The Truth about Gold: Why It Should (or Should Not) Be Part of Your Asset Allocation Strategy

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Most arguments for holding gold in a portfolio are not supported by an analysis of the data. Nonetheless, an argument can be made for including gold as a commodity in a well-diversified portfolio, particularly if investors and central banks increase their demand—even moderately—for gold.

The attractiveness of gold as an investment can generate heated arguments, many of which are based on wishful thinking rather than fact. In this presentation, I am going to examine the most popular assertions and offer some tools for assessing gold in a manner that is informed by data rather than hype.

Arguments for Holding Gold

Many arguments have been made in favor of gold as an investment, but aside from the literature on the gold standard as it relates to foreign exchange, little academic research has been done on the role of gold in asset allocation. The proponents of holding gold assert that it is useful as an inflation hedge, a currency hedge, an alternative to assets with low real returns, and/or a safe haven—that is, a tail-risk protection policy. Some proponents also argue that the world is returning to a *de facto* gold standard because gold is equivalent to money, whereas others believe that gold is "underowned" as an investment asset and should thus be viewed as a desirable element in a portfolio. Unfortunately, most of these arguments do not hold up under close analysis.

Inflation Hedge. There are many reasons to be concerned about unexpected inflation in the future; the number one reason is that central bank balance sheets are rapidly expanding. The balance sheets of the European Central Bank, the U.S. Federal Reserve Bank, and the Bank of England dramatically increased during the financial crisis and continue to expand under open-ended quantitative easing.

Gold vs. CPI inflation. One way to determine the relationship between gold and inflation is to divide the nominal price of gold by the U.S. Consumer Price Index (CPI), as shown in **Figure 1**. From January 1975, when futures trading for gold began, to March 2012, the average ratio of gold prices to inflation is 3.2. The current ratio is 7.31. But historically, the ratio appears to revert to the mean. The current 7.0 range is similar to the unsustained range in the late 1970s and early 1980s, which suggests that the real price of gold is now too high. Instead of the current price of $1,600 per ounce, perhaps the price of gold should be closer to $800.

Figure 2 shows that from 1985 to 2012, the CPI's 10-year average inflation rate was quite steady; the 10-year return on gold, however, was much more volatile in both real and nominal terms. Since 2005, the price of gold has risen compared with inflation, but from 1990 to 2005, the return on gold was well below the inflation level and thus not a good hedge. A hedge should have a consistent relationship over long periods of time with what it is hedging. Gold has moved erratically compared with the inflation rate and hence does not provide an effective inflation hedge.

Next, consider the standard deviation and the R^2 of the real price of gold and of CPI inflation at a one-year horizon. The standard deviation of gold is roughly 10 times the standard deviation of CPI inflation: 26.7% and 23.6% for the nominal and real gold returns, respectively, versus 2.9% for the CPI.

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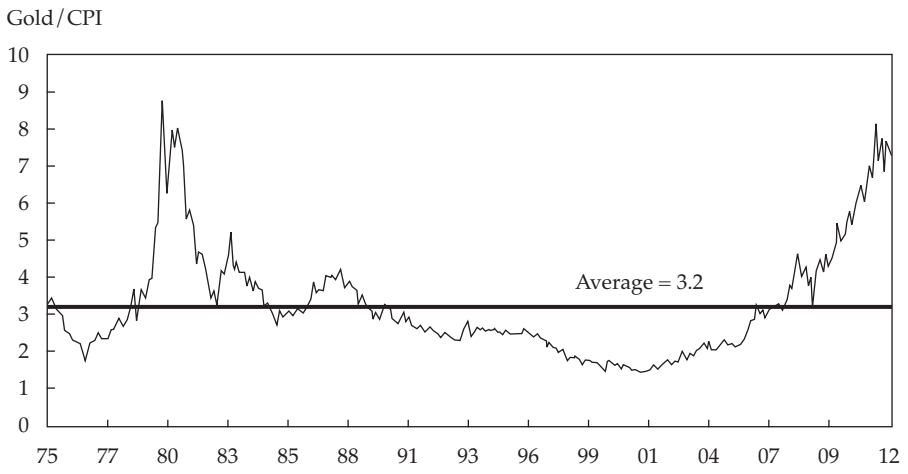
Editor's Note: This piece is based on a conference presentation of a shortened version of "The Golden Dilemma" by Claude B. Erb, CFA, and Campbell R. Harvey, which is scheduled to appear in the May/June issue of the Financial Analysts Journal.

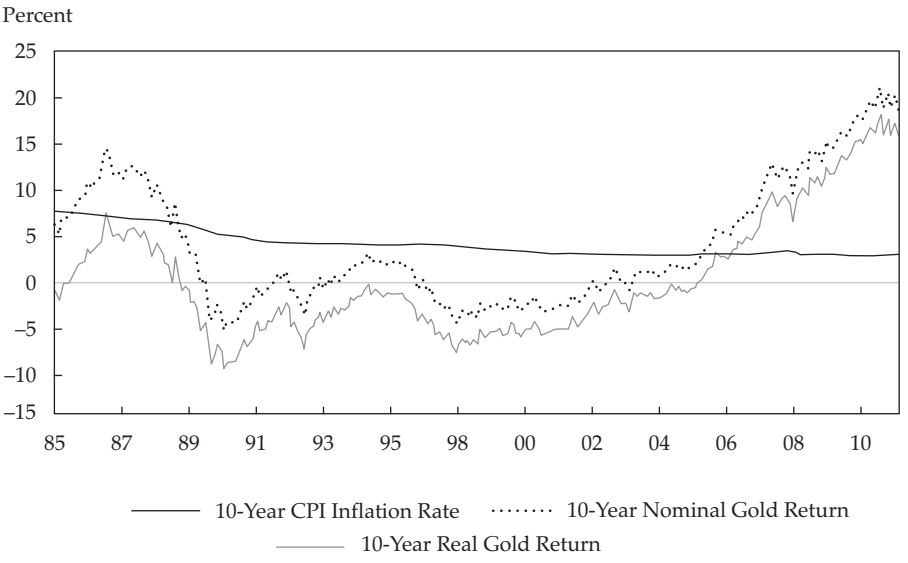
Figure 1. Ratio of Gold Prices to the CPI, January 1975–March 2012



Note: CPI set to 100 in 1975.

Sources: Based on data from Bloomberg and the U.S. Bureau of Labor Statistics.

Figure 2. Trailing 10-Year and Inflation-Adjusted Real Total Return on Gold vs. CPI Inflation Rate, 1985–2012



Sources: Based on data from Bloomberg and the U.S. Bureau of Labor Statistics.

In the same one-year horizon, gold can account for only 15.5% of the variation in inflation (the R^2); in the 10-year horizon, gold accounts for only 1.2% of the variation in inflation. Based on such analyses, the only conclusion is that gold is a dangerous hedge for inflation.

A key characteristic of an inflation hedge is that it protects against unexpected inflation, no matter the inflation's level. As inflation rises, so should the price of the hedge, which is gold in this case. The relationship should demonstrate a positive slope. But from January 1975 to March 2012, the price of gold showed no such positive relationship with inflation, aside from the single year of 1980. But a diversified set of commodities, of which gold is a part, does have a reliable and sizable positive correlation with unexpected inflation. Gold alone does not do the job. As an inflation hedge, it is much oversold.

■ *Real price of gold.* Another way to examine mean reversion in the price of gold is to compare

gold's 10-year return with its initial real price (i.e., the nominal price of gold divided by the CPI). In the case of gold, the lower its initial real price, the higher its return over the next 10 years. The ratio of the price of gold to inflation is currently high at 7.31, which suggests that the return on gold over the next 10 years will be low.

Examining the real price of gold back to 1791, the same pattern of mean reversion is clearly visible. The long-term average ratio of the price of gold to inflation is 2.0, but the average over various subperiods differs widely from that long-term value. For example, the average from 1937 to 1973, the period just preceding 1975–2012, was just slightly above 1.0.

Per capita nominal disposable personal income in ounces of gold is basically the same in the United States today as it was in 1929, but it does not make sense that the wage rate today is effectively the same as in 1929. Most people consider themselves much better off today compared with their grandparents or great-grandparents in 1929. In other words, gold appears overvalued in this context.

Going even further back in history, I compare the pay of Roman soldiers in the time of Emperor Augustus (27 BC–AD 14) with the pay of U.S. soldiers today. The salary of a Roman legionary was 225 denarii. Denarii are silver; the exchange rate during the period was 25 denarii for 1 aureus, which is gold. These gold coins still exist, so we know that 1 aureus equals 7.85 grams of 24-carat gold, which equals 31.103 grams per troy ounce. The annual wage of a legionary, therefore, was equivalent to 2.31 ounces of gold, whereas the annual wage of a U.S. Army private today is equivalent to 11.01 ounces of gold—an annual growth rate of 0.08%. When I compare the salary of a Roman centurion, who was paid the equivalent of 38.58 ounces of gold annually, with that of a U.S. Army captain, whose annual salary is the equivalent of only 27.84 ounces of gold, the growth rate is –0.02%. This analysis reveals two things. First, gold might be an effective long-term hedge, but very few people care about 2,000-year horizons. Second, it does not make sense to expect "equity-like" returns on gold over the long-term. At a 1.62% annual return, $1 turns into $100 trillion in 2,000 years—more than the combined capitalization of world stock and bond markets.

My conclusion is that gold is not an effective short-term or long-term hedge for unexpected inflation, although it may be effective over the extremely long term. Some evidence also indicates that gold can be effective in a hyperinflationary environment, assuming that the real price of gold is stable, but I will address hyperinflation in more detail later.

Currency Hedge. The idea of gold as a currency hedge is similar to the inflation-hedging argument because a currency hedge is basically navigating the difference between expected inflation in two different countries. Nonetheless, the argument for gold as a currency hedge is typically presented in one of two ways. One argument asserts that gold protects against unexpected currency fluctuations. For example, if the U.S. dollar depreciates by 10% against the yen and gold appreciates by 10%, an investor holding gold is protected. The other argument asserts that gold protects against currency debasement, such as the massive printing of money, by holding its value in relation to the debased currency.

For gold to be a good currency hedge, its beta compared with a currency should be –1.0. **Table 1** shows the relationships—the gold beta, *t*-statistic, correlation, standard deviation, R^2, and indexed U.S. dollar value—between gold and seven currencies from January 1975 to March 2012. The currencies are the Australian dollar (AUD), Canadian dollar (CAD), German mark (DEM), Japanese yen (JPY), New Zealand dollar (NZD), Swiss franc (CHF), and British pound (GBP). The gold betas are negative across the board, but they are very small—from –0.24 for the CHF to –0.09 for the CAD. The standard deviations between gold and the global currencies are very high, and the R^2 for each is very small. Both measures indicate that gold is an unreliable hedge for currency exposure.

Furthermore, comparing the real price of gold over this period with the CPIs of the same countries shows that the two measures move in tandem, which again implies that gold is not a good currency hedge. I have done similar research that expands the analysis to 23 countries, and the results are the same. Gold is not a good currency hedge.

Alternative to Low Real-Return Assets. The most frequent manifestation of the argument for holding gold as an alternative to low real-return assets is that the price of gold rises because nominal or real interest rates fall.

At first glance, the data appear to confirm this assertion. From January 1997 to March 2012, a strong correlation (–0.82) appears to exist between the real price of gold and the real yield measured by 10-year Treasury Inflation-Protected Securities (TIPS). But the sample is small. Furthermore, the relationship is not as direct as it appears because other forces most likely affected the real yield and the real price of gold. The result is probably a spurious correlation. The decline in the real yield of 10-year TIPS was probably related to economic turmoil and is not causing the price of gold to rise.

Table 1. Relationship of Gold with Global Currencies, January 1975–March 2012

	Gold	AUD	CAD	DEM	JPY	NZD	CHF	GBP
Gold beta	1.00	–0.16	–0.09	–0.21	–0.14	–0.17	–0.24	–0.15
t-Statistic		–5.95	–5.62	–8.47	–5.46	–5.63	–8.85	–6.12
Correlation with gold	1.00	–0.27	–0.26	–0.37	–0.25	–0.26	–0.39	–0.28
Standard deviation	19.8%	11.7%	6.6%	11.3%	11.3%	12.7%	12.3%	10.4%
R^2	100.0%	7.4%	6.6%	13.9%	6.3%	6.7%	15.0%	7.8%
Indexed USD value[a]	$9.51	$1.29	$1.00	$0.63	$0.28	$1.62	$0.36	$1.49

[a]USD/Foreign 1975 = 1.0.

Source: Based on data from Bloomberg.

Thus, the apparent correlation is not helpful in understanding what the price of gold should be. The argument for gold as an alternative to low real returns is not compelling.

Safe Haven. A safe haven is an asset that is purported to protect the value of a portfolio in a time of stress. To protect the value of an equity portfolio during a left-tail event, the value of a safe haven should rise when the value of equity falls. **Figure 3** shows the monthly total returns of three-month T-bills and the S&P 500 Index from January 1975 to March 2012 divided into four quadrants. The third quadrant would hold data points that indicate negative returns for both. But there are no data points in the third quadrant, which indicates that T-bills are an appropriate safe haven. **Figure 4** shows the monthly total returns of gold and the S&P 500 for the same period (January 1975–March 2012), but the third quadrant contains 17% of the data points. Thus, by this measure, gold is not a safe haven—at least not for an equity portfolio.

■ *False safety of hidden treasure.* The traditional way of thinking about a safe haven is as a hidden treasure that can be accessed during times of trouble. An excellent example of this mindset is the Hoxne Hoard, which was found in Suffolk, England, in 1992. The Hoxne Hoard is an intact treasure chest of 15,000 gold and silver coins, gold jewelry, and numerous small items of silver tableware. It was buried by a family during a period of grave political turmoil, when the Romans were abandoning Britain. The family probably believed the treasure would provide a safe haven in its time of need. But the fact that it was found untouched 2,000 years later is evidence that it did not provide the family with utility; it was an "unsafe haven."

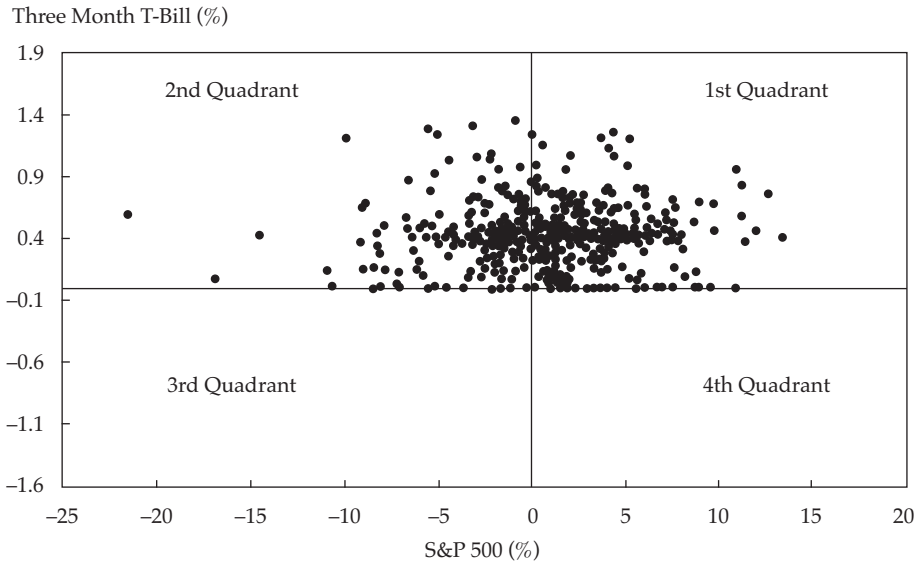
Gold is valuable, but it is hard to transport. At $1,600 per troy ounce, $1 million of gold weighs 43 pounds, $5 million weighs 215 pounds, and $10 million weighs 429 pounds. In June 2012, an Italian businessman and his daughter were stopped crossing the border into Switzerland with 120 pounds of gold on the backseat of their car and charged with smuggling. The difficulty of transporting and storing gold is a serious practical disadvantage to its use as a safe haven during periods of political unrest, when the potential for sudden flight is very real—yet another way in which gold is not a safe haven.

■ *Gold and hyperinflation.* Gold as a safe haven in times of hyperinflation is a different story. Hyperinflation has occurred in many countries over the past 200 years, with the most recent episode being in Zimbabwe. To deal with the hyperinflation, Zimbabweans simply switched from the local currency to the U.S. dollar, rendering gold superfluous as a safe haven.

Another good example is Brazil. Suppose a Brazilian investor with foresight in 1980 decided to buy gold. Over the next 20 years, Brazil experienced an annual inflation rate of about 250%. Over this period, the real price of gold (using the Brazilian CPI) fell by 70%. The gold investment performed much better than the local currency. But any "hedge" that loses 70% of its value is not an effective hedge.

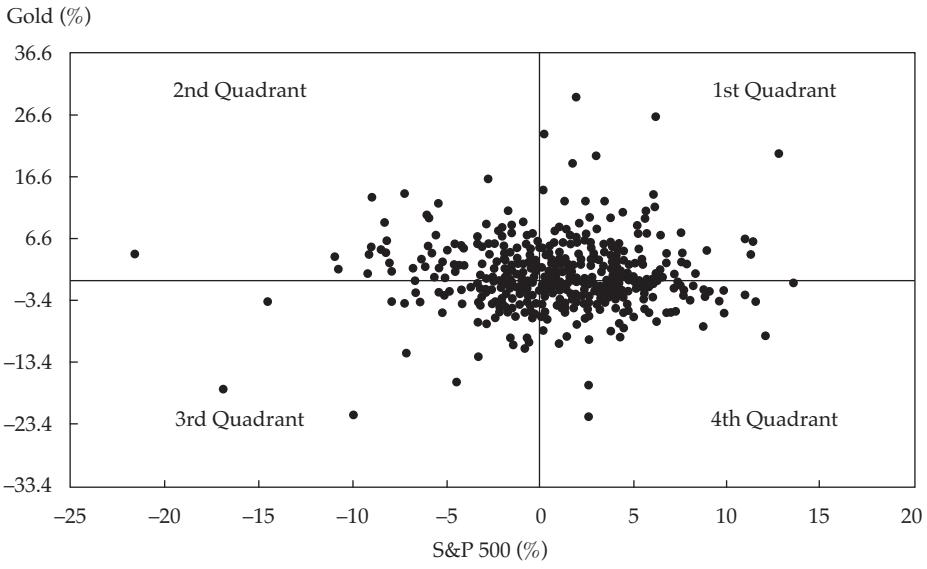
The use of gold as a safe haven during hyperinflation is more relevant in developed nations, such as the United States, Europe, or Japan, whose currencies are usually among the most desirable. But the probability of a hyperinflation event is hard to anticipate. From 1920 to 1923, Germany's Weimar Republic experienced one of the most infamous periods of hyperinflation. Those 4 years out of the 100 years of the century could be said to represent a 4%, or 1-in-25, probability of occurrence. Yet, it is a far stretch to assume a 4% probability that

Figure 3. Monthly Total Return of Three-Month T-Bills and S&P 500, January 1975–March 2012



Sources: Based on data from Bloomberg and Ibbotson Associates.

Figure 4. Monthly Total Return of Gold and S&P 500, January 1975–March 2012



Sources: Based on data from Bloomberg and Ibbotson Associates.

Germany or any other developed nation will face hyperinflation in the near future.

Another challenge is estimating the magnitude of hyperinflation. I approach the task by using a black swan–type of analysis to determine the price of gold in two scenarios: a stable economy and an economy experiencing hyperinflation similar to that during the Weimar Republic. I begin by assuming that the expected value of an ounce of gold is $877 in an economy with a 100% probability of remaining stable. Then I increase the probability of a hyperinflation event, staring with one in a quintillion. The expected value does not start to increase until the probability reaches one in a trillion. At that probability, the value

of gold is $949. But by the time I reach a one-in-a-billion chance of hyperinflation, the expected value of gold is $72,970.

So, I conclude that even a small probability of hyperinflation has a big impact on the price of gold. Thus—unlike the case of the Hoxne Hoard—this analysis makes a plausible case for holding gold as a safe haven.

***De Facto* Gold Standard.** In 2000, Switzerland was the last major country to go off the gold standard. Basically, the argument that a gold standard exists, even if it is *de facto*, suggests that gold is money. But the gold-is-money argument does not require the existence of the gold standard. In essence, the gold-is-money argument is another way of stating the argument that prices are constant when they are measured in gold.

As some have said, the price of gold approximates the total amount of money in circulation divided by the size of the gold stock. Therefore, if the known U.S. money supply of $2.8 trillion is divided by the U.S. gold stock of about 8,300 metric tons, the shadow price of gold should be $10,000 an ounce, not the current $1,600 an ounce.

As an illustration of the gold-is-money argument, the shadow price of gold is merely a rehash of the argument for using gold as an inflation hedge. It does little to explain the dynamics of the nominal or real price of gold. It would be more reasonable for those who support this view to divide the global money supply by the global gold stock and not limit the calculation to the United States.

Gold Is Underowned. This argument asserts that not enough people own gold and that if gold ownership trended toward the universal, the nominal and real prices of gold would increase. To address this argument, I will start by assessing the supply and demand for gold.

- *Supply of gold worldwide.* Since the start of civilization, 171,300 metric tons of gold have been mined, and about 2,500 metric tons are mined every year. According to U.S. Geological Survey (USGS) estimates, only 51,000 metric tons of gold are left in the ground worldwide, which means that three-quarters of the total supply on Earth (excluding the gold in seawater) has already been mined.[1] Based on these USGS estimates, only a 20-year supply of gold remains. Yet even as the price of gold has risen substantially, no corresponding increase in production has occurred.

In 2011, the largest portion of the above-ground supply of gold (approximately 85,000 metric tons) was used for producing jewelry. Private investment—including investments made by exchange-traded funds (ETFs) as well as the bullion itself—accounted for 33,000 metric tons, central bank reserves accounted for 29,500 metric tons, and fabrication required 20,800 metric tons.

- *Investor ownership and the price of gold.* From 2001 to 2011, the price of gold rose from $279 an ounce to $1,567 an ounce. Production each year over that period remained within a very tight range, from a low of 2,290 metric tons in 2008 to a high of 2,821 metric tons in 2011. Demand over the same period for the purpose of making jewelry fell by about one-third, from 3,009 metric tons in 2001 to 1,963 metric tons in 2011. Demand by investors, on the other hand, rose dramatically, from 357 metric tons in 2001 to 1,641 metric tons in 2011. Demand by the technology sector rose from 363 metric tons in 2001 to 464 metric tons in 2011.

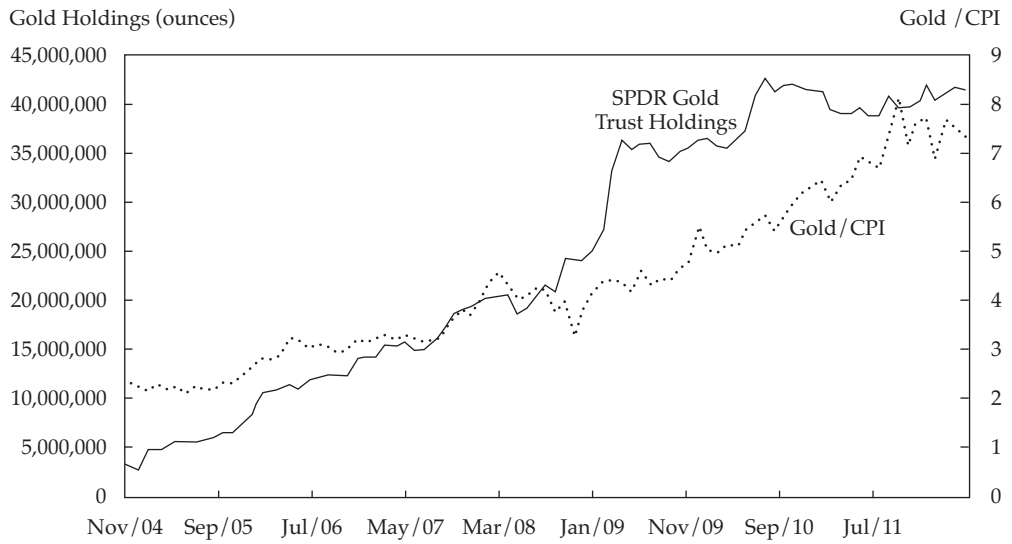
Total gold supply showed almost no response to the increase in price over the 11-year period. Demand by jewelry producers did drop with a higher price, but the demand by investors rose substantially, exhibiting a strong positive slope (demand curves usually slope down). There are two possible explanations. First, gold investors are momentum investors: As the price goes up, they buy more. Second, gold investors are driving the price of gold up by demanding more because they want real assets in their portfolios and believe gold is a good investment. Given limited production, increasing investor demand could help explain the sensitivity of the price of gold.

Another example of the increase in investor demand in recent years is shown in **Figure 5**. From November 2004—when the SPDR Gold Trust ETF (GLD ETF) was first listed as streetTRACKS Gold Shares—to March 2012, the ratio of gold prices to the CPI rose steadily and the GLD ETF continued to increase its gold holdings.

- *Effect on price of national gold reserves.* Today, the GLD ETF holds 1,200 metric tons of gold, which is more gold than China holds as part of its official reserves. This fact has caused China to question why its gold holdings as a percentage of total foreign currency reserves (1.7%) are so low compared with those of other nations—for example, 71% for the United States and 72% for Germany. China also does not like the fact that an ETF owns more gold than it does. So, I would not be surprised to see an increase in China's demand for gold. But even if it rises, it is simply not feasible for China to convert its total foreign currency holdings into gold

[1]U.S. Geological Survey, "Mineral Commodity Summaries: Gold" (2011): http://minerals.usgs.gov/minerals/pubs/commodity/gold/mcs-2011-gold.pdf.

Figure 5. Gold/CPI and SPDR Gold Trust ETF Holdings, November 2004–March 2012



Source: Based on data from Bloomberg.

because it would require 66,000 metric tons of gold, which is one-third of the total world supply. But with only 2,500 metric tons mined every year, a concerted buying effort on China's part could have a huge impact in the gold market and on the price of gold.

The net change in central bank ownership of gold from March 2000 to December 2011 was –2,232.9 metric tons. In general, the primary buyers of gold during this period were the emerging markets—in particular, China, Russia, and India. The largest sellers of gold during the period were the European Central Bank, the United Kingdom, the Netherlands, the International Monetary Fund (IMF), France, and Switzerland. Switzerland has been the biggest seller, but it still owns quite a sizeable amount of gold given the size of the Swiss economy. Remember that Switzerland went off the gold standard only 12 years ago.

For 63 countries, including the United States, the net change over the last 11 years has been less than 10 metric tons. The United States has the largest central bank position, equal to about 8,300 metric tons. Germany is the second-largest holder of gold with less than half that amount. The IMF, the third-largest seller of gold in the last 11 years, is also the third-largest holder of gold. Italy and France are the third- and fourth-largest holders of gold, respectively, and China is fifth. China's gold reserves equal about one-eighth of the U.S. gold reserves.

Table 2 shows what could happen if China and a few other countries decide to follow the path of the United States in terms of gold reserves. First, I believe that for China to be a world player, it must freely float its currency. If it does, it will acquire more gold, although it is unclear how much. Table 2 lists the GDP, central bank gold reserves, and gold-to-GDP ratio for 2010 for six countries: the United States, Switzerland, Brazil, Russia, India, and China. The gold-to-GDP ratio for the United States is 0.56, and for China, 0.18. If China chooses to pursue the same ratio of gold to GDP that the United States has, it would need to increase its holdings of gold by more than 3,000 metric tons, as shown in the fourth column of Table 2. In the last 11 years, China has accumulated only 700 metric tons, and the market for gold is tight. If China were to pursue a policy of buying gold to bolster its reserves, the price of gold could have some substantial upside.

Gold in Asset Allocation

The global portfolio is composed of $51.4 trillion in equity, $41.2 trillion in fixed income, and $9.14 trillion in gold. So, gold is about 9% of the world portfolio. The simplest way to achieve a diversified portfolio is to mimic the weights of the different asset classes that compose world wealth, which suggests that gold should be 9% of a diversified portfolio. But that 9% includes gold used for all purposes, including jewelry production, central bank reserves, and fabrication. The gold available for investment equals only 1.9% of the world portfolio, but few investors have 1.9% of their portfolios in gold.

Table 2. GDP, Gold Reserves, Gold/GDP, and Reserves Needed to Change Ratio for Six Countries, 2010

	GDP (US$ billions)	Central Bank Gold Reserves (metric tons)	Gold/GDP	Estimated Reserves if Move to U.S. Gold/GDP Ratio (metric tons)
United States	14,582	8,133	0.56	8,133
Switzerland	524	1,040	1.99	292
Brazil	2,088	34	0.02	1,165
Russia	1,480	811	0.55	825
India	1,729	558	0.32	964
China	5,879	1,054	0.18	3,279
Total		11,630		14,659

Sources: Based on data from the World Gold Council, IMF, Bloomberg, and the World Bank.

If investors come to the conclusion that they are underinvested in gold, the move to add gold to their portfolios could provide some upside to the price of gold. It may be that this realization on the part of investors explains the increase in demand that has been obvious from the inflows to gold ETFs, but it will take a lot more buying before investors as a whole are fully invested in gold as defined by gold's position in the world portfolio.

Nonetheless, gold is overvalued in terms of its real price, which is analogous to a P/E in its behavior. If a P/E gets too high, it reverts to the mean. Since 1791, the behavior of the real price of gold has been fairly consistent: When it gets too high, it reverts to the mean. But if China or another emerging market country starts to convert its currency reserves to gold or investors choose to invest a larger part of their portfolios in gold, the price of gold could explode. That is the golden dilemma.

Conclusion

Many of the arguments for holding gold can be disproved. The evidence reveals that gold does not provide a hedge for traditional, unexpected inflation. It is also not a good currency hedge; the currency-hedge argument is just another form of the inflation-hedge argument. Gold seems to be useful in hyperinflation, and the price can be very sensitive to small probabilities. The correlation used to argue that gold is a good alternative to low real-return assets is actually spurious. Similarly, the argument that there is a *de facto* gold standard does little to explain the price dynamics of gold.

Two arguments can be made in favor of holding gold. First, because of limited production, a move by developing markets to hold more gold could exert substantial upward pressure on the price of gold. Second, if all investors held gold in terms of its weight in the global portfolio, the pressure on the price of gold would be substantial. Certainly, many investors are hugely undiversified, continuing to hold the traditional 60/40 equity/bond portfolio and no real assets, such as gold. I believe that gold should be part of a portfolio but not on a standalone basis. Rather, it should be part of a diversified set of commodities and other real assets.

Finally, beware of technological change, which can cause comprehensive realignments in historical relationships. Over the very long term, the real return on many commodities is negative as a result of technological change.

This article qualifies for 0.5 CE credit.

Question and Answer Session

Campbell R. Harvey

Question: What type of technological change could affect gold?

Harvey: The impetus for technological change is expense, so as gold gets more expensive, the chances of such change increase. Two ideas that could get some traction are, one, extracting gold from seawater and, two, mining gold from a near-Earth asteroid. The first was proposed by Fritz Haber—who won the Nobel Prize in chemistry in 1918—as a way to pay Germany's war reparations for World War I.

Gold in seawater is six parts per trillion, or six kilograms of gold per cubic kilometer. The volume of the world's oceans is 1.37 billion cubic kilometers, which means a massive amount of gold—8.2 million metric tons—could be harvested from the oceans. At $1,600 per troy ounce, that amount of gold has a value of $423 trillion.

The idea of space mining—exploring the asteroid belt for natural resources, including gold—is being pursued by Planetary Resources,[2] an organization backed and advised by such luminaries as Eric Schmidt (chairman of Google) and James Cameron (film director and producer). The website www.asterank.com has catalogued 580,000 asteroids in our solar system and provides estimates of both their mineral value and the estimated profit from harvesting them. There are currently 15 near-Earth asteroids with expected profit greater than $1 trillion.

Question: Among potential sources of gold, such as bullion, ETFs, commodity funds, and gold mining stocks, what is the best way to get exposure to gold?

Harvey: If investors just want gold, an ETF is probably the easiest way to access it. Bullion is difficult to deal with, so I would not recommend it. In my opinion, investors should look not only at gold but also at commodities in general as nontraditional assets that are needed in a diversified portfolio. Today, it is easy to get exposure to a diversified portfolio of commodities, and that exposure should include a meaningful exposure to gold. Gold is a commodity, and that is the role it should have in a portfolio.

Question: What does your research indicate about the expected return on commodity futures?

Harvey: Over the very long term, the expected real return on commodities is negative, but not with futures. Futures have many advantages over commodities. They are very liquid and generate no worries about storage. The thesis of a paper I co-authored with Claude Erb is that commodities in general do not have equity-like returns.[3]

Commodities are important for a portfolio because they have low correlations with the other asset classes in a portfolio. Commodities cannot lay claim to spectacular expected returns on the merits of their asset class alone, but they have an acceptable expected return when they are held in an actively managed portfolio. Using the slope of the futures curve, Erb and I show how to earn a reasonable real rate of return by using commodity futures in a very simple way. But their return is nowhere near what is expected for equities.

Question: What does the commodity futures curve being in contango tell us?

Harvey: It tells us nothing about gold because gold behaves like a currency. For other commodities, however, the futures term structure offers extensive information. Typically, it is best to invest in futures that are experiencing backwardation, not contango.[4]

Question: Does gold have a rival, such as diamonds or platinum, in its role as a store of value?

Harvey: Not really. Diamonds do not have the mobility problem that gold has. A handful of diamonds constitutes a great deal of value, whereas the equivalent value of gold would be very hard to carry. But diamonds vary widely in quality, which is not the case with gold, and the supply of diamonds is small compared with that of gold. Finally, the history of diamonds and other precious commodities is limited, whereas the history of gold is quite long. It has survived as a valuable asset for 6,000 years and will probably continue as such.

[2]See www.planetaryresources.com.

[3]Claude B. Erb and Campbell R. Harvey, "The Strategic and Tactical Value of Commodity Futures," *Financial Analysts Journal*, vol. 62, no. 2 (March/April 2006):69–97.

[4]Contango is when the futures price is above the expected future spot price, so the price will decline before the delivery date. Backwardation is the idea that as a contract approaches expiration, the futures contract will trade at a lower price than the expected future spot price.