased exploration will not lead to increased gold discoveries. If the assumption is incorrect, then South Africa's limitation on current production will be self-defeating.

In contrast, the U.S.S.R., the world's second largest producer, increased its annual gold production from 304 metric tons in 1968 to 371 metric tons in 1973, an increase of almost 22 percent (Table 3). Nevertheless, only a portion of the Russian output is sold in the West each year — an estimated 220 metric tons in 1974. Altogether, the total supply in Western gold markets declined from 1,634 tons in 1970 to 1,473 tons in 1973.

World supply is also dependent on the gold strategies and foreign-exchange needs of South Africa and the U.S.S.R. Russian sales depend largely on the market price and on the size of liabilities incurred by the U.S.S.R. in its transactions with the West. These sales were particularly large in the 1972-74 period, but there is no guarantee that they will continue to be so. In the South African case, the Reserve Bank performs the role of a price leader by withholding gold from the market in the face of sluggish demand or an unusual increase in supply, such as the recent Treasury sales from the U.S. gold stock.

Conflicting factors thus have affected production during the recent period of rising gold prices. Hence, from the supply flow point of view, the private inflation-hedger cannot feel confident that gold prices will continue to rise faster than the general price level. World production apparently declined in 1974 for the fourth straight year, helping *ceteris paribus* to raise the gold price. For the longer-run, however, higher gold prices are likely to result in more gold production.

The supply-stock side of the market is dominated by the amount of monetary gold held by central banks and by the amount in private gold holdings, which together are many times larger than annual world production. Total stocks today may approximate 3.7 billion ounces. Central-bank holdings alone are more than 25 times as large as annual production. Incidentally, the United States still holds more than any other nation, accounting for more than 23 percent of central-bank holdings at the end of November 1974 (Table 4).

Consequently, if central banks sold off only 4 percent of their gold stocks, they could have a disastrous effect on prices, because that would equal the total world production for an entire year. The U.S. Treasury conducted such a sale on January 6, 1975, when 753.6 thousand ounces — from a total of 2 million ounces offered at auction — were sold at prices varying between \$153.00 and \$185.00 per ounce. Future sales either by the U.S. or foreign governments are always a possibility. In fact, Senator William Proxmire, new Chairman of the Senate Banking Committee, recently said that he will introduce a bill requiring the Treasury to sell 25 million ounces of gold (9 percent of its stock) in 1975 at prevailing market prices. Such sales should certainly tend to lessen gold's role as a good hedge against inflation.

A decision by foreign central banks to sell their stocks in the free market will depend largely on their views concerning gold's future role as international money. If gold is gradually demonetized, then central bankers may gradually sell off their gold holdings. The trend towards the use of gold as collateral for loans (as recently done by Italy) is a practical step in this direction.

### **Gold Price Determinants - Demand**

The demand for gold depends on stock and flow considerations, as does the supply. There is a flow demand for gold for industrial, commercial and artistic purposes. There is also a stock demand for purposes of inventory building, whether it be by central banks or by private hoarders, investors and speculators. As gold prices have risen, flow demand generally has declined (Table 5). The largest decline has occurred in jewelry fabrication, which in 1973 was less than half of the 1970 level as a consequence of the 170-percent rise in gold prices over that period. At currently high prices, flow demand may continue to decrease in 1975 and beyond, reflecting the high price elasticity of demand for gold jewelry, and also for coins, medals and medallions. Another factor likely to reduce flow demand is the current world recession, which is causing a decline in demand for most raw materials, including gold.

The private stock demand for gold increased in the 1972-74 period, as world inflation accelerated and as investors bought gold as an inflation hedge. This demand could continue to increase during 1975, the first year of legal bullion purchases for American citizens. In contrast, central-bank stock demand has been constant for several years. Increased official gold holdings overseas (71.8 million ounces) were almost matched by declining official U.S. gold holdings (62.8 million ounces) between the end of 1969 and late 1974 (Table 4).

The speculative and investment demands for gold became very large in 1973, and undoubtedly continued high in 1974, with investors and speculators buying relatively large amounts of official gold coins. Hoarding demand meanwhile expanded in 1973 after an earlier decline. It should be noted that different factors underlie each of these three types of demand. Hoarding demand is strongest in those parts of the world with a long record of political and economic turmoil, such as France and South and East Asia, particularly India. Gold is regarded in those areas as the ultimate store of value, as well as a means of exchange in times of emergency or flight. Hoarding demand appears to be price elastic as indicated by Table 5, which shows smaller or negative additions to hoards during the recent period of rising gold prices.

The basic motive for investment demand is to





buy and hold gold for an extended period, at least until investment in other assets becomes more attractive. In contrast, the motive for speculative demand is to profit from short-run variations in gold prices, buying when the price is relatively low and selling when it is relatively high. Both of these types of demand have been encouraged by the 1973-74 inflation, and also by the expectations of inflation which many market participants hold for 1975. Inflation and inflation expectations promote speculative commodity purchases rather than currency or paper-asset retention.

Central-bank demand has decreased in recent years, reflecting the continued efforts to demonetize gold. When the two-tier market was established in March 1968, central banks agreed not to purchase any newly mined gold, nor to buy or sell gold on private markets. In 1973, this agreement was terminated, and central banks may now sell gold in the free market at going prices. However, International Monetary Fund rules currently prohibit government purchases in the free market at more than the official price of \$42.22 per ounce. Hence, central-bank gold purchases have been minimal in recent years. The trend to demonetization was confirmed this January, when France abolished the official price of its gold reserves.

Between March 1968 (when the two-tier market was established), and September 1974, gold reserves of non-Communist nations increased only one percent (11.6 million ounces), reflecting restrictions on central-bank purchases during this period. South Africa accounted for all of the increase since 1971. Because the South African Reserve Bank purchases all of that nation's output and releases gold in the free market only when it desires to do so, its recent tendency to add to its stocks reflects its intention (as the world's dominant producer) to keep gold prices high.

### **Future Course of Gold Prices**

Gold is unlikely to be a good short-term hedge against inflation, because of the wide price fluctuations which can occur on a month-to-month basis. Even during the inflationary 1972-74 period, the price of gold sometimes fell for months at a time (Chart 3).

Over the entire course of the 1972-74 inflation, gold turned out to be an excellent investment. Nevertheless, the remaining years of this decade will inevitably bring changes in the many supply and demand factors which determine its price. This paper has shown the many costs and risks involved in gold-market participation, as well as the complexity of factors which affect the gold price. Hence, *caveat emptor*: gold may not continue to be a good private hedge against inflation.

Among the many price determinants analyzed here, gold's role as a hedge against world inflation is one of the most important. Just as domestic inflation is strongly influenced by growth in the domestic money stock, so world inflation is also influenced by growth in the world money stock.<sup>6</sup> World money is a common factor in the demand functions of all internationally traded goods (including gold). Thus, the rate of increase in the world money stock will, with a substantial lag, lead to an increase in the prices of internationally traded goods. When world money growth was relatively moderate, as in the period from 1963 through 1968, internationally traded goods prices were stable (Chart 5). However, when world money growth later accelerated sharply, prices of internationally traded goods responded. Given the substantial lag between world money and world prices, the stability in world money growth which was resumed in early 1973 should be reflected in renewed stability in world prices in 1975.

A renewal of stable prices for internationally traded goods should reduce demand for gold as an inflation hedge. Given the relatively small demand for gold for other purposes at its current price, this could lead to a substantial fall in the price of gold.

### FOOTNOTES

<sup>1</sup> In 1933, U.S. citizens were forbidden by law to own gold except by license from the U.S. Department of the Treasury for certain specified artistic, commercial and industrial purposes. At the end of 1973, U.S. restrictions were eased on the holding of gold coins originally minted prior to 1960. On December 31, 1974, U.S. citizens were once again legally entitled to pur-chase, sell and hold gold bullion.

<sup>2</sup> Technically, it would be more appropriate in Chart 3 to plot percentage changes in the gold price rather than absolute changes, but for practical purposes it makes little difference.

<sup>3</sup> The choice of any commodity as an inflation hedge depends crucially upon the particular time span in which it is held, as well as the price appreciation of that particular commodity as compared with the increase in the general price level during the period in question.

<sup>4</sup> Charles R. Stahl, American Metal Markets' Gold Conference, October 1974. David O. Tyson, "Record Gold Price Abroad Anticipates Dominance of Coming U.S. Market, Dealers Feel", *American Banker*, November 12, 1974, p. 1.

<sup>5</sup> For a more detailed discussion of this period, see Milton Friedman and Anna Schwartz, *A Monetary History of the United States 1867-1960* (Princeton: Princeton University Press, 1963), pp. 15-88.

<sup>6</sup> World money stock may be measured by the total international reserves of industrial countries.

### Price Indices (1934 = 100)

		U.S. Wholesale Prices					
Period	Gold Price (Free-market average)	All Commodities	Industrial Commodities	Metals and Metal Products			
1934	100	100	100	100			
1940	100	105.0	106.1	111.4			
1950	100	212.0	187.6	196.1			
1960	100	245.9	229.2	273.3			
1968	112.2	265.6	246.5	303.5			
1969	117.5	276.0	254.9	320.9			
1970	102.7	286.0	264.5	345.2			
1971	116.6	295.2	274.1	352.0			
1972	166.3	308.7	283.5	365.3			
1973	277.8	349.0	302.7	392.7			
1974 (Nov.)	519.1	445.4	398.7	552.2			

**Sources:** Gold Price: Index constructed from London gold price data (U.S. dollars per ounce fine at daily fixing), *Annual Bullion Review*, Samuel Montagu and Co. Ltd., London, various years; and *Dow Jones News Service*, Dow Jones and Co. Inc., New York, New York, daily reports for November 1974. U.S. Wholesale Prices: Index constructed from the B.L.S. wholesale-price index, *Economic Report of the President* (Washington: Government Printing Office, 1974), and *Monthly Labor Review*, December 1974.

### Table 2

### Depreciation of the Dollar vis-a-vis Gold and Foreign Currencies May 1970 to December 20, 1974

	Depreciation (percent)			
Gold	-80.8			
Swiss franc	-48.5			
West German mark	-41.9			
Dutch guilder	-36.4			
Belgian franc	-30.1			
Swedish krona	-22.5			
French franc	-21.2			
Japanese yen	-18.0			
Australian dollar	-17.1			

### Table 3

# Estimated World Gold Production (metric tons)

	1968	1969	1970	1971	1972	1973	1974
South Africa	969.5	973.0	1000.4	976.3	908.7	852.3	n.a.
Canada	85.3	79.2	74.9	70.3	64.7	59.9	n.a.
United States	46.0	53.9	54.2	46.5	44.4	36.7	n.a.
Ghana	22.6	22.0	21.9	21.7	22.5	22.7	n.a.
Philippines	16.4	17.8	18.7	19.8	18.7	18.2	n.a.
Australia	24.3	21.7	19.4	20.9	23.4	18.0	n.a.
Rhodesia	15.5	14.9	15.6	15.6	15.6	15.6	n.a.
Japan	7.0	7.7	8.0	7.9	7.4	7.8	n.a.
Colombia	7.5	6.8	6.3	5.9	5.9	6.5	n.a.
Mexico	5.5	5.6	6.2	4.7	4.5	4.7	n.a.
Zaire	5.3	5.5	5.5	5.4	4.3	3.6	n.a.
Other Non-Communist							
Countries	43.3	52.9	56.8	55.1	52.8	48.0	n.a.
Total Non-Communist	1248.2	1261.0	1287.9	1250.1	1172.9	1094.0	1034.2
U.S.S.R. Other Communist	304.2	318.2	335.5	344.8	360.2	370.6	n.a.
Countries	8.4	8.4	8.4	8.4	8.4	8.4	n.a.
Estimated world total	1560.8	1587.6	1633.8	1603.3	1541.5	1473.0	n.a.
Sales by the U.S.S.R. to the West	10			60	220	280	220

Sources: Bank for International Settlements, Annual Reports, June 1973, p. 116, and June 1974, p. 123.

Peter D. Fells, Gold 1974 (London: Consolidated Gold Fields, Ltd., 1974), pp. 24 and 47.

E. M. Bernstein, Ltd. U.S. Participation in the Free Gold Market, Report No. 75/1, p. 3.

### Table 4

# Official Gold Reserves (millions of ounces at end of period)

	1968	1969	1970	1971	1972	1973	Nov. 1974
United States	311.2	338.8	316.3	291.6	276.0	276.0	276.0
Rest of World*	857.5	833.1	863.0	884.4	905.3	904.7	904.9
Total World**	1168.7	1171.9	1179.3	1176.0	1181.3	1180.7	1180.9

\* Rest of World includes International Monetary Fund

\*\* Excludes U.S.S.R., other Eastern European countries, and Peoples Republic of China. Source: International Monetary Fund, *International Financial Statistics*, Vol. 28, No. 1, January 1975.

### Table 5

# Estimated Uses of Gold (metric tons)

	1968	1969	1970	1971	1972	1973	1974
Flow Demand	1159.6	1180.3	1335.6	1339.2	1287.8	800.2	496.1
Jewelry	913.3	906.2	1062.6	1058.7	992.7	505.2	267.5*
Electronics	84.2	102.4	93.6	90.6	110.2	129.5	93.3
Dentistry	64.5	64.6	63.9	70.0	72.5	72.7	65.3*
Other Industrial							
and Decorative	57.6	63.1	61.9	68.2	71.2	71.0	60.7
Fake Coins, Medals							
and Medallions	40.0	44.0	53.6	51.7	41.2	21.8	9.3
Stock Demand	+58.8	+56.8	-61.7	-43.1	+115.4	+601.0	+908.2**
Purchases by							
Governments	-619.0	+90.2	+236.4	-96.4	+152.4	-6.2	n.a.
Hoarding	+72.0	+60.0	+88.0	+80.0	-8.0	+46.0	n.a.
Speculation and Investment	+537.0	-118.0	-432.0	-79.0	-91.0	+508.0	n.a.
Official Coins	+67.8	+24.6	+45.9	+52.3	+62.0	+53.2	+293.9

\* Does not include Middle East and Far East demand for these purposes.

**\*\*** Includes errors in estimates of other uses.

Source: Peter D. Fells, Gold 1974 (London: Consolidated Gold Fields, Ltd., 1974), pp. 12 and 13.

E. M. Bernstein Ltd., U.S. Participation in the Free Gold Market, Report No. 75/1, p. 3.