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Gold: Pet Rock or Useful Portfolio Diversifier?

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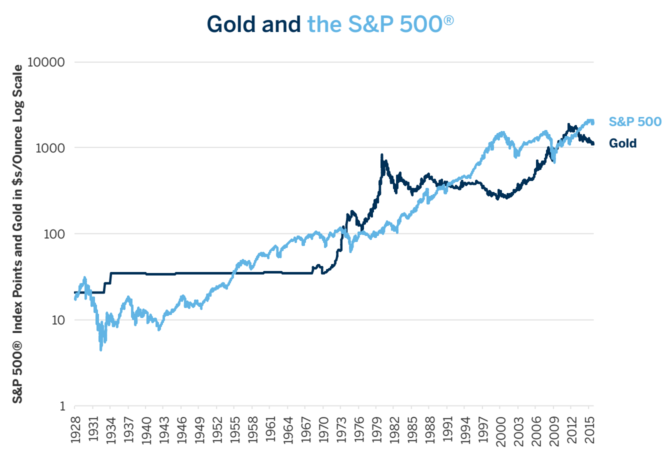
No two investments have louder, more dedicated cheering sections than equities and gold. Equity investors are optimists. They see growth ahead and view their asset class as a means to benefit from an expanding economy. Gold bugs are pessimists. They see danger on the horizon in the form of financial crises, war and, above all, inflation. Equities and gold also have something that the other major asset class, fixed income, lacks: high volatility. Fixed income gives a steady return (though not always a positive one, especially after factoring in inflation). While fixed income has a pretty good track record of risk adjusted returns and inspires a great deal of interest, it hardly spurs passion. Equities and gold have two other things in common:

1. They are both usually viewed in terms of U.S. dollars (USD).
2. They have achieved (from a USD perspective) remarkably similar price returns since 1928 (excluding dividends) although their advances happened at very different times (Figure 1).

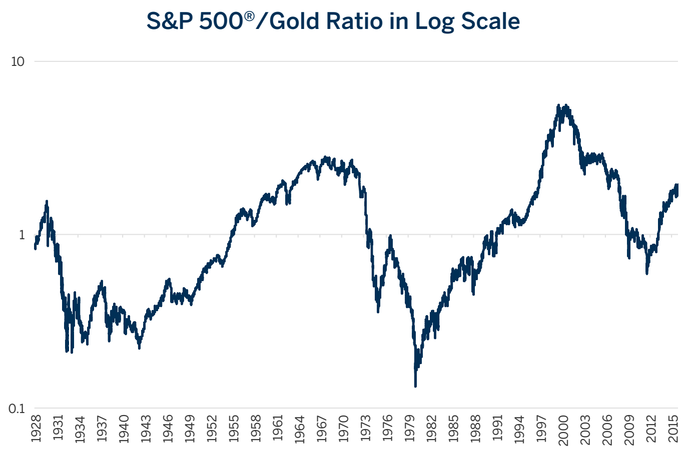
Figure 1: Upward Tendencies Versus USD But At Different Times And For Different Reasons



Source: Bloomberg Professional (GOLDS and SPX)

While investors traditionally view gold and equities separately, and price them in USD, they can also be seen as a ratio (Figure 2), a scale that measures optimism and fear.

Figure 2: Stocks (Without Dividends) Versus Gold



Source: Bloomberg Professional (GOLDS and SPX)

The S&P® / gold ratio is given to extremely long and powerful trends. Since the 1920s, it has essentially undergone seven phases:

1. **The Roaring '20s:** Stocks outperformed during the growth years of the 1920s.
2. **The Great Depression and the Early Part of World War II:** Stocks fell by 86% versus gold between the equity market peak in 1929 and its various lows in 1932 and 1933, as well as in 1942 when the Axis Powers reached the furthest extent of their military expansion. Stocks' performance versus gold was exacerbated by the Roosevelt Administration's confiscation of gold (except for amounts below five ounces, for jewelry and industrial uses) under Executive Order 6102. From 1933 to 1971, gold's worth remained fixed versus the USD at about $35/ounce. Thus, the S&P® / gold ratio fluctuated only as a function of stock price movements.
3. **1943 to 1967 WW II Victory and Post-War Growth:** Stocks rose by 1,048% versus gold, or about 10% per year compounded, as the U.S. emerged victorious in World War II and the U.S. economy began a strong period of low-inflation, post-war growth.
4. **1967 to 1980 Vietnam, Watergate, Oil Shocks and Inflation:** Stocks fell by 95% versus gold, or by about 22% per year. The combination of President Lyndon B. Johnson's Great Society programs, the Vietnam War, strong labor unions, high marginal tax rates and increasingly burdensome government regulations along with tight labor markets created the conditions for high inflation let loose by an easy monetary policy. In 1971, President Nixon abandoned the dollar's peg to gold amid dwindling U.S. reserves of the yellow metal. Between 1971 and 1980, gold rose from $35 per ounce to over $800, while equities went nowhere.
5. **1981 to 2000 Disinflation and the Equity Bubble:** Stocks outperformed gold by 4,000% over the period, or by about 20% per year. In 1979, President Carter appointed Paul Volcker to head the Federal Reserve (Fed). Volcker sent interest rates soaring in a successful, if aggressive, attempt to tame inflation. President Reagan shepherded through Congress a series of tax cuts and accelerated Carter's push towards deregulation. Reagan also broke the backs of organized labor, at least in much of the private sector. These policies led to higher productivity growth, stagnant wages, lower inflation and huge returns for equity investors. Gold suffered from rising mining production and lower inflationary pressures.
6. **2000 to 2011: Tech Wreck, War on Terror, Financial Crisis and Quantitative Easing:** Stocks fell 89% versus gold, or by about 18.5% per year. This period is still so fresh in everyone's memory that we don't need to go into the details other than to say that consumer price inflation never emerged, at least according to the consumer price index and GDP deflator, which, to be fair, have been making increasingly aggressive use of hedonic and substitution adjustments since the early 1990s. Commodity prices (energy, metals, and agriculture) soared along with gold, but labor costs stagnated and the cost of computing power plunged.
7. **2011 Onward, Winding Down of QE and A Return to Prosperity or a False Equity Recovery?** Stocks have risen 225% relative to gold since September 2011. We put a question mark in this sub-title because we aren't really sure if stocks will durably outperform gold or not. Notice that equities had a powerful counter-trend rally in 1975 and 1976 when investors thought that with Vietnam and the first oil shock behind them that things would return to normal. A second massive round of inflation in the late 1970s left equity investors

sorely disappointed and gold investors overjoyed. Equity investors should probably ask themselves: Has anything that led to the financial crisis actually been resolved? Inequality is still as high as ever. Consumer debt has come down from 100% to 80% of GDP but public sector and corporate debt has soared. Gold has fallen from $1,900 to below $1,100 as stocks went higher, at least through 2014.

The common themes are that gold benefits from inflation, war, and economic distress. Equities benefit from stability and growth.

Gold: Good Investment or Pet Rock? A Look Through the Rear View Mirror.

The above analysis may be interesting to the historically inclined and to trend followers but it doesn't really answer the key question: Is gold actually a good investment? In real life, investors don't usually choose between equities and gold but rather between equities and fixed income. Also, in real life equities pay dividends. One of the short comings of the S&P 500® / gold price ratio is that it fails to take into account dividends. Two percent per year dividends might not sound like much but when one compounds them out for 87 years, they add up to about a 460% return – no small oversight. Gold, meanwhile, doesn't really earn much in the way of interest.

For obvious reasons we can't answer the question "is gold a good investment" with certainty. What we evaluate with confidence is whether or not gold was useful to portfolios in the past. To do so, we compare the risk adjusted excess returns of gold to the risk adjusted excess returns on stocks and bonds. First, we define an excess return as being equivalent to the price return + any dividend or interest – return of the risk free rate (T-Bills). Second, we scale up the risk of gold and U.S. Treasuries to the same level as equities – this can easily be done via futures. Finally, we find the optimal risk allocation between the three asset classes for two different periods (1928 to 2015, and 1985 to 2015). For the longer period, we use annual data assembled by Stern Business School and the St. Louis Fed. For the shorter (but still lengthy) period we use daily data from futures that trade at CME, CBOT and COMEX, rolled five days prior to expiry. Futures have the convenient property of already being in excess return and taking into account dividends, interest accumulation and storage costs.

The results show the following:

- Having gold in the portfolio would have been marginally beneficial in both the longer and the shorter period.
- Ideal gold allocations would have been around the 10-15% of portfolio risk (not the same thing as a 10-15% dollar allocation).
- Gold has a much lower risk adjusted excess return over time than either government bonds or stocks.
- What makes gold attractive is that it also has a low correlation to both stocks and bonds and is thus a useful portfolio diversifier.

Figure 3: Low Correlations = Good Diversification

Correlation Table	1928 – 2015 Annual Data	1985 to 2015 Daily Futures Data
U.S. Treasuries & S&P 500®	0.00	-0.03
U.S. Treasuries & Gold	-0.02	-0.06
S&P 500® & Gold	-0.09	-0.01

Source: Federal Reserve Bank of St Louis, NYU Stern School of Business, Bloomberg Professional (TY1, SP1 and GC1) for raw data with calculations performed by CME Economic Research.

Correlations between the three asset classes are close to zero. Equities and bonds have historically earned much higher returns than gold on a risk adjusted basis.

Figure 4: Historically, Diversification Benefits Come Mainly from Stocks and Bonds but Gold Adds Value

1928-2015 Annual All Asset Scaled to S&P 500® Risk	Average Annualized Excess Return over T-Bills	Risk = Standard Deviation (scaled from)	Information Ratio (Average Return / Standard Deviation)
S&P 500®	5.38%	19.30%	0.279
U.S. Treasuries	4.13%	19.30% (from 6.97%)	0.214
Gold	1.30%	19.30% (from 17.29%)	0.067
Blend 1*	6.77%	19.30% (from 13.72%)	0.351
Blend 2**	7.02%	19.30% (from 11.81%)	0.364

*Blend 1 is 55% equity and 45% bond risk; **Blend 2 is 47.5% equity, 37.5% bond and 15% gold risk.

Allocation is based upon risk and not upon $s because bonds and gold are adjusted to equity level risk using the risk-parity approach.

Source: Federal Reserve Bank of St Louis, NYU Stern School of Business for raw data with calculations performed by CME Economic Research.

There is much to quibble with over the longer period analysis. Bond futures didn't exist until the late 1970s and it would not have been easy or even possible to lever up their returns to equity-level risk beforehand. Gold futures didn't exist until 1975 and gold was not really tradable by the public in the U.S. from 1933 until 1971. The strong point of the longer-term analysis is that it indicates how the three assets performed over many different economic periods.

The shorter-term analysis using daily futures data from January 1, 1985 until present (almost 31 years) comes up with some fairly similar conclusions, at least insofar as gold allocations are concerned. What is strikingly different is the relative allocation of stocks and bonds. While stocks did better than bonds in risk adjusted terms from 1928 until present, the opposite is true from the 1985 to-present period. Bonds were the chief beneficiaries of the great disinflation and the financial crisis.

Figure 5: Blend 2 (With Gold) is Slightly Better Off Than Blend 1 (Without Gold)

1985 - 2015 Daily Futures with All Asset Scaled to S&P 500® Risk	Average Annualized Futures Return	Risk = Standard Deviation (scaled from)	Information Ratio (Average Return / Standard Deviation)
S&P 500®	6.45%	19.61%	0.329
U.S. Treasuries	13.65%	19.61% (from 6.51%)	0.696
Gold	2.25%	19.61% (from 16.4%)	0.115
Blend 1*	15.27%	19.61% (from 14.66%)	0.779
Blend 2**	15.51%	19.61% (from 10.49%)	0.791

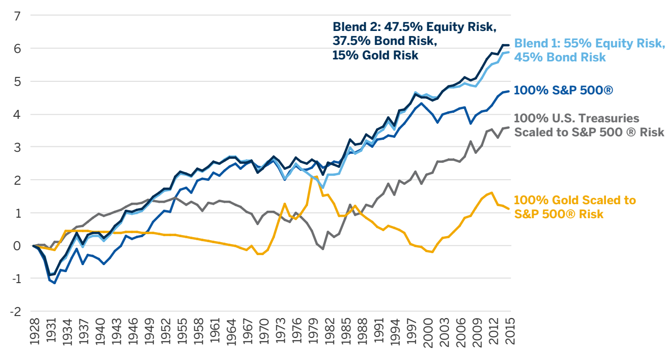
*Blend 1 is 31% equity and 69% bond risk; **Blend 2 is 26.5% equity, 62.5% bond and 11% gold risk.

Allocation is based upon risk and not upon $s because bonds and gold are adjusted to equity level risk using the risk-parity approach.

Source: Bloomberg Professional (TY1, SP1 and GC1) for raw data with calculations performed by CME Economic Research.

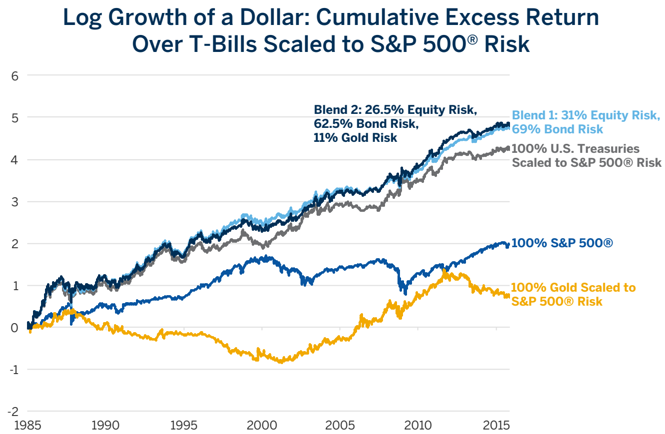
Figure 6: Gold of Mild Benefit Historically at Around a 15% Risk Allocation

Log Growth of a Dollar: Cumulative Excess Return Over T-Bills Scaled to S&P 500® Risk



Source: Federal Reserve Bank of St. Louis, Stern School of Business at NYU, Bloomberg Professional (XAU, GC1, SP1 and TY1), CME Economic Research Calculations

Figure 7: Gold Has Been of Modest Benefit More Recently As Well



Source: Bloomberg Professional (GC1, SP1 and TY1), CME Economic Research Calculations

Gold: Good Investment or Pet Rock? A Forward-Looking View.

Going forward, we think that two things from the past will likely remain the same:

1. Equities and gold will remain much more volatile than fixed income.
2. Correlations among the three assets classes, though unstable in the short term, will probably remain low in the long term, and that gold will still offer diversification benefits.

Those familiar with our research will know that we aren't especially optimistic about gold in the short term because we think that it's driven by mining supply to a much greater extent than most people realize, and that mining supply, in our view, is likely to continue growing. Our perspective on mining supply appears to be in the minority. Many analysts think that gold mining supply is likely to come down significantly in the next few years. If mining companies begin shutting down production, it would be bullish for gold.

With respect to gold demand, we don't see inflation becoming a major problem with average hourly earnings growing at a modest 2.5% year on year. The Fed seems to disagree, however. If they didn't think that inflation was a threat at all, they probably wouldn't be considering raising rates. To the extent that they tighten, however, this should be negative for gold as it will quell inflation fears while, at the same time, highlight the contrast between (near) zero interest rate gold deposits and rising interest rates on T-Bills and other short-term interest rate instruments in the U.S.

While we aren't particularly hot on gold, it's hard to be enthused about bonds or equities either. Whatever bonds do over the coming decade, with ten-year yields currently around 2% in the United States, the UK, Spain, and Italy, and below 1% in France, Germany and Japan, it will be a challenge for them to produce strong risk-adjusted returns that resemble what they have achieved during the past three and half decades. In fact, we wouldn't be surprised if fixed income returns are close to zero or even negative, after inflation, over the next decade or so. U.S. fixed income yields were at levels similar to those that prevail today during the late 1940s and early-to-mid 1950s. Over the course of the late 1950s, 1960s and 1970s, investments in ten year U.S. bonds earned negative returns after subtracting inflation.

Equities present a more complex picture. U.S. stocks have moderate to somewhat-higher-than-average valuation measures on an outright basis with P/E ratios of around 17.5x earnings. On the downside, corporate profits aren't growing very quickly and with the Fed apparently getting ready to hike rates, the cost of capital might begin to increase slightly. Equities in Europe and Asia are a bit cheaper than in the U.S. and might outperform the S&P 500® in coming years, especially if the U.S. dollar remains strong.

Even if neither gold nor financial assets, like bonds or equities, look especially attractive, investors presumably have to put their money somewhere. Chances are that one or maybe two of these asset classes will perform quite well over the next decade or so. The problem is that we don't know which one it will be in advance. This is the argument for holding a diversified portfolio. In the past, which is no guarantee of future results, holding gold as part of a diversified portfolio would have marginally improved the portfolio long-term risk adjusted returns. Gold would have helped portfolio returns during periods of high inflation, negative real interest rates, war and declining mining supply and would have detracted from portfolio performance in most other periods.