WORLD GOLD COUNCIL

The relevance of gold as a strategic asset
US edition

About the World Gold Council

The World Gold Council is the market development organisation for the gold industry. Our purpose is to stimulate and sustain demand for gold, provide industry leadership, and be the global authority on the gold market.

We develop gold-backed solutions, services and products, based on authoritative market insight, and we work with a range of partners to put our ideas into action. As a result, we create structural shifts in demand for gold across key market sectors. We provide insights into the international gold markets, helping people to understand the wealth preservation qualities of gold and its role in meeting the social and environmental needs of society.

Based in the UK, with operations in India, the Far East and the US, the World Gold Council is an association whose members comprise the world's leading gold mining companies.

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What makes gold a strategic asset?

Gold benefits from diverse sources of demand: as an investment, a reserve asset, a luxury good and a technology component. It is highly liquid, no one's liability, carries no credit risk, and is scarce, historically preserving its value over time.

Gold can enhance a portfolio in four key ways:

- generate long-term returns
- act as a diversifier and mitigate losses in times of market stress
- provide liquidity with no credit risk
- improve overall portfolio performance.

New decade, renewed challenges

As the new decade begins, investors face an expanding list of challenges around asset management and portfolio construction.Among these:

- Low interest rates, which may push investors to seek riskier assets at elevated valuation levels and, for US pension funds in particular, may increase the value of liabilities, possibly reducing their funding ratio
- Continued financial market uncertainty ranging from geopolitical tensions, to expectations of diverging global economic growth and an increase in asset volatility.

We believe that gold is not only a useful long-term strategic component for portfolios, but one that is increasingly relevant in the current environment (see *2020 Gold Outlook*).

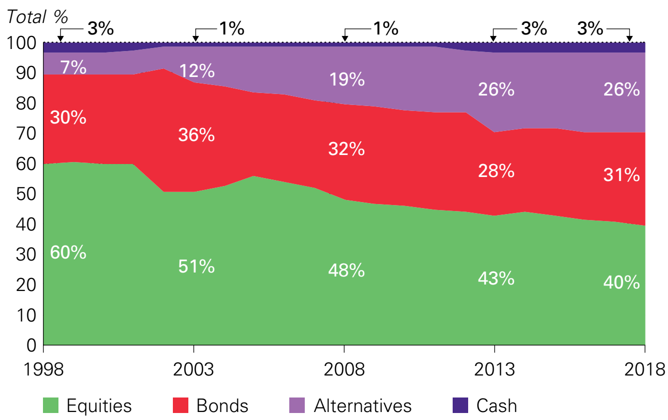
The increased relevance of gold

Institutional investors have embraced alternatives to traditional stocks and bonds in pursuit of diversification and higher risk-adjusted returns. The share of non-traditional assets among global pension funds increased from 7% in 1998 to 26% in 2018 – this is 30% in the US[2] (**Chart 1**).

> "Our analysis illustrates that adding between 2% and 10% in gold to a hypothetical US pension fund average portfolio over the past decade would have resulted in higher risk-adjusted returns.[1]"

Gold allocations have been recipients of this shift. It is increasingly recognised as a mainstream investment as global investment demand has grown by an average of 14% per year since 2001 and the gold price has increased by almost six-fold over the same period.[3]

Chart 1: Investors continue to add alternative investments, including gold, to their portfolios*



*As of December 2018.

Source: Willis Towers Watson, World Gold Council

1 See Chart 7 on page 6 for more details behind the composition of the hypothetical average US pension fund portfolio. In addition, refer to important disclaimers and disclosures at the end of this report.

2 Willis Towers Watson, *Global Pension Assets Study 2018*, February 2019 and *Global Alternatives Survey 2017*, July 2017.

3 As of 31 December 2019.

The principal factors behind this growth include:

- **Emerging market growth:** economic expansion – particularly in China and India – increased and diversified gold's consumer and investor base (**Chart 13**, p11 and **Chart 24**, p14)
- **Market access:** the launch of gold-backed ETFs in 2003 facilitated access to the gold market and materially bolstered interest in gold as a strategic investment, reduced total cost of ownership and increased efficiencies (**Chart 14**, p11)
- **Market risk:** the global financial crisis prompted a renewed focus on effective risk management and an appreciation of uncorrelated, highly liquid assets such as gold (**Chart 15**, p11). Today, trade tensions, the growth of populist politics and concerns about the economic and political outlook have encouraged investors to reexamine gold as a traditional hedge in times of turmoil (**Chart 25**, and **Chart 26**, p14)
- **Monetary policy:** persistently low interest rates reduce the opportunity cost of holding gold and highlight its attributes as a source of genuine, long-term returns, particularly when compared to historically high levels of global negative-yielding debt (**Chart 23** and **Table 2**, p13)
- **Central bank demand:** a surge of interest in gold among central banks across the world, commonly used in foreign reserves for safety and diversification, has encouraged other investors to consider gold's positive investment attributes (**Chart 16**, p11).

Gold's strategic role

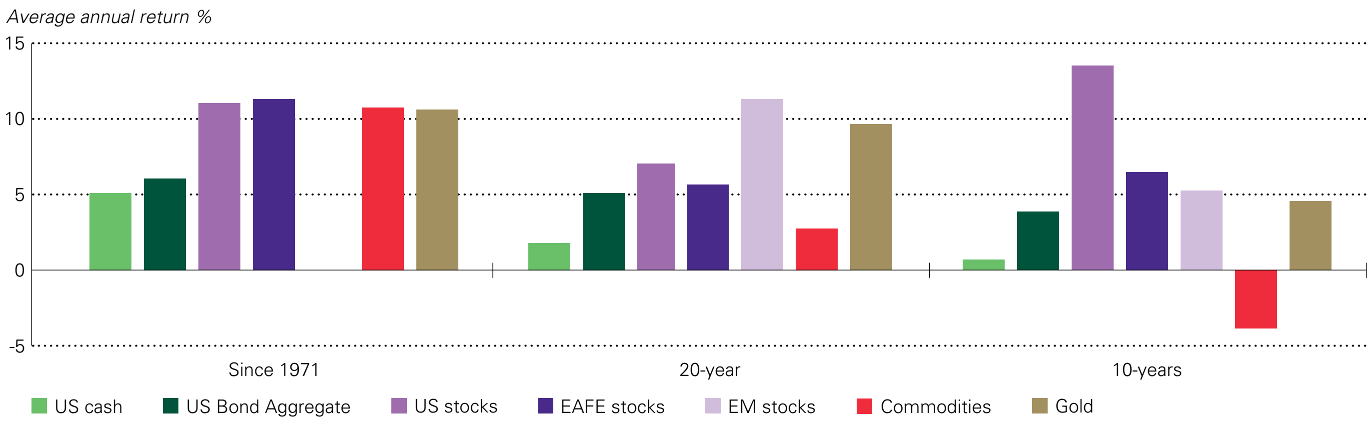
Gold is a clear complement to stocks, bonds and broad-based portfolios. A store of wealth and, a hedge against systemic risk, currency depreciation and inflation, gold has historically improved portfolios' risk-adjusted returns, delivered positive returns, and provided liquidity to meet liabilities in times of market stress.

1. A source of returns

Gold is long considered a beneficial asset during periods of uncertainty. Historically, it generated long-term positive returns in both good times and bad. Looking back almost half a century, the price of gold has increased by an average of 10% per year since 1971 when the gold standard collapsed.[4] Over this period, gold's long-term return was comparable to stocks and higher than bonds.[5] Gold has also outperformed other major asset classes over the past two decades (**Chart 2** and **Chart 17**, p12).

Gold is used to protect and enhance wealth over the long-term and it operates as a means of exchange, because it has global recognition and is no one's liability. Gold is also in demand as a luxury good, valued by consumers across the world. And it is a key component in electronics.[6] These diverse sources of demand give gold a particular resilience: a dual-nature with the potential to deliver solid returns in good times and in bad (**Focus 1**).

Chart 2: Gold has delivered positive returns over the long run, outperforming key asset classes
Average annual return of key global assets in US dollars*



*As of 31 December 2019. Computations in US dollars of total return indices for ICE 3-month Treasury, Bloomberg Barclays US Bond Aggregate, MSCI US, EAFE and EM indices, Bloomberg Commodity Index and spot for LBMA Gold Price PM. For compounded annual growth rates see Appendix **Chart 17**.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

4 During the gold standard, the US dollar was backed by gold and the foreign currency exchange rates were dictated by the Bretton Woods System: https://www.imf.org/external/about/histend.htm

5 For other return metrics and y-o-y performance see Appendix.

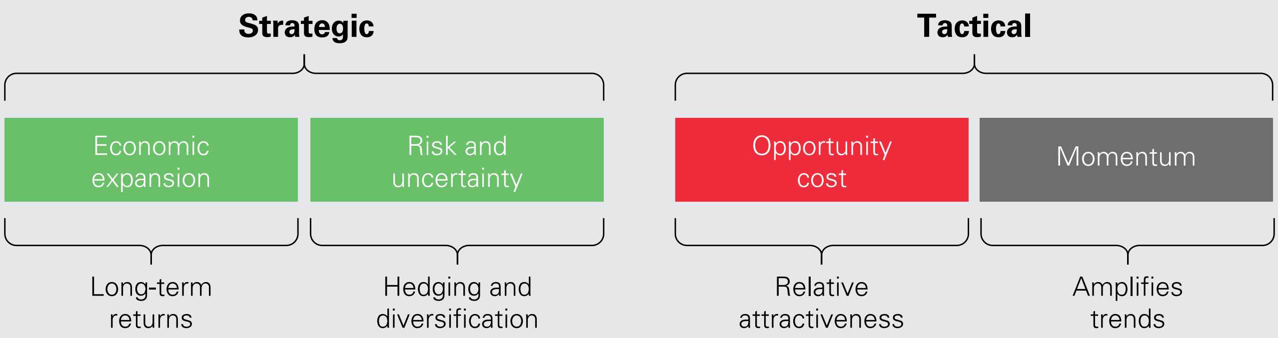
6 See Chart 11 on p10.

Focus 1: Understanding gold valuation

Gold does not conform to most of the common valuation frameworks used for stocks or bonds. Without a coupon or dividend, typical discounted cash flow models fail. And there are no expected earnings or book-to-value ratios either.

Our research shows that, in fact, valuing gold is intuitive: its equilibrium price is determined by the intersection of demand and supply which we highlight with ***Qaurum***.[SM 7]

- **Economic expansion:** periods of growth are very supportive of jewellery, technology and long-term savings
- **Risk and uncertainty:** market downturns often boost investment demand for gold as a safe haven
- **Opportunity cost:** the price of competing assets, especially bonds (through interest rates) and currencies, influence investor attitudes towards gold
- **Momentum:** capital flows, positioning and price trends can ignite or dampen gold's performance.



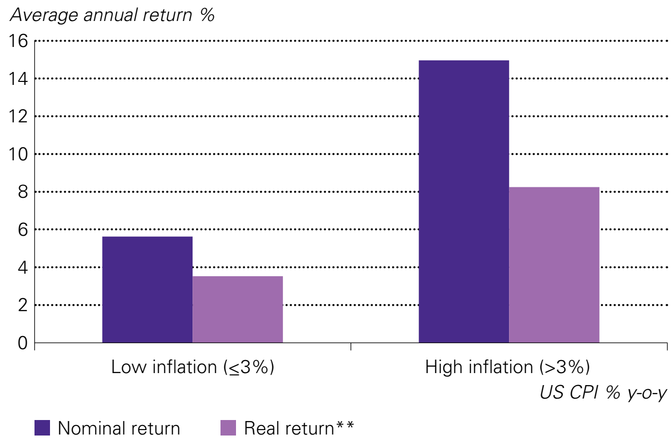
Beating inflation, combating deflation

Gold is long considered a hedge against inflation and the data confirms this. Its average annual return of 10% over the past 49 years – following the end of the Gold Standard – has outpaced the US consumer price index (CPI).

Gold also protects investors against extreme inflation. In years when inflation was higher than 3% gold's price increased 15% on average (**Chart 3**). Over the long-term, therefore, gold has not just preserved capital but helped it grow.

Notably too, research by Oxford Economics shows that gold should do well in periods of deflation.[8] Such periods are characterised by low interest rates, reduced consumption and investment, and financial stress, all of which tend to foster demand for gold.

Chart 3: Gold has historically rallied in periods of high inflation
Gold returns in US dollars as a function of annual inflation*



* Based on y-o-y changes of the LBMA Gold Price and US CPI between 1971 and 2019.
** For each year on the sample, real return = (1+nominal return)/(1+inflation)-1.
Source: Bloomberg, ICE Benchmark Administration, World Gold Council

7 Qaurum is a web-based quantitative tool that helps investors intuitively understand the drivers of gold's performance that can be explained by four broad sets of drivers.

8 Oxford Economics, *The impact of inflation and deflation on the case for gold*, July 2011.

Outperforming fiat currencies

Investor demand has been boosted by persistently low interest rates and concerns about the outlook for the dollar, as these factors affect the perceived opportunity cost of holding gold.

Historically, major currencies were pegged to gold. That changed with the collapse of Bretton Woods in 1971. Since then, gold has significantly outperformed all major currencies as a means of exchange (**Chart 4**). This outperformance was particularly marked immediately after the end of the Gold Standard and, subsequently, when major economies defaulted. A key factor behind this robust performance is that the supply growth of gold has changed little over time – increasing by approximately 1.6% per year over the past 20 years.[9] By contrast, fiat money can be printed in unlimited quantities to support monetary policy, as exemplified by the Quantitative Easing (QE) measures in the aftermath of the global financial crisis.

2. Diversification that works

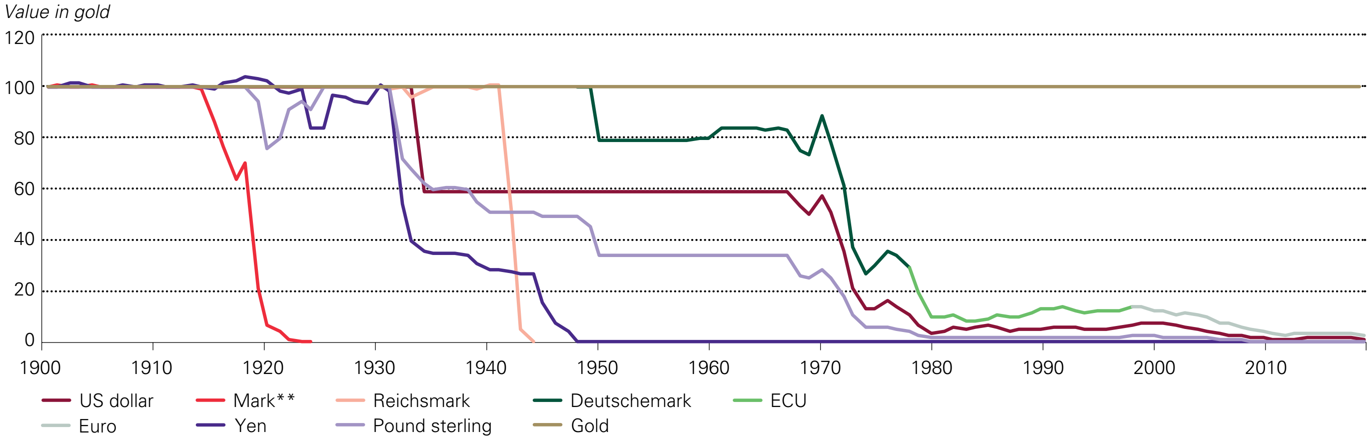
The benefits of diversification are widely acknowledged – but effective diversifiers are hard to find. Many assets are increasingly correlated as market uncertainty rises and volatility is more pronounced, driven in part by risk-on/risk-off investment decisions. As a result, many so-called diversifiers fail to protect portfolios when investors need them most.

Gold is different, in that its negative correlation to stocks and other risk assets increases as these assets sell off (**Chart 26**, p14). The 2008-2009 financial crisis is a case in point. Stocks 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 51% from December 2008 to December 2009.[10]

This robust performance is perhaps not surprising.

Gold has consistently benefited from "flight-to-quality" inflows during periods of heightened risk. It is particularly effective during times of systemic risk, delivering positive returns and reducing overall portfolio losses (**Chart 25**, p14) Importantly too, gold allows investors to meet liabilities when less liquid assets in their portfolio are difficult to sell, undervalued and possibly mispriced.

Chart 4: Gold has outperformed all major fiat currencies over time
Relative value between major currencies and gold since 1900*



*As of 31 December 2019. Based on the annual average price of a currency relative to the gold price.
**The 'Mark' was the currency of the late German Empire. It was originally known as the Goldmark and backed by gold until 1914. It was known as the Papermark thereafter.

Source: Bloomberg, Harold Marcuse – UC Santa Barbara, World Gold Council

9 See the demand and supply section at Goldhub.com

10 Based on the LBMA Gold Price PM fix from 1 December 2008 to 30 November 2009.

But gold's correlation does not just work for investors during periods of turmoil. It can also deliver positive correlation with stocks and other risk assets in positive markets.

This dual benefit arises from gold's dual nature: as an investment and a luxury good. As such, the long-term price of gold is supported by income growth. Our analysis bears this out, showing that when stocks rally strongly, their correlation to gold can increase (**Chart 5**), likely driven by a wealth-effect supporting gold consumer demand as well as demand from investors seeking protection against higher inflation expectations.

3. A deep and liquid market

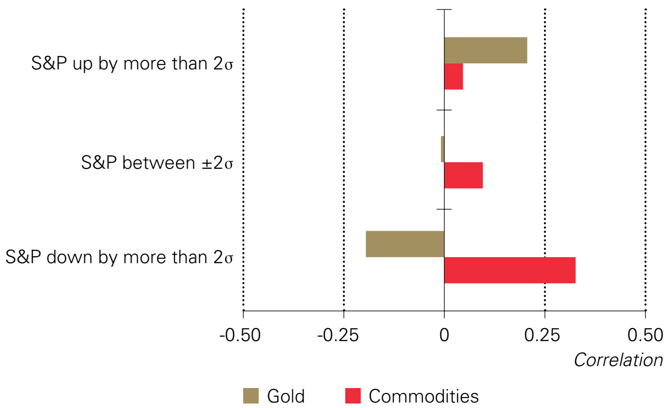
The gold market is large, global and highly liquid.

We estimate that physical gold holdings by investors and central banks are worth approximately US$3.7 trillion (trn), with an additional US$900 billion (bn) in open interest through derivatives traded on exchanges or the over-the-counter market.[11]

The gold market is also more liquid than several major financial markets, including German Bunds, euro/Yen and the Dow Jones Industrial Average, while trading volumes are similar to the S&P 500 (**Chart 6**). Gold's trading volumes averaged US$145bn per day in 2019. During that period, over-the-counter spot and derivatives contracts accounted for US$78bn and gold futures traded US$65bn per day across various global exchanges. Gold-backed ETFs offer an additional source of liquidity, with the largest US-listed funds trading an average of US$2bn per day.

The scale and depth of the market mean 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 acute financial stress.

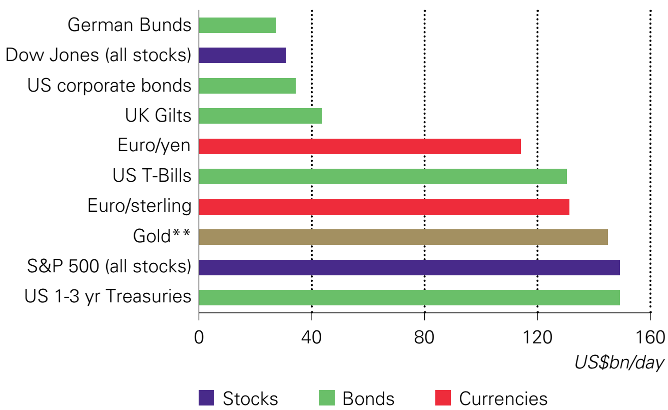
Chart 5: Gold's correlation with stocks helps portfolio diversification in good and bad economic times
Correlation between gold and US stock returns in various environments of stocks' performance*



*As of 31 December 2019. Correlations computed using weekly returns based on the Bloomberg Commodity Index and the LBMA Gold Price PM since January 1971. The middle bar corresponds to the unconditional correlation over the full period. The bottom bar corresponds to the correlation conditional on S&P 500 weekly return falling by more than two standard deviations (or 'σ') respectively, while the top bar corresponds to the S&P 500 weekly return increasing by more than two standard deviations. The standard deviation is based on the same weekly returns over the full period.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

Chart 6: Gold trades more than many other major financial assets
Average daily trading volumes in US dollars*



*Based on estimated one-year average trading volumes as of 31 December 2019, except for currencies that correspond to March 2019 volumes due to data availability.
**Gold liquidity includes estimates on over-the-counter (OTC) transactions and published statistics on futures exchanges, and gold-backed exchange-traded products. For methodology details visit the liquidity section at Goldhub.com

Source: BIS, Bloomberg, German Finance Agency, Japan Securities Dealers Association, LBMA, UK Debt Management Office (DMO), World Gold Council

11 See Chart 10 and Figure 1 on p9 as well as the holders and trends section at Goldhub.com

4. Enhanced portfolio performance

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

Our analysis of investment performance over the past five, 10 and 20 years underlines gold's positive impact on an institutional portfolio. It shows that the average US pension fund would have achieved higher risk-adjusted returns if 2.5%, 5% or 10% of the portfolio were allocated to gold. (**Chart 7** and **Table 1**). The positive impact has been particularly marked since the global financial crisis.

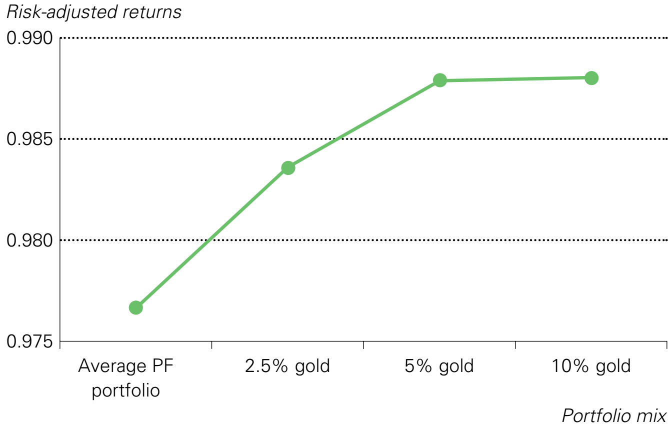
Looking to the future, stronger dynamics apply. Our analysis shows that US dollar-based investors can benefit from a material enhancement in performance if they allocate between 2% and 10% of a well-diversified portfolio to gold (**Chart 8**).

The amount of gold varies according to individual asset allocation decisions. Broadly speaking however, the higher the risk in the portfolio – whether in terms of volatility, illiquidity or concentration of assets – the larger the required allocation to gold, within the range in consideration, to offset that risk (**Chart 8**).[12]

Our analysis indicates that gold's optimal weight in hypothetical portfolios is statistically significant even if investors assume an annual return for gold of between 2% and 4% – well below its actual long-term historical performance.

This works equally for investors who already hold other inflation-hedging assets, such as inflation-linked bonds,[13] and for investors who hold alternative assets, such as real estate, private equity and hedge funds.[14]

Chart 7: Adding gold over the past decade would have increased risk-adjusted returns of a hypothetical average pension fund portfolio
Performance of a hypothetical average pension fund (PF) portfolio with and without gold*



*Based on performance between 31 December 2009 and 31 December 2019. The hypothetical average US pension fund portfolio is based on Willis Tower Watson Global Pension Assets Study 2019 and Global Alternatives Survey 2017. It includes annually-rebalanced total returns of a 42% allocation to stocks (27% MSCI USA Net Total Return, 15% MSCI ACWI ex US), 27% allocation to fixed income (21% Barclays US Aggregate, 3% Barclays Global Aggregate ex US, 1% JPMorgan EM Global Bond Index and 3% short-term Treasuries), and 30% alternative assets (13% FTSE REITs Index, 8% HFRI Hedge Fund Index, 8% S&P Private Equity Index and 1% Bloomberg Commodity Index). The allocation to gold comes from proportionally reducing all assets. Risk-adjusted returns are calculated as the annualised return/annualised volatility. See important disclaimers and disclosures at the end of this report.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

Table 1: Gold increases risk-adjusted returns by reducing portfolio volatility and drawdowns across various time horizons
Comparison of an average hypothetical pension portfolio and an equivalent portfolio with 5% gold over the past one, five, ten and twenty years*

	20-year		10-year		5-year		1-year	
	No gold	*5% gold*	*No gold*	*5% gold*	*No gold*	*5% gold*	*No gold*	*5% gold*
Annualised return	6.4%	**6.5%**	**8.4%**	8.2%	**7.0%**	6.9%	**21.7%**	21.5%
Annualised volatility	10.0%	**9.7%**	8.6%	**8.3%**	7.4%	**7.1%**	7.4%	**7.2%**
Risk-adjusted returns	62.8%	**67.1%**	97.7%	**98.8%**	94.6%	**97.9%**	293.8%	**298.7%**
Maximum drawdown	-42.4%	**-39.8%**	-12.7%	**-11.8%**	-8.2%	**-7.5%**	-2.5%	**-2.3%**

*As of 31 December 2019. The average hypothetical portfolio is based on Willis Towers Watson *Global Pension Assets Study 2019* and *Global Alternatives Survey 2017* and as described on **Chart 7.**

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

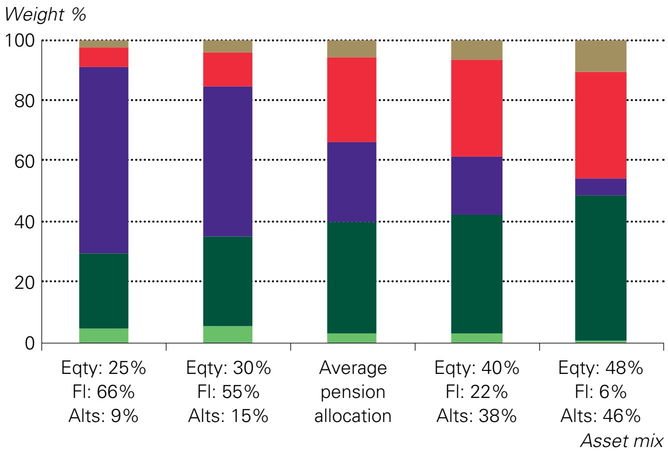
12 Analysis based on the re-sampled efficiency methodology developed by Richard and Robert Michaud and praised as a robust alternative to traditional mean-variance optimisation. See *Efficient Asset Management: A Practical Guide to Stock Portfolio Optimization and Asset Allocation*, Oxford University Press, January 2008.

13 *Gold as a tactical inflation hedge and long-term strategic asset*, July 2009.

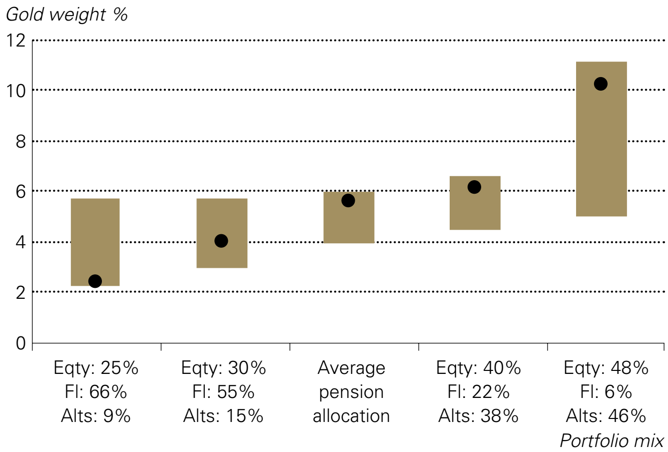
14 *How gold improves alternative asset performance*, *Gold Investor*, Volume 6, June 2014.

Chart 8: Gold can significantly improve risk-adjusted returns of hypothetical portfolios across various levels of risk

(a) Long-run optimal allocations based on asset mix*



(b) Range of gold allocations and the allocation that delivers the maximum risk-adjusted return for each hypothetical portfolio mix*



*Based on monthly total returns from January 1990 to December 2019 of ICE 3-month Treasury, Bloomberg Barclays US Bond Aggregate, Bloomberg Barclays Global Bond Aggregate ex US, MSCI US, EAFE and EM indices, FTSE Nareit Equity REITs Index, Bloomberg Commodity Index and spot returns of LBMA Gold Price PM. Each hypothetical portfolio composition is roughly equivalent to the portfolio in **Chart 7**. That portfolio reflectsreflects a percentage in stock (Eqty), alternative assets (Alts), cash and bonds (FI). For example: 'Average pension allocation' is a portfolio with 42% in stocks, 30% in REITs, hedge funds, private equity and commodities, and 28% in cash and bonds. Analysis based on New Frontier Advisors Resampled Efficiency. For more information see *Efficient Asset Management: A Practical Guide to Stock Portfolio Optimization and Asset Allocation, Oxford University Press,* January 2008. See important disclaimers and disclosures at the end of this report.

Source: World Gold Council

Focus 2: Gold goes beyond commodities

Gold is often considered part of the broad commodity complex, whether as a component of a commodity index (e.g. S&P GSCI Index, Bloomberg Commodity Index), a security in an ETF or a future trading on a commodity exchange.

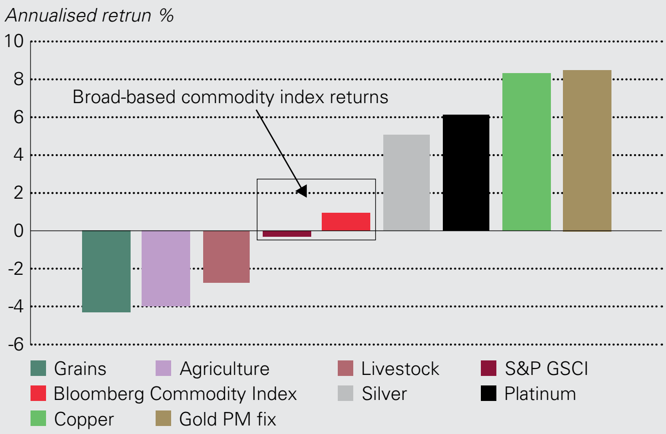
Gold shares some similarities with commodities. But there are several important differences:

- gold is a traditional safe-haven asset: scarce, yet highly liquid, it offers effective downside portfolio protection during difficult times
- gold is both an investment and a luxury good, which reduces its correlation to other assets
- the supply of gold is balanced, deep and broad, limiting uncertainty and volatility
- gold does not degrade over time, unlike several traditional commodities.

These unique attributes set gold apart from the commodity complex. And our research suggests that a distinct allocation to gold can enhance the performance of portfolios with passive commodity exposures.[15]

Chart 9: Gold has outperformed all broad-based indices and all individual commodities

20-year commodity and commodity index returns



Annualised returns from December 1999 to December 2019. Indices include: S&P GS Energy Index, S&P GS Precious Metals Index, S&P GS Industrial Metals Index, S&P GS Non-Precious Metals Index, Gold (US$/oz) London PM fix.

Source: Bloomberg, World Gold Council

15 See: *Gold: the most effective commodity investment*, September 2019, and *Gold: metal by design, currency by nature*, *Gold Investor*, Volume 6, June 2014.

Conclusion

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

Gold's unique attributes as a scarce, highly liquid and un-correlated asset highlight that it can act as a genuine diversifier over the long term.

Gold's position as an investment and a luxury good has allowed it to deliver average returns of approximately 10% over nearly the past 50 years, comparable to stocks and more than bonds and commodities.[16]

Gold's traditional role as a safe-haven asset means it comes into its own during times of high risk. But gold's dual appeal as an investment and a consumer good means it can generate positive returns in good times too.

This dynamic is likely to persist, reflecting persistent political and economic uncertainty, persistently low interest rates and economic concerns surrounding stock and bond markets (see ***2020 Gold Outlook***).

Overall, extensive analysis suggests that adding between 2% and 10% of gold to a US-dollar based portfolio will make a tangible improvement to performance and boost risk-adjusted returns on a sustainable, long-term basis.[17]

16 See Chart 2 p2.

17 See Chart 7 p6.

Composition and trends of gold demand and supply

A large yet scarce market

The gold market has two attractive features for investors. Gold's scarcity supports its long-term appeal. But gold's market size is large enough to make it relevant for a wide variety of institutional investors – including central banks.

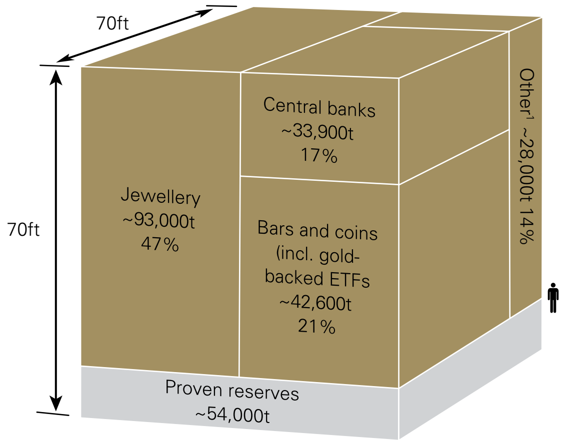
There are approximately 197,576 tonnes (t) of gold above ground, worth more than US$9.6trn (**Figure 1**).[18] Mine production adds approximately 3,500t per year, equivalent to an annual 1.8% increment.[19]

The approximate breakdown of physical gold,[20] based on its use, is:

- **Jewellery:** 92,947t (US$4.5trn) 47%
- **Official sector:** 33,919t (US$1.7trn) 17%
- **Bars and coins:** 39,722t (US$1.9trn) 20%
- **ETFs and similar:** 2,885t (US$143bn) 1%
- **Other and unaccounted:** 28,090t (US$1.3trn) 14%

The financial gold market is made up of bars, coins, gold-backed ETFs and central bank reserves. This segment of the gold market compares favourably to the size of major financial markets (**Chart 10**).

Figure 1: Gold supply fits in 2.6 Olympic swimming pools*



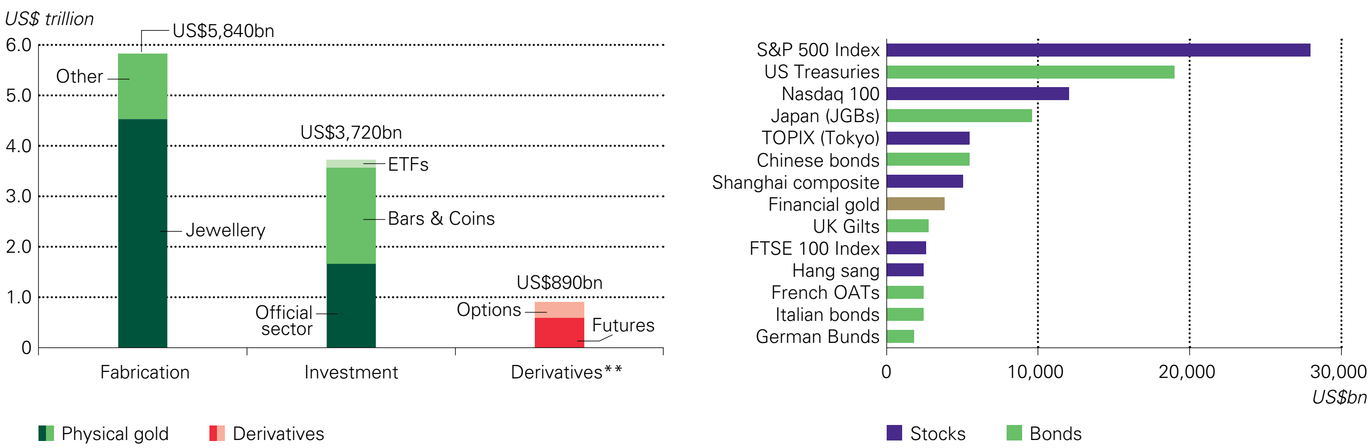
*Based 2019 above ground estimates and the standard Olympic swimming pool dimensions of (length = 164ft, width = 82ft, depth = 9ft).
[1]Includes "other fabrication" (12%) and "unaccounted for" (2%).

Source: Metals Focus, Refinitiv GFMS, US Geological Survey, World Gold Council

Chart 10: The size of the financial gold market is large compared to many global assets, and dwarfs known open interest in gold derivatives*

(a) Value of above-ground gold and gold derivatives

(b) Market size of major global financial assets



* As of 31 December 2019.
**Represents open interest in COMEX, TOCOM and over-the-counter (OTC) transactions.

Source: Bank for International Settlements, Bloomberg, ETF company filings, ICE Benchmark Administration, Metals Focus, World Gold Council

18 Based on the December 2019 LBMA Gold Price and 2019 above-ground estimates by Metals Focus, Refinitiv GFMS and the World Gold Council.

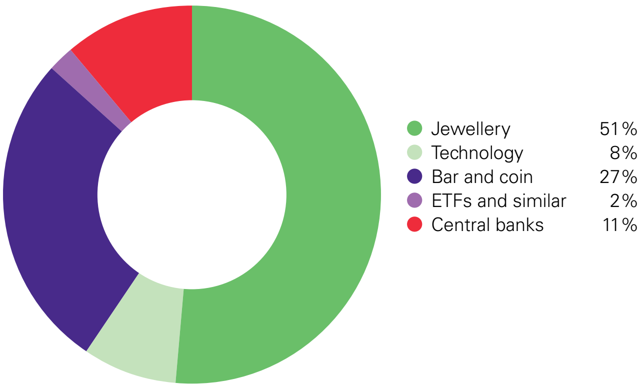
19 Based on Metals Focus and Refinitiv GFMS 10-year mine production average as a percentage of above ground stocks, as of December 2019.

20 Ibid 21.

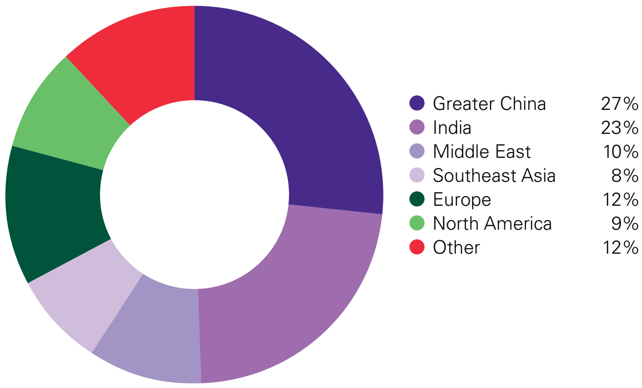
Demand diversity underpins gold's low correlations

Chart 11: Gold is bought around the world for multiple purposes – as a luxury good, a component in high-end electronics, a safe-haven investment or a portfolio diversifier

(a) 10-year average gold demand by source*



(b) 10-year average gold demand by region*



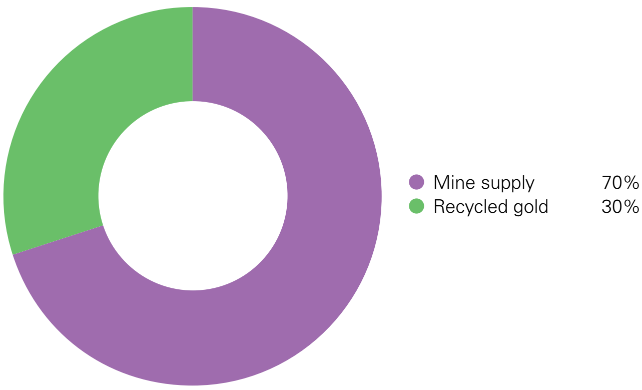
*Computed using annual demand from 2010 to 2019. Regional breakdown excludes central bank demand due to data availability.

Source: ETF company filings, Refinitiv GFMS, Metals Focus, World Gold Council

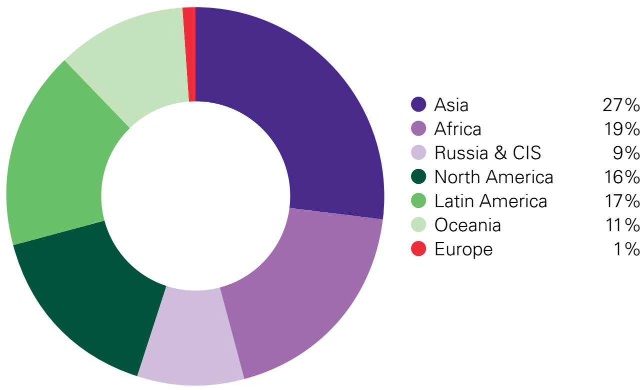
Fewer supply side shocks help reduce gold's volatility

Chart 12: Gold supply is a combination of mined and recycled gold; mine production is evenly spread across continents, contributing to gold's low volatility relative to commodities

(a) 10-year average gold supply by source*



(b) 10-year average gold-mine production by region**



*Computed using annual demand from 2010 to 2019.
**Computed using annual demand from 2009 to 2018. Regional breakdown excludes central bank demand due to data availability.

Source: ETF company filings, Refinitiv GFMS, Metals Focus, World Gold Council

Three trends have reshaped gold demand

Consumer demand is fuelled by transformational economic growth in China and India. In the early 1990s China and India accounted for 25% of global gold demand. Today, increased wealth has boosted their combined share to more than 50% (**Chart 13**).[21] Expansion of wealth is one of the most important drivers of gold demand over the long run, fuelling jewellery consumption, investment in technology and the acquisition of gold bars and coins (see **Focus 1**, p3).

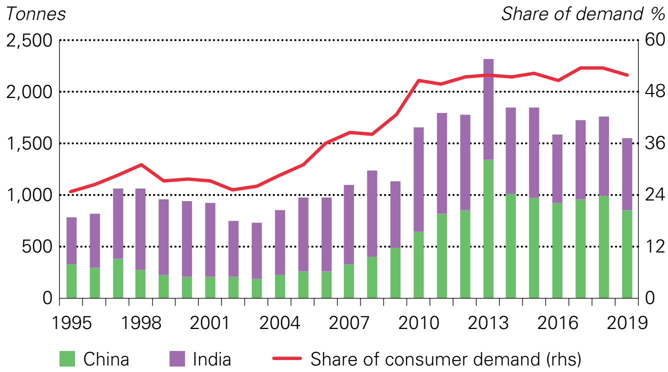
Among institutional and retail investors the introduction of **gold-backed ETFs and similar products has had a material impact on demand for and exposure to gold.**

Gold-backed ETFs have amassed approximately 2,900t of gold, worth US$143bn, since they were first launched in 2003 (**Chart 14**).[22] The growth is particularly pronounced in Europe, where market share has neared levels on par with North America, a sign of global acceptance.

Bar and coin demand has also substantially increased in Europe following the 2008-2009 financial crisis and remains high amid currency concerns and low rates (**Chart 15**).

Central bank demand transformed in recent years. Reserve managers have been net buyers of gold since 2010 and, more recently, they have purchased multi-decade record amounts of gold, using the asset to diversify their foreign reserves (**Chart 16**).

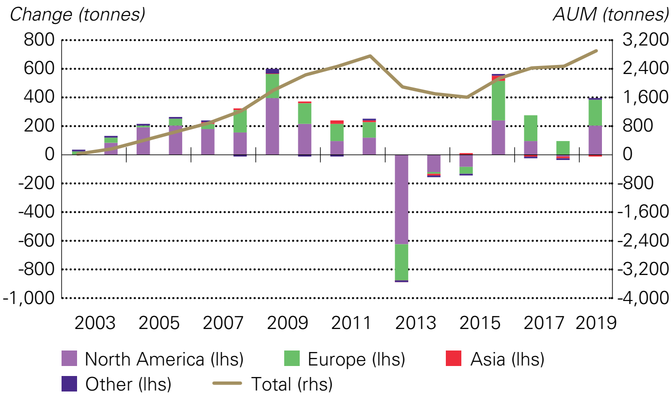
Chart 13: India and China have doubled their gold market share in less than two decades
Emerging market economic development has created consumer demand and market share in India and China*



*Consumer demand is defined as the sum of jewellery, bar and coin demand.

Source: Refinitiv GFMS, Metals Focus, World Gold Council

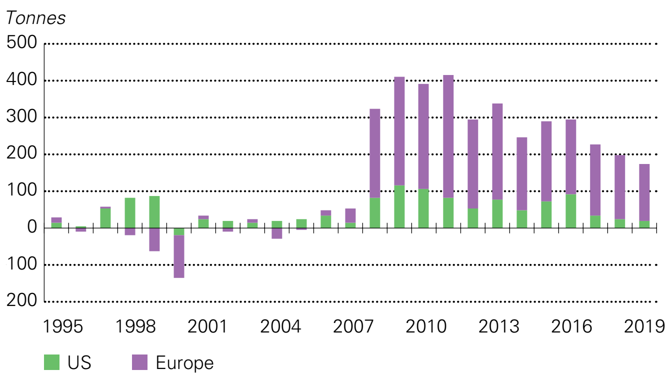
Chart 14: Gold-backed ETFs have introduced new investors to gold across the world
Annual ETF gold demand and cumulative holdings*



*Includes gold-backed ETFs and similar products. For more details, visit the gold-backed ETF holdings and flows section at Goldhub.com

Source: Bloomberg, ETF regulatory fund filings, World Gold Council

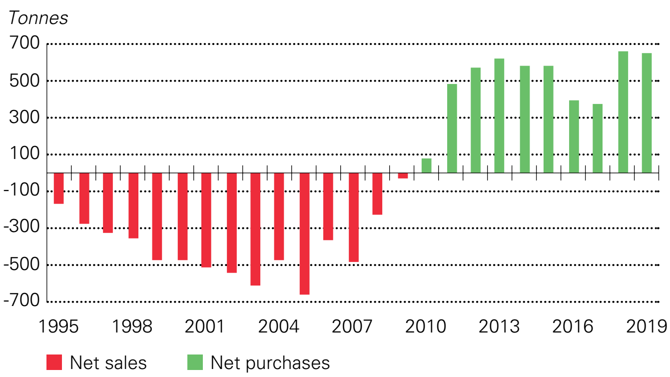
Chart 15: The bar and coin market in the US and Europe strengthened in the wake of the financial crisis
Bar and coin demand in US and Europe*



*Europe excluding Russia and ex-CIS countries.

Source: Refinitiv GFMS, Metals Focus, World Gold Council

Chart 16: Central banks have been a steady net source of demand since 2010, led by emerging markets
Net global central bank gold demand



Source: Refinitiv GFMS, Metals Focus, World Gold Council

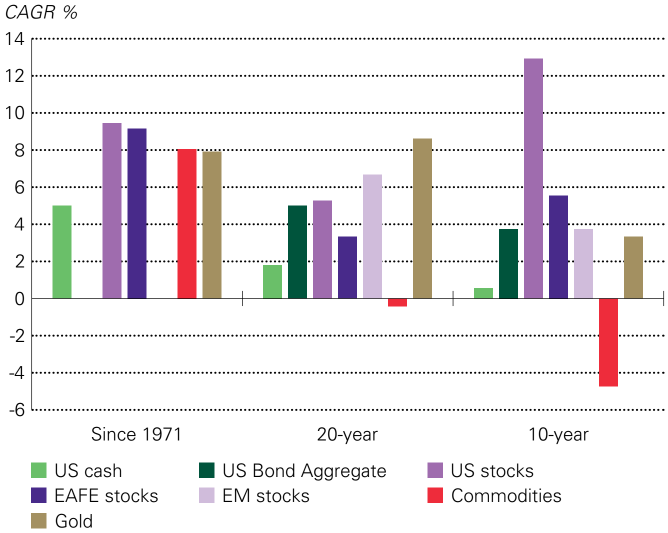
21 Based on Metals Focus and Refinitiv GFMS 10-year mine production average as a percentage of above ground stocks, as of December 2019.

22 As of 31 December 2019. For more information visit Goldub.com

Appendix:
Gold's performance over time

Annual growth rates and historical returns

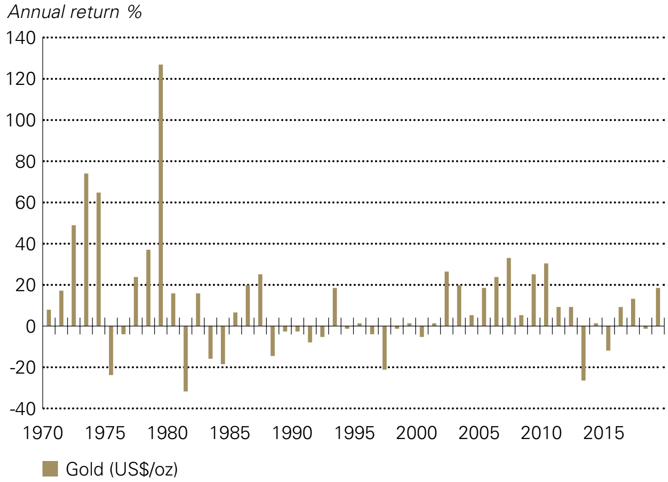
Chart 17: Gold's compounded returns compare favourably to many asset classes, including stocks
Compounded annual growth rate for major asset classes*



*As of 31 December 2019. Computations in US dollars of total return indices for ICE 3-month Treasury, Bloomberg Barclays US Bond Aggregate, MSCI US, EAFE and EM indices, Bloomberg Commodity Index and spot for LBMA Gold Price PM.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

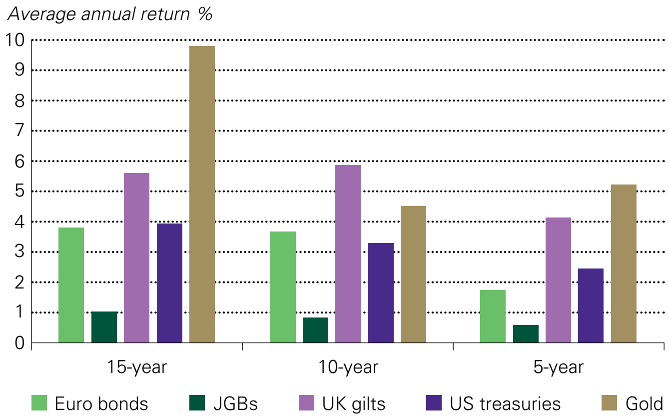
Chart 18: After high price volatility in the 1970s, gold returns have been steadier
Gold price return per year since 1971*



*As of 31 December 2019. Computations based on the LBMA Gold Price PM.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

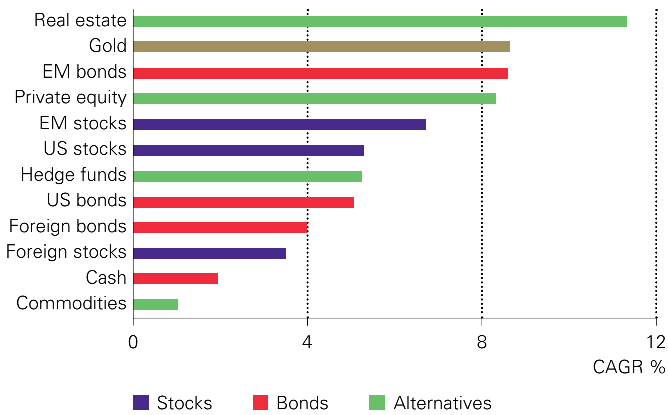
Chart 19: Gold significantly outperforms major global sovereign debt
Gold's long-term performance compared to major sovereign debt*



*Based on data from 31 December 2004 to 31 December 2019 due to limited bond data.
All data measured in US dollars and unhedged. Indices used include: Euro bonds (ICE BofA AAA Euro Government Index), JGBs (ICE BofA Japan Government Index), UK gilts (ICE BofA UK Gilt Index), US treasuries (J.P. Morgan GBI US Unhedged), and spot for LBMA PM Gold Price.

Source: Bloomberg, J.P. Morgan Global Bond Index

Chart 20: Gold has delivered strong returns against major asset classes over the past 20 years*

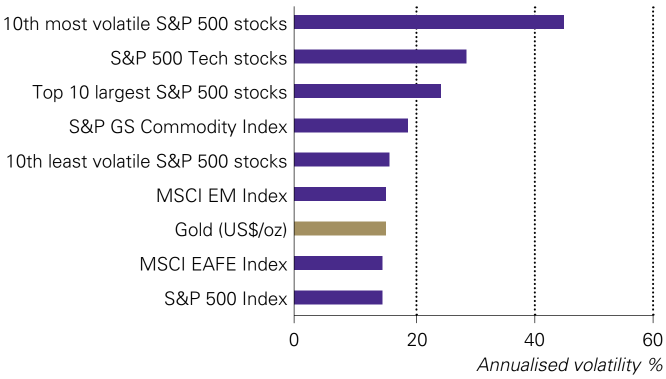


As of 31 December 2019. Computations in US dollars of total return indices for ICE 3-month Treasury, Bloomberg Barclays US, Global and EM Bond Aggregate, MSCI US, EAFE and EM indices, FTSE REITs Index, HFRI Composite, S&P Private Equity Index, Bloomberg Commodity Index and spot for LBMA Gold Price PM.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

Less volatile than most stocks and commodities

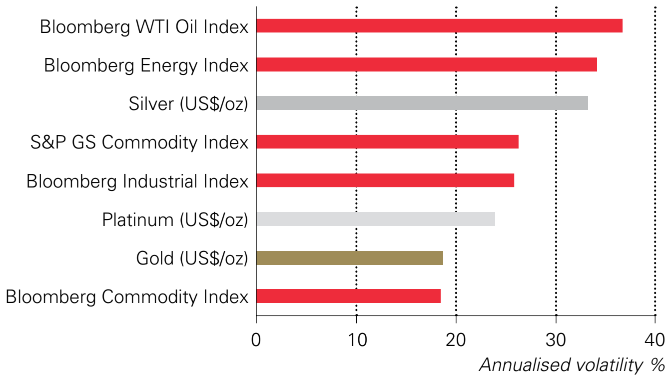
Chart 21: Gold's volatility sits below that of many individual stocks and stock indices
Realised volatility of stocks, stock indices and gold*



*Annualised volatility is computed based on daily returns between 31 December 2009 and 31 December 2019. Only stocks with 10 years' worth of data are included in the computations.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

Chart 22: Gold is also less volatile than individual commodities
Realised volatility of commodities and gold*

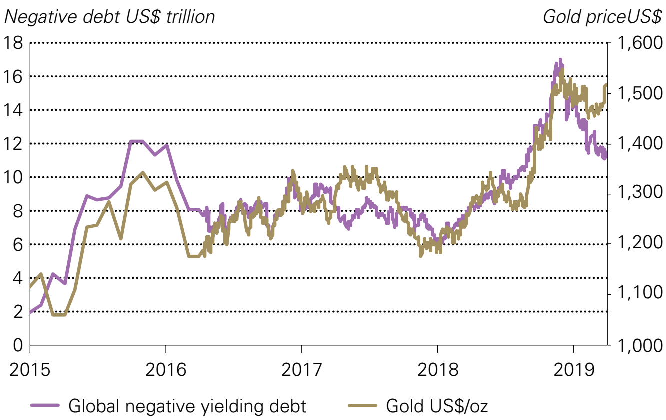


*Annualised volatility is computed based on daily returns between 31 December 2009 and 31 December 2019.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

Performs well in a low or negative real rate environment

Chart 23: Global negative yielding debt vs gold prices
Gold prices have closely tracked total global negative yielding debt over the past five years



Monthly numbers from 1 September 2015 to 31 December 2019. Negative yielding debt numbers based on Bloomberg Barclays Global Aggregate Negative Yielding Debt Market Level.

Source: Bloomberg, World Gold Council

Table 2: Gold performance nearly doubles in periods of negative interest rates
Gold performance in various real rate environments*

	Long-term average	Low (<0%)	Moderate (0% - 2.5%)	High (>2.5%)
Monthly return	0.6%	1.2%	1.0%	0.3%
Annualised return**	7.9%	15.3%	12.9%	-3.9%
Standard error	0.2%	0.4%	0.4%	0.3%
Different from 0?	Yes	Yes	Yes	Mo

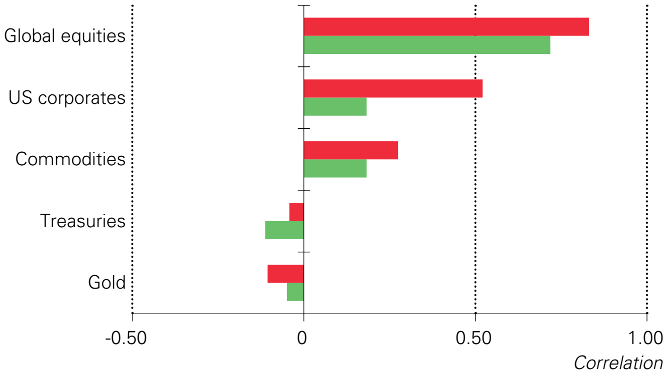
*Based on nominal gold returns between January 1971 and December 2019. Real rate regimes based on the 12-month constant maturity US T-bill minus the corresponding y-o-y CPI inflation. Difference from zero computed as a two-way T test at a 5% significance level.
**Compounded annual return computed using the corresponding average monthly return for each rate environment, based on the equivalence formula $(1+r) = (1+r^{(m)}/m)^m$.

Source: Bureau of Labour Statistics, Federal Reserve, ICE Benchmark Administration, World Gold Council

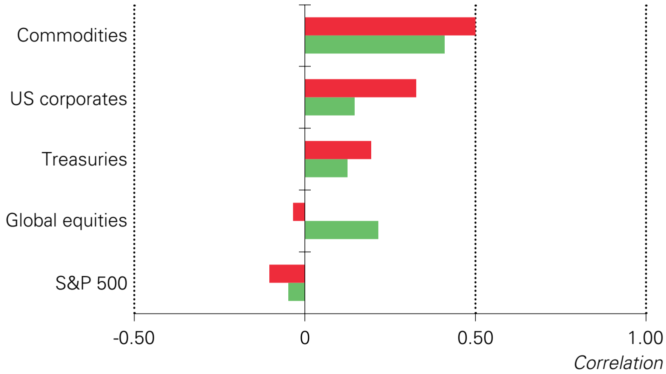
Effective correlation across economic cycles

Chart 24: Gold is an effective diversifier in periods of economic expansion and contraction

(a) Correlation between US stocks and major assets*



(b) Correlation between gold and major assets*



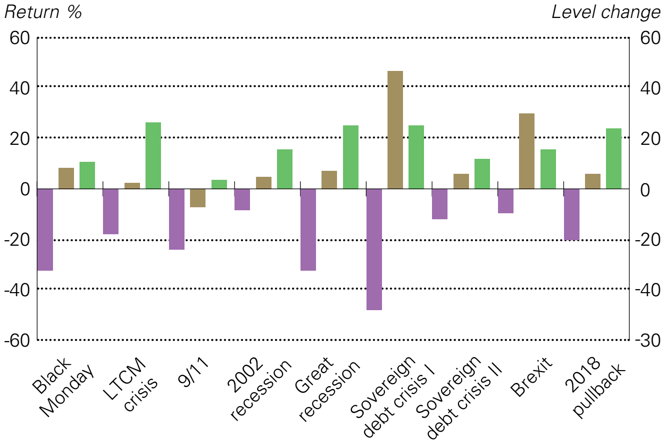
*Based on monthly returns between 1 January 1971 and 31 December 2019. Economic expansions and contractions as determined by the National Bureau of Economic Research (NBER).

Source: Bloomberg, NBER, World Gold Council

Often viewed as a safe haven

Chart 25: The gold price tends to increase in periods of systemic risk

S&P 500 and gold return vs change in VIX level*

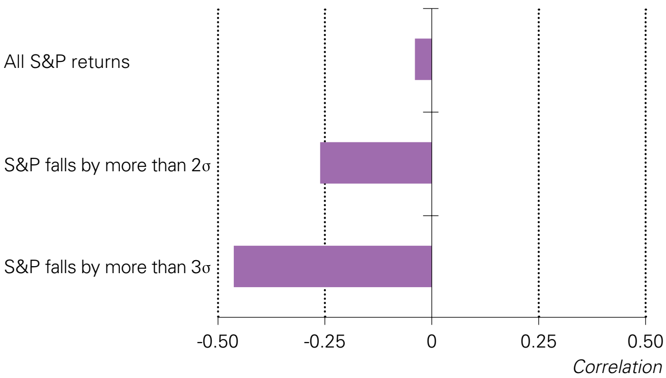


*The VIX is available only after January 1990. For events occurring prior to that date annualised 30-day S&P 500 volatility is used as a proxy. Dates used: Black Monday: 9/1987–11/1987; LTCM: 8/1998; Dot-com: 3/2000–3/2001; September 11: 9/2001; 2002 recession: 3/2002–7/2002; Great Recession: 10/2007–2/2009; Sovereign debt crisis I: 1/2010–6/2010; Sovereign debt crisis II: 2/2011–10/2011; 2018 pullback: 10/2018-12/2018.

Source: Bloomberg, World Gold Council

Chart 26: The price of gold tends to increase more when stocks pull down sharply

Conditional correlation between gold and the S&P 500 relative to the magnitude of the stock pullback*



*Based on weekly returns between 31 December 1989 and 31 December 2019.

Source: Bloomberg, World Gold Council

Additional reading

We include below a list of publications by the World Gold Council that discuss relevant aspects of gold for investors:

Gold Investor

- *Currency crises, over-leverage and low rates – potential drivers of a gold bull market,* Lu Zhengwei, December 2019
- *BNP Paribas: The outlook for gold as Fed rates fall,* Harry Tchilinguirian, October 2019
- *First Eagle Investment Management on gold's contribution to an investment portfolio,* Thomas Kertsos, September 2019
- *The curse of cash and the allure of gold,* Kenneth Rogoff, February 2019.

Market and Investment Updates

- *Gold 2020 outlook,* January 2020
- *Global gold-backed ETF holdings and flows,* January 2020
- *Investment Update: It may be time to replace bonds with gold,* October 2019
- *Gold mid-year outlook 2019: Heightened risk meets easy money,* July 2019
- *Investment Update: The impact of monetary policy on gold,* March 2019
- *Cryptocurrencies are no substitute for gold,* January 2019
- *Increased transparency on gold trading,* December 2018.

In-depth reports

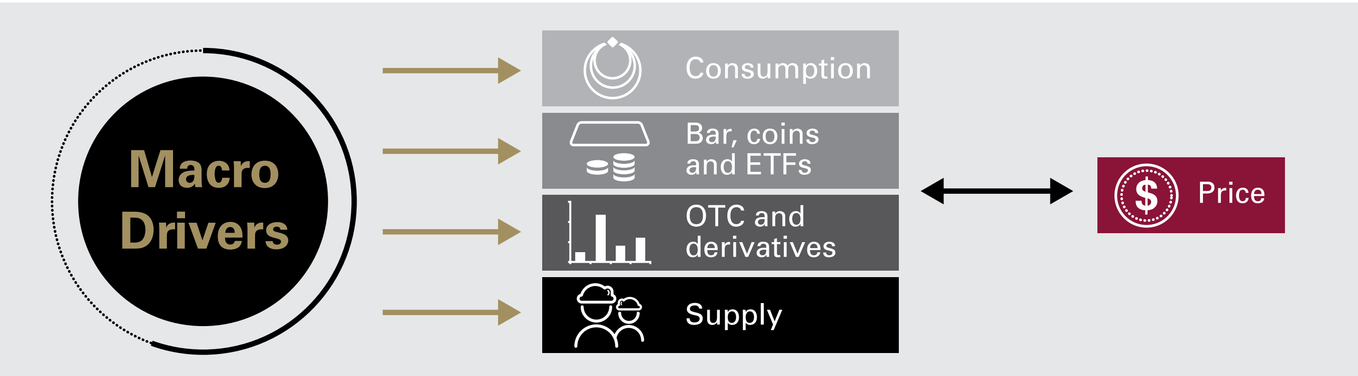
- *The need for bullion banking in India,* October 2019
- *Gold and climate change: Current and future impacts,* October 2019
- *A Central Banker's Guide to Gold as a Reserve Asset – 2019 edition,* September 2019
- *Gold: the most effective commodity investment,* September 2019
- *Recommendations for the further development of China's gold market,* July 2017
- *Gold 2048: the next 30 years for gold,* May 2018
- *Enhancing the performance of alternatives with gold,* February 2018.

Gold Demand Trends

- *Full year and Q4 2019,* January 2020
- *Third quarter 2019,* November 2019
- *Second quarter 2019,* August 2019
- *First quarter 2019,* May 2019.

Qaurum℠: What is the Gold Valuation Framework?

A **methodology** that allows investors to understand the **drivers of gold** and their impact on price **performance**, based on **market equilibrium**, that allows investors to determine **gold's long-term return**.



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