



The relevance of gold as a strategic asset 2023

About the World Gold Council

We're the global experts on gold.

Leveraging our broad knowledge and experience, we work to improve understanding of the gold market and underscore gold's value to individuals, investors, and the world at large.

Collaboration is the cornerstone of our approach. We're an association whose members are the world's most forward-thinking gold mining companies. Combining the insights of our members and other industry partners, we seek to unlock gold's evolving role as a catalyst for advancements that meet societal needs.

We develop standards, expand access to gold, and tackle barriers to adoption to stimulate demand and support a vibrant and sustainable future for the gold market. From our offices in Beijing, London, Mumbai, New York, Shanghai, and Singapore, we deliver positive impact worldwide.

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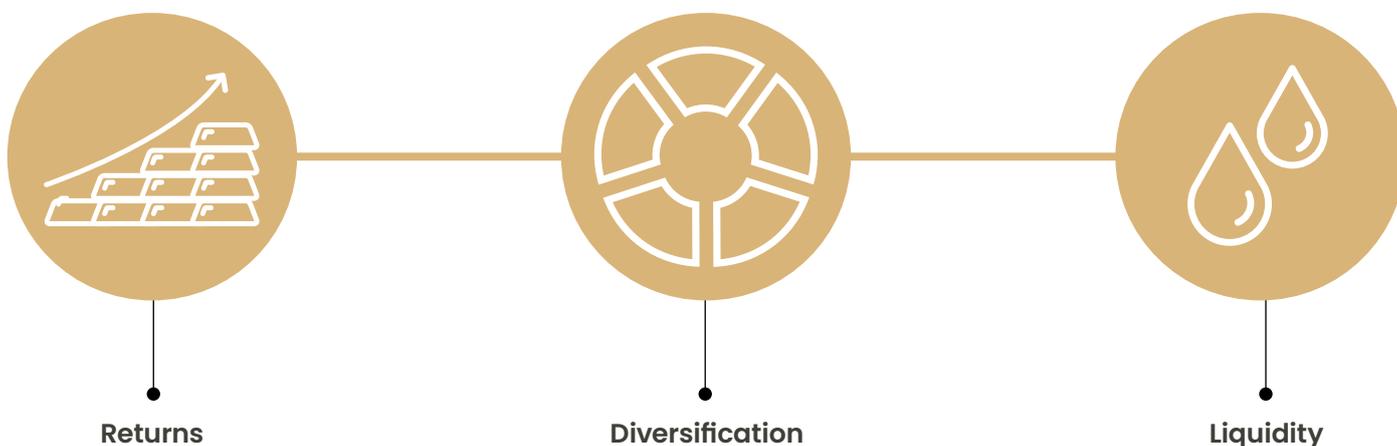
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What makes gold a strategic asset?

Gold has a key role as a strategic long term investment and as a mainstay allocation in a well-diversified portfolio. Investors have been able to recognise much of gold's value over time by maintaining a long-term allocation and taking advantage of its safe-haven status during periods of economic uncertainty.

Gold can enhance a portfolio in three key ways:



Gold is a highly liquid asset, which is no one's liability, carries no credit risk, and is scarce, historically preserving its value over time. It also benefits from diverse sources of demand: as an investment, a reserve asset, jewellery, and a technology component. These attributes mean gold can enhance a portfolio in three key ways:

- Delivering long-term returns ([page 2](#))
- Improving diversification ([page 5](#))
- Providing liquidity ([page 6](#))

Combined, these characteristics make gold a clear complement to stocks and bonds and a welcome addition to broad based portfolios.

Moreover, the shift towards a greater integration of environmental, social and governance (ESG) objectives within investment strategies has important implications and we believe gold can play a role in supporting these. Gold should be recognised as an asset that is responsibly sourced and delivered from a supply chain that adheres to high ESG standards. Gold also has a potential role to play in reducing investor exposure to climate-related risks.

Gold's key attributes

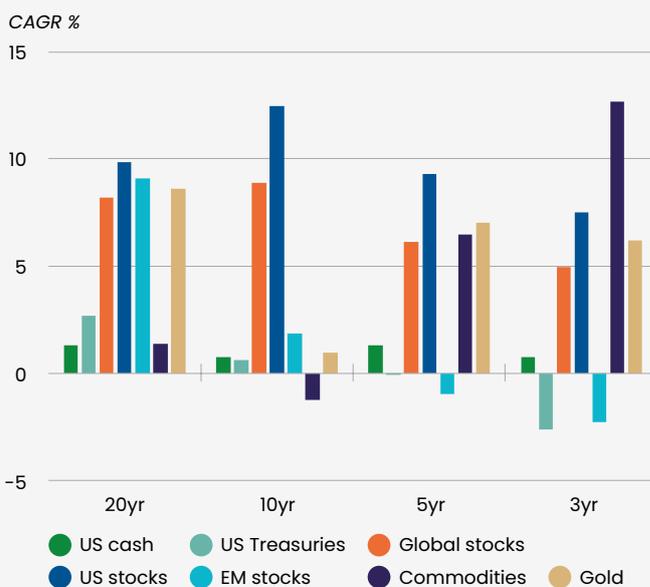
A long-term source of return

Investors have long considered gold a beneficial asset during periods of uncertainty. Yet, historically, it has generated long-term positive returns in both good and bad economic times. Its diverse sources of demand give gold a particular resilience and the potential to deliver solid returns in various market conditions (Figure 1). Gold is, on the one hand, often used as an investment to protect and enhance wealth over the long term, but on the other hand it is also a consumer good, via jewellery and technology demand. During periods of economic uncertainty, it is the counter-cyclical investment demand that drives the gold price up. During periods of economic expansion, the pro-cyclical consumer demand supports its performance. Combined these factors give gold the ability to provide stability under a range of economic environments.

Looking back over half a century, the price of gold in US dollars has increased by nearly 8% per year since 1971 when the US gold standard collapsed. Over this period, gold's long-term return is comparable to equities and higher than bonds. Gold has also outperformed many other major asset classes over the past 3, 5, 10 and 20 years (Chart 1).

Chart 1: Gold has performed well over the past 3, 5, 10 and 20 years, despite the strong performance of risk assets

Annualised return over the past 3, 5, 10 and 20 years*

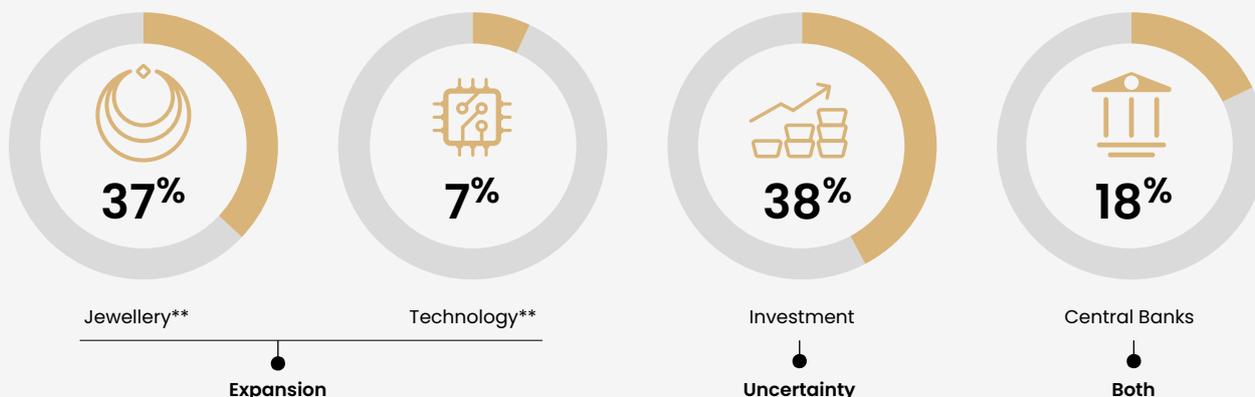


*Returns from 31 December 2002 to 31 December 2022

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

Figure 1: Gold's sources of demand

Average annual net demand = 3,140 tonnes (approx. US\$ 181bn)



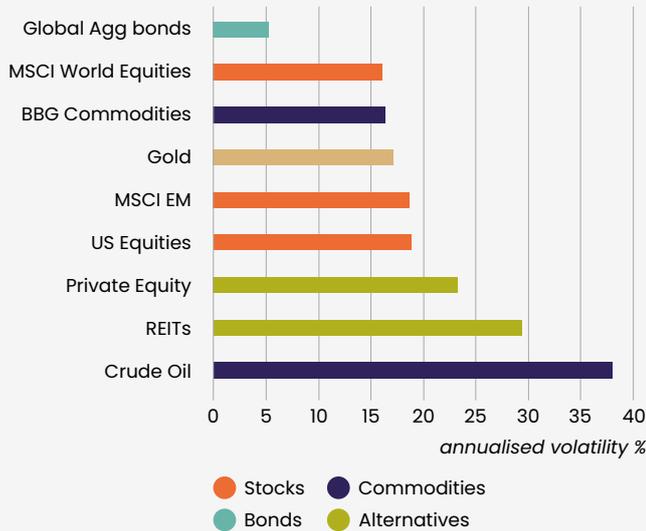
* Based on 10-year average annual net demand estimates ending in 2022. Includes: jewellery and technology net of recycling, in addition to bars & coins, ETFs and central bank demand which are historically reported on a net basis. It excludes over-the-counter demand owing to limitations in data availability.

** Net jewellery and technology demand computed assuming 90% of annual recycling comes from jewellery and 10% from technology.

Source: Metals Focus, Refinitiv GFMS, World Gold Council

Chart 2: Gold has been less volatile than many equity indices, alternatives and commodities because of its scale, liquidity and diverse sources of demand

Average daily volatility of several major assets since 2002*

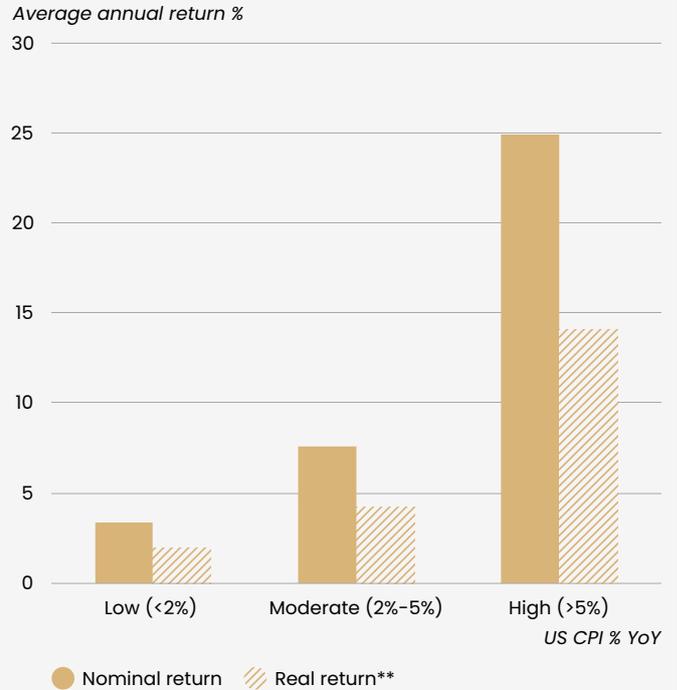


*Annualised volatility is computed based on daily returns in US dollars between 31 December 2002 and 31 December 2022. Indices used: Bloomberg Global Aggregate Bond Index, MSCI Daily Gross World Index; MSCI Daily Gross EM; MSCI USA Index; LBMA Gold Price PM, Bloomberg Commodity Index, Bloomberg WTI Crude Oil; S&P Listed Private Equity Index; FTSE Nareit Equity REITs Index USD.

Source: Bloomberg, COMEX, ICE Benchmark Administration, World Gold Council

Chart 3: Gold historically rallies in periods of high inflation

Gold nominal and real returns in US dollars as a function of annual inflation*



*As of 31 December 2022. Based on y-o-y changes in US dollars for 'gold': LBMA Gold Price PM and 'inflation': US CPI since January 1971

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

Moreover, the diversity of its sources of demand, help to make gold a less volatile asset than some equity indices, other commodities or alternatives (Chart 2).

Beating inflation, combating deflation

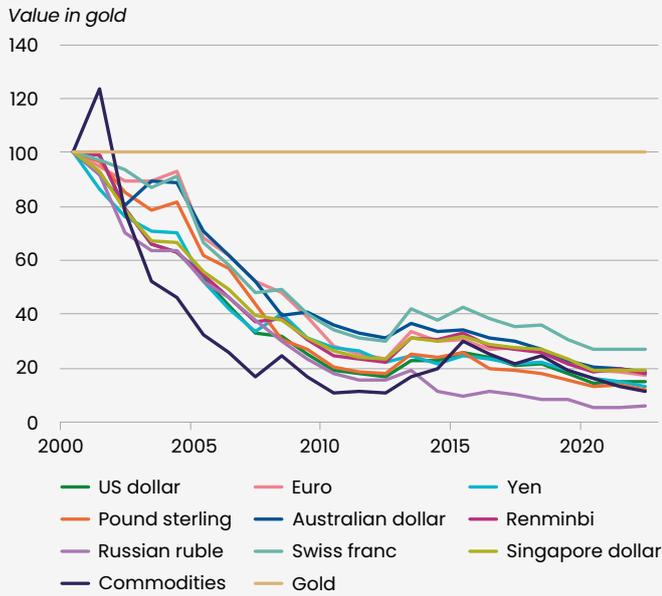
Gold has long been considered a hedge against inflation and the data confirms this: since 1971, it has outpaced the US and world consumer price indices (CPI). Gold also protects investors against high inflation.

In years when inflation was between 2%-5%, gold's price increased 8% per year on average. This number increased significantly with even higher inflation levels (Chart 3). Over the long term, therefore, gold has not just preserved capital but also helped it grow.

Our research also shows that gold should do well in periods of deflation. Such periods are characterised by low interest rates, reduced consumption and investment, and financial stress, all of which tend to foster gold demand.

Chart 4: The purchasing power of major currencies and commodities has significantly eroded relative to gold

Value of currencies and broad commodities relative to gold (January 2000 = 100)*

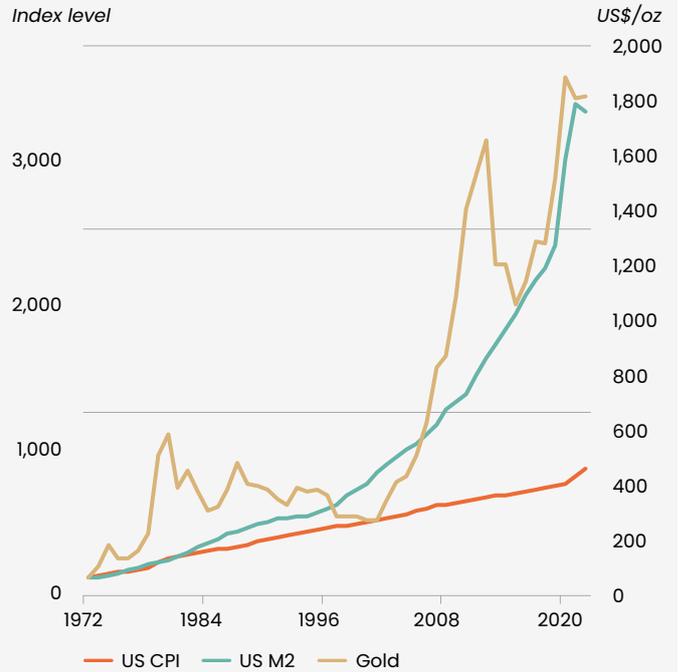


*As of 31 December 2022. Relative value between 'gold': LBMA Gold Price PM, 'commodities': Bloomberg Commodity Index, and major currencies since 2000. Value of commodities and currencies measured in ounces of gold and indexed to 100 in January 2000.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

Chart 5: Gold prices have tracked the expansion of US money supply

US M2 growth, US CPI and gold price*



*As of 31 December 2022. US CPI and US M2 were constructed using data from January 1972 and re-based to 100 on January 1972. Gold based on the LBMA Gold Price PM USD.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

Store of value

Historically, major currencies were pegged to gold. That changed with the unravelling of the US gold standard in 1971 and the eventual collapse of the Bretton Woods system. Since then, with few exceptions, gold has significantly outperformed all major currencies and commodities as a means of exchange. And although this outperformance was particularly marked immediately following the end of the gold standard, gold has clearly continued to outperform most major currencies in the more recent past (**Chart 4**). A key factor behind this robust performance is that gold mine production has grown slowly over time – increasing by approximately 1.7% per year over the past 20 years.

By contrast, fiat money can be printed in unlimited quantities to support monetary policy, as exemplified by the quantitative easing measures in the aftermath of the Global Financial Crisis (GFC) and the COVID-19 pandemic. In these crises, many investors turned to gold in order to hedge themselves against currency devaluation and preserve their purchasing power over time.

In fact, the rapidly increasing US money supply and the low-rate environment fostered an optimal environment for gold to perform well (**Chart 5**).

Diversification that works

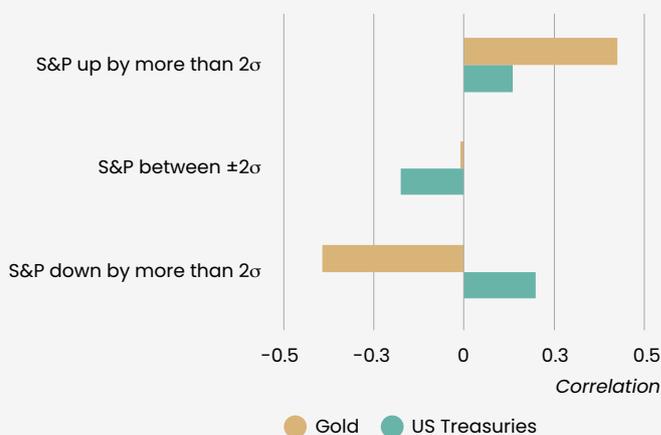
Effective diversifiers are sometimes hard to find. Many assets become increasingly correlated as market uncertainty rises and volatility is more pronounced, driven in part by risk-on/risk-off investment decisions. As a result, many so-called diversifiers fail to protect portfolios when investors need them most.

Gold is different in that its negative correlation to equities and other risk assets increases as these assets sell off (**Chart 6**). The GFC is a case in point. Equities and other risk assets tumbled in value, as did hedge funds, real estate, and most commodities, which were long deemed portfolio diversifiers. Gold, by contrast, held its own and increased in price, rising 21% in US dollars from December 2007 to February 2009. And in the most recent sharp equity market pullbacks of 2020 and 2022, gold's performance remained positive.

This robust performance is not surprising. With few exceptions, gold has been particularly effective during times of systemic risk, delivering positive returns and reducing overall portfolio losses (**Chart 7**).

Chart 6: Gold becomes more negatively correlated with stocks in extreme market selloffs

Correlation of US stocks versus gold and US stocks versus US treasuries in various environments of US equity market performance since 1994*

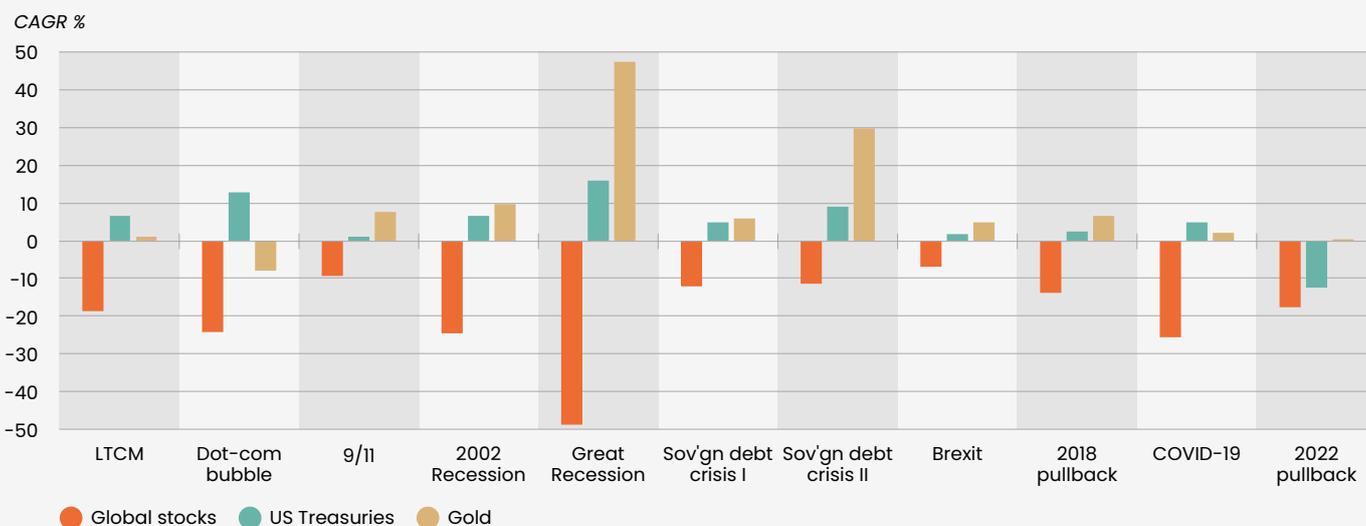


*As of 31 December 2022. Correlations based on weekly returns in US dollars for 'US equities': S&P 500 Index; 'US treasuries': Bloomberg Barclays US Treasury Index and 'gold' LBMA Gold Price PM since January 1994 due to US treasury availability of data. The top bar corresponds to the respective correlations when the S&P 500 weekly returns rise by more than two standard deviations. The middle bar corresponds to the respective correlations when the S&P 500 weekly returns are between two standard deviations (or 'σ'), while the bottom bar corresponds to the respective correlation when the S&P 500 weekly returns fall by more than two standard deviations. The standard deviation for the S&P 500 is calculated using weekly returns over the full period.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

Chart 7: The gold price tends to increase in periods of systemic risk

Global stocks, US treasuries and gold during various crises



*As of 31 December 2022. Return computations in US dollars for 'Global equities': FTSE All World Index; 'US treasuries': Bloomberg Barclays US Treasury Index; 'gold': LBMA Gold Price PM. 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; global financial crisis (GFC): 10/2007 - 2/2009; Sovereign debt crisis I: 1/2010 - 6/2010; Sovereign debt crisis II: 2/2011-10/2011; Brexit: 23/6/2016 - 27/6/2016; 2018 pullback: 10/2018 - 12/2018; 2020 pullback: 31/1/2020 - 31/3/2020; 2022 pullback: 1/2022 - 12/2022

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

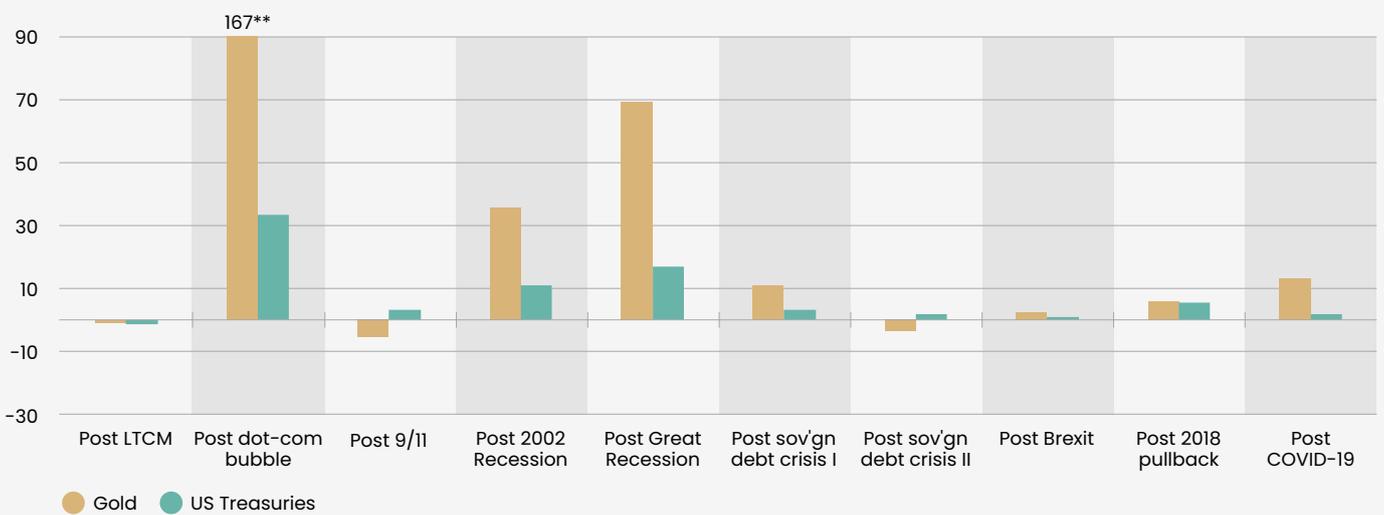
But gold’s correlation does not just work for investors during periods of turmoil. It can also deliver positive correlation with equities and other risk assets in positive markets, making gold a well-rounded efficient hedge (**Chart 8**).

Our analysis bears this out, showing that when equities rally strongly, their correlation to gold can increase. This is driven by a wealth-effect supporting gold consumer demand, as well as demand from investors seeking protection against higher inflation expectations.

This benefit arises from gold’s dual nature: as both an investment and a consumer good. As such, the long-term performance of gold is supported by income growth.

Chart 8: Gold performs well in the recovery periods following a systemic selloff

Performance of gold and treasuries from the market trough (bottom) to the market recovery point (stock market levels before the systemic selloff)



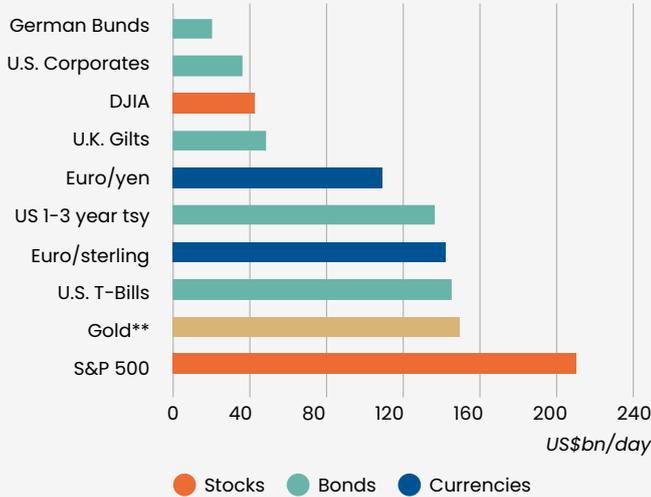
* As of 31 December 2022. Return computations in US dollars for 'US treasuries': Bloomberg Barclays US Treasury Index; 'gold': LBMA Gold Price PM. Dates used are based off the end dates of Chart 7. Post Black Monday: 11/1987 - 6/1989; Post LTCM: 8/1998 - 11/1998; Post dot-com: 3/2001 - 5/2007; Post 9/11: 9/2001-11/2001; Post 2002 recession: 7/2002 - 11/2004; Post GFC: 2/2009 - 1/2013; Post sovereign debt crisis I: 6/2010 - 10/2010; Post sovereign debt crisis II: 10/2011 - 2/2012; Post Brexit: 6/2016 - 7/2016; Post 2018 pullback: 12/2018 - 6/2019; Post 2020 pullback: 3/2020 - 7/2020.

** The bar is truncated for the Dot-com bubble recovery due to its extreme differential between others and visibility

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

Chart 9: Gold trades more than many other major financial assets

Average daily trading volumes over the last 5 years in US dollars*



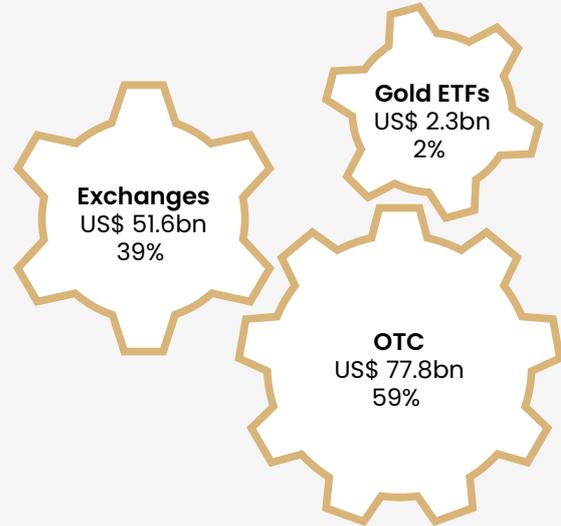
* Based on estimated average daily trading volumes from 31 December 2017 to 31 Dec 2022, except for currencies that correspond to April 2019 to April 2022 volumes due to data availability. Fixed income trading volumes include primary dealer statistics only due to data availability.

** Gold liquidity includes estimates on OTC transactions and published statistics on futures exchanges, and gold-backed exchange-traded products.

Source: Bloomberg, Bank for International Settlements, UK Debt Management Office (DMO), Germany Finance Agency, Japan Securities Dealers Association, Nasdaq, World Gold Council

Chart 10: Gold is liquid across key investment platforms

Average daily trading volume by point of access in 2022*



*Average daily trading volume from 1 January 2022 to 31 December 2022. Gold liquidity includes estimates of OTC transactions and published statistics on futures exchanges, and gold-backed exchange-traded products.

Source: Bloomberg, Nasdaq, World Gold Council

A deep and liquid market

The gold market is large, global, and highly liquid. We estimate that physical gold holdings by investors and central banks are worth approximately US\$4.8 trillion (trn), with an additional US\$1.0trn in open interest through derivatives traded on exchanges or the over-the-counter (OTC) market.

The gold market is also more liquid than several major financial markets, including euro/yen and the Dow Jones Industrial Average, while trading volumes are similar to those of US 1-3 year treasuries and US T-Bills

among primary dealers ([Chart 9](#)). Gold’s trading volumes averaged approximately US\$132bn per day in 2022. During that period, OTC spot and derivatives contracts accounted for US\$78 billion (bn) and gold futures traded US\$52bn per day across various global exchanges. Physically-backed gold ETFs (gold ETFs) offer an added source of liquidity, with global gold ETFs trading an average of US\$2.3bn per day ([Chart 10](#)).

The scale and depth of the market means that it can comfortably accommodate large, buy-and-hold institutional investors. In stark contrast to many financial markets, gold’s liquidity does not dry up, even at times of financial stress. Importantly too, gold allows investors to meet liabilities when less liquid assets in their portfolio are difficult to sell, or mispriced.

Portfolio impact

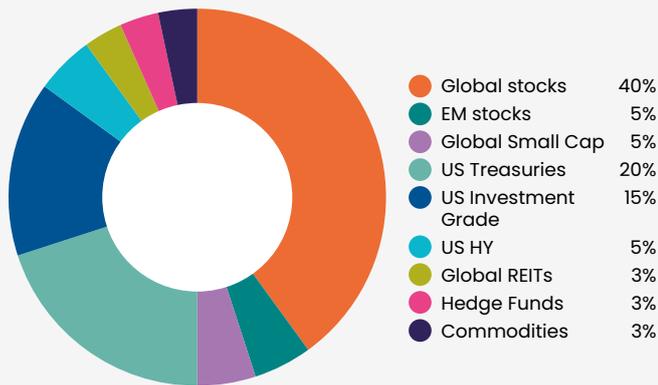
Risk/reward profile

Long-term returns, liquidity and effective diversification all benefit overall portfolio performance. In combination, they suggest that the addition of gold can materially enhance a portfolio's risk-adjusted returns.

Our analysis of investment performance over the past 3, 5, 10 and 20 years emphasises gold's positive impact on an institutional portfolio ([Chart 11](#)).

Chart 11: Hypothetical Portfolio

Asset allocation: 50% stocks, 40% fixed income, 10% alternatives



* As of 31 December 2022

Source: World Gold Council

Chart 12: Adding gold over the past 20 years would have increased risk-adjusted returns of a hypothetical USD portfolio

Performance of a hypothetical USD portfolio with and without gold*

Risk adjustment returns



* Based on US dollar performance between 31 December 2002 and 31 December 2022.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

It shows that an average USD portfolio would have achieved higher risk-adjusted returns and lower drawdowns if 2.5%, 5%, 7.5% or 10% were allocated to gold ([Chart 12](#) and [Table 1](#)).

Table 1: Gold has increased risk-adjusted returns while reducing portfolio volatility and maximum drawdowns

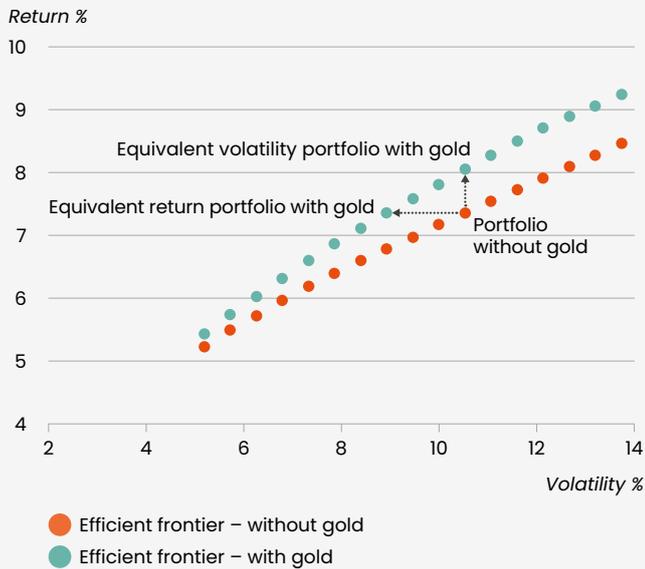
Comparison of an average hypothetical USD portfolio and an equivalent portfolio with 5% gold over the past 3, 5, 10 and 20 years based on US-dollar returns*

	3-year		5-year		10-year		20-year	
	No gold	5% gold						
Annualised returns	2.3%	2.5%	3.7%	3.9%	5.3%	5.1%	6.8%	6.9%
Annualised volatility	13.2%	12.7%	11.3%	10.9%	9.0%	8.7%	9.7%	9.5%
Reward to risk	17.3%	20.0%	33.0%	36.4%	58.6%	58.9%	69.4%	73.0%
Maximum drawdown	-19.9%	-19.3%	-19.9%	-19.3%	-19.9%	-19.3%	-35.3%	-33.0%

*As of 31 December 2022 Source: Bloomberg, ICE Benchmark Administration, World Gold Council

Chart 13: Gold could significantly improve risk-adjusted portfolio returns across various levels of risk

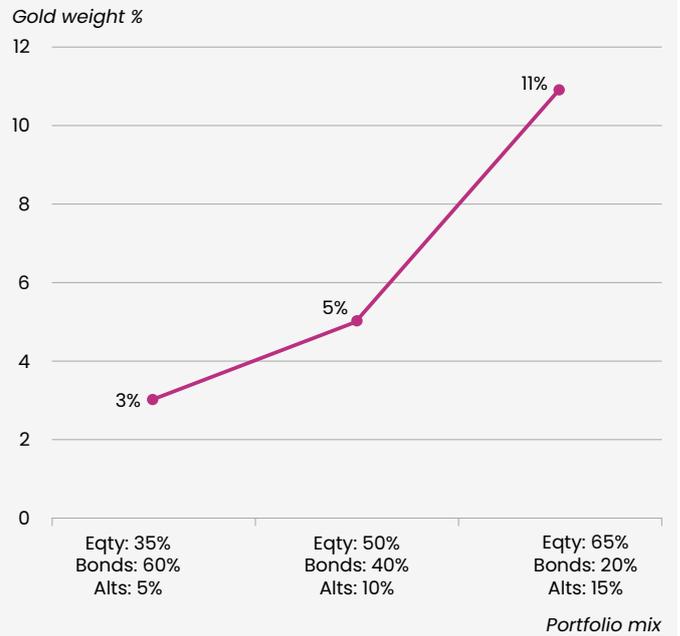
Efficient frontier of a hypothetical average USD portfolio



* As of 31 December 2022

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

Chart 14: The gold allocation that could deliver the maximum risk-adjusted return for each hypothetical portfolio mix



* As of 31 December 2022

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

In addition to a traditional historical simulation, a mean variance optimisation analysis suggests that an allocation to gold may result in a material enhancement to portfolio risk-adjusted returns by shifting the efficient frontier upwards. For example, a portfolio with gold could deliver higher return for the same level of risk, or the same return for a lower level of risk (**Chart 13**).

The 'optimal' amount of gold varies according to individual asset allocation decisions. Broadly speaking, the analysis suggests that the higher the risk in the portfolio – whether in terms of volatility or concentration of assets – the larger the required allocation to gold, within the range in consideration, to offset that risk (**Chart 14**).

Gold's ESG credentials and contributions

While gold mining is, by definition, an extractive industry, responsible gold miners follow stringent frameworks to mitigate environmental impact and reduce risks. In fact, the social and economic contribution of the gold mining industry plays a key role in the communities and host countries in which it operates. It does so through the payment of wages and taxes, supporting local economic development, improving infrastructure, and providing access to healthcare and schooling, and much more. The majority of this expenditure remains in the local economies of host nations and communities, as documented recently in our measurement of the social and economic contribution of gold mining. The industry is also committed to contributing to the advancement of the UN Sustainable Development Goals.

In addition, gold also has a potential role to play in reducing investor exposure to climate-related risks. In fact, gold's lack of downstream emissions has important implications, as gold holdings can reduce the overall carbon intensity of the portfolio value. And the positive outlook for future decarbonisation of the gold value chain has potential benefits for the projected carbon profile, 'implied temperature' and climate target alignment of portfolio holdings.

Our analysis suggests that gold has the potential to perform better than many mainstream asset classes under various long-term climate scenarios, particularly if climate impacts create or exacerbate market volatility or we experience a disruptive transition to a net zero carbon economy. Furthermore, gold's value is less likely to be negatively impacted by a rising carbon price, also offering investors a degree of insulation from the likely policy responses needed to accelerate the move to a decarbonised economy.

Potential risks and challenges

Given the risk/reward trade off associated with any investment, it's important to acknowledge and understand not only opportunities, but also key risks.

Non-standard valuation: Gold does not directly conform to the most common valuation methodologies used for equities or bonds. Without a coupon or dividend, typical models based on discounted cash flows, expected earnings, or book-to-value ratios struggle to provide an appropriate assessment for gold's underlying value. This presented an opportunity for the World Gold Council to develop a framework to better understand gold valuation.

Our gold valuation framework allows investors to understand the drivers of gold demand and supply and, based on market equilibrium, estimate their impact on price performance.

No cash flows: A well-documented perceived drawback of gold is that it does not provide any regular income whereas other asset classes, such as bonds, property or even equities, generate coupons, dividends and rents. This means that for investors to profit from gold, its price must increase. But in an era when other defensive assets like government bonds are providing low yield-to-maturities compared to history, gold's zero yield has not been a major disadvantage.

Price volatility: Gold is a great diversifier to a portfolio because it behaves so differently to equities and bonds, not because it has a low volatility. And while gold is a less volatile asset than some equity indices, other commodities or alternatives, in some years the metal has posted close to 30% gains (2010) and in other years it has posted close to 30% losses (2013). On balance however gold has an asymmetric correlation profile with equities; in other words, it does much better when equities fall than it does badly when equities rise.

Conclusion

Perceptions of gold have changed substantially over the past two decades, reflecting increased wealth in the East and a growing worldwide appreciation of gold's role within an institutional investment portfolio.

Gold's unique attributes as a scarce, highly liquid, and uncorrelated asset enable it to act as a diversifier over the long term. Gold's position as an investment and a luxury good has allowed it to deliver annualised returns of nearly 8% since 1971, comparable to equities and more than bonds and commodities.

Gold's traditional role as a safe-haven asset means it comes into its own during times of high risk. But its dual appeal as an investment and a consumer good means it can generate positive returns in good times too. This dynamic is likely to continue, reflecting ongoing political and economic uncertainty, and economic concerns surrounding equity and bond markets.

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Diversification does not guarantee any investment returns and does not eliminate the risk of loss. The resulting performance of various investment outcomes that can be generated through allocation to gold are hypothetical in nature, may not reflect actual investment results and are not guarantees of future results. WGC does not guarantee or warranty any calculations and models used in any hypothetical portfolios or any outcomes resulting from any such use. Investors should discuss their individual circumstances with their appropriate investment professionals before making any decision regarding any Services or investments.

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Information regarding QaurumSM and the Gold Valuation Framework

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