

The relevance of gold as a strategic asset



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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The relevance of gold as a strategic asset

Gold is a highly liquid yet scarce asset, and it is no one's liability. It is bought as a luxury good as much as an investment. As such, gold can play four fundamental roles in a portfolio:

- a source of long-term returns
- a diversifier that can mitigate losses in times of market stress
- a liquid asset with no credit risk that has outperformed fiat currencies
- a means to enhance overall portfolio performance.

Our analysis shows that adding 2%, 5% or 10% in gold over the past decade to the average pension fund portfolio would have both increased returns and reduced volatility, resulting in higher risk-adjusted returns.

Why gold, why now

Gold is becoming more mainstream. Since 2001, investment demand for gold worldwide has grown 18% per year, on average. This has been driven in part by the advent of new ways to access the market, such as physical gold-backed exchange-traded funds (ETFs), but also by the expansion of the middle class in Asia, and a renewed focus on effective risk management following the 2008–2009 financial crisis in the US and Europe.

Today, gold is more relevant than ever for institutional investors. While central banks in developed markets are starting to normalise monetary policies – leading to higher interest rates – we believe the effect of quantitative easing and the prolonged period of low interest rates can have a long-term effect.

These policies may have fundamentally altered what it means to manage portfolio risk and could extend the time needed to meet investment objectives.

In response, institutional investors have embraced alternatives to traditional assets such as stocks and bonds. The share of non-traditional assets among US pension funds has increased from 17% in 2006 to 27% in 2016.¹

Many investors are drawn to gold's role as a diversifier – due to its low correlation to most mainstream assets – and as a hedge against systemic risk and strong stock market pullbacks. Some use it as a store of wealth and as an inflation and currency hedge.

As a strategic asset, gold has historically improved the risk-adjusted returns of portfolios, providing returns while reducing losses and providing liquidity to meet liabilities in times of market stress.

¹ Willis Towers Watson, *Global Pension Assets Study 2017*, and *Global Alternatives Survey 2017*.

A source of returns

Gold is not only useful in periods of higher uncertainty. Its price has increased by an average of 10% per year since 1971, when gold began to be freely traded following the collapse of Bretton Woods.

And gold's long-term returns have been comparable to stocks and higher than bonds or commodities (Chart 1).²

There is a good reason behind gold's price performance: it trades in a large and liquid market, yet it is scarce.

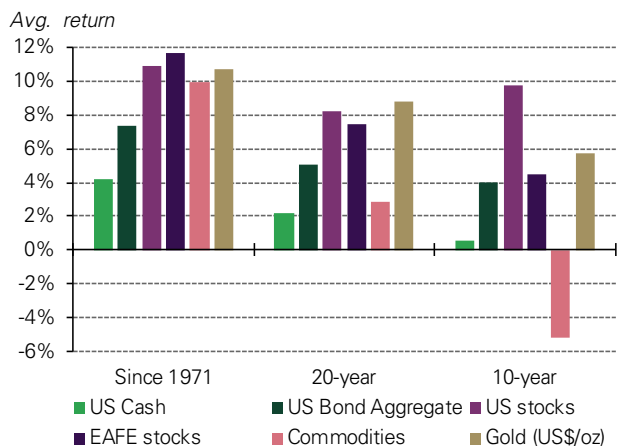
Mine production has increased by an average of 1.6% per year for the past 20 years. At the same time, consumers, investors and central banks have all contributed to higher demand.

On the consumer side, the combined share of global gold demand from India and China grew from 25% in the early 1990s to more than 50% in recent years.

Our research shows that expansion of wealth is one of the most important drivers of gold demand over the long run. It has had a positive effect on jewellery, technology, and bar and coin demand – the latter in the form of long-term savings.³

Chart 1: Gold has delivered positive returns over the long run, outperforming key asset classes

Annual average returns over various periods of time*



*As of 31 December 2017. Annual return computations are based on total return indices except gold where the spot price is used. This arrangement more accurately reflects portfolio level performance.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

Gold-backed ETFs and similar products have amassed more than 2,000 tonnes (t) of gold worth almost US\$100 billion since they were first launched in 2003. And central banks have been net buyers of gold since 2010 as a means of diversifying their expanding foreign reserves.

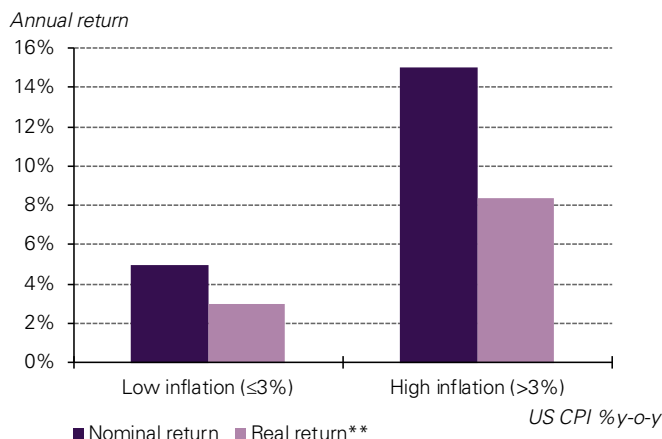
Well above inflation

During the Gold Standard and subsequently the Bretton Woods system, when the US dollar was backed by and pegged to the price of gold, there was a close link between gold and US inflation. But once gold became free floating, US inflation was not its main price driver. Sure enough, gold returns have outpaced the US consumer price index (CPI) over the long run, due to its many sources of demand. Gold has not just preserved capital, it has helped it grow.

Gold has also protected investors against extreme inflation. In years when inflation has been higher than 3%, gold's price has increased by more than 14%, on average (Chart 2). Additionally, research by Oxford Economics shows that gold should do well in periods of deflation.⁴

Chart 2: Gold has historically rallied in periods of high inflation

Gold returns as a function of annual inflation*



*Inflation computed using annual US CPI year-on-year changes between 1970 and 2017.

**For each year on the sample, real return = (1+nominal return)/(1+inflation)-1.

Source: Bloomberg, World Gold Council

2 For other return metrics and year by year performance see Appendix II.

3 See Appendix I.

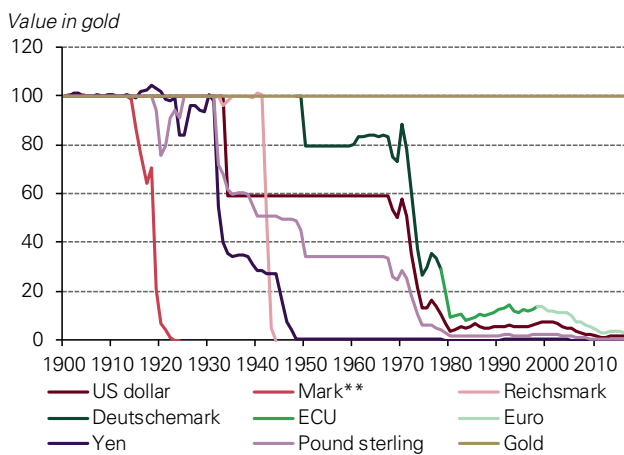
4 Oxford Economics, *The impact of inflation and deflation on the case for gold*, July 2011.

A high-quality, hard currency

Over the past century, gold has greatly outperformed all major currencies as a means of exchange (Chart 3). This includes instances when major economies defaulted, sending their currencies spiralling down, and after the end of the Gold Standard. One of the reasons for this robust performance is that the available supply of gold has changed little over time – growing less than 2% per year through mine production for the past two decades. In contrast, fiat money can be printed in unlimited quantities to support monetary policies.

Chart 3: Gold has outperformed all major fiat currencies over time

Relative value between major currencies and gold since 1900*



*As of 31 December 2017.

**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

Diversification that works

Most investors agree about the relevance of diversification, but effective diversifiers are not easy to find. Correlations tend to increase as market uncertainty (and volatility) rises, driven in part by risk-on/risk-off investment decisions. Consequently, many so-called diversifiers fail to protect portfolios when investors most need it.

For example, during the 2008–2009 financial crisis, hedge funds, broad commodities and real estate, long deemed portfolio diversifiers, sold off alongside stocks and other risk assets. This was not the case with gold.

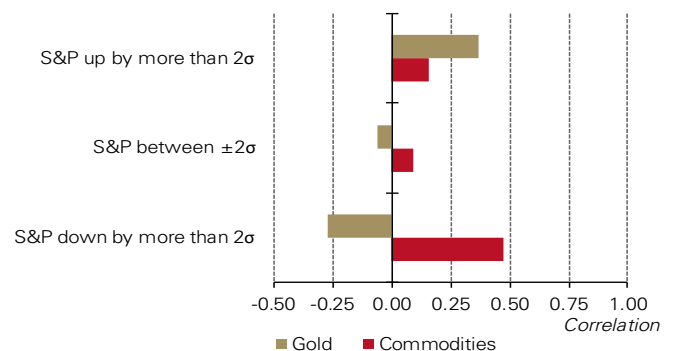
Gold historically benefits from flight-to-quality inflows during periods of heightened risk. By providing positive returns and reducing portfolio losses, gold has been especially effective during times of systemic crisis, when investors tend to withdraw from stocks (see Appendix II). Gold has also allowed investors to meet liabilities while less liquid assets in their portfolio were undervalued and possibly mispriced.

The greater a downturn in stocks and other risk assets, the more negative gold's correlation to these assets becomes (Chart 4). But gold's correlation doesn't only work for investors during periods of turmoil.

Due to its dual nature as a luxury good and an investment, gold's long-term price trend is supported by income growth. As such, our research shows that when stocks rally strongly, their correlation to gold can increase driven by the wealth effect and, sometimes, by higher inflation expectations.

Chart 4: 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*



*Correlations computed using weekly returns between January 1987 and December 2017. 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 2 standard deviations (or 'σ') respectively, while the top bar corresponds to the S&P 500 weekly return increasing by more than 2 standard deviations. The standard deviation is based on the same weekly returns over the full period.

Source: Bloomberg, World Gold Council

A deep and liquid market

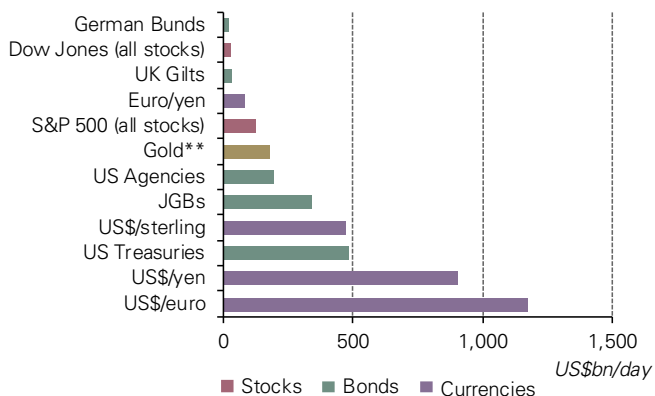
For large buy-and-hold institutional investors, size and liquidity are important factors when establishing a strategic holding.

Gold benefits from its large, global market. We estimate that physical gold holdings by investors and central banks are worth approximately US\$2.9 trillion, with an additional US\$400 billion in open interest through derivatives traded on exchanges or over-the-counter.

In addition, the gold market is liquid (**Chart 5**). Gold trades between US\$150 billion and US\$220 billion per day through spot and derivatives contracts over-the-counter. Gold futures trade US\$35–60 billion per day across various global exchanges. Gold-backed ETFs offer an additional source of liquidity, with the largest US-listed fund trading an average of US\$1.2 billion per day.

Chart 5: Gold trades more than many other major financial assets

Average daily trading volumes in US dollars*



*Based on estimated annual averages as of December 2016.

**Gold liquidity includes estimates on over-the-counter transactions, as well as published statistics on futures exchanges and gold-backed ETFs.

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

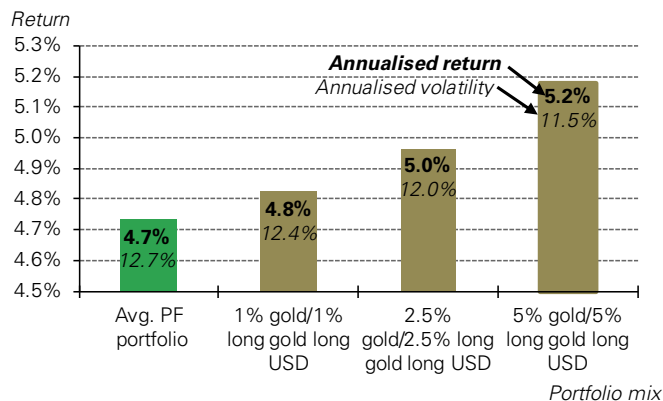
Enhancing portfolio performance

The combination of all these factors means that adding gold to a portfolio can enhance risk-adjusted returns.

Over the past decade, institutional investors with an asset allocation equivalent to the average US pension fund would have benefitted from including gold in their portfolio. Adding 2%, 5% or 10% in gold would have both increased returns and reduced volatility, resulting in higher risk-adjusted returns.

Chart 6: The average pension fund portfolio would have increased returns and reduced risk by investing in gold over the past decade

Performance of an average pension fund (PF) portfolio with and without gold*



*Based on performance between 12/2006 and 12/2016. The average PF portfolio is based on Willis Tower Watson Global Pension Assets Study 2017 and Global Alternatives Survey 2016. It includes a 50% allocation to stocks (30% Russell 3000, 20% MSCI ACWI ex US), 25% allocation to fixed income (22% Barclays US Aggregate, 1% Barclays Global Aggregate ex US, 1% JPMorgan EM Global Bond Index, and 2% short-term Treasuries), and 25% alternative assets (9% FTSE REITs Index, 7% HFRI Hedge Fund Index, 7% S&P Private Equity Index, and 2% S&P GS Commodity Index). The allocation to gold comes from proportionally reducing all assets.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

But looking at the past performance of an average portfolio alone is not enough to answer how much gold investors should add to achieve the maximum benefit to a portfolio.

Portfolio allocation analysis indicates that, for most US dollar investors, holding 2% to 10% of their portfolio in gold can improve performance even more (Chart 7).⁵ Broadly speaking, the higher the risk in the portfolio – whether in terms of volatility, illiquidity or concentration of assets – the larger the required allocation to gold to offset that risk.

The analysis shows that gold’s optimal weight in a portfolio is statistically significant even if investors assume an annual return for gold between 2% and 4% – well below its actual, long-term historical performance.

This is also the case for investors who already hold other inflation-hedging assets, such as inflation-linked bonds,⁶ as well as for investors who hold other alternative assets (e.g., real estate and hedge funds).⁷

Gold goes beyond commodities

Gold is often lumped together with the commodity complex by investors and investment practitioners alike. Whether as a component in a commodity index (e.g., S&P Goldman Sachs Commodity Index, Dow Jones UBS Commodity Index), one of the securities in an ETF, or as a future trading on a commodity exchange, gold is viewed as a part of this complex.

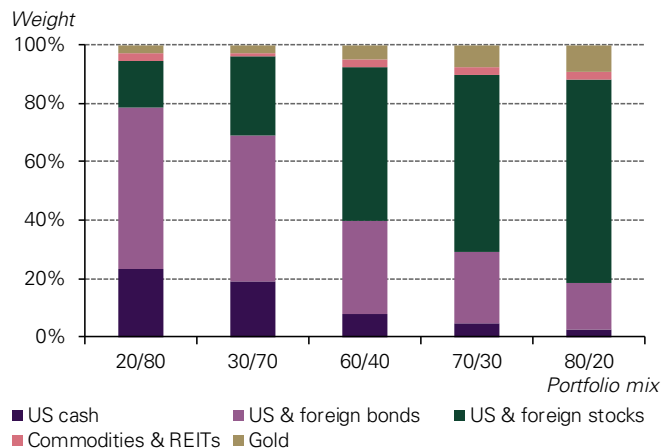
Gold undoubtedly shares some similarities with commodities. But a detailed look at the make-up of supply and demand highlights that the differences outnumber the similarities:

- The supply of gold is balanced, deep and broad, helping to quell uncertainty and volatility
- Because gold is not consumed, its above-ground stocks dwarf the stock levels of other commodities
- Gold demand comes from a wide range of segments and regions
- Gold has a lower correlation with the global business cycle.

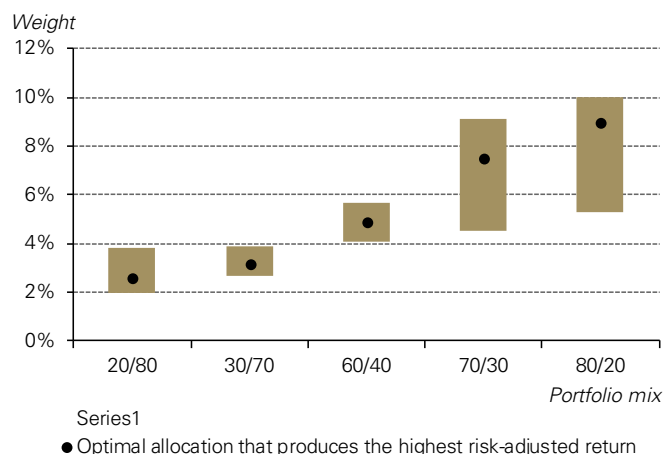
Gold’s unique attributes set it apart from the commodity complex. From an empirical perspective, including a distinct allocation to gold has improved the performance of portfolios with passive commodity exposures.⁸

Chart 7: Gold can significantly improve risk-adjusted returns for 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 portfolio mix*



*Each portfolio composition reflects the percentage in stock (and other assets) relative to cash and bonds. For example: 60/40 is a portfolio with 60% in stocks, commodities, REITs and gold, and 40% in cash and bonds. Analysis based on New Frontier Advisors Resampled Efficiency.

Source: World Gold Council

5 Based on the seminal work of Richard and Robert Michaud and praised as a robust alternative to traditional mean-variance optimisation.

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

7 *How gold improves alternative asset performance*, Gold Investor, June 2014.

8 See *Gold: A commodity like no other*, April 2011, and *Gold: metal by design, currency by nature*, Gold Investor, Volume 6, June 2014.

Appendix I: Demand, supply and drivers of gold

Consumption, investment, both

In the long term, the expansion of wealth has a positive effect on demand for gold jewellery, technology, and to some extent bar and coin demand – the latter in the form of long-term savings.

Investment demand can, over the short and medium term, also strongly influence gold's performance. This type of demand, from the physical (and physically backed) markets to exchange-traded derivatives and over-the-counter products, increases during periods of economic and political uncertainty and falls as investor confidence grows.

Broadly speaking, drivers of the gold price can be grouped into four categories:

- **Opportunity cost:** gold responds to the relative strength of fiat currencies, especially the US dollar, and key interest rates
- **Economic growth and market uncertainty:** periods of growth are very supportive of jewellery, technology, and long-term savings, but downturns can boost investment demand
- **Tactical flows and price momentum:** positioning and short-term capital flows can exert pressure on gold prices
- **Other internal gold market dynamics:** including, for example, seasonal consumption and mine production.

Large yet scarce

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

We estimate that there are approximately 190,000t of gold above ground worth more than US\$7.6 trillion.⁹ Mine production adds approximately 2,900t per year, equivalent to an annual 1.6% increment.¹⁰

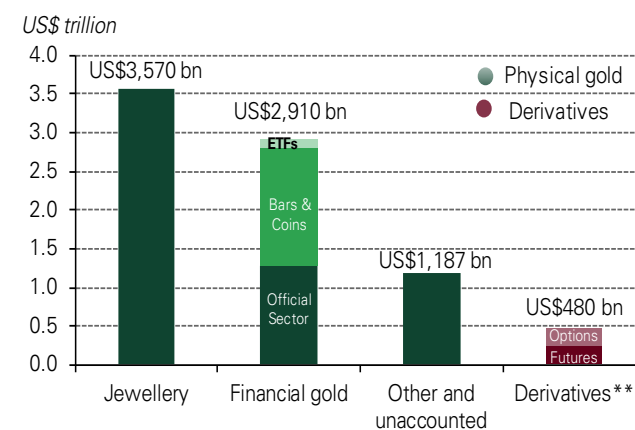
The estimated breakdown of physical gold,¹¹ based on its use, is:

- **Jewellery:** 89,600t (US\$3.6 trillion) 47%
- **Official sector:** 31,600t (US\$1.3 trillion) 17%
- **Bars and coins:** 38,400t (US\$1.5 trillion) 20%
- **ETFs and similar:** 2,300t (US\$98 billion) 1%
- **Other and unaccounted:** 27,700t (US\$1 trillion) 15%

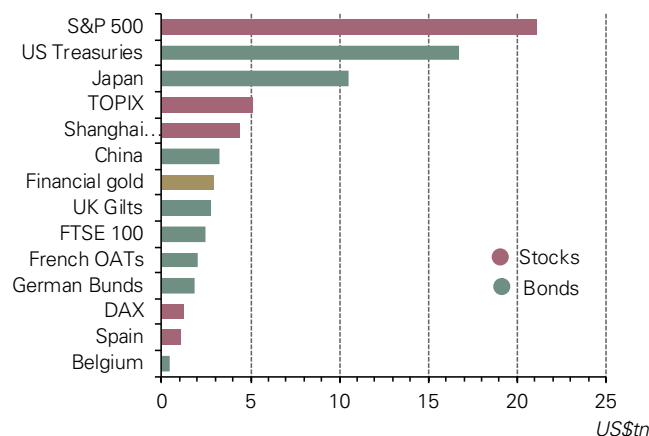
The financial gold market is made up of bars, coins, gold-backed ETFs, and central bank reserves. This segment of the gold market compares favourably to the size of major financial markets (**Chart 8**).

Chart 8: The size of the financial physical gold market is large compared to many global assets and dwarfs known open interest in gold derivatives*

(a) Market size of above ground gold holdings and gold derivatives



(b) Market size of major global financial assets



*As of 30 September 2016.

**Represents open interest in COMEX, TOCOM and over-the-counter.

Source: BIS; Bloomberg, ETF company filings, ICE Benchmark Administration, GFMS-Thomson Reuters, World Gold Council

9 Based on the Q1-Q3 2017 average LBMA Gold Price and the Q3 2017 above ground estimates by GFMS-Thomson Reuters, Metals Focus and the World Gold Council.

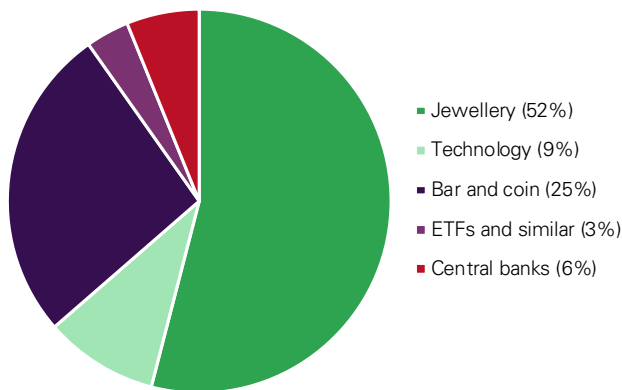
10 Based on 10-year mine production average.

11 Ibid 9.

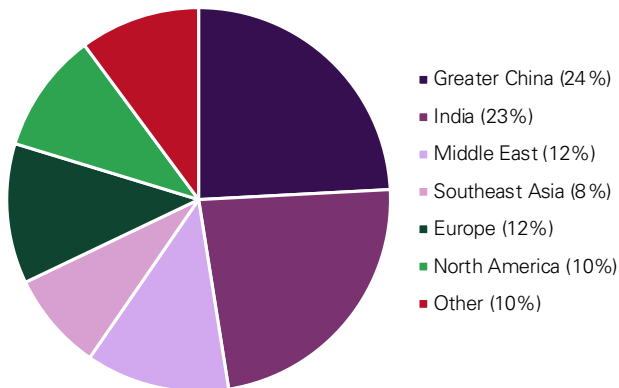
Demand diversity underpins gold's low correlations

Chart 9: Gold is bought around the world for multiple purposes – whether as a luxury good, a component in high-end electronics, safe-haven investment or a portfolio diversifier

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



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

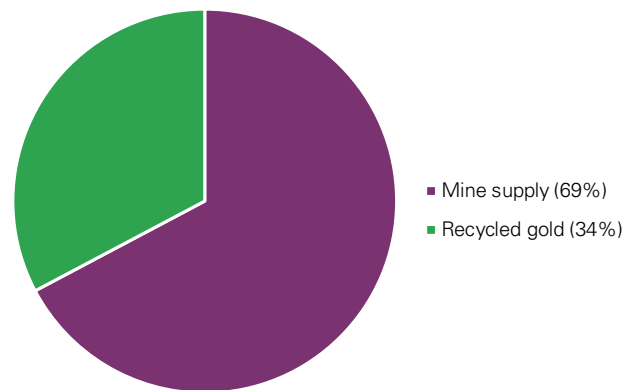


*Computed using annual demand from 2007 to 2016. Regional breakdown excludes central bank demand due to data availability.
Source: ETF company filings, GFMS-Thomson Reuters, Metals Focus, World Gold Council.

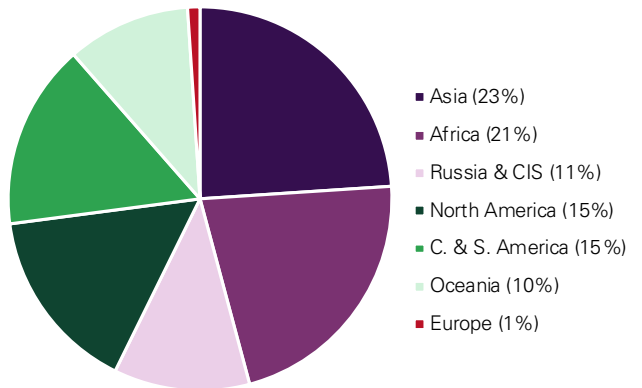
Fewer supply side shocks help bring gold's volatility lower

Chart 10: 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*



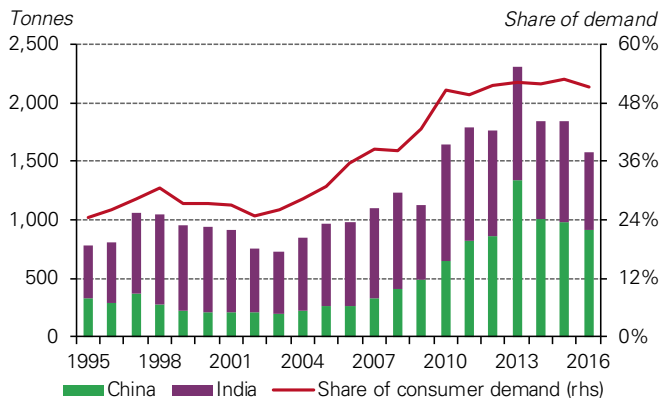
*Computed using annual demand from 2007 to 2016. Regional breakdown excludes central bank demand due to data availability.
Source: ETF company filings, GFMS-Thomson Reuters, Metals Focus, World Gold Council.

Four trends have re-shaped gold demand

- **Emerging markets:** The economic development that emerging markets, especially China and India, have experienced for almost two decades has increased and diversified gold's consumer and investor base (**Chart 11**)
- **Gold-backed ETFs:** The advent of exchange-traded products reduced total cost of ownership, increased efficiencies, provided liquidity and access, and brought new interest – and demand – into gold as a strategic investment (**Chart 12**)

Chart 11: India and China have doubled their gold market share in less than two decades

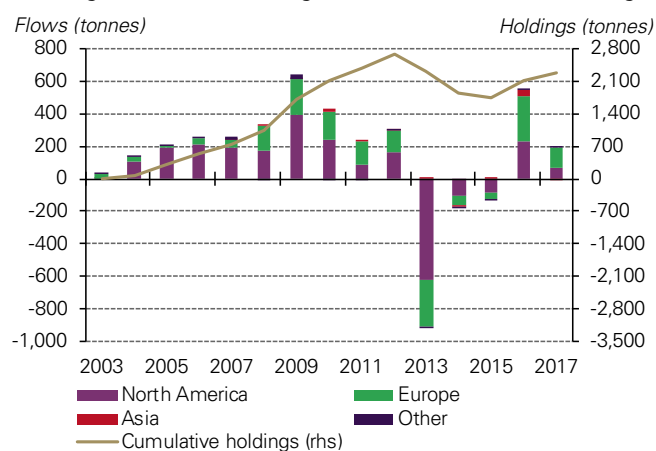
Consumer demand and market share of India and China*



*Consumer demand is defined as the sum of jewellery, bar and coin demand.
Source: GFMS-Thomson Reuters, Metals Focus, World Gold Council

Chart 12: Gold-backed ETFs have brought in new investors to gold across the world

Annual gold demand through ETFs & cumulative holdings*

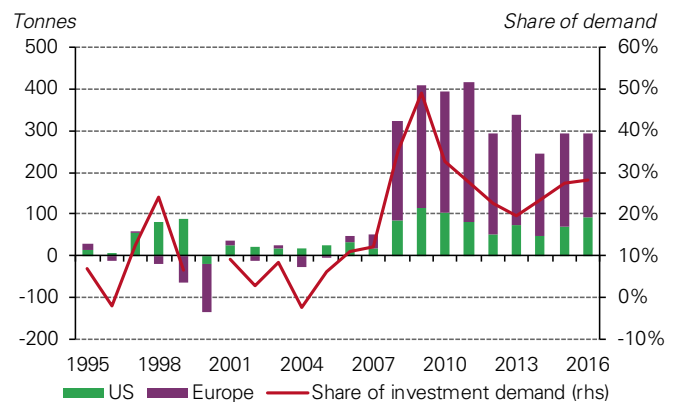


*Includes gold-backed ETFs and similar products
Source: Bloomberg, ETF regulatory fund filings, World Gold Council

- **The 2008–2009 financial crisis:** Gold has benefitted from a change in attitudes towards risk and risk management by investors following the Great Recession – new markets have appeared and old markets resurfaced, lifting demand (**Chart 13**)
- **Central banks:** The expansion of foreign reserves, led by emerging markets, has resulted in net gold demand by central banks as a source of return, liquidity and diversification (**Chart 14**)

Chart 13: The bar and coin market in the US and Europe strengthened in the wake of the financial crisis

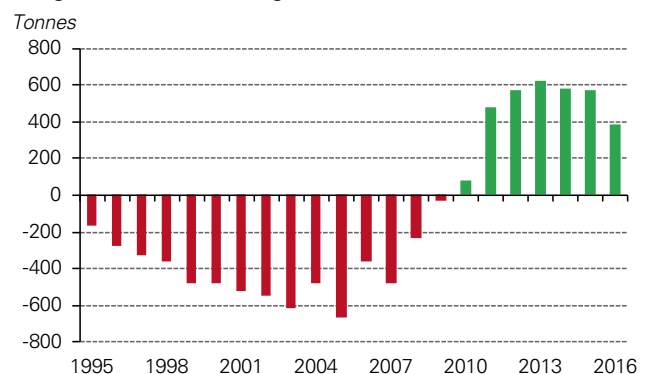
Bar and coin demand and market share in US and Europe*



*Europe exclude Russia and ex-CIS countries.
Source: GFMS-Thomson Reuters, Metals Focus, World Gold Council

Chart 14: Central banks have been a steady net source of demand since 2010, led by emerging markets

Net global central bank gold demand



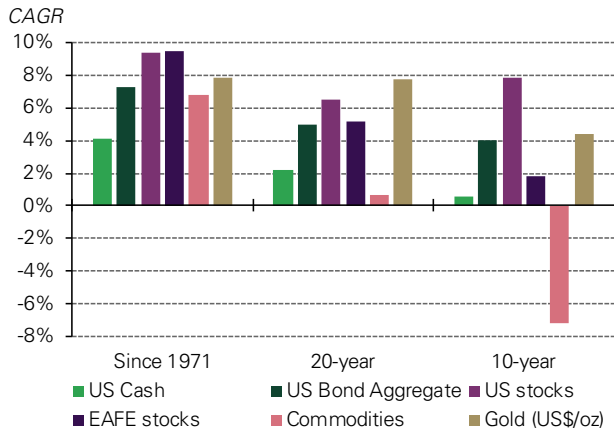
Source: GFMS-Thomson Reuters, Metals Focus, World Gold Council

Appendix II: Gold's performance over time

Annual growth rates and historical returns

Chart 15: Gold's compounded returns compare favourably to many asset classes including stocks

Compounded annual growth rate for major asset classes*

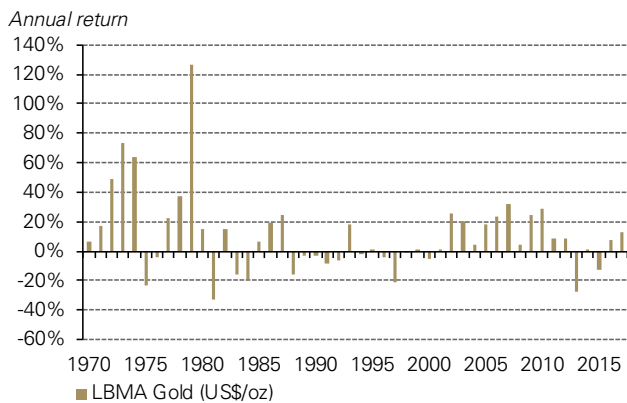


*As of December 2017. Computations exclude gold based on total return indices.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

Chart 16: After high price volatility in the 1970s, gold returns have been steadier

Gold price return per year since 1971*



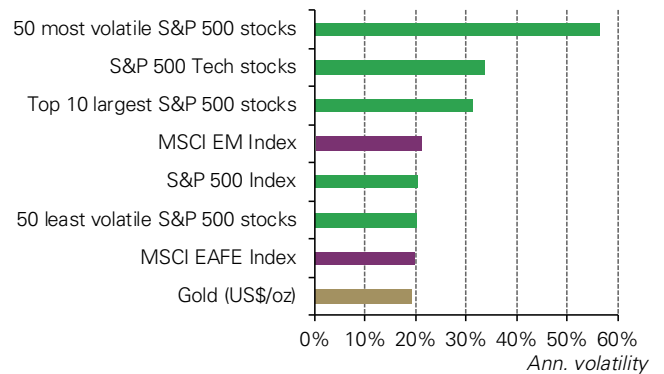
*As of December 2017. Computations exclude gold based on total return indices.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

Gold is less volatile than most stocks and commodities

Chart 17: Gold's volatility sits below that of many individual stocks and stock indices

Realised volatility of stocks, stock indices and gold*

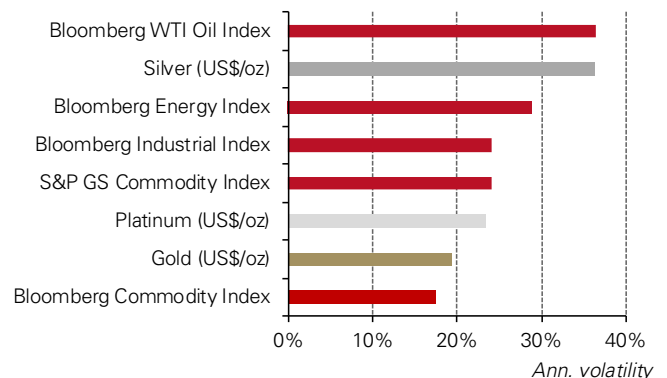


*Annualised volatility is computed based on daily returns between 1 October 2007 and 30 September 2017. Only stocks with 10 years' worth of data are included in the computations.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

Chart 18: Gold is also less volatile than individual commodities

Realised volatility of commodities and gold*



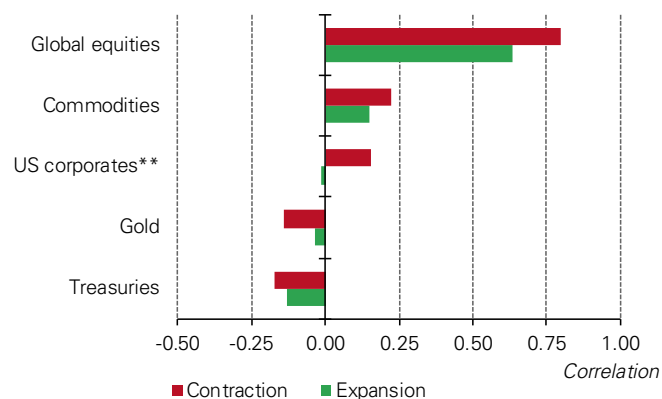
*Annualised volatility is computed based on daily returns between 1 October 2007 and 30 September 2017.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

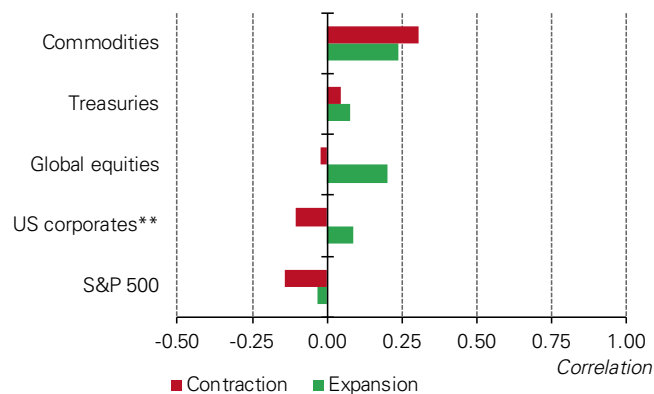
Effective correlation during expansions and contractions

Chart 19: Gold behaves as 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 weekly returns between January 1987 and September 2016. Economic expansions and contractions as determined by the National Bureau of Economic Research (NBER).

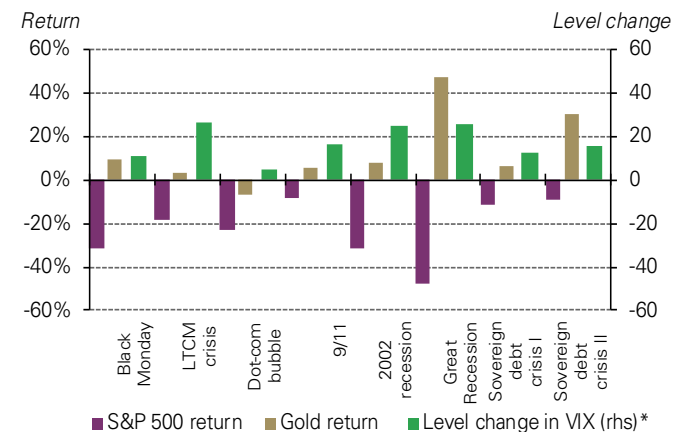
**Data for US corporates starts December 1988 due to data availability.

Source: Bloomberg, NBER, World Gold Council

Gold is often seen as a safe haven

Chart 20: The gold price tends to increase in periods of systemic risk

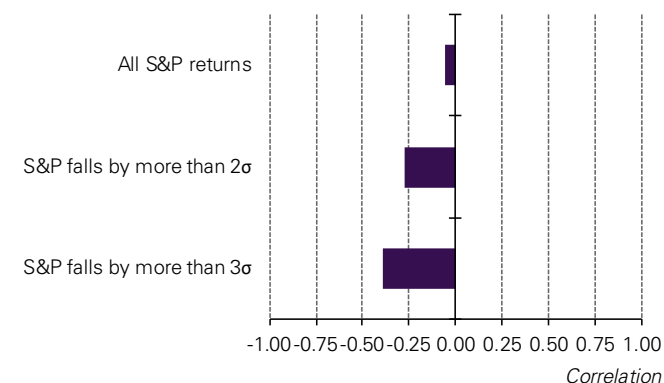
S&P 500 and gold return versus change in VIX level*



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. Source: Bloomberg, World Gold Council

Chart 21: 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 January 1987 and September 2016.

Source: Bloomberg, World Gold Council

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