

The Facts—Nothing but the Facts!

A longstanding curiosity in the investment business has been the widespread indifference towards precious metals shared by many institutional investors. Whether from the handful of consultants now leading the institutional space, or directly from the stewards of our nation’s pension, endowment, and family-office wealth, skepticism over gold’s portfolio relevance remains fairly pervasive. Because investment professionals are generally a well-informed lot, competing in an industry in which performance is king, one would assume any asset class deserving of rightful consideration would enjoy a fair hearing. In this report, we present a collection of empirical evidence we view as compelling support of gold’s productive role as portfolio-diversifying asset.

Eight years of ZIRP have compressed returns across a wide spectrum of institutional investment regimens. Especially in the pension and endowment world, few portfolios are achieving chartered rates of return. In this environment, we find it puzzling that institutional investors still choose to ignore gold’s market-leading returns. As shown in Figure 1, below, gold has generated annual returns during the past 17 years which are more consistently positive than any competing global asset. Indeed, it is fair to say that since the turn of the millennium, *any* long-term allocation to gold would have improved total returns for the vast majority of pension and endowment portfolios. What is it about gold’s performance that is so difficult to embrace?

Year	US Dollar	Euro	Yuan	Rupee	Yen	Pound	CAD	AUD	CHF	Average
2001	2.46%	8.13%	2.45%	5.90%	17.62%	5.25%	8.65%	11.80%	5.32%	7.51%
2002	24.78%	5.76%	24.78%	24.08%	12.64%	12.67%	23.48%	13.85%	3.87%	16.21%
2003	19.37%	-0.21%	19.36%	13.52%	8.04%	7.80%	-1.81%	-11.22%	7.32%	6.91%
2004	5.54%	-2.19%	5.54%	0.54%	0.66%	-1.76%	-2.19%	1.40%	-3.10%	0.49%
2005	17.92%	35.09%	14.98%	22.23%	35.70%	31.44%	14.06%	25.84%	35.97%	25.91%
2006	23.16%	10.51%	19.11%	21.00%	24.32%	8.17%	23.46%	14.61%	14.24%	17.62%
2007	30.98%	18.46%	22.46%	16.64%	22.96%	29.28%	11.40%	17.77%	21.96%	21.32%
2008	5.78%	10.55%	-1.07%	30.62%	-14.10%	43.89%	29.91%	31.59%	-4.90%	14.70%
2009	24.37%	21.09%	24.40%	18.88%	27.38%	12.25%	7.90%	-2.39%	20.40%	17.14%
2010	29.52%	38.88%	25.02%	24.45%	12.75%	34.15%	21.95%	13.66%	16.91%	24.14%
2011	10.06%	13.51%	5.22%	30.74%	4.35%	10.65%	12.53%	9.81%	10.63%	11.94%
2012	7.14%	5.22%	6.04%	10.54%	20.84%	2.31%	4.86%	5.82%	4.39%	7.46%
2013	-28.04%	-31.13%	-30.15%	-18.76%	-12.42%	-29.45%	-23.13%	-16.30%	-30.09%	-24.39%
2014	-1.72%	11.99%	0.79%	0.45%	11.81%	4.48%	7.40%	7.44%	9.92%	5.84%
2015	-10.42%	-0.25%	-6.38%	-6.16%	-10.15%	-5.27%	6.65%	0.33%	-9.90%	-4.62%
2016	8.56%	11.85%	16.13%	11.42%	5.35%	29.57%	5.60%	9.66%	10.46%	12.07%
10/13/17	13.22%	0.96%	7.17%	7.76%	8.69%	5.10%	5.30%	3.60%	8.51%	6.70%

Figure 1: Annual Performance of Spot Gold in Nine Global Currencies (2001-10/13/17) [Bloomberg]

To us, the most interesting aspect of gold’s dogged performance since 2000 has been the wide variety of financial, monetary and asset-market conditions which have prevailed during the various years in which gold has advanced. Along the way, every popular variable to which some portion of consensus attributes strong gold correlation has oscillated repeatedly, yet gold has advanced in the overwhelming majority of these years. Our investment thesis for gold transcends short-term fluctuations in economic variables and centers on the migration of global wealth spurred by unprecedented imbalances between paper claims and underlying productive output. ***Because we have communicated our investment thesis extensively in prior communications, we will focus this narrative on quantification of the performance benefits of a portfolio commitment to gold.***

Now that the S&P 500 Index has almost quadrupled from its 3/6/09 low (666.79), few plan sponsors would equate gold's potential portfolio "alpha" with that available among U.S. equities. However, as shown in Figure 2, below, *the S&P 500, measured in gold terms, remains 64% lower today than at its 2000 peak!* During the past two corrections in the S&P 500, during which the Index declined 50.50% (2000-2) and 57.7% (2007-9), gold has provided unrivaled protection of real purchasing power. We are aware of no reasoning to suggest gold's portfolio-protection benefits will prove any less potent during the next correction in U.S. equities. In fact, the slopes of the lines in Figure 2 suggest gold's portfolio-insurance value has rarely been more compelling.

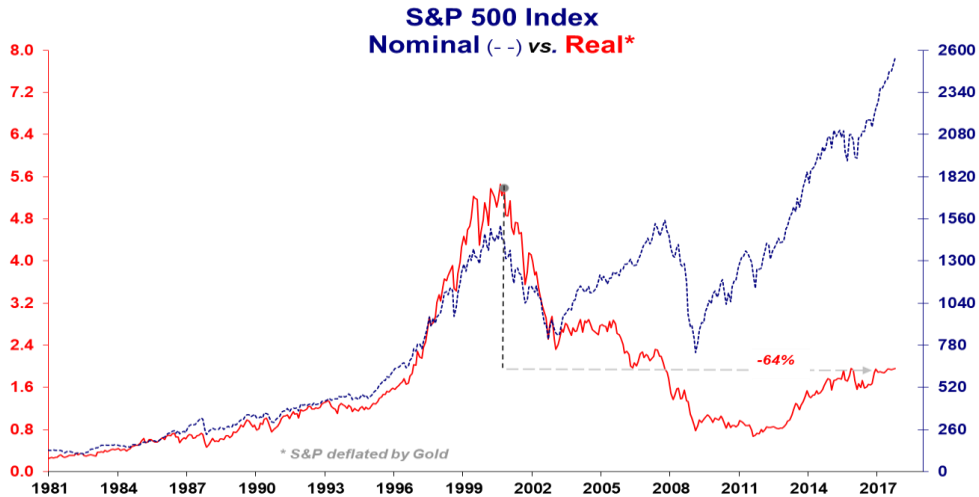


Figure 2: S&P 500 Index Performance since 1981 (Nominal and Deflated by Gold Price) S&P 500 Index Level (rhs) & Ratio of S&P 500 Index Divided by Spot Gold (lhs) [MacroMavens]

In documenting an objective record of gold's portfolio utility, one logically begins with gold's traditional profile as safe-harbor asset. It goes without saying that gold's safe-haven reputation accrues from bullion's established history of relative outperformance during periods of financial stress. As shown in Figure 3, below, gold has done a masterful job of insulating portfolio capital from sharp declines in U.S. equities during the past three decades of financial crises.

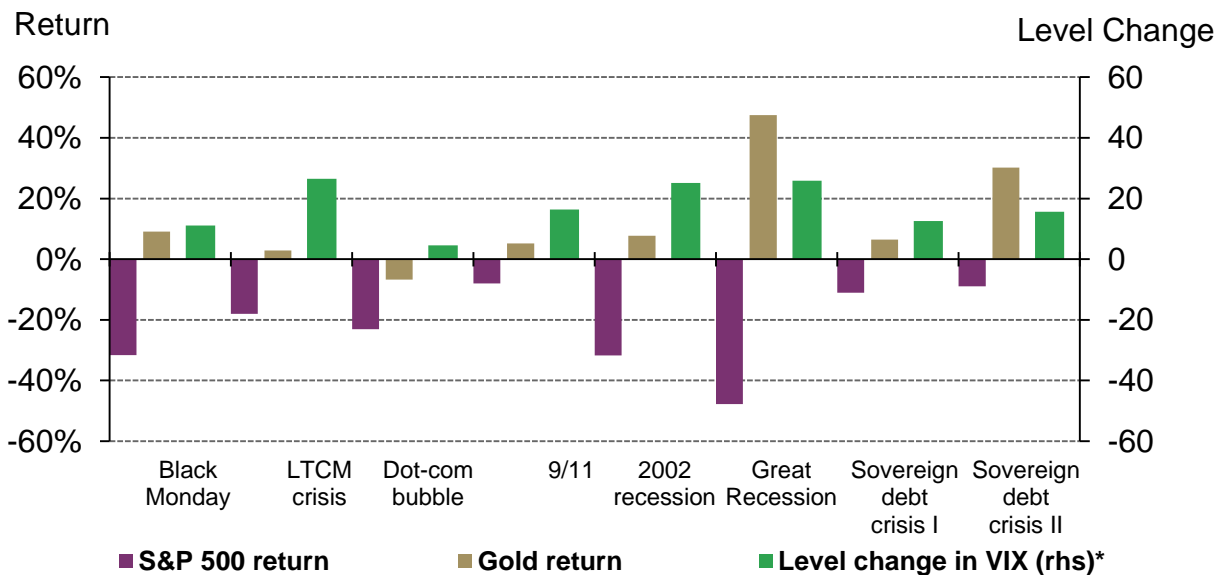


Figure 3: Percentage Changes for S&P 500 Index & Spot Gold (lhs) versus Absolute Change in VIX Index Level (rhs) During "Crisis" Periods (1987-Present) [World Gold Council]

Somewhat less heralded is the fact that *gold's portfolio-insurance benefits accrue with no long-term performance penalty* versus traditional asset classes. As shown in Figure 4, below, gold's performance over standard look-back periods since 1971 approximates that of U.S. equities, and exceeds other broad asset categories.

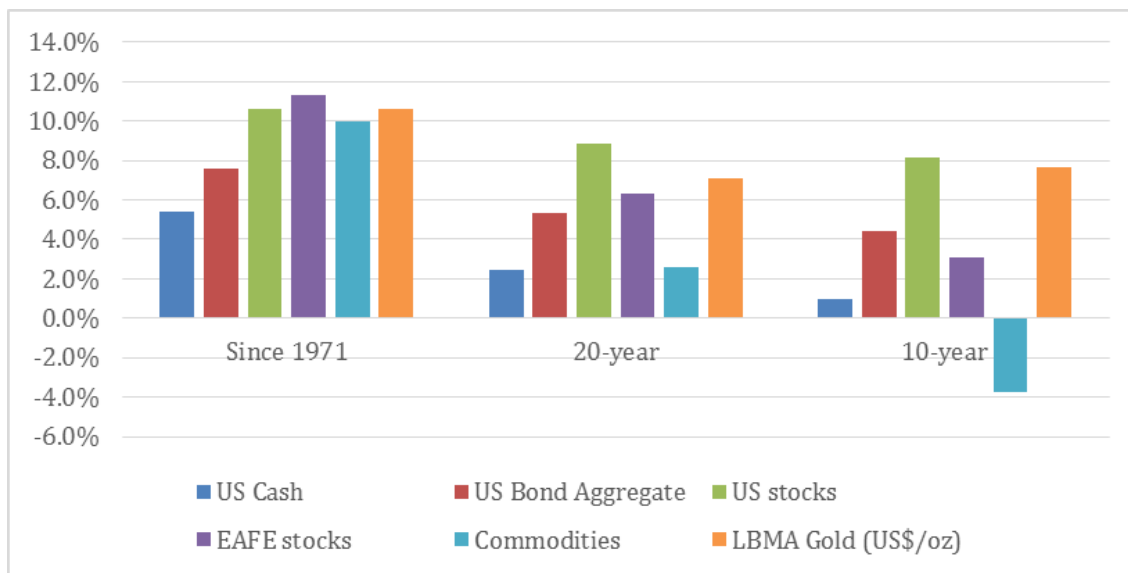


Figure 4: Long-term Average Annual Returns of Gold Bullion versus Traditional Asset Classes (Trailing 10-years, Trailing 20-years and Since-1971, all through 2016) [World Gold Council]

As the investment-advisory business has become more scientific, amid increasingly frequent financial shocks, the holy grail of portfolio allocation has become the overarching search for *non-correlating assets*. Methodologies for identifying and measuring non-correlating assets are in no short supply. However, a routine calculation employed by contemporary risk managers is stress-testing portfolio components under simulated conditions of both positive and negative economic trends. As shown in Figure 5, below, *gold's correlation to traditional asset classes remains uniquely low during periods of both economic expansion and contraction*. In other words, gold's portfolio-diversification benefits are not solely dependent on bad news.

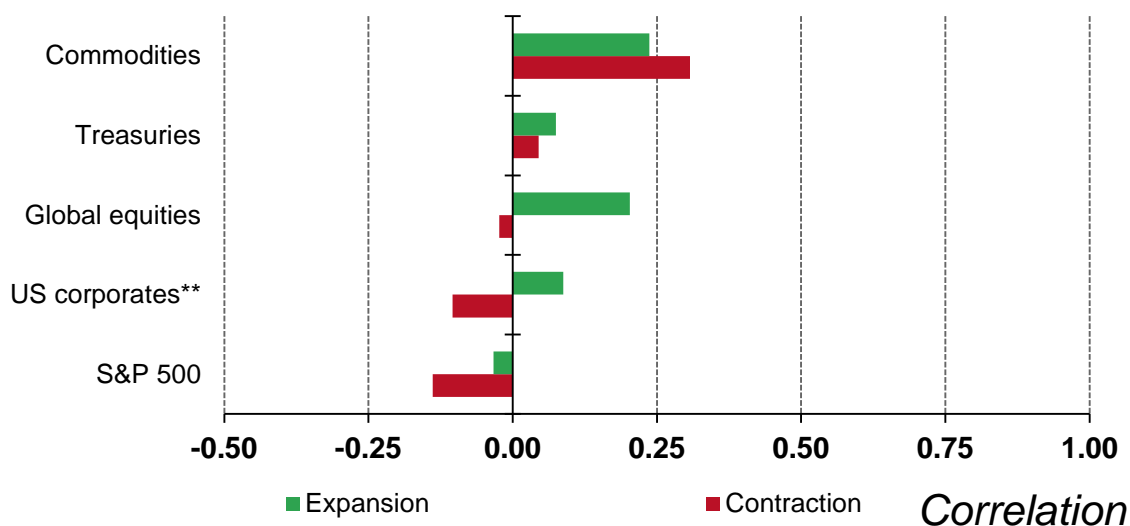


Figure 5: Correlation of Spot Gold to Traditional Financial Assets during U.S. Economic Expansions & Contractions (1987-Present) [World Gold Council]

Institutional focus on non-correlating assets has directed trillions-of-dollars of investment capital towards hedge funds and specialized investment partnerships in disciplines such as real estate, private equity and venture capital. A more recent trend, however, has been mounting investor backlash against elevated fees charged by alternative managers in the context of mediocre investment returns (not to mention onerous liquidity and lockup provisions). In short, a marquee consideration for today’s pension and endowment stewards has become whether the fees, lockups and obfuscation of alternative investments are truly worth their while.

Recognizing there will always be outlying homeruns in the ultra-competitive partnership space, it is instructive to compare the performance of gold bullion directly against the performance of prominent indices of alternative-investment vehicles. After all, portfolio allocations to gold bullion incur no incentive fees, no liquidity or lockup provisions and no onerous due diligence or cumbersome redemption obligations. As documented in Figure 6, below, **gold bullion has more than held its own against returns of high-profile alternative-investment indices, both during the recent past (year-to-date 2017), as well as over the long run (2000-2016).**

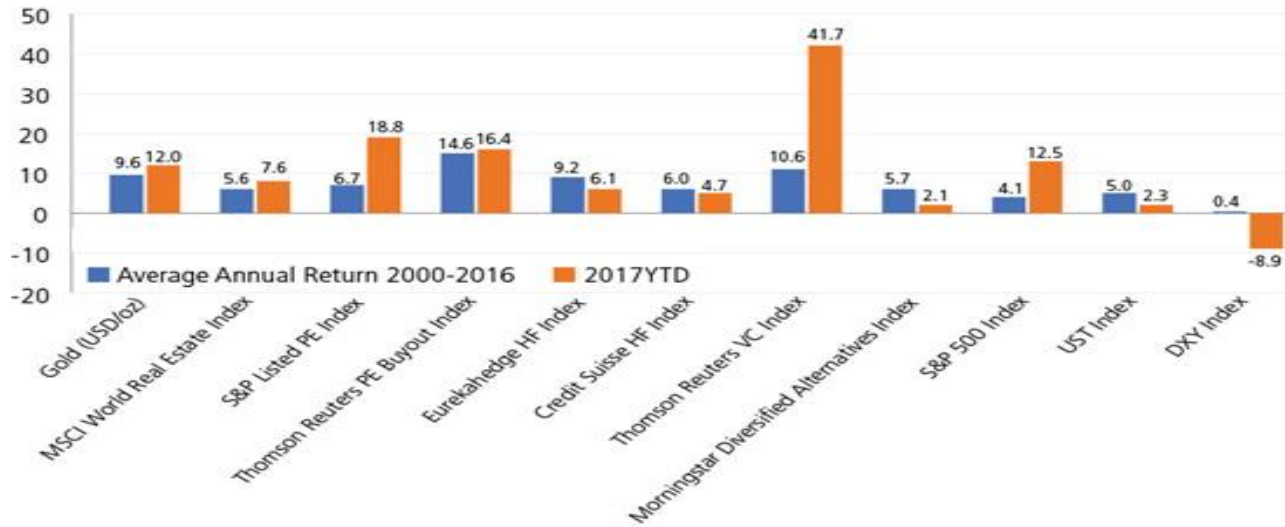


Figure 6: Average Annual Percentage Returns for Spot Gold versus Selected Alternative Asset Indices (2000-2016 and 2017 YTD-through-9/30/17) [World Gold Council]

Even more challenging to industry *status quo*, **gold bullion has rivaled the performance of alternative asset indices while simultaneously displaying far lower correlation to these vehicles than either stocks or bonds.** As shown in Figure 7, below, the correlation between prominent alternative asset indices and the S&P 500 Index has averaged **81%** over the decade through 9/30/17. By way of comparison, the 10-year correlation between these same indices and spot gold has averaged just **10%**. At an 81% correlation-rate with U.S. equities, are high-priced and unwieldy alternative vehicles really worth their freight? What are we missing?

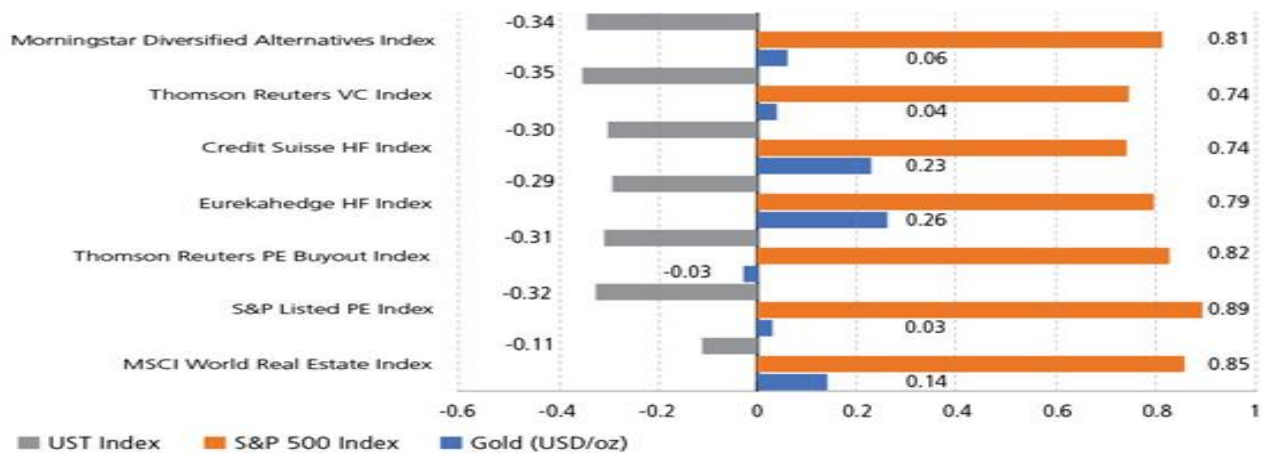


Figure 7: Correlations between Alternative Asset Indices and S&P 500 Index, U.S. Treasuries and Spot Gold (Monthly Data Trailing 10-years through 9/30/17) [World Gold Council]

Now that we have established that gold bullion’s historical performance rivals returns of sophisticated alternative investments, while displaying far lower correlation to traditional asset classes, all unburdened by onerous fees and lockups, a highly operative question might be, **“Is there a reliable method for investors and institutions to right-size a portfolio commitment to gold?”** Given the variables involved, there can never be a single, definitive solution to any portfolio-construction challenge—but there has certainly been no shortage of competing efforts to “break the code” of portfolio allocation. Historically, asset-allocators have favored classical “mean variance optimization” techniques to quantify appropriate portfolio weightings among selected “input” assets to maximize projected portfolio returns within predetermined ranges of risk tolerance. The shortcoming of mean-variance calculations is that they massage **historical** price trends to calculate (a geometric average and standard deviation for) a likely efficient frontier between **future** returns and **future** volatility. There is no guarantee, however, that future returns and volatility will perform in precisely the same manner as they have in the past.

Tapping into the contemporary investment trend of sophisticated quantitative analysis, we cite the considered work of Richard and Robert Michaud (New Frontier Advisors) in developing their “resampled efficiency optimization” approach to portfolio allocation. While RE optimization still recognizes there is some information about future returns and covariance in historical performance, this method of portfolio optimization assumes there are no “fixed known parameters,” and that there will always be a degree of variability in future outcomes. The essence of RE optimization is to establish a portfolio allocation most likely to maximize returns for every unit of undertaken portfolio risk (the “information ratio”) **amid any combination of future financial and market conditions**. In Figure 8, below, we present RE optimization outcomes for five different portfolios of traditional assets, each with unique risk-tolerance assumptions. For example, the most conservative portfolio mandates a 20% weighting in stocks (and other assets) versus an 80% weighting for cash and bonds. The most aggressive portfolio mandates an 80% weighting in stocks versus a 20% weighting for cash and bonds. The five asset inputs utilized in this exercise are cash, stocks, bonds, commodities/REIT’s, and gold. **RE optimization suggests a gold allocation between 2% and 9% will maximize risk-adjusted returns across the spectrum of risk tolerances**. Broadly speaking, the higher the risk in the portfolio, whether in terms of volatility, illiquidity or concentration, the larger will be the modeled gold allocation to offset that risk.

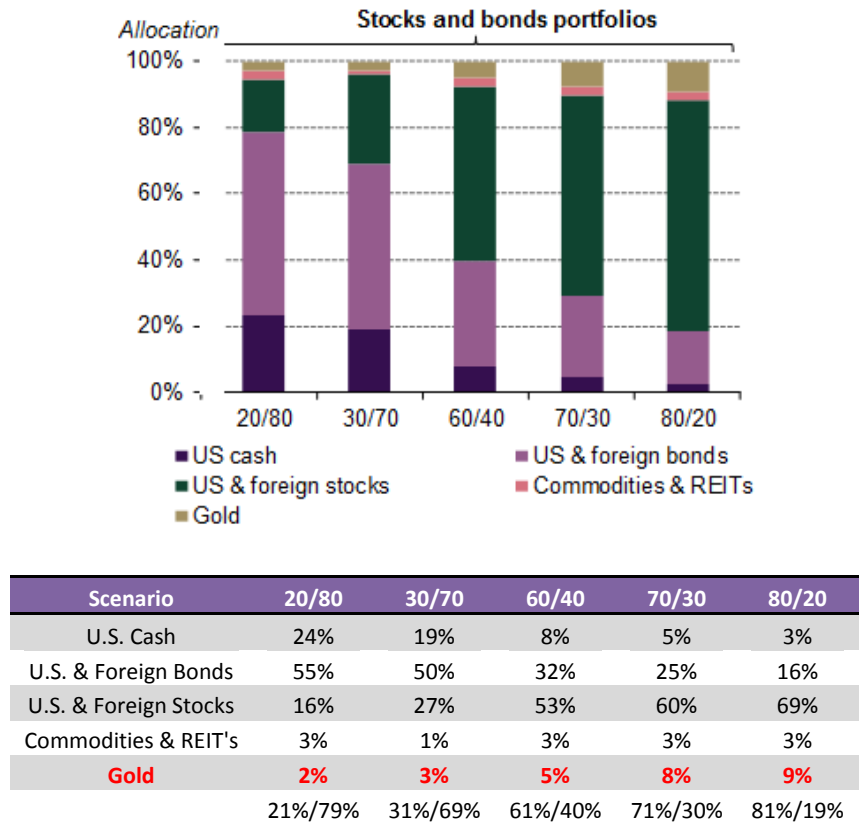
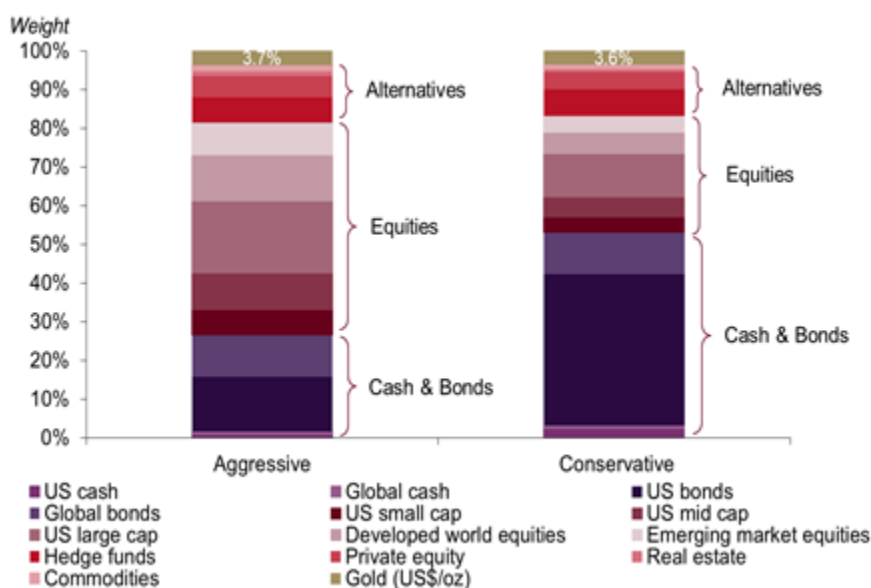


Figure 8: Optimal Gold Weightings in Basic Stock/Bond Portfolios at Five Risk Tolerance Levels [Based on Michaud&Michaud RE Optimization; World Gold Council]

It is one thing to establish that an allocation to gold can augment risk-adjusted returns among basic portfolio building blocks such as stocks and bonds. In the contemporary institutional world, however, so much brainpower and so many resources are directed at synthesizing complex investment strategies, it is difficult for participants to recognize that gold's passive and seemingly anachronistic profile actually adds considerable value to modern portfolio dynamics. For example, despite the fact that institutions are laser-focused on noncorrelating assets, we believe industry due diligence generally gravitates to alternative vehicles with the highest nominal returns in each product category. In the process, gold's unrivaled powers of non-correlation are shortchanged. ***It is gold's lack of correlation to all other portfolio assets, as opposed strictly to bullion's nominal return patterns, which empowers gold's unique ability to protect against portfolio drawdowns.*** As we have long maintained, when paper assets perform as advertised, gold's portfolio utility recedes to average profile. However, when paper ceases to perform as advertised, such as during stress tests like 2008, no alternative asset can match gold's portfolio-protection power.

Firing up the Michaud RE optimization model to address a more sophisticated portfolio input mix, including alternative investments such as hedge funds, private equity and real estate, we plot in Figure 9, below, optimal allocations to maximize total return in two portfolios with varying risk profiles. Once again demonstrating gold's unique ability to maximize risk-adjusted returns across the spectrum of risk tolerances, the optimal portfolio allocation to gold is remarkably similar in both the aggressive and conservative portfolio mix.



Asset	Aggressive	Conservative
U.S. Cash	0.8%	2.4%
Global Cash	0.8%	0.7%
U.S. Bonds	14.1%	39.2%
Global Bonds	10.9%	10.8%
U.S. Small Cap	6.5%	4.0%
U.S. Mid Cap	9.5%	5.2%
U.S. Large Cap	18.7%	11.2%
DW Global Equities	11.9%	5.6%
EM Equities	8.4%	4.1%
Hedge Funds	6.5%	6.9%
Private Equity	5.6%	4.5%
Real Estate	1.3%	0.8%
Commodities	1.4%	1.1%
Gold	3.7%	3.6%

Figure 9: Optimal Gold Weightings in Diversified Asset Portfolios at Two Risk Tolerance Levels [Based on Michaud & Michaud RE Optimization; World Gold Council]

Why Gold?

As precious-metal investors, we are familiar with the philosophical hurdles confronting gold in institutional circles. Gold is often perceived as a catastrophe asset, and a common line of reasoning suggests no endowment could weight gold sufficiently to insulate an investment corpus from actual catastrophe, so why introduce the distraction? Pension and endowment trustees routinely sidestep the precious-metal debate with the simple observation, “Gold is not what we do.” Finally, many investment advisors and consultants, especially in a late-stage equity bull market, fear a portfolio allocation to gold might be misinterpreted by clients as a signal “something is wrong.”

On the other hand, to many investors, gold offers attractive protection *from* financial assets when their quoted prices are perceived as detached from intrinsic value, or, even more importantly, when the integrity of the unit of account in which these prices are quoted (fiat currencies) becomes increasingly suspect. By way of example, some of the world’s most sophisticated investors, including Soros, Druckenmiller, Klarman and Singer, employ gold liberally to navigate fluid market conditions. To these heavyweight investors, gold offers the ability to remove, at a moment’s notice, virtually unlimited amounts of portfolio capital from the vagaries of overpriced markets or questionable central bank policies. In our experience, the logic of a portfolio allocation to gold is most easily understood by owners of accumulated wealth. Those who have created significant capital are highly sensitive to potential risks of its dissipation, even amid the intoxication of fresh weekly highs for the S&P 500.

Somewhere in the middle rest gold’s true investment merits. In this report, we have presented evidence that a portfolio allocation to gold can improve risk-adjusted returns in portfolios of any risk tolerance. Gold’s long-term returns have rivaled the performance of sophisticated alternative-asset indices, with far lower correlations to traditional asset classes, and without burdensome fee and liquidity frictions. The empirical data suggest a modest gold allocation provides tangible portfolio-diversification benefits in any investment climate. Given the unprecedented monetary, financial and asset-valuation risks now confronting investors, gold’s potent benefit of purchasing-power-protection, which essentially accrues for free, seems to us an incredibly precious commodity.

We would like to express sincere gratitude to our colleagues at the World Gold Council for their invaluable assistance in producing this report. Significant contributions were made from three separate continents! Additionally, we extend our best wishes to good friend David Harquail as he assumes WGC stewardship. Given David’s intellect, passion and leadership skills, we suspect good things are in store for the precious-metal community!

We look forward to visiting with Sprott clients at their convenience to review their allocations to gold and gold equities for the coming year.

Sincerely,

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World Gold Council Footnotes

Figure 3: VIX Index data is available only after January 1990. For event occurring prior to that date, annualized 30-day S&P 500 volatility is used as a proxy. Dates used: Black Monday: 9/1987-11/1987; LTCM: 8/1998; Dot-com: 3/2000-3/2001; September 11: 9/2001; 2002 recession: 3/2002-7/2002; Great recession: 10/2007-2/2009; Sovereign debt crisis I: 1/2010-6/2010; Sovereign Debt Crisis II: 2/2011-10/2011.

Figure 4: Based on total-return indices including MSCI U.S.; MSCI EAFE Total Return Index; JP Morgan 3-month U.S. cash; BarCap U.S. Bond Aggregate; Bloomberg Commodity Index for trailing 10-year and 20-year, S&P Goldman Sachs Commodity Index since 1971 due to data availability. Performance of gold bullion based on LBMA pm fix. Data are annual figures from 1971 to 2016.

Figure 5: From January 1987 to September 2017. Based on weekly returns of the S&P 500, MSCI ACWI ex-U.S., JPMorgan U.S. Treasury Index, Bloomberg Barclays Corporate Bond Index, S&P Goldman Sachs Commodity Index, and LBMA pm fix. Business cycles defined by National Bureau of Economic Research (NBER). Data for U.S. Corporates starts December 1988 due to data availability.

Figure 6: All figures as of September 30, 2017. UST Index is Barclays U.S. Treasuries Unhedged Total Return Index.

Figure 7: All figures as of September 30, 2017. UST Index is Barclays U.S. Treasuries Unhedged Total Return Index.

Figure 8: Each portfolio composition reflects the percentage in stocks (and other assets) relative to cash and bonds. For example: 60/40 is a portfolio with 60% in stocks, commodities, REIT's and gold, and 40% in cash and bonds. Analysis based on New Frontier Advisors Resampled efficiency.

Figure 9: Resampled efficiency utilized to maximize returns for each unit of portfolio risk under two scenarios. The "aggressive" portfolio simulates standard allocations of 55% equities, 25% fixed income, and 0% to 5% cash, with the remaining 15%-20% optimally distributed among alternative assets. The "conservative" portfolio simulates allocations of 30% equities, 50% fixed income, 0% to 10% cash, with the remaining 10%-20% distributed optimally among alternative assets.

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