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Currently, the real, or inflation-adjusted, price of gold is almost as high as it was in January 1980 and August 2011. Since 1975, periods of high real gold prices have occurred during periods of elevated concern about high future price inflation. Five years after the real price peaks in January 1980 and August 2011, the nominal (real) prices of gold fell 55% (67%) and 28% (33%), respectively. Today's high real price of gold suggests that gold is an expensive inflation hedge with a low prospective real return. The financialization of gold ownership by exchange-traded funds, however, may introduce a period of irrational exuberance.

The real, or inflation-adjusted, price of gold is currently almost as high as it was in January 1980 and August 2011. In 1980, some were concerned that the US economy would continue to experience low, stagnant real economic growth and high inflation (stagflation). From January 1980 to January 1985, inflation averaged 6.3% per year, the nominal price of gold fell 55%, and the real price of gold fell 65%. In 2011, some were concerned that the US Federal Reserve's policy of quantitative easing would lead to a high rate of inflation. From August 2011 to August 2016, inflation averaged 1.2% per year, the nominal price of gold fell about 28%, and the real price of gold fell about 33%. Currently, some are concerned that the fiscal and monetary policies implemented in the United States to counter the economic impact of the COVID-19 pandemic will be inflationary. If gold did not reward inflation fear in 1980 and 2011, why should it reward inflation fear now?[1]

Real gold prices may matter for those who want to believe that gold is an inflation hedge. The financialization of gold ownership through exchange-traded funds (ETFs), in which the real price of gold may be correlated with the amount of gold held by gold-owning ETFs, could possibly lead to higher peaks and lower troughs for the real price of gold relative to the experience of the past.[2] **Figure 1** shows how the real price of gold has fluctuated since the inception of gold futures trading in January 1975.

Erb and Harvey (2013) explored Jastram's (1978) "golden constant" framework, which suggests—but offers no proof—that gold is an inflation hedge. The framework suggests that over long periods of time, the purchasing power of gold is constant (hence, the term *golden constant*) and implies that the long-run real return on gold is zero. Erb and Harvey found that, given the historical data, the real price of gold was a more important driver of future nominal and real gold returns than the realized rate of inflation.

Just as it is possible to think of a stock's price as the product of its earnings and its price-to-earnings ratio (P/E), it is possible to see the

Figure 1. Inflation-Adjusted (Real) Price of Gold, 1975–2020
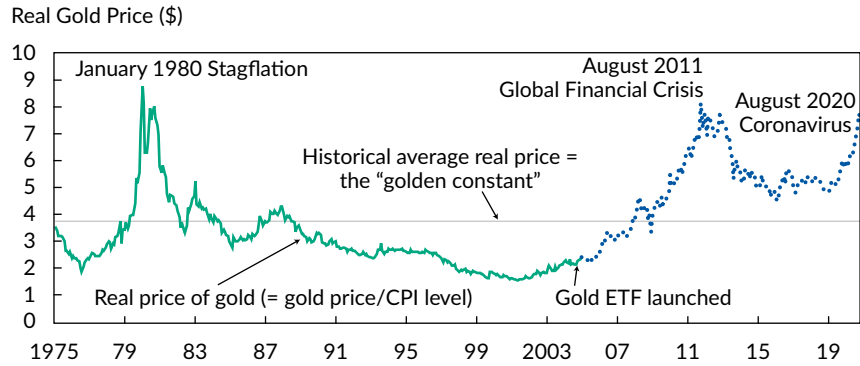
Notes: The real price of gold is the nominal price divided by the US CPI level. The "golden constant" is a term introduced by Jastram (1978) suggesting that the long-term real return on gold is zero (gold retains its value) and, hence, the real price is constant.
Source: Bloomberg data (tickers: GC1 Comdty, CPI INDX).

price of gold as the product of an inflation index and the real price of gold. **Table 1** uses the golden constant framework to decompose the poor performance of gold following the peak in the real gold price in January 1980.

From January 1980 to January 1985, the price of gold per ounce declined 55% from a price of $682 to $304, the US Consumer Price Index (CPI) rose 35% from 78 to 105.7, and the real price of gold (the price of gold divided by the CPI) fell 67% from $8.7 to $2.9. Given this decomposition framework, if the real price of gold is constant over time, then an increase in the level of inflation should result in an increase in the price of gold. Because the real price of gold fluctuates widely over time, however, it is difficult to know how an increase in the inflation level will affect the

price of gold without knowing how the real price of gold will change.

The process of decomposing the price of gold into the product of an inflation index and the real price of gold is similar to decomposing the price of a stock index into an index of earnings and a P/E.[3] It is simply an accounting identity and tool.[4]

In a simplified quantitative sense, the golden constant comes down to regressing the price of gold on a measure of inflation, an exogenous (external) variable. The supposed influence of an exogenous variable works only in one direction: Here, the US CPI supposedly drives the price of gold, but the price of gold does not drive the US CPI. The golden constant is an unprovable concept that exemplifies the aphorism "an absence of evidence is not evidence of absence."[5]

In contrast, an *endogenous variable* simultaneously interacts with one or more variables (e.g., price, demand, and supply): The supply and demand for gold affects its price, and its price affects supply and demand.

Thus, linking a financial outcome to a specific cause can be quite challenging. For those who invest in stocks as a play on earnings growth, it is unlikely earnings will be viewed as an exogenous force, such as the growth rate of GDP or the amount of rainfall.

We have extended the golden constant decomposition to monthly rolling five-year returns for gold from January 1975 to July 2020 in **Figure 2**. The highest rolling five-year nominal annualized return on gold was about 37%, and the lowest was about –15%. The highest rolling five-year annualized inflation rate

Table 1. Return Decomposition of Gold Price Five Years Following All-Time High in January 1980

Date	US Gold Nominal Price		US CPI		Real Gold Price
January 1980	$682	=	78	×	$8.7
January 1985	$304	=	105.7	×	$2.9
Percentage change	–55.4%		35.5%		–67.1%
Annualized return	–14.9%		6.3%		–19.9%

Note: The real price of gold is the nominal price divided by the US CPI.
Source: Bloomberg data (tickers: GC1 Comdty, CPI INDX Index).

Figure 2. Five-Year Average Gold Returns and Inflation, January 1975–July 2020

Percent
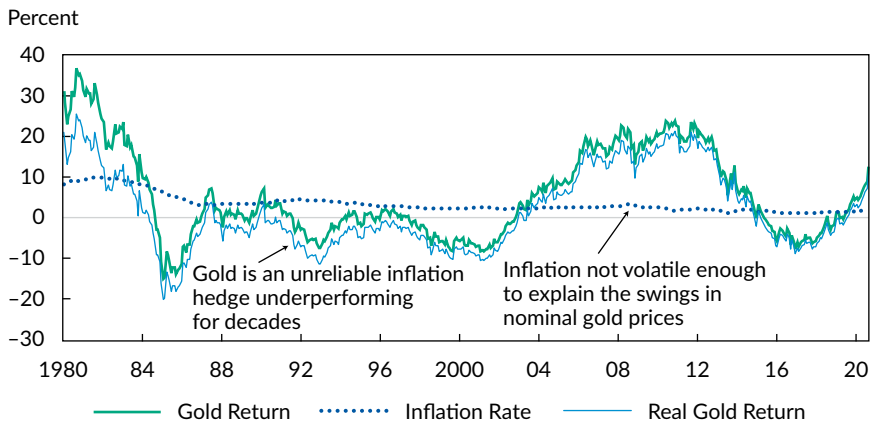
Source: Bloomberg data (tickers: GC1 Comdty, CPI INDX).

was about 10%, and the lowest was about 1.2%. The highest rolling five-year real annualized return on gold was about 25%, and the lowest was about –20%.

A message of Figure 2 is that even if gold is, in some very long-term sense, an inflation hedge, at a five-year time horizon, the performance of gold is almost entirely explained by the variation in the real price of gold. Kritzman (2015) argued that the risk of investing in equities does not vanish as the investment time horizon increases (i.e., there is no time diversification).[6] In a similar manner, fluctuations in the nominal price of gold will probably continue to be largely driven by the real price of gold, not inflation, regardless of time horizon.

Gold may truly be an inflation hedge, but insufficient data exist to prove it has been an inflation hedge. An interesting nuance is the question of which inflation definition gold is supposed to hedge. For instance, the Boskin Commission (1996) found that inflation

measured by the US CPI had been overstated; as a result, the commission's report resulted in a new definition of inflation.[7] Should gold hedge inflation as defined in the pre–Boskin Commission report or the post–Boskin Commission report? If neither, then what inflation does gold hedge?

The golden constant decomposition framework suggests the presence of two return drivers of the nominal gold price: the rate of inflation and the return on the real price of gold.

The realized rolling 10-year rate of inflation has varied reliably since 1959. As **Figure 3** shows, the highest rolling 10-year inflation rate, about 9%, occurred in October 1982, more than two years after the January 1980 peak real gold price. Figure 3 also shows the 10-year inflation breakeven rate, the yield difference between a 10-year nominal US T-bond and a 10-year US Treasury Inflation-Protected Security (TIPS). With many caveats and

Figure 3. Ten-Year Inflation Rates Implied by TIPS

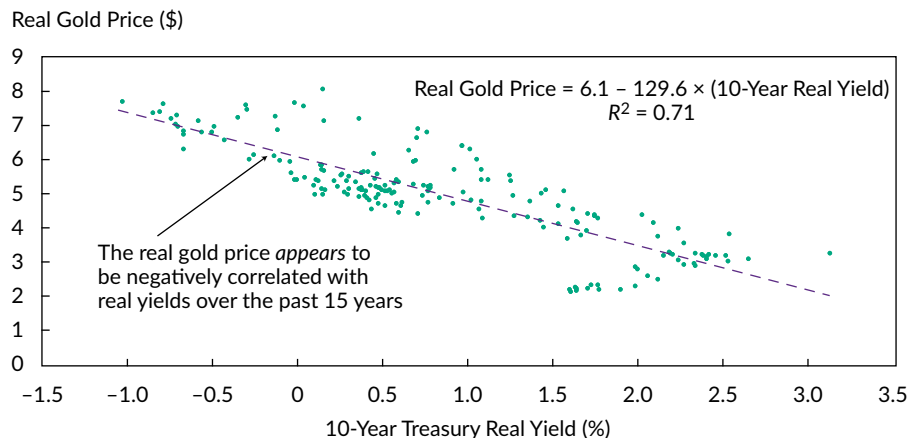Rolling 10-Year Inflation Rate (annualized)
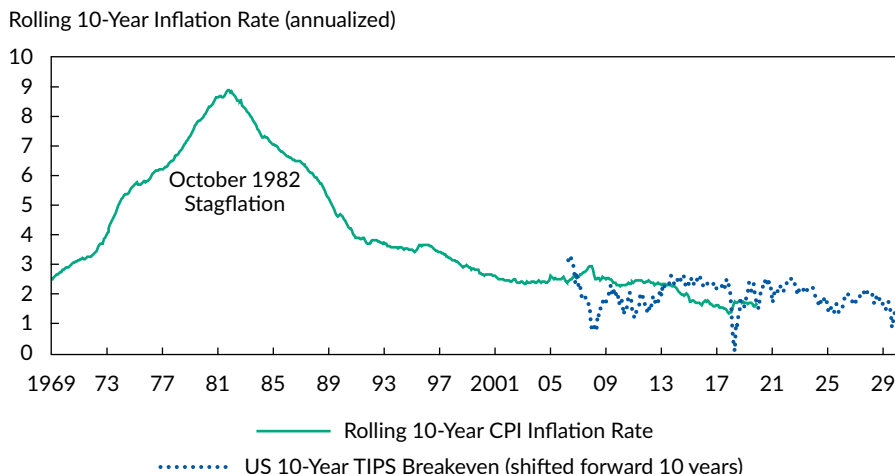
qualifications, this yield difference can be thought of as a 10-year inflation rate forecast, and this forecast suggests moderate inflation in our future.

Figure 3 shifts the breakeven measure forward 10 years, so the January 1997 breakeven is matched with the January 2007 realized 10-year inflation rate. Whether the 10-year inflation forecast has accurately forecasted actual 10-year inflation is a matter of personal interpretation. As of 31 July 2020, the 10-year breakeven, the "inflation forecast," is 1.56%. It could be that fixed-income market intervention by the Federal Reserve related to the COVID-19 economic crisis has distorted the ability of nominal and inflation-protected debt to provide a useful market-based inflation forecast.[8]

Breakeven yields may provide some (highly caveated) market-based forecasts of future inflation, but no market-based forecasts of the future real price of gold exist. Statistically derived models can be employed, however, as a crutch to forecast the future real price of gold.[9] Models that rely on exogenous factors are more abundant, easier to find, and probably less believable than those that consider the interaction of supply, demand, and price.[10] It may be easier to find data to support a theory than to find a theory to support some data.

One example of "finding a theory to support some data" (after the fact) is the idea that the prices of ostensibly default-free inflation hedges, such as gold and inflation-protected debt, should zig and zag with one another. If changes in the real yield of inflation-protected debt drive changes in the prices of inflation-protected debt, then maybe the real yield will also predict changes in the price of gold.

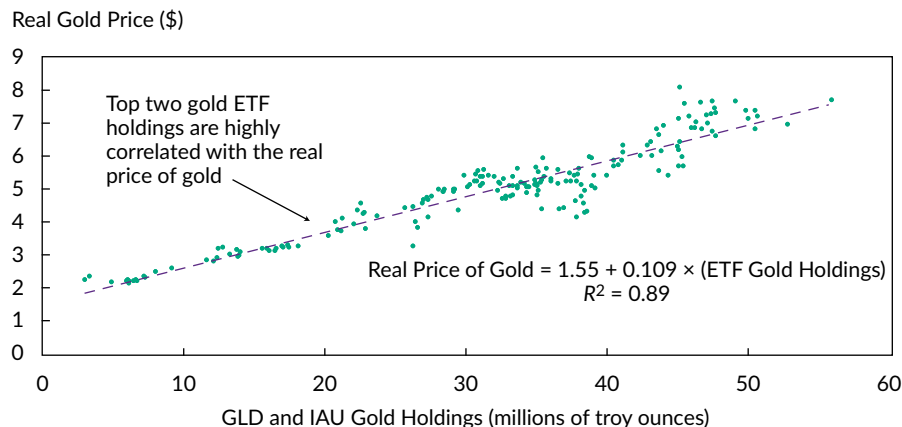Johnson (2014) suggested that changes in real yields explain the majority of changes in gold prices.[11] **Figure 4** illustrates this idea. It is worth noting that price and real yield are simultaneous endogenous variables for an inflation-protected bond, but real yield is just an exogenous statistical abstraction for the real price of gold. If "gold is a bond," then Figure 4 is extraordinarily compelling. If gold is not a bond, then Figure 4 may be just a convenient false discovery resulting from data mining.

What you see may not be what you get. In a very short sample such as this, caution should be exercised before drawing causal conclusions from two endogenous variables. Is this an example of what Yule (1926) might have called a "nonsense correlation"[12] and what Granger and Newbold (1974) might have referred to as a "spurious regression"?[13]

The historical relationship between the real price of gold and the gold holdings of the two largest gold-owning ETFs is shown in **Figure 5** for the period November 2004–July 2020.[14] As the gold holdings of these ETFs have risen, the real price of gold has risen. These two ETFs' gold holdings represent the majority of demand for gold by ETF investors.[15] It is hard to view these ETF gold holdings as an exogenous variable, such as inflation or the real yield.[16] Figure 5 can impressionistically be viewed as an illustration of Keynesian demand-pull inflation in which too much money chases too little gold.[17]

Figure 5 suggests that, on average, a buyer drives up the real price of gold and a seller drives down the real price of gold.[18] In contrast, gold-as-a-bond buyers and sellers are naively assumed to have no impact on the real price of gold.

Figure 4. Real Gold Prices and Real Yields, November 2004–July 2020

Real Gold Price = 6.1 – 129.6 × (10-Year Real Yield)
$R^2 = 0.71$

The real gold price *appears* to be negatively correlated with real yields over the past 15 years

Source: Bloomberg data (tickers: CTII10 Govt, GC1 Comdty, CPI INDX).

Figure 5. Troy Ounce Holdings of Top Two Gold ETFs and Real Price of Gold, November 2004–July 2020

Real Gold Price ($)

Top two gold ETF holdings are highly correlated with the real price of gold

Real Price of Gold = 1.55 + 0.109 × (ETF Gold Holdings)
$R^2 = 0.89$

GLD and IAU Gold Holdings (millions of troy ounces)

Source: Bloomberg data (tickers: GDTRAUOZ Index, ISHGOLD Index, GC1 Comdty, CPI INDX).

Cases in which too much money chased too little opportunity in the commodity markets are not hard to find. In the 1970s, the Hunt brothers (possibly fearing inflation would erode their wealth[19]) attempted to corner the market for silver. They drove the price of silver from about $10 an ounce to $50—before being wiped out.[20] Masters and White (2008) argued that the growing institutional financialization of commodity investment was leading to food and energy price inflation. Chilton (2009) referred to commodity index investors as "massive passives" and observed that massive passives were significant and price-insensitive participants in commodity markets whose growing positions were driving up commodity prices.[21]

A stable, equilibrium, cointegrating relationship between ETF gold holdings and the real price of gold seems to exist. The real price of gold is currently historically high. High real gold prices have usually been followed by low real gold returns. Following the peak real gold prices in 1980 and 2011, both nominal and real gold prices fell substantially. So, when will the expected fall in the real price of gold occur?

For those who want to believe that gold is a bond, the expected real price of gold will fall when, and if, real interest rates rise. For those who are intrigued by the influence of massive passives, the fall will occur when, and if, the gold holdings of massive-passive gold investors fall.

Even though the real price of gold is high, the path to lower gold prices may not be as straightforward as in 1980 and 2011. Greenspan (1996) warned about "irrational exuberance" when stocks were about as expensive as in 1929, but the US stock market's peak

valuation in 2000 was about 40% higher than at the time of Greenspan's speech in 1996.[22] High valuation is not a dog whistle commanding an asset to fall, and an asset's future valuation is not range bound by its past. If stocks can experience irrational exuberance, it is certainly plausible that gold can experience irrational exuberance. Massive-passive ETF gold ownership leading to demand-pull inflation may, in turn, be a catalyst for irrational exuberance.

For a believer in the gold-is-a-bond story, the real price of gold will rise if real yields fall. For a believer in the massive-passive story, the real price of gold will rise if massive-passive gold holdings rise.

Indeed, it is easy to extrapolate the relationship documented in Figure 5. For every increase of 10 million troy ounces of gold holdings, the nominal gold price should increase by $280 (assuming no inflation). Over the last 12 months (that is, July 2019–July 2020), ETF holdings increased by 19.4 million troy ounces. Regression models interpolate insights from the "known known," but concern that the future will deviate from the past requires out-of-sample extrapolation. Extrapolating with a regression model into a region where we have never seen the data is fraught with danger. That is, the observable past may be a poor guide to the unseen future. The higher the real price of gold, the more likely it is that non-ETF holders of gold will, at the margin, contemplate selling gold. Caveats are innumerable.[23]

The golden constant framework is an accounting identity: The price of gold equals the product of an inflation index and the real price of gold. **Table 2** shows gold prices 10 years into the future as the

Table 2. The Nominal Price of Gold in 10 Years under Different Inflation Rates and Assumptions for the Future Real Price of Gold

Future Real Price of Gold	Expected Inflation over Next 10 Years							
	0.56%	1.56%	2.56%	3.56%	4.56%	6.56%	8.56%	10.56%
$1.8	$483	$533	$588	$648	$713	$862	$1,038	$1,246
2.8	755	833	919	1,013	1,115	1,348	1,623	1,948
3.8	1,027	1,134	1,250	1,378	1,517	1,833	2,208	2,650
4.8	1,299	1,434	1,582	1,743	1,919	2,319	2,793	3,352
5.8	1,571	1,734	1,913	2,108	2,320	2,804	3,377	4,054
6.8	1,843	2,035	2,244	2,473	2,722	3,290	3,962	4,756
7.8	**2,115**	**2,335**	**2,575**	**2,838**	**3,124**	**3,775**	**4,547**	**5,458**
8.8	2,387	2,635	2,906	3,203	3,526	4,261	5,132	6,160
9.8	2,659	2,935	3,238	3,567	3,927	4,747	5,717	6,862
10.8	2,931	3,236	3,569	3,932	4,329	5,232	6,301	7,563
15.6	4,230	4,670	5,150	5,675	6,248	7,551	9,094	10,915
23.3	6,345	7,005	7,726	8,513	9,371	11,326	13,641	16,373
31.1	8,459	9,339	10,301	11,350	12,495	15,102	18,188	21,831
$38.9	$10,574	$11,674	$12,876	$14,188	$15,619	$18,877	$22,735	$27,289

Notes: Our baseline assumptions are that gold = $2,000, breakeven inflation = 1.56% (column in boldface), US CPI level = 257.21. These assumptions imply an inflation-adjusted price of gold of $7.8 (row in boldface). Although not reported, if inflation were to be zero over the next 10 years and the real price of gold remained at $7.8, then the future nominal gold price would be $2,000.

product of possible future inflation rates and real gold prices. For instance, if the real gold price stays at $7.80 for 10 years and the 10-year inflation rate is 1.56% (the current 10-year breakeven), then the nominal price of gold 10 years in the future should be $2,328, rising 1.56% per year from an initial level of $2,000. If, instead, personal beliefs suggest that 10-year inflation will average 10.56% per year (perhaps because of a COVID-19–fueled "helicopter money-drop" inflation fear) and the real price of gold will rise to $38.90 (perhaps because new mine production grinds to a halt), then the expected price of gold will be $27,289. The golden constant framework makes it possible to translate beliefs into prices, but it is silent on what those beliefs should be.

Since the launch of gold futures trading, the real price of gold has averaged about $3.80. If the real price of gold declines to $3.80, then in order to nominally break even, inflation would have to average in excess of 7% per year. Given an expected inflation rate, a breakeven terminal real gold price can be inferred. Given a terminal real gold price, a breakeven

expected inflation rate can be inferred. Regardless of inflation, mean reversion will lower returns by about 6% per year.

Conclusion

The real price of gold is at levels today from which it fell substantially in both 1980 and 2011. The path to a lower gold price may be as straightforward as it was in 1980 or 2011, but the ETF financialization of gold ownership has created massive passives that have seemingly produced gold demand-pull inflation and driven up the real price of gold.

If too much money is chasing too little gold, as the gold holdings of massive passives grow, the real price of gold could rise. Of course, gold-holding sales by non-massive-passives could act to reduce the real price of gold.

In the past, movement in the price of gold has been a useless predictor of future inflation. In both 1980 and in 2011, however, high real gold prices coincided with widely held views that future inflation would be

significant. Those widely held views were ultimately proved wrong. Perhaps this time is different, and one economic legacy of COVID-19 will be a decade of high inflation. Just as in 1980 and 2011, an expectation of high future inflation is already built into the price of gold. What happens to the price of gold over the next decade will largely be determined by what happens to the real price of gold.

Notes

1. In 1980, according to the US Consumer Price Index (CPI), inflation was high. During the global financial crisis, reported inflation was low but many feared that inflation could rise. Wolf (2008) noted that because of economic weakness, central banks "may soon resort to their most powerful weapons against deflation: the printing press and the 'helicopter drop' of money." Lopez (2012) observed that "the recent expansion in the monetary base (currency in circulation and bank deposits), brought about by the Federal Reserve's quantitative easing measures, has stoked fears of high inflation" and "fears of high inflation are grounded in memories of the Great Inflation, which remain fresh in the minds of many." Asness (2014) noted that "in 2010, I co-signed an open letter warning that the Fed's experiment with an unprecedented level of loose monetary policy—in amount, and in unorthodox method—created a risk of serious inflation." More recently, Sandbu (2020) speculated that "helicopter money," a concrete money-printing monetary phenomenon, might be a way to pay for the fiscal costs associated with recovering from the impact of the coronavirus. Jones and Georgianni (2020, p. 1) asserted that "COVID-19 is a one-of-a-kind virus that has triggered a one-of-a-kind policy response," which they labeled the "Great Monetary Inflation."

2. Ben-David, Franzoni, and Moussawi (2015) found that "due to their exceptional liquidity, ETFs are likely to be a catalyst for noise traders" and that "ETFs introduce new noise into the market, as opposed to just reshuffling existing noise across securities" (p. 1). Chari and Christiano (2017, p. 2) found no support for the financialization view that "increased trading activity is associated with increases in commodity spot price growth and spot price volatility."

3. See Erb, Harvey, and Viskanta (2020). Over the 1975–2020 period, the average annual increase in the nominal price of gold was 5.3%, of which 3.6% represented inflation, and the increase in the real price was 1.6%. Analogously, the total return on the S&P 500 Index over the same period was 8.7%. It is possible to decompose this into two components: a 5.8% average annual increase in Shiller's earnings per share (EPS) and a 2.7% increase in the Shiller cyclically adjusted P/E (CAPE). Robert Shiller's online data can be found at www.econ.yale.edu/~shiller/data.htm.

4. An accounting identity is different from an asset pricing hypothesis. An "accounting identity is an equality that must be true regardless of the value of its variables, or a statement that by definition (or construction) must be true (see https://en.wikipedia.org/wiki/Accounting_identity). It can be quite challenging to define what an asset pricing hypothesis is, but it is generally the case that an asset pricing hypothesis is not an accounting identity. In the "accounting identity" sense, the real price of gold is analogous to a stock's P/E and an index of inflation is analogous to a stock's EPS. Additionally, Erb and Harvey (2017) suggested that the real price of gold is to gold as the P/E is to stocks.

5. The golden constant is an unprovable concept for two reasons. The first is that the golden constant idea is so broadly described (as an assertion that the purchasing power of gold is constant over time) that there is no way to test it. No unambiguous way to define purchasing power exists, and because of the general nonstationarity of observed returns, empirical observations over different time periods are likely to support different interpretations and narratives. In this regard, the golden constant is much like the capital asset pricing model, in which asset returns are theoretically driven by *ex ante* expectations of unmeasurable perceptions of risk (not driven by backward-looking measured volatility or covariance). The second reason is that data on gold as a tradable investment start in 1975. It is possible to calculate sample statistics for the performance of gold over this 45-year time period, but unless gold returns come from a stationary distribution, a 45-year sample may have little relevance for future returns. These twin issues (vaguely phrased investment hypotheses and an absence of empirical data to test a hypothesis) probably plague all investment propositions. The fact that a poorly defined investment hypothesis is untestable also makes a poorly defined investment hypothesis irrefutable.

6. Also see Bodie (1995).

7. The Boskin Commission found that inflation measured by the US CPI was overstated by more than 1% per year. The recommended changes in the calculation of inflation affected the cost-of-living adjustments received by Social Security recipients. The Boskin Commission's finding might have been objective and free of political influence, or its finding might have been determined prior to its formation. One way of thinking about this largely unanswerable question is whether the Boskin Commission was, subject to the data, equally likely to determine that the US CPI was underreporting inflation as overreporting inflation.

8. Does the real price of gold do a better job than the currently observable breakeven inflation rate at forecasting the future 10-year rate of return? No. For the period from January 1975 to July 2010, the real price of gold essentially explains none of the variation in the realized 10-year inflation rate of January 1985 to July 2020.

9. This is not a suggestion that statistically derived models *should* be used. Rather, it is a practical observation that if order is preferred to disorder, then a statistical model fit to signal or to noise will often be preferred to no model at all.

10. Imagine regressing the price of any company's shares on exogenous variables, such as the US GDP, the US CPI, the average daily temperature in the United States,

or random white noise. With enough experimentation and ingenuity, a few exogenous variables will emerge as in-sample predictors of the price of the company's shares. If "predictor" variables can be segregated into groups of exogenous and endogenous variables, it is possible that the number of exogenous variable data-mining false discoveries will be greater than the number of endogenous variable data-mining false discoveries (because the number of exogenous variables is, in general, vastly larger than the number of endogenous variables).

11. In the context of a mea culpa for having referred to gold as a "pet rock," Zweig (2020) offered an example of the acceptance of the "gold is a bond" idea by offering his opinion that "low interest rates in the US and negative rates elsewhere will drive gold higher" and "low rates have fueled high returns for gold."

12. For example, Yule (1926) pointed out that it may be possible to see a significant correlation between two random-walk variables, such as the evolution over time of the mortality rate in England and the proportion of Church of England marriages, without any underlying connections between the two time series.

13. Granger and Newbold (1974) used simulated data to make their point. Leinweber (2007) used a database of economic time series to illustrate the abstract argument of Granger and Newbold.

14. The two gold-owning ETFs are SPRD Gold Trust (ticker: GLD) and iShares Gold Trust (ticker: IAU).

15. Because the price of GLD shares is one-tenth the price of gold, the real price of GLD is one-tenth the real price of gold.

16. It is, of course, possible to defend the gold-is-a-bond view by expanding the argument from the idea that changes in real yield drive changes in the real price of gold to the idea that changes in real yield drive changes in gold holdings, which, in turn, drive changes in the real price of gold.

17. Keynesian demand-pull inflation is often referred to as "too much money chasing too few goods" or as a situation in which aggregate demand grows faster than aggregate supply. The World Gold Council (2020) claimed that more than 197,576 metric tons of gold have been mined throughout history. The fact that the supposedly most authoritative source for the history of gold production comes from a gold industry advocacy group rather than an outside compiler of data introduces any number of reasons to be suspicious of the estimate of the above-ground stock of gold. The World Gold Council noted that 2,500–3,000 metric tons of gold are mined each year, which works out to an annual increase of roughly 1.27%–1.51% in the above-ground stock of gold.

18. The R^2 of the plotted data in Figure 4 is about 71%, and the R^2 of the plotted data in Figure 5 is 89%. Those who believe that gold is a bond can no doubt connect the two exhibits by suggesting that gold holdings are simply an intermediate and unnecessary accounting observation stuck between the connection between real yields and the real price of gold. It makes sense for fixed-income managers to suggest that gold is a bond because the assertion expands the universe of investment products they can manage. Real yield and gold holdings are highly correlated. Various statistical tools, such as principal components analysis, partial least squares, and Lasso regressions, offer absolutely no insight into identifying the true driver of the real price of gold. In general, a manager of a gold fund has no reason to highlight the positive correlation between gold holdings and the real price of gold because doing so would suggest that client asset accumulation is a disservice to clients.

19. Iskyan (2016) wrote engagingly about the Hunt brothers, but distinguishing between fact and invention is difficult.

20. The Hunt brothers had significant exposure to silver futures contracts when, in early 1980, the COMEX futures and options market instituted Silver Rule 7, which limits silver contracts delivery to 500 contracts per month and made it difficult for the Hunts to maintain their positions.

21. Cheng and Xiong (2014, p. 420) found no evidence that commodity financialization, in which "commodity futures have become a popular asset class for portfolio investors, just like stocks and bonds," and the commensurate growth of institutional investment in commodities have affected prices. Perhaps part of the reason they found no support for the idea is that they sidestepped the idea: "The large inflow of investment capital to commodity futures markets in the past decade has generated a heated debate about whether financialization distorts commodity prices. Rather than focusing on the opposing views concerning whether investment flows caused a price bubble, we critically review academic studies through the perspective of how financial investors affect risk sharing and information discovery in commodity markets" (p. 419).

22. The September 1929 US Shiller CAPE ratio was 32.56, the December 1996 CAPE ratio was 27.72, and the December 1999 CAPE ratio was 44.20. From the perspective of December 1996, it might have been possible to look at a historical time series of the CAPE ratio and arrive at the conclusion that the 1996 valuation is eerily similar to that of 1929. Campbell and Shiller (1998) noted that valuation "ratios are extraordinarily bearish" (p. 24) and added that the "only previous year with a comparably high ratio is 1929" (p. 16).

23. If the 10-year Treasury real rate fell to −7.60%, then in a similarly extrapolated model, the real price of gold might rise to $14. If the real rate fell to −26.22%, the real price of gold might rise to $35 (or a nominal price of $10,000 an ounce). Which is more likely: Real yields will fall to −7.6%, or the gold holdings of GLD will double? Which is more likely: Real yields will fall to −26.22%, or the gold holdings of GLD will rise sixfold? If real yields do not fall from current levels, then the gold-is-a-bond framework suggests that the real price of gold will not rise even if the gold holdings of GLD double or sextuple.

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