

Gold as a strategic allocation

WHITEPAPER

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In this paper, we evaluate the case for gold as a strategic allocation in an institutional portfolio. We start with a brief history of gold as an early form of money, its relationship to fiat currencies, and as an investment. We then address gold's correlation with other asset classes, its relationship with inflation, real yields, the US dollar, and its role as a safe-haven asset. In addition, we briefly touch on the different manners in which an allocation to gold may be implemented.

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We find that gold has provided downside support during periods of heightened volatility or increases in systemic risk. This safe haven attribute, when combined with gold's independence from any central bank, means that gold exhibits its own unique characteristics that provide potential benefits to a diversified portfolio. While we note that gold has traditionally been considered an asset with both inflation and deflation hedging benefits, most of the major test cases for this occurred either when gold's price was pegged to the dollar or during the collapse of the Bretton Woods system, making it difficult to rely on historical data. Still, our view is that many portfolios would benefit from having a strategic allocation to gold, particularly in a world that appears poised to experience persistently low real interest rates.

The history of gold

Humankind's interest in gold dates back thousands of years and across a number of civilizations. As seen in museums around the world, prior to being used in commerce, gold was principally used in worship and religious ceremonies. Its explicit luster and similarities to the color of the sun (seen as a god by many early civilizations) prompted many to consider the metal as a direct connection to the spiritual world and worthy of religious focus.

That said, it is not just the apparent divine nature of the metal that established its relevance for humans, but also unique elements that made it attractive versus other raw materials. Gold's relative scarcity, portability, and malleability also supported its use by early civilizations as a store of value for that time. As a medium of exchange, gold has experienced a range of regimes. Initially, the metal was simply used in its raw state, with its weight and purity used as the basis of value and trade. That changed around 700 to 500 BC when the first gold coins were reportedly struck and used in a more formal monetary structure.

One of the challenges, however, with using gold coins was the potential for them to be physically manipulated or contaminated with other metals. This includes the most blatant abuse: the ability to “clip” them and create counterfeit coins that would ultimately make their way into circulation and disrupt trust in the intrinsic value of gold coins. While laws with stiff penalties were established to deter the clipping, governments also participated in this “debasement” to generate a financial gain for the sovereign entity at the expense of its citizens. The subsequent inflation generated from the debasement was a fiscal strategy for governments as it allowed them to pay off outstanding government bonds as the value of that debt declined.

Significant discoveries of gold and silver at various points in time also created challenges for monetary systems. In the 15th century, Spain’s discovery of gold in the Americas resulted in Europe’s supply of gold increasing by a multiple of five times. Additional gold rushes, including those across the Americas, Australia, and South Africa, created additional spikes in supply and material devaluations in those regimes. Nonetheless, gold remained the preferred means of exchange all the way through the late 19th century.

While paper money was first introduced around 607-618 AD by the Chinese during the Tang Dynasty, it was not until the 17th century that paper money and other forms of bank credit started to take hold as a means of exchange. Still, gold, in various facilities and monetary structures, maintained its influence on the ultimate value of currency for a number of years.

Indeed, the gold standard (which in retrospect was a common, although loosely defined, structure prior to the formal international standard established in the late 1800s) was a monetary system in which nearly all countries fixed the values of their respective currencies to a specified amount of gold, or, linked their currencies to that of a country that did so. By agreement, domestic currency was freely convertible into physical gold at a fixed price. With the currencies fixed in terms of gold, exchange rates between participating currencies were also fixed.

After the Second World War, a new international system was designed to replace the gold standard. With the objective of pursuing a more stable structure, it was decided at the US Bretton Woods Conference in 1944 that the new system would fix the dollar (at the center of the system) to gold at the existing parity of US \$35 per ounce and that other countries would have fixed but adjustable currency exchange rates to the US dollar.

In the post-war years that followed, the global economy grew rapidly. But, the US involvement in the Korean and Vietnam Wars, along with the Johnson administration’s expansion of social programs, resulted in the subsequent deterioration in the US trade deficit (which drained US gold reserves) and expansion of debt, highlighting the building fragility of the policy. While additional structures and agreements were made

by participating countries in an effort stabilize the system,¹ these efforts ultimately failed as strains continued to emerge and accelerate.

¹ This included the 1961 London Gold Pool, which represented eight nations pooling their gold reserves in an effort to defend the US \$35 per ounce peg.

As speculation against the dollar intensified and foreign central banks became increasingly uncomfortable accepting US dollars for settlement, in 1971, President Nixon announced the end of on-demand currency to gold convertibility and, ultimately, the Bretton Woods system. The gold market has traded freely ever since.

With gold untethered from currency values, it became, in the opinion of many, an independent hedge against poor governmental fiscal and monetary policies. Today, gold continues to maintain its influence on the global financial system across a number of elements that support a potential strategic allocation. However, the rise in [cryptocurrencies](#) over the last few years has introduced a potential disruption to the gold market as investors consider the possibility of a new medium of exchange outside of direct government control.

The case for gold as a strategic allocation

Our research suggests that a number of factors contribute to the performance of gold and that these factors may support a strategic allocation to gold within institutional portfolios. Focusing on the ones we feel are most compelling from a strategic perspective, we include:

- Gold's correlation and performance versus other asset classes
- Gold's performance relative to real interest rates and the US dollar
- Gold's tendency to trade as a 'safe-haven' asset and how that might enhance a diversified portfolio
- The strategic implementation of gold exposure

Recognizing that the gold market has many unique characteristics related to these four areas of focus, we include in the appendix, a review of supply and demand factors that impact the gold market.

Gold's low correlation to traditional asset classes may support a diversified portfolio

Gold's correlation² with most major asset classes is low and is one of the principal arguments for considering a strategic allocation (Table 1). Within a strategically designed portfolio, this supports the potential ability of a dedicated, long-term gold exposure to provide meaningful diversification benefits on an ongoing basis.

² Correlations based on Meketa's 2021 capital market assumptions. Gold is defined as a 60-40 Gold Metal/Mining mix.

	Global Equity	Emerging Markets Equity	Investment Grade Bonds	TIPS
Gold	0.19	0.33	0.39	0.48

TABLE 1
Major Asset Class
Correlations

Additionally, in Figure 1, we highlight that across a more frequent basis (in this case a rolling 3-year time period) gold's correlation³ can vary and potentially provide a hedge in various market environments. Two examples of environments where gold can provide diversification benefits are: 1) when equity markets decline materially, such as 2008-2009, and investors seek safety in gold exposures, and 2) situations where real interest rates (as measured by Treasury Inflation-Protected Securities, or "TIPS") are declining and investors consider the opportunity cost of holding gold in a low real rate environment.

³ Source: Data provided by Bloomberg; inflation adjusted gold price is compared against the S&P 500 Index, MSCI EAFE Index, Bloomberg Barclays US Aggregate Index, and Bloomberg Barclays US TIPS Index.

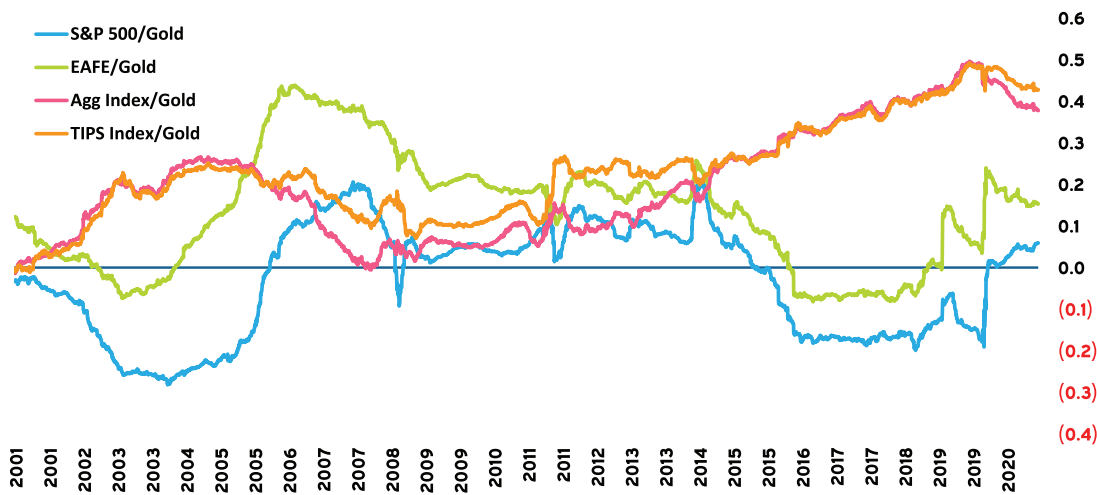


FIGURE 1
Historical Correlations
Rolling 3-Year Correlations

Source: Bloomberg.

From the investment performance standpoint, gold has performed as might be expected over time. Over the last 30 years, gold has returned roughly 3.3% per annum, lagging the performance of riskier assets like equities but outperforming inflation. Like many other assets and strategies that diversify growth/equity risk, expected rates of return are modest, at best, but shine when growth assets are in crisis.



FIGURE 2
Major Asset Class
Performance
Annualized Performance
as of 3/31/2021

Source: Bloomberg.

With beneficial correlation dynamics and a historical return profile, an allocation to gold may support the portfolio's risk and return objectives over the longer-term horizon.

Beginning with a mean-variance optimization ("MVO") framework, and based on the asset class' correlations and long-run expectations for risk and return,⁴ Table 2 shows that a modest 3.0% allocation to gold funded by a reduction in natural resources, real estate and TIPS allocations, increases the portfolio's expected return by seven basis points without increasing its expected risk. This marginally improves the overall risk-adjusted return⁵ of the portfolio.

	Current Targets (%)	Policy with 3% Gold (%)
Equities	50	50
Global Equity	40	40
Private Equity	10	10
Fixed Income	28	28
Investment Grade Bonds	20	20
Bank Loans & High Yield Bonds	6	6
Emerging Market Bonds	2	2
Real Assets	16	16
Real Estate	8	7
Natural Resources	4	3
TIPS	4	3
Gold ⁶	0	3
Risk Mitigating Strategies	6	6
Portfolio Statistics:		
20-year Expected Return	6.26	6.33
Standard Deviation	11.8	11.80
Sharpe Ratio	0.437	0.443

⁴ Meketa's Capital Markets Research Team updates the capital markets assumptions every January for most major asset classes; assumptions reflect a 20-year investment horizon. Risk and return assumptions for select asset classes are provided in the appendix.

⁵ As defined by the Sharpe ratio.

TABLE 2
Example Portfolio

Source: Meketa 2021 Capital Market Expectations.

⁶ Gold is defined as a 60/40 mix between gold metal and gold mining expectations.

Building further on the capital market assumptions and the MVO analysis, the simulated portfolio performance (Table 3) highlights that with an arbitrary policy return target of 6.5% for the sample portfolio, the probability of reaching the policy target increases by 1% over the 20-year horizon when including a strategic allocation to gold.

Policy Target Ex-Gold	Policy Target With Gold
45.9%	46.9%

TABLE 3
Probability of Achieving 6.5% Policy Target over 20 Years

Source: Meketa 2021 Capital Market Expectations.

While the magnitude of benefit may be optically small, faced with the risk of lower capital market returns for major asset classes over the longer-term horizon, any marginal improvements in the risk-return profile of the portfolio may be attractive for investors.

Inflation and gold: real yields and the US dollar

Gold is perceived as a hedge against inflation, largely based on the average inflation adjusted price (or “real price”) remaining relatively stable over time. While this is true, it is also the case that gold has experienced extended periods where the price changed only marginally and counter to the overall inflation trend. Similarly, there have been periods where gold prices changed abruptly, and this was reflective of non-inflation-related developments.

Historically, inflation and gold prices have moved in ways that imply a significant relationship (i.e., a positive correlation) over multi-year periods. However, it may be more appropriate for investors to pursue hedging inflation-related risks through assets whose underlying structure is more directly tied to realized inflation (as is the case with other commodities and TIPS).

Additionally, because of the significant structural changes in the gold market over the last handful of decades, a historical comparison of gold and inflation to the current/future environments is fraught with caveats and unique situations. As examples, the gold standard and the Bretton Woods exchange rate agreement both contributed to unique gold market regimes that are unlikely to occur in the future.

It is because of these dynamics that we consider the strategic case for gold against factors that have stronger relationships with the asset class – namely, movements in real US interest rates and the US dollar.

As we highlight in the following sections, gold has performed well as real interest rates have declined to record low levels over the last few decades. Similarly, gold has provided a modest (albeit volatile) hedge during periods of US dollar weakness. And while we acknowledge that the future performance for any of these assets is highly uncertain, we believe that many of the underlying market factors that have defined and driven these markets over the recent history are likely to persist and continue to have a measurable influence on gold markets.

Gold and real yields

As shown in the following charts, gold’s performance and the direction of real rates appear to have a reasonably strong relationship.

As proxied by TIPS, real interest rates have been declining over the last 20 years, and they continue to remain near record low levels (Figure 3). At the same time, the price of gold has generally risen with this decline in yields. One explanation for this is that in a low real interest rate environment, the opportunity cost of gold, all else equal, is lower when the yield on a low-risk proxy like cash is also relatively low. In Figure 4, we see further evidence of this negative relationship when regressing the price of gold against 10-year real yields over the last 20 years.⁷

⁷ We acknowledge that while there is a clear correlation, there is not necessarily causation between the two as it is possible both are being impacted by something else (e.g., inflation expectations, central bank policy).

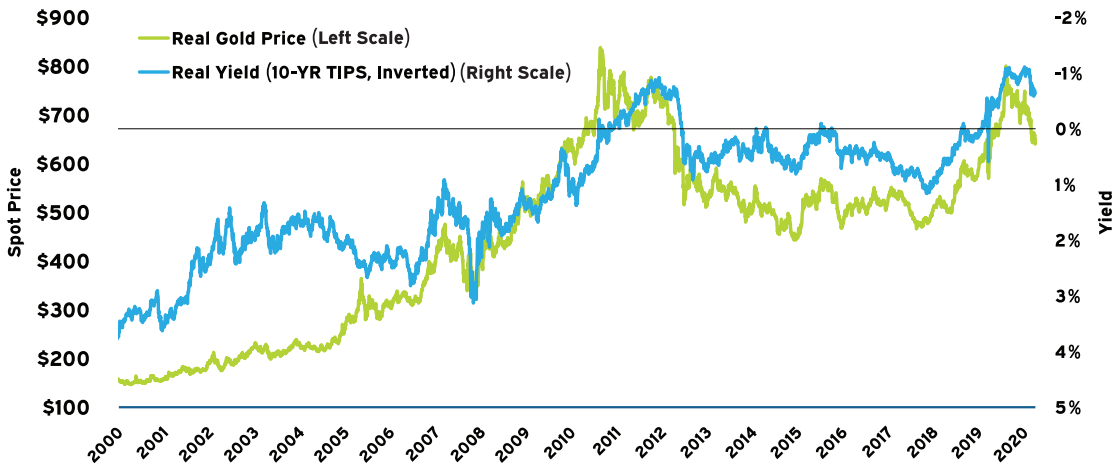


FIGURE 3
Gold and Real Yield
Performance

Source: Bloomberg.

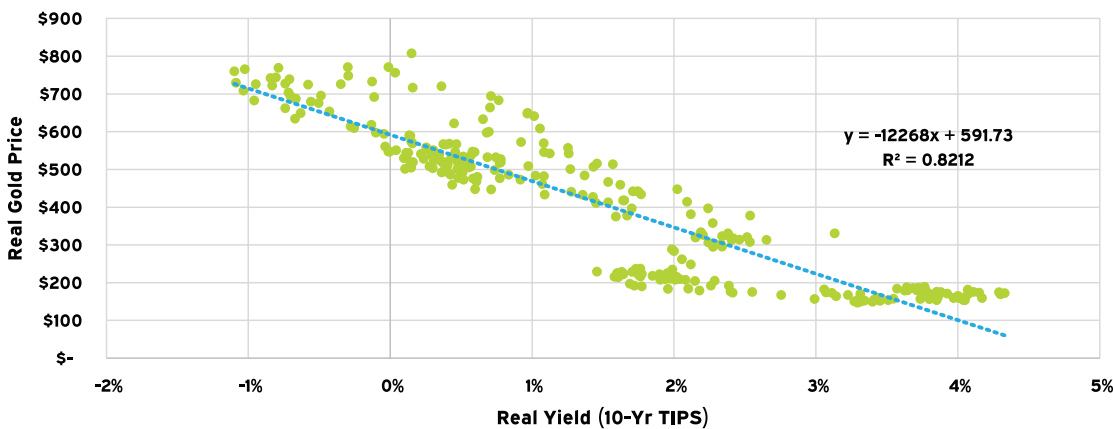


FIGURE 4
Gold and Real Yield
Relationship

Source: Bloomberg.

From a strategic perspective, we expect interest rates, and particularly real interest rates, to remain near historically low levels for a prolonged period. Specifically, we see entrenched, secular, disinflationary forces⁸ keeping growth and inflationary pressures contained. As a result, real rates are likely to remain subdued for the foreseeable future. In this low real interest rate environment,⁹ gold exposure could prove beneficial to a diversified portfolio.

⁸ Notable secular market forces include technological improvements, global demographic dynamics, and continued globalization and integration of capital markets.

⁹ Meketa has been focusing on these expectations through various channels, including our [recently published research](#) and the work of the [Low Interest Rate Working Group](#).

Additionally, with interest rates providing low and even negative yields in some markets, investors are largely forced to take on additional risk in pursuit of returns to meet their objectives. Traditionally, this comes at the expense of greater allocations to risky assets like equities (public and private) and higher yielding debt. But, in this situation and respective market environment, gold has also benefited from the demand for risk exposure.¹⁰

¹⁰ While gold is neither typically considered a “risk” asset like equities, nor does it provide any yield like traditional fixed income securities, it has nonetheless benefited from risk-seeking demand by investors. This has been especially true under the record levels of monetary policy support (and most recently fiscal support) that have driven risk assets to historically rich levels and pushed allocators to pursue diversifying options to protect portfolios.

It is important to note, however, that real interest rates could rise beyond our expectations. In this case, gold exposure could negatively impact portfolio performance as the opportunity cost increases and investors seek exposure to higher yielding

assets. That said, it would also depend on the factors driving real yields higher as a case could be made that in a situation where US credit worthiness deteriorates, investors potentially sell US sovereign debt exposure and seek gold as a safe-haven investment.

Gold and the US dollar

Similar to the experience with real interest rates, gold has performed well against the US dollar. While this is reasonable considering the strong relationship between the dollar and US interest rates, and the fact that gold is priced in US dollars, enough differentiation exists between the three (gold, interest rates, and the US dollar) to consider strategic exposures.

As seen in Figures 5 and 6 below, the price of gold has generally risen with US dollar depreciation; however, the relationship has not been stable over time as seen in the variability of correlation in Figure 6. With the ongoing integration of global financial markets and the increasing possibility that digital currencies may play a more meaningful role in the future, volatility in the dollar could potentially rise. In this scenario, gold exposure could mitigate this risk for a portfolio.¹¹

¹¹ Of note, diversified portfolios are likely partially hedged against US dollar exposure through their international security holdings.

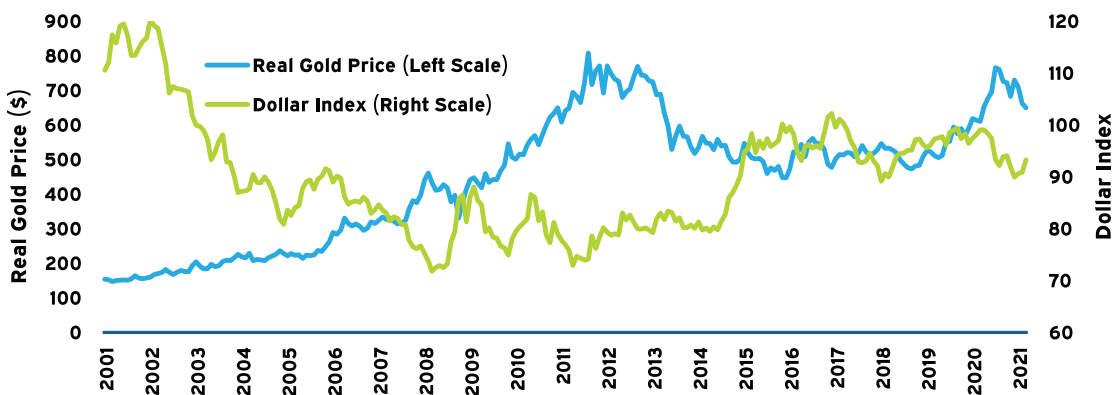


FIGURE 5
Gold and US Dollar Performance

Source: Bloomberg.

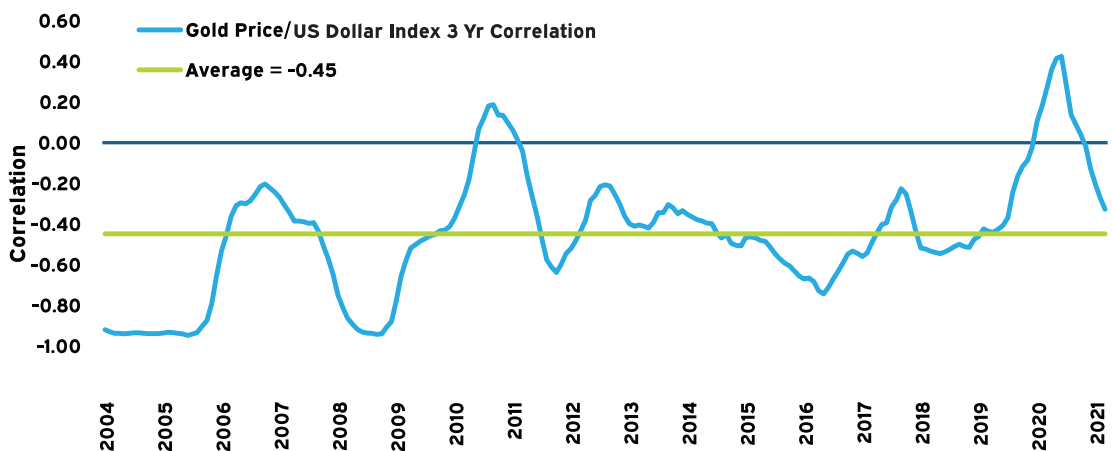


FIGURE 6
Gold and US Dollar Performance

Source: Bloomberg.

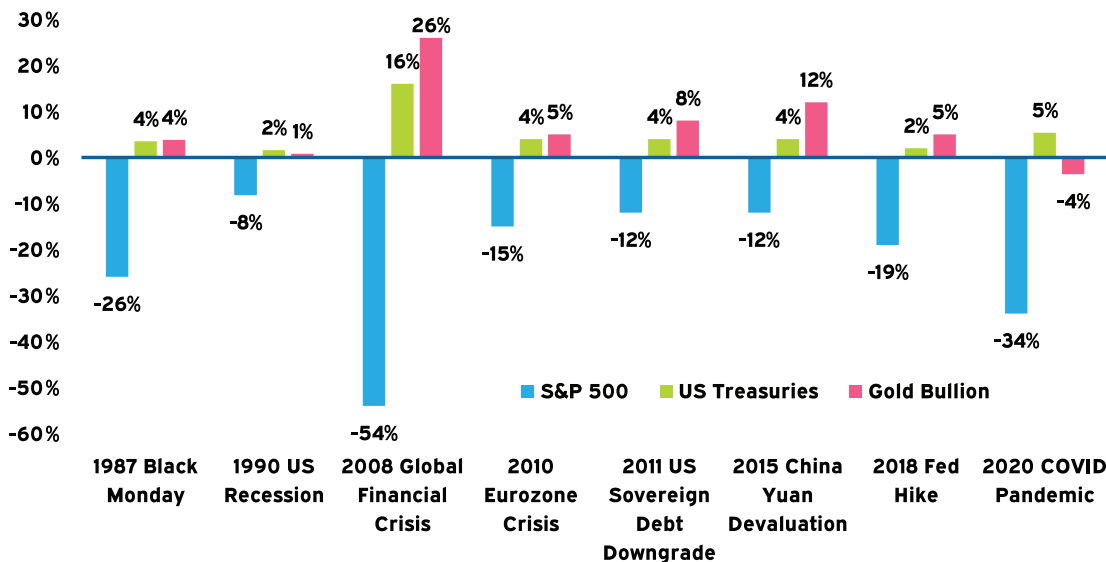
Gold as a safe-haven asset

Gold has also shown a tendency to serve as a 'safe-haven' investment when markets are experiencing notable selling pressures and bouts of volatility. This safe-haven characteristic can be seen in periods of significant market dislocation, as well as during global political uncertainty.

Directly, every individual episode of volatility has unique defining characteristics, and while the possible future shocks to our financial and economic systems are unknowable, this uncertainty alone makes diversification critically important. What we know is that gold tends to provide diversification benefits¹² when these events take place.

As direct examples, during the most volatile periods of the Global Financial Crisis ("GFC") in September and October 2008, US equity markets (as measured by the S&P 500) declined by over 32%, while the dollar price of gold declined by only 2.8%. This also occurred during the onset of the COVID pandemic in March 2020 when US equity markets declined by over 30%, while the dollar price of gold declined by roughly 11%.

Even during more moderate drawdown events, like those also included in Figure 7 below, gold has managed to provide supportive (if not positive) returns while other asset classes lagged.



¹² Gold investments are often classified by investors as either "Growth" or "Real/Inflation Sensitive" assets, but due to the 'safe haven' characteristics, some investors consider gold as part of their "Risk Mitigating Strategies" ("RMS") allocation.

FIGURE 7
Performance in Volatile Periods

Source: Bloomberg; dates: Black Monday: 10/13/1987 - 10/30/1987, 1990 US Recession: 07/3/1990 - 10/16/1990, GFC: 10/11/2007 - 03/06/2009, Eurozone Crisis: 04/20/2010 - 07/01/2010, US Sovereign Debt Downgrade: 07/25/2011 - 08/09/2011, Chinese Yuan Devaluation: 08/18/2015 - 02/11/2016, Fed Rate Hike & China Trade War: 09/20/2018 - 12/24/2018, COVID-19 Pandemic: 02/19/2020 - 03/23/2020; S&P 500 is measured by the SPX Index; US Treasuries are measured by Bloomberg Barclays US Treasury Total Return Unhedged USD Index; and spot gold performance is measured by the Bloomberg Gold Index.

Investors should be aware, however, that outside of highly volatile periods and when real interest rates are declining, gold market performance can be lackluster. As highlighted in Figure 8 on the following page, gold investors experienced this in the years following the GFC, when the economy stabilized and real interest rates rose on expectations of tighter monetary policy.

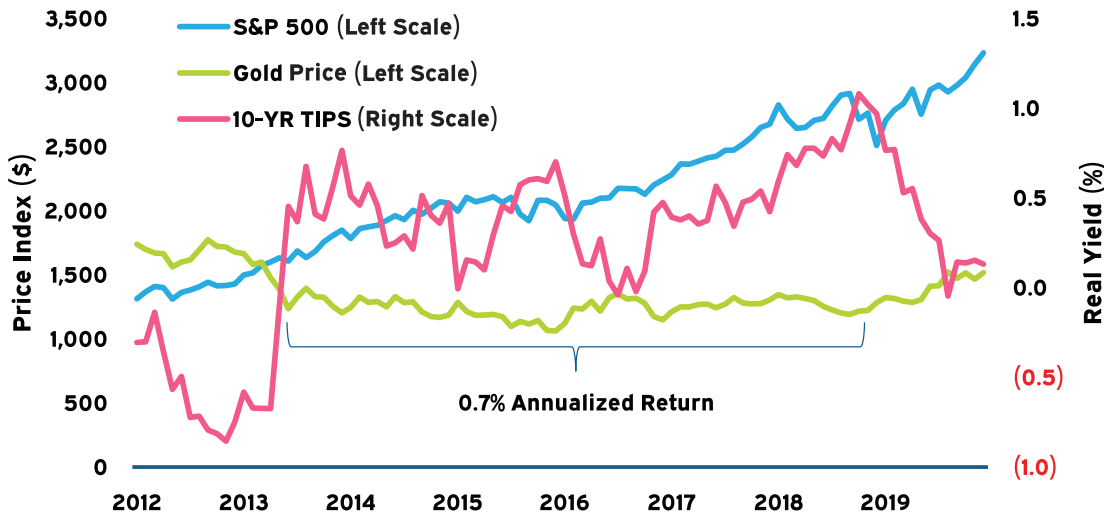


FIGURE 8
Performance in More Stable Markets

Source: Bloomberg. Gold price is not inflation adjusted.

Specifically, from mid-2013 until late 2018,¹³ the price of gold remained largely range-bound between \$1,000 and \$1,400 per ounce and returned only roughly 0.7%. Gold mining stocks experienced similar performance, albeit with relatively higher volatility. During the same period, however, risk assets performed quite well, with the S&P 500 index returning over 10.6% on an annualized basis.

¹³ Period represents 6/30/2013 to 12/31/2018.

We highlight this dynamic to set expectations for what investors may be facing over the long run. And particularly, the possibility that as monetary policy becomes less accommodative and policy rates drift towards the long-run policy expectation of around 2.5%, the opportunity cost of gold may again become less attractive.

Implementation considerations

A gold allocation can be implemented with various investment structures, including physical gold bullion holdings at banks, gold mining stocks, gold futures and options on related markets, and gold ETFs.

Meketa believes that a higher exposure to physical gold bullion holdings, along with a lesser degree of exposure to gold mining stocks, provides a reasonable balance between expected return and risk over the long-term horizon. Physical gold (and gold futures) has provided a better hedge against extreme market events, albeit with lower returns, while gold miners have exhibited higher returns but with greater volatility and a much higher correlation to equities.

Taken together (physical and miners), an attractive risk/return profile can be designed and executed for investors. We highlight this dynamic further in the appendix, including the impact on the tracking error¹⁴ of a general portfolio across various allocations to physical gold and gold miners.

¹⁴ Of note, because the majority of institutional investors do not have a strategic allocation to gold, any allocation would likely introduce tracking error versus peers and potentially versus policy benchmarks.

Conclusion

In summary, we view an allocation to gold as a strategic position in a world with persistently low real interest rates. Gold provides potential downside support during periods of heightened volatility or increases in systemic risk. Gold's independence from any central bank makes it attractive as an asset (or currency) that cannot be easily devalued. Importantly, gold serves as an asset class with its own unique characteristics that provide potential benefits to a diversified portfolio. Still, while gold has traditionally been considered an asset with both inflation and deflation hedging benefits, most of the major test cases for this occurred either when gold's price was pegged to the dollar or during the collapse of the Bretton Woods system, making it difficult to rely on historical data.

Appendix

A1. Expected returns and risks for select asset classes

	20-year Geometric Expected Return	Standard Deviation
Investment Grade Bonds	1.8	4.0
TIPS	1.8	7.0
High Yield Bonds	4.2	11.0
Bank Loans	4.0	9.0
Emerging Market Bonds	3.9	14.0
Global Equity	7.1	18.0
Private Equity	9.1	28.0
Real Estate	6.9	17.0
Natural Resources (Public)	7.3	23.0
Natural Resources (Private)	8.3	23.0
Gold Mining	7.9	41.0
Gold (Metal)	2.3	20.0
Global Macro	4.3	5.0
CTA (Trend Following)	4.7	15.0
Long Puts	-2.2	6.0

TABLE 4
Expected Returns and Risks for Select Asset Classes

Source: Meketa 2021 Capital Market Expectations. High Yield and Bank Loans is weighted 50% to each. Natural Resources is weighted 50% each to public and private. Gold is weighted 60% to bullion (metal) and 40% to mining. RMS is equally weighted (one-third each) to Global Macro, Trend Following, and Long Puts.

A2. Supply and demand dynamics

As seen in Figures 10 and 11 on the following pages, gold performance is driven by a unique set of supply and demand factors.

On the supply side, total physical gold bullion in existence is finite. Furthermore, the mined nature of gold bullion imposes certain logistical challenges. For example, low-cost sources of gold have been exploited, suggesting gold mining could become

a more capital-intensive undertaking going forward. Importantly, this also means that the available supply of gold bullion at any given point in time is increasingly well understood.

On the demand side, influential factors range from the mineral’s use as a key component across certain technological equipment and related hardware, to central bank holdings for monetary stability purposes, as well as consumer demand as a principal component in the jewelry industry and as an overall luxury item. To this last point, evidence further suggests that as consumers’ wealth increases, demand for gold naturally follows. This may be a particularly important (and persistent) fundamental as emerging market countries, such as China and India, continue to grow and develop their economies.

Gold is also viewed as a store of wealth and a measure of status in many emerging market countries where faith in governments, and fiat currencies, is relatively low. Subsequent improvements in the standard of living and increases in consumer spending power, as the emerging markets middle class grows, may provide a notable demand for the precious metal going forward.

In addition, gold, at its basic level, is simply a commodity that should benefit from any related market dynamics that might influence the broader commodity complex. During an economic recovery, as an example, where increased consumer demand naturally drives raw materials and commodity prices higher, gold should also perform well.

It is also the case, however, that gold has distinct characteristics that can differentiate it from the experience of the industrial commodity cycle, particularly during extreme periods of market stress. As another related example, during the extremes of the 2007-2009 crisis and the recent pandemic, as highlighted in chart 1, gold outperformed most of the traditional commodity markets as they reacted negatively to the expected economic weakness.

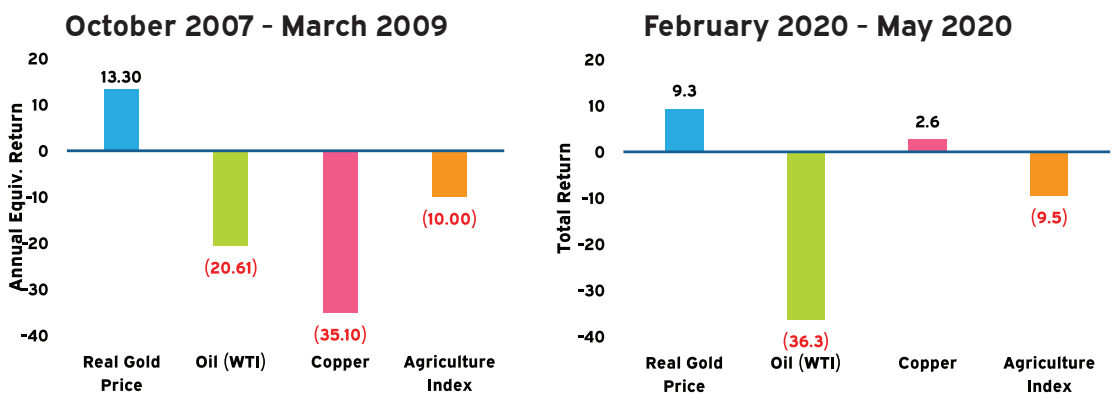


FIGURE 9
Commodity Prices in 2007-2009 Financial Crisis

Source: Bloomberg.

While gold is not typically utilized in a similar way as other commodities, the nuanced supply and demand dynamics can create an environment where idiosyncratic factors ultimately drive diversified returns for a portfolio across various market cycles.

Lastly, but no less important, central bank activity in gold (both buying and selling), creates an additional source of influence outside the typical financial market dynamics that portfolios are exposed to.

To be clear, gold is not immune from changes in supply and demand; the supply of gold can vary and the demand from both discretionary and investment related buyers can fluctuate over time. However, we consider these risks to be relatively manageable due to the depth of the asset class, usage of gold by various industries, and the significant coverage by various market participants.

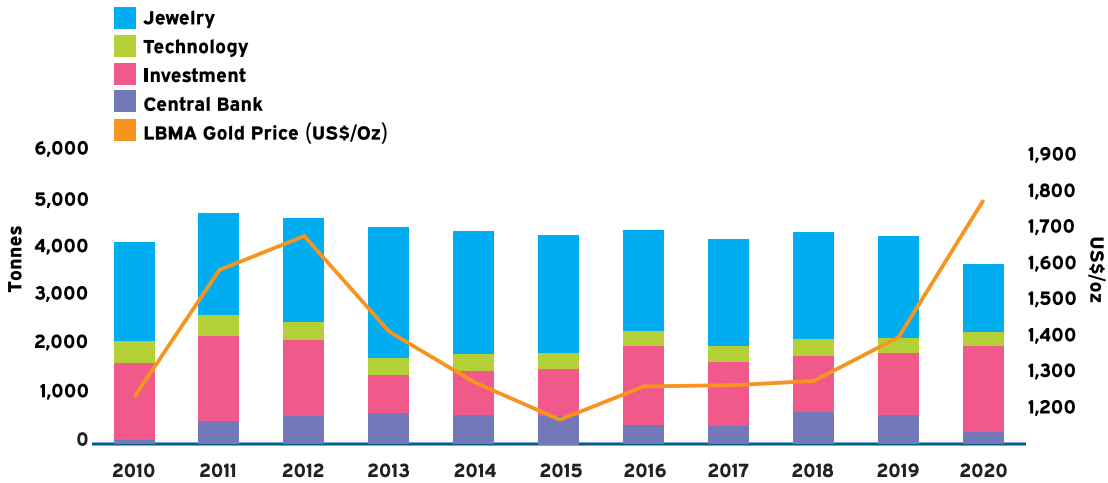


FIGURE 10
Gold Demand Statistics
As of June 30, 2021

Sources: Gold.org, ICE Benchmark Administration, Metals Focus, Refinitiv GFMS, World Gold Council.

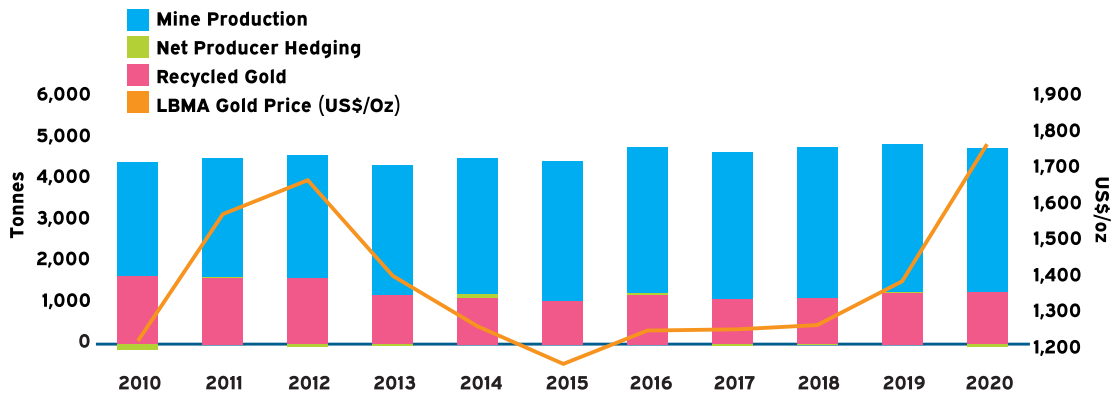


FIGURE 11
Gold Supply Statistics
As of June 30, 2021

Sources: Gold.org, ICE Benchmark Administration, Metals Focus, Refinitiv GFMS, World Gold Council.

A3. Gold investment vehicles

	Gold-Backed ETFs	Gold Mutual Funds	Gold Mining Stocks ETFs	Physical Gold Holdings	Gold Futures
Holdings	Shares of Trust backed by physical gold	Physical gold and other related assets, including gold ETFs	Diversified, typically gold mining companies and related operations; exposure to other precious metals	Physical gold holdings in the form of bars/coins	Indirect exposure via futures contracts
Liquidity	Highly Liquid	Fairly Liquid	Highly Liquid	Somewhat liquid; depending on quantity to trade, typically takes days or weeks	Highly Liquid
Fees	Typically around 40 - 55 bps, but cheaper options are available	Higher than ETFs due to additional expenses; around 75 bps but can be higher based on degree of active management	Typically around 70 bps, with additional fees	Depends on counterparty, market dynamics, shipping/handling/processing fees, quantity, insurance; est. >50bps	Fees depend on level of management; 30 bps to 60 bps for basic, higher for more active management including incentive fees
Management Approach	Typically Passive	Can be Active or Passive	Typically Passive	Passive	Active
Other Considerations	Counterparty risk No upside beyond the change in gold prices Investors typically cannot settle in physical gold; only cash	Counterparty risk Bullion holdings typically capped For active funds, fees vary based on holdings, fund structure, and strategy	Counterparty risk Investor exposed to factors beyond gold prices (e.g., company specific risk, economic cycle) Exposure to other commodities	Additional costs such as insurance, transportation, and safekeeping, can be meaningful No upside beyond gold price changes	Counterparty risk Highly leveraged Requires deep understanding of futures trading dynamics as well as gold markets.

TABLE 5
Gold Investment Vehicles

A4. Implementation

In keeping with the 3% allocation to gold mentioned earlier, we see from Table 6 below that an allocation of 2% physical gold and 1% gold miner equities suggests a reasonable increase in tracking error of 0.7%¹⁵ when compared to a traditional 60/40 portfolio. This modest increase in active risk is at least partially mitigated by the potential improvement in the risk-adjusted return of the portfolio, with the Sharpe ratio increasing from 0.43 to 0.44 in the sample portfolio.

¹⁵ The added benefit is that management fees should be notably lower.

Gold Allocation within 60/40 Portfolio	Tracking Error vs. 60/40 Portfolio											
	Allocation to Gold Miners (%)											
	10	9	8	7	6	5	4	3	2	1	0	
Allocation to Physical Gold (%)	0	3.5%	3.1%	2.8%	2.4%	2.1%	1.7%	1.4%	1.0%	0.7%	0.3%	0.0%
1	3.6%	3.2%	2.9%	2.6%	2.2%	1.9%	1.5%	1.2%	0.8%	0.5%	0.2%	
2	3.7%	3.4%	3.0%	2.7%	2.3%	2.0%	1.7%	1.3%	1.0%	0.7%	0.4%	
3	3.9%	3.5%	3.2%	2.8%	2.5%	2.1%	1.8%	1.5%	1.1%	0.8%	0.5%	
4	4.0%	3.7%	3.3%	3.0%	2.6%	2.3%	2.0%	1.6%	1.3%	1.0%	0.7%	
5	4.1%	3.8%	3.5%	3.1%	2.8%	2.5%	2.1%	1.8%	1.5%	1.2%	0.9%	
6	4.3%	4.0%	3.6%	3.3%	2.9%	2.6%	2.3%	2.0%	1.6%	1.3%	1.1%	
7	4.4%	4.1%	3.8%	3.4%	3.1%	2.8%	2.4%	2.1%	1.8%	1.5%	1.3%	
8	4.6%	4.3%	3.9%	3.6%	3.3%	2.9%	2.6%	2.3%	2.0%	1.7%	1.4%	
9	4.7%	4.4%	4.1%	3.7%	3.4%	3.1%	2.8%	2.5%	2.2%	1.9%	1.6%	
10	4.9%	4.6%	4.2%	3.9%	3.6%	3.3%	2.9%	2.6%	2.3%	2.1%	1.8%	

TABLE 6
Tracking Error vs. 60/40 Portfolio

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