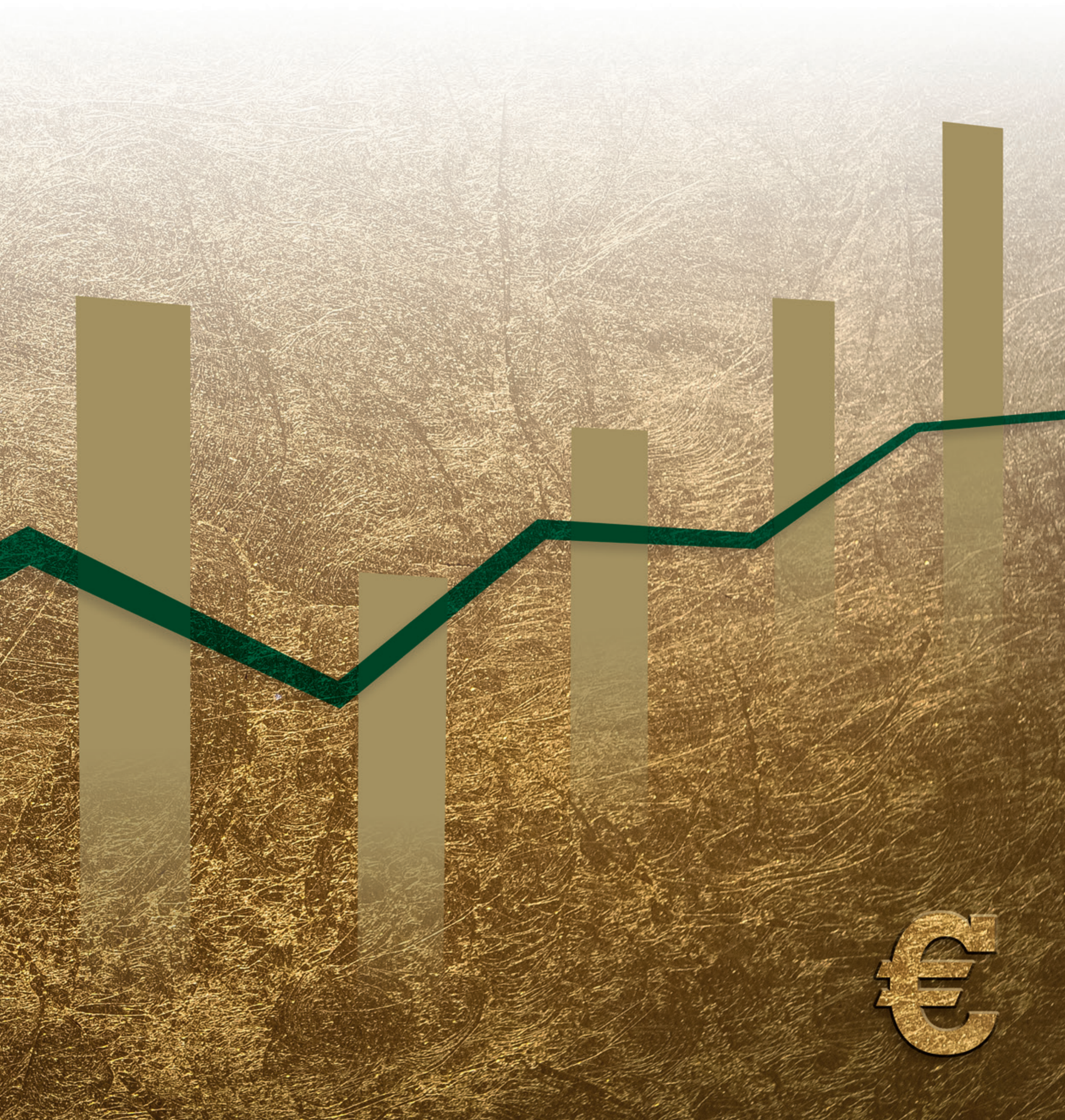
WORLD GOLD COUNCIL

The relevance of gold as a strategic asset

European 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.

> "Our analysis illustrates that adding between 3% and 11% in gold to an average European investor's portfolio over the past 20 years would have resulted in higher risk-adjusted returns.[2]"

New decade, renewed challenges

European investors have seen turbulent times in the last decade. The sovereign debt crisis which immediately followed the Global Financial Crisis highlighted the need for robust risk management. As a new decade has begun, investors face an expanding list of challenges around asset management and portfolio construction.[1]

Persistent ultra-low interest rates

European investors have had to endure low and negative interest rates since the Global Financial Crisis. As with previous crises, and more recently the onset of COVID-19, policy makers continue to navigate their way through by keeping rates low in order to support economic growth. But low interest rates can push investors to seek out riskier assets at elevated valuation levels to achieve higher returns. Persistently low interest rates also 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 – and much needed diversification.

The impact of loose monetary policy could also lead to unintended consequences on asset performance and distort asset allocations for years to come. Additionally, widespread fiscal stimuli and ballooning government debt are raising concerns about a long-term run up of inflation.

Trade tensions and geopolitical uncertainty

Investors in the region are faced with several geopolitical risks, both local and global. The uncertainty and volatility, both financially and politically, caused by the UK's decision to leave the European Union ("Brexit") has posed a serious risk to investor portfolios. Beyond this, a deterioration of relations between the US and China, as well as greater levels of protectionism and trade tensions presents a significant threat to global demand. This adds up to a very real risk for European economies, with Germany, France, the Netherlands, and Italy in the top 10 exporting nations globally.[3]

ESG considerations

Environmental, social and governance (ESG) issues are now decisive in shaping asset selection or strategies. According to Mercer, 89% of European investors now take ESG factors into account when choosing investments.[4] This is in line with wider societal expectations but also driven by a host of legal and regulatory changes. The moves towards an increased understanding of this wider set of risks, and actions to mitigate their negative impacts, has also been a key factor in shaping the evolution of the gold supply chain, as well as gold's developing role as a climate-change risk mitigation asset.[5]

1 See *2020 Gold Outlook*, January 2020.

2 See Chart 8 on page 7 for more details behind the composition of the hypothetical average European investor portfolio. In addition, refer to important disclaimers and disclosures at the end of this report.

3 World Trade Statistical Review 2019, World Trade Organisation.

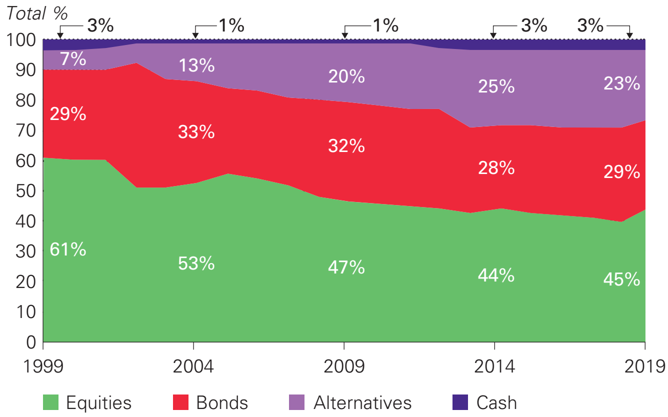
4 Mercer European Asset Allocation Insights 2020.

5 See *Gold and climate change: Current and future impacts*, October 2019.

The role of gold

Investors in Europe have long recognised the benefits of gold. Per capita gold consumption in Germany and Switzerland is among the highest in the world.[6] However, institutional investors also stand to benefit from allocating a proportion of their portfolio to gold. In today's environment, we believe that gold has an increasingly relevant role to play in helping European investors tackle the risk and uncertainty that lies ahead.

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



*As of December 2019. Based on Willis Towers Watson Global Pension Assets Study 2020.

Source: Willis Towers Watson, World Gold Council

The increased relevance of gold

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 1999 to 23% in 2019[7] (**Chart 1**).

Gold allocations have been recipients of this shift. Gold is increasingly recognised as a mainstream investment, evidenced by the fact that global investment demand has grown by an average of 14% per year since 2001 and the gold price has increased by almost four-fold in euro terms over the same period.[8]

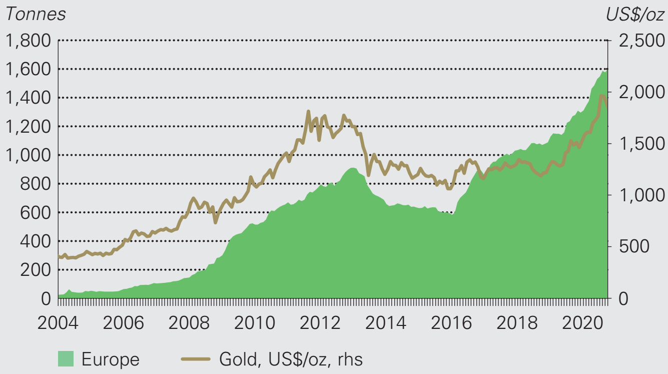
Focus 1: European ETP growth

European gold-backed exchange-traded products (ETPs) holdings have grown rapidly since 2016, hitting a record high of 1,604t (€83bn) in 2020.[9] They now account for 41% of the global gold-backed ETP market, and have transformed gold investment in Europe (**Chart 2**).

Swiss-listed gold-backed ETPs represent nearly a quarter of European fund holdings (366t, €19bn, 23%).

For more information see *Global gold-backed ETFs – A popular gateway to the gold market*, November 2020, and *Market Update: European ETPs reach record highs*, April 2019.

Chart 2: European gold-backed ETP AUM



*Holdings of European listed gold-backed ETPs as of 30 September 2020.

Source: Bloomberg, Company Filings, ICE Benchmark Administration, World Gold Council

6 See the demand and supply section at Goldhub.com

7 Willis Towers Watson, *Global Pension Assets Study 2020* and *Global Alternatives Survey 2017*, July 2017.

8 As of 31 December 2019.

9 As of 30 September 2020.

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 16**, p13 and **Chart 27**, p16)
- **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 (**Focus 1**, p2 and **Chart 17**, p13)
- **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 19**, p13). 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 28** and **Chart 29**, p16)
- **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 26** and **Table 2**, p15)
- **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 18**, p13).

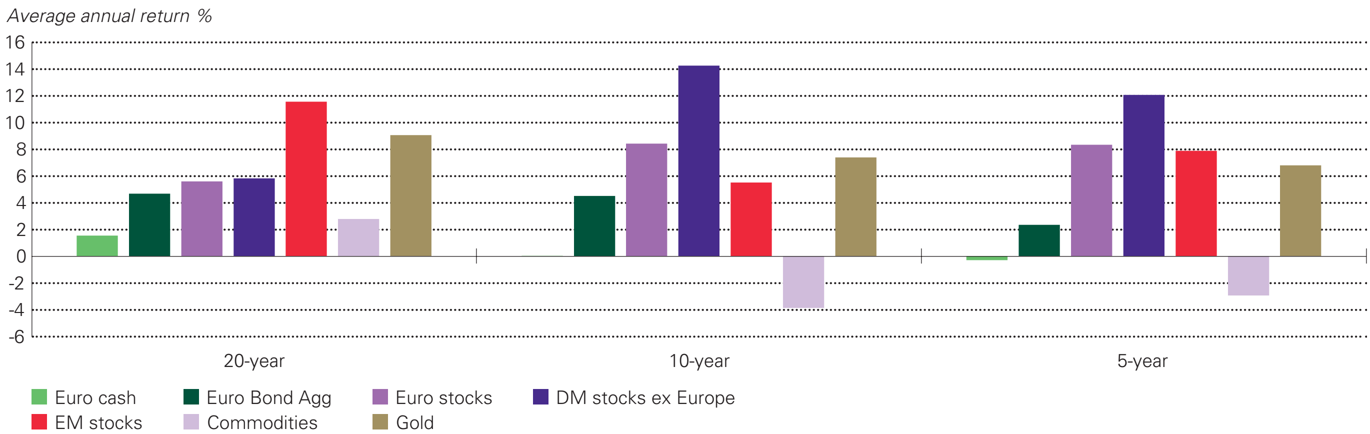
Gold's strategic role

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, measured in euros,[10] has increased by an average of nearly 12% per year since 1971 when the gold standard collapsed.[11] Over this period, gold's long-term return was comparable to stocks and higher than bonds.[12] Gold has also outperformed other major asset classes over the past two decades (**Chart 3** and **Chart 20**, p14).

Chart 3: Gold has delivered positive returns over the long run, outperforming key asset classes
Average annual return of key global assets in euros*



*As of 31 December 2019. Computations in euros of total return indices for Barclays EUR Cash Index, Barclays Pan-European Bond Aggregate Index, MSCI Europe Index, MSCI World ex Europe Index, MSCI Emerging Market Index, Bloomberg Commodity Index, and spot for LBMA Gold Price PM. For compounded annual growth rates see **Chart 20**.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

10 The performance is a blend of the pre-1999 euro performance of the German Mark and the post-release of the euro itself.

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

12 For other return metrics and y-o-y performance see Appendix 2.

This duality reflects the diverse sources of demand for gold and differentiates it from other investment assets. 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.[13] These diverse sources of demand give gold a particular resilience: the potential to deliver solid returns in good times and in bad (**Focus 2**, p5).

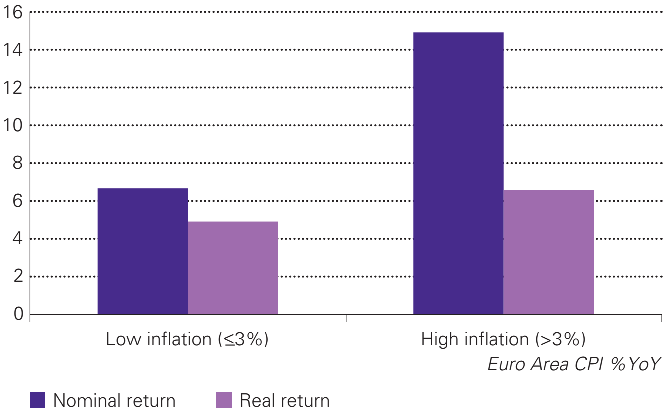
Beating inflation, combating deflation

Gold is long considered a hedge against inflation and the data confirms this. The average annual return of nearly 12% since 1971 has outpaced the European 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 4**). 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.[14] Such periods are characterised by low interest rates, reduced consumption and investment, and financial stress, all of which tend to foster demand for gold.

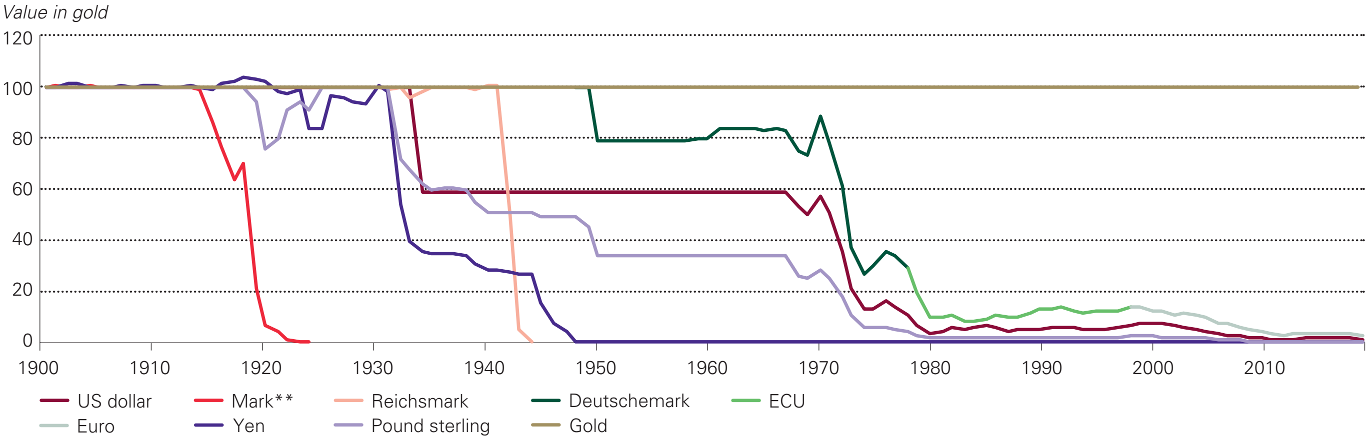
Chart 4: Gold has historically rallied in periods of high inflation
Gold returns in euros as a function of annual inflation*



* Based on y-o-y changes of the LBMA Gold Price PM and European CPI between 1971 and 2019.

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

Chart 5: 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

13 See Chart 14 on page 12.

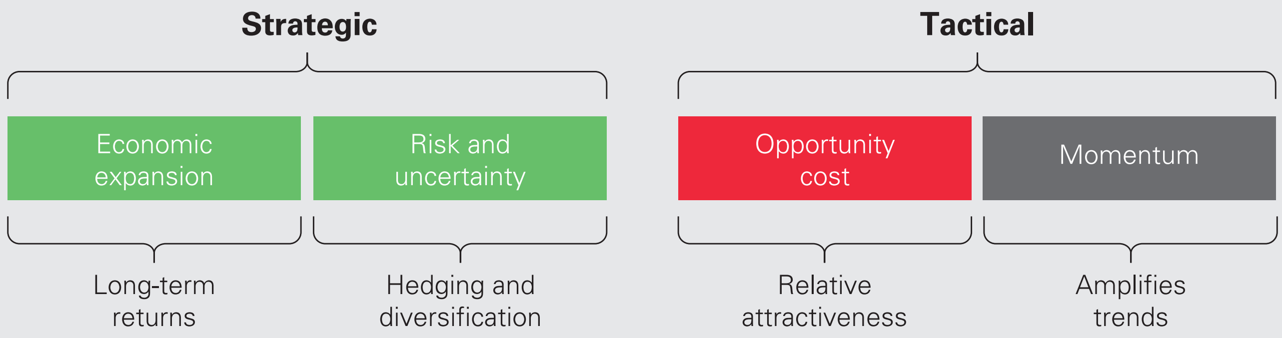
14 Oxford Economics, *The impact of inflation and deflation on the case for gold*, July 2011.

Focus 2: 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***.℠[16]

- **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.



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 5**, p4). 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.[15] 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 29**, p16). 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, all of which were long deemed portfolio diversifiers. Gold, by contrast, held its own and increased in price, rising 27% in euros from December 2008 to December 2009.[17]

15 See the demand and supply section at Goldhub.com

16 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.

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

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 28**, p16) Importantly too, gold allows investors to meet liabilities when less liquid assets in their portfolio are difficult to sell, undervalued and possibly mispriced.

But gold's correlation does not just work for investors during periods of turmoil. It can also deliver a 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 6**), 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

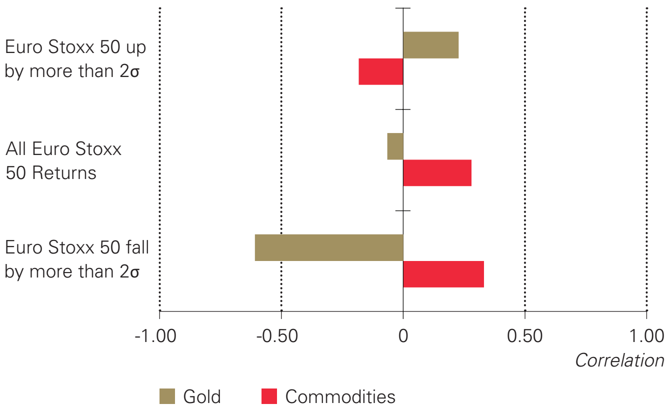
The gold market is large, global and highly liquid.

We estimate that physical gold holdings by investors and central banks are worth approximately €3.1 trillion (tn) with an additional €620bn in open interest through derivatives traded on exchanges or the over-the-counter market.[18]

The gold market is also more liquid than several major financial markets, including German Bunds and European stock markets, while trading volumes are similar to the US short-dated Treasuries (**Chart 7**). Gold's trading volumes averaged €136bn per day in 2019. During that period, over-the-counter spot and derivatives contracts accounted for €72bn and gold futures traded €60bn 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 €1.8bn 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.

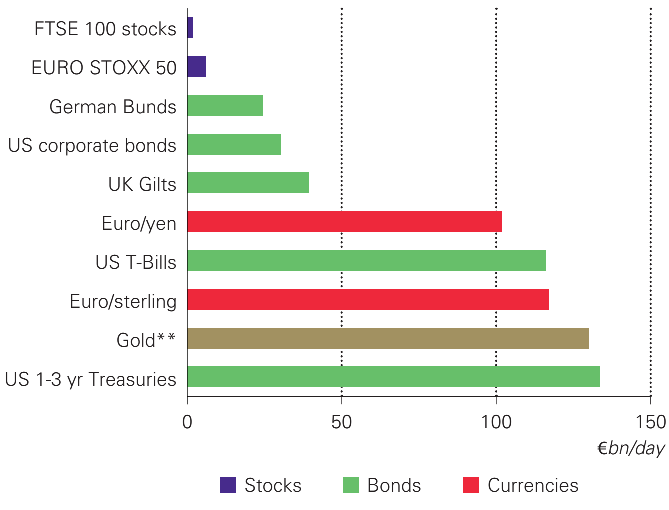
Chart 6: Gold's correlation with stocks helps portfolio diversification in good and bad economic times
Correlation between gold and European stock returns in various environments of stocks' performance*



* As of 31 December 2019. Correlations computed using weekly returns in euros based on the Bloomberg Commodity Index and the LBMA Gold Price PM since January 1999.
The middle bar corresponds to the unconditional correlation over the full period. The bottom bar corresponds to the correlation conditional on Euro Stoxx 50 weekly return falling by more than two standard deviations (or 'σ') respectively, while the top bar corresponds to the Euro Stoxx 50 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 7: Gold trades more than many other major financial assets
Average daily trading volumes in euros*



* Based on estimated one-year average trading volumes in euros 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

18 See Chart 13 and Figure 1 in Appendix 1 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 a European investment portfolio. It shows that an average hypothetical fund portfolio would have achieved higher risk-adjusted returns if between 5% and 15% of the portfolio had been allocated to gold. (**Chart 8** and **Table 1**). The positive impact has been particularly marked since the Global Financial Crisis.

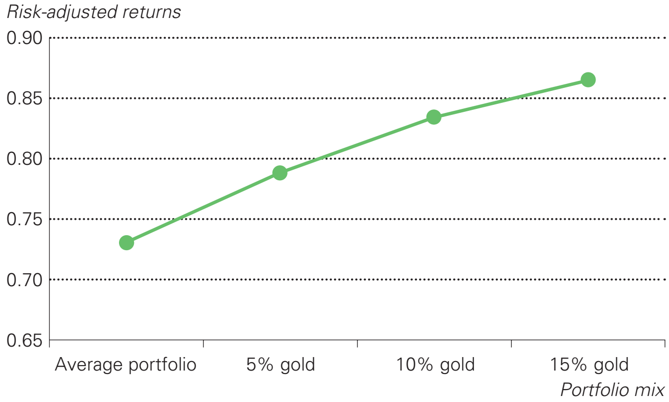
Beyond historical backtesting, a more robust optimisation analysis shows that euro based investors can benefit from a material improvement in performance if they allocate between 3% and 11% of a well-diversified portfolio to gold (**Chart 9**, p8).[19]

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 9**, p8).

Our analysis indicates that gold's optimal weight in hypothetical portfolios is statistically significant even if investors assume a more conservative annual return for gold between 4% and 5% - 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,[20] and for investors who hold alternative assets, such as real estate, private equity and hedge funds.[21]

Chart 8: Adding gold would have increased risk-adjusted returns of a hypothetical average investor portfolio
Performance of a hypothetical average investor fund portfolio with and without gold*



*Based on performance in euros between 31 December 1999 and 31 December 2019. The composition of the hypothetical average European investment portfolio is based on Willis Tower Watson Global Pension Assets Study 2020, OECD Global Pension Statistics, and the Mercer 2019 European Asset Allocation Survey. It includes quarterly-rebalanced total returns of a 35% allocation to stocks (16% MSCI Europe, 14% MSCI World ex Europe, 5% MSCI Emerging Markets) 50% allocation to fixed income (32% Bloomberg Barclays Pan-Euro Agg Index, 13% Bloomberg Barclay US Agg Index, 2% Bloomberg Barclays EM Agg, 3% Barclays EUR Cash Index) 15% alternative assets (8% HFRI Hedge Fund Index, 3% FTSE EPRA Nareit Developed Europe Index, 3% LPX Europe Listed Private Equity Index, 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 investor 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%	**5.2%**	7.1%	**7.1%**	5.6%	**5.8%**	15.9%	**16.4%**
Annualised volatility	10.0%	**6.3%**	5.3%	**5.3%**	6.1%	**5.9%**	4.5%	**4.3%**
Risk-adjusted returns	62.8	**83.4**	133.3	**133.4**	91.9	**97.9**	349.0	**377.4**
Maximum drawdown	-24.2%	**-39.8%**	-6.9%	**-7.2%**	-6.9%	**-7.2%**	-1.4%	**-1.1%**

*As of 31 December 2019. The average hypothetical portfolio is based on Willis Tower Watson Global Pension Assets Study 2020, OECD Global Pension Statistics, and the Mercer 2019 European Asset Allocation Survey and as described in **Chart 8**. See important disclaimers and disclosures at the end of this report.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

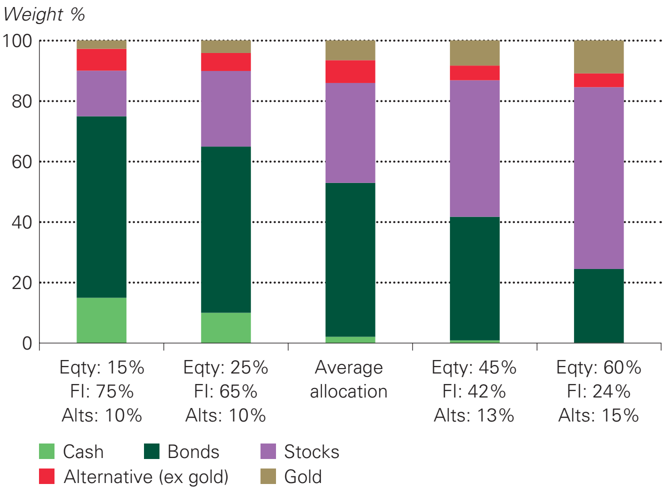
19 Analysis based on the re-sampled efficiency methodology developed by Richard and Robert Michaud and praised as a robust alternative to traditional mean-variance optimisation. See *Efficient Asset Management: A Practical Guide to Stock Portfolio Optimization and Asset Allocation*, Oxford University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

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

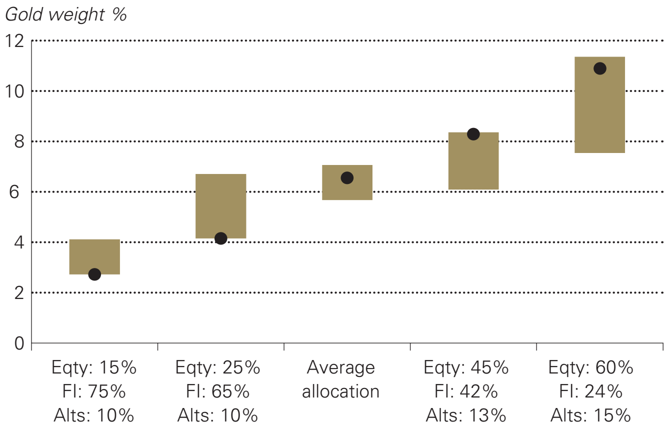
21 *How gold improves alternative asset performance*, Gold Investor, Volume 6, June 2014.

Chart 9: 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 performance in euros between 31 December 1999 and 31 December 2019. The composition of the hypothetical average European investment portfolio is based on Willis Tower Watson Global Pension Assets Study 2020, OECD Global Pension Statistics, and the Mercer 2019 European Asset Allocation Survey. It includes quarterly-rebalanced total returns of a 35% allocation to stocks (16% MSCI Europe, 14% MSCI World ex Europe, 5% MSCI Emerging Markets) 50% allocation to fixed income (32% Bloomberg Barclays Pan-Euro Agg Index, 13% Bloomberg Barclay US Agg Index, 2% Bloomberg Barclays EM Agg, 3% Barclays EUR Cash Index) 15% alternative assets (8% HFRI Hedge Fund Index, 3% FTSE EPRA Nareit Developed Europe Index, 3% LPX Europe Listed Private Equity Index, 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.

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.

Source: World Gold Council

Focus 3: 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.

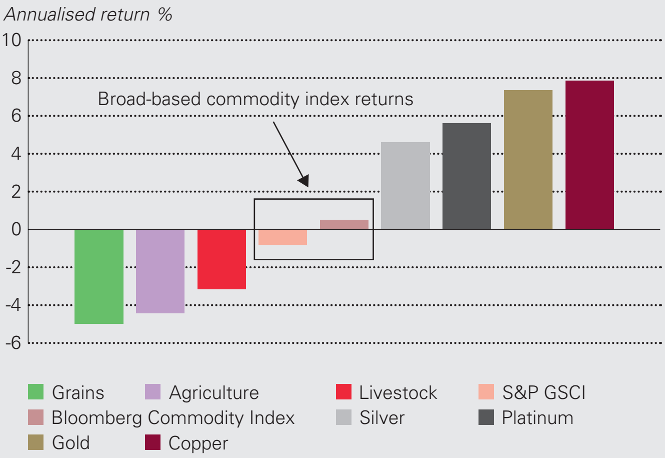
Gold shares some similarities with commodities. But there are several important differences:

- 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.[22]

Chart 10: Gold has outperformed all broad-based indices and all individual commodities

20-year commodity and commodity index returns



Annualised returns in euros 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, LBMA Gold Price PM.

Source: Bloomberg, World Gold Council

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

Focus 4: The case for gold for Swiss investors

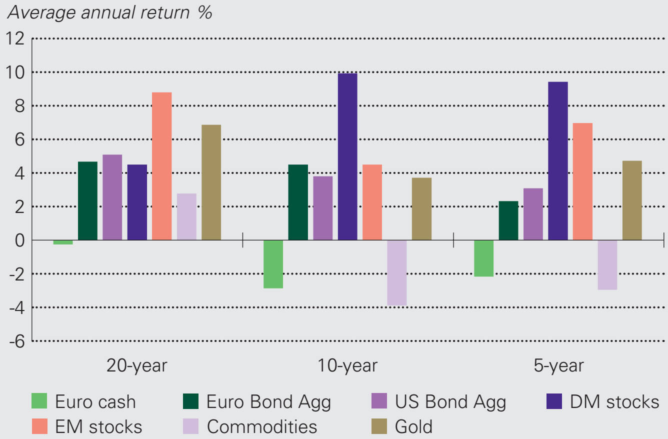
In Switzerland, where wealth per adult is ranked number one globally, capital preservation and growth are important in a low-to-negative rate environment, especially given that financial assets account for 55% of gross wealth.[23] With the prospects of equity returns uncertain, and bond yields low across most developed markets, there has been growing interest in hunting for higher returns via riskier assets.

Additionally, there is growing concern around the prospect of inflation in the medium term and potential currency debasement, given the unprecedented levels of global monetary and fiscal stimulus announced by governments around the global since the onset of COVID-19. In the case of Switzerland, the government announced a CHF32bn (US$33bn) fiscal stimulus package in March to support the economy and navigate the uncertainty ahead.

Gold can serve as an effective hedge to address these risks. It is one of few assets that retains its value over time and is proven to generate long-term positive returns (**Chart 11**). Over the past 10 years, gold in Swiss francs has increased by 30%, although lagging gold's euro performance of 78% due to the franc's position as a safe haven.[24] It has also been shown to be an effective hedge against inflation.

Based on our analysis over the past 20 years, we conclude that an allocation to gold would have had a positive impact on the risk-adjusted returns for the average Swiss investor. We believe investors can benefit from a material enhancement in performance if they allocate between 5% and 15% of a well-diversified portfolio to gold (**Chart 12**).

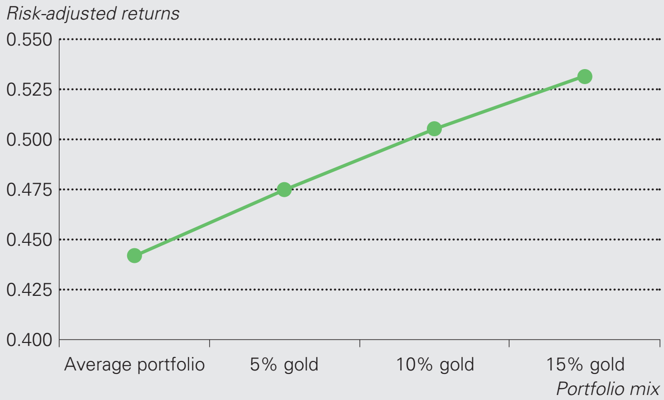
Chart 11: Gold has delivered positive returns over the long run, outperforming key asset classes
Average annual return of key global assets in Swiss francs*



*As of 31 December 2019. Computations in Swiss francs of total return indices for Barclays EUR Cash Index, Barclays Pan-European Bond Aggregate Index, MSCI Europe Index, MSCI World ex Europe Index, MSCI Emerging Market Index, Bloomberg Commodity Index, and spot for LBMA Gold Price PM.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

Chart 12: Adding gold would have increased risk-adjusted returns of a hypothetical average investor portfolio
Performance of a hypothetical average investor fund portfolio with and without gold



*Based on performance in euros between 31 December 1999 and 31 December 2019. The composition of the hypothetical average Swiss investment portfolio is based on Willis Tower Watson Global Pension Assets Study 2020, OECD Global Pension Statistics, and the Mercer 2019 European Asset Allocation Survey. It includes quarterly-rebalanced total returns of a 35% allocation to stocks (12.5% MSCI Europe, 17.5% MSCI World ex Europe, 5% MSCI Emerging Markets) 35% allocation to fixed income (12.5% Bloomberg Barclays Pan-Euro Agg Index, 12.5% Bloomberg Barclay US Agg Index, 5% Bloomberg Barclays EM Agg, 5% Barclays EUR Cash Index) 30% alternative assets (7.5% HFRI Hedge Fund Index, 10% FTSE EPRA Nareit Developed Europe Index, 7.5% LPX Europe Listed Private Equity Index, 5% 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

23 Credit Suisse Global Wealth Report 2019.

24 Based on the LBMA Gold Price PM performance in euros and Swiss francs between 31 December 2009 and 31 December 2019.

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.

Its position as an investment and a luxury good has allowed it to deliver average returns of nearly 12% in euro terms over nearly the past 50 years, comparable to stocks 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 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 continue, reflecting ongoing political and economic uncertainty, persistently low interest rates and economic concerns surrounding stock and bond markets (see *Gold Mid-year Outlook 2020*).

Overall, extensive analysis suggests that adding between 3% and 11% of gold to a European portfolio can make a tangible improvement to performance and boost risk-adjusted returns on a sustainable, long-term basis.[25]

25 See Chart 9, p8.

Appendix 1: 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.

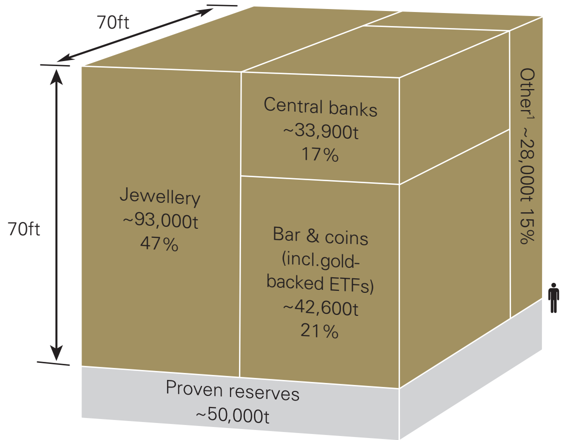
There are approximately 197,576t of gold above ground, worth more than €8.5trn (**Figure 1**).[26] Mine production adds approximately 3,500t per year, equivalent to an annual 1.8% increment.[27]

The approximate breakdown of physical gold,[28] based on its use, is:

- Jewellery: 92,947t (€4.08trn) 47%
- Official sector: 33,919t (€1.49trn) 17%
- Bars and coins: 39,722t (€1.74trn) 20%
- ETFs and similar: 2,885t (€126bn) 1%
- Other and unaccounted: 28,090t (€1.23trn) 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 13**).

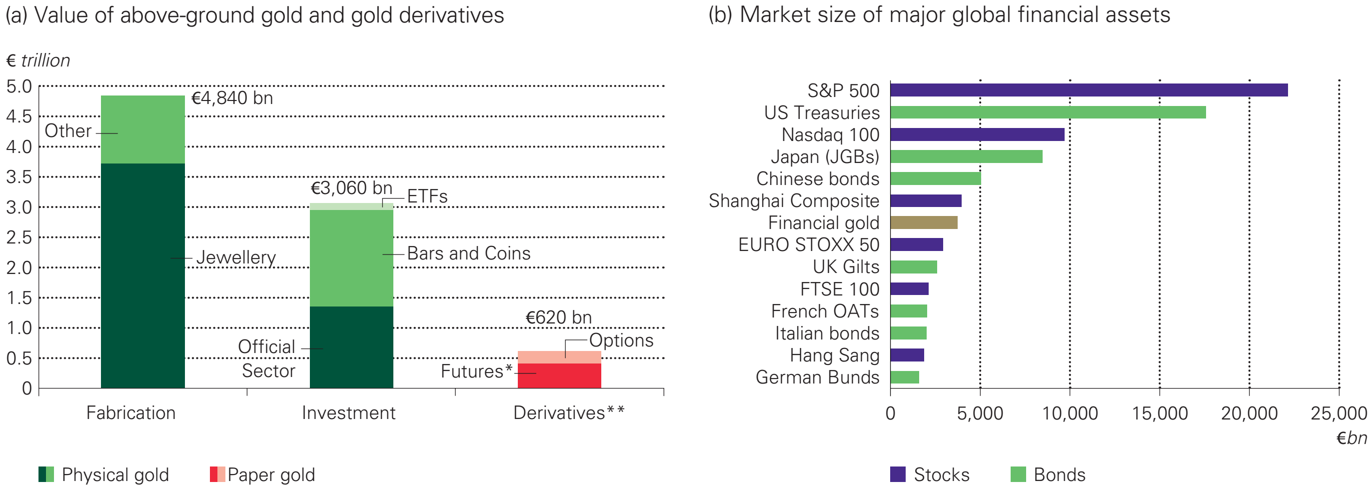
Figure 1: Gold supply fits in 2.6 Olympic swimming pools*



* Based 2019 above ground estimates and the standard Olympic swimming pool dimensions of (length = 164ft, width = 82ft, depth = 9ft)..
[1]Includes "other fabrication" (13%) and "unaccounted for" (2%).

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

Chart 13: The size of the financial gold market is large compared to many global assets, and dwarfs known open interest in gold derivatives*



* 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

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

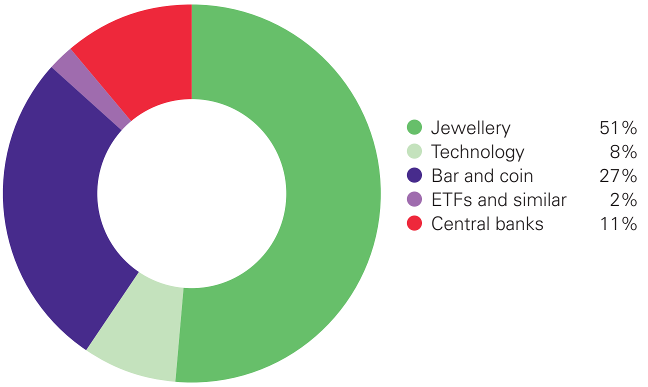
27 Based on Metals Focus and Refinitiv GFMS 10-year mine production average as a percentage of above ground stocks, as of December 2019.

28 Ibid 29.

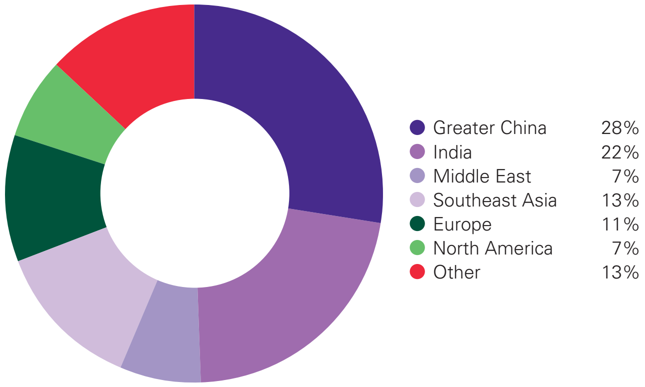
Demand diversity underpins gold's low correlations

Chart 14: 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*



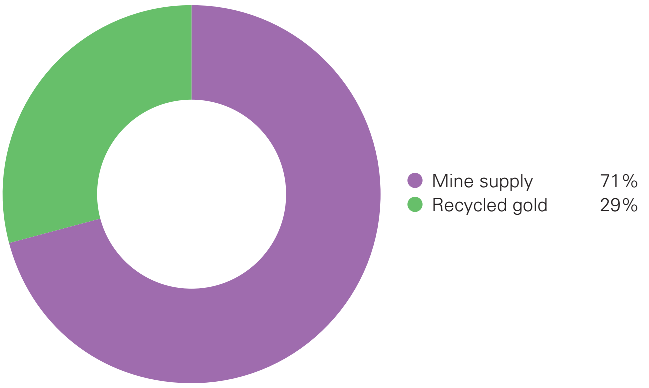
*Computed using annual demand from 2010 to 2019. Regional breakdown excludes central bank demand due to data availability.

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

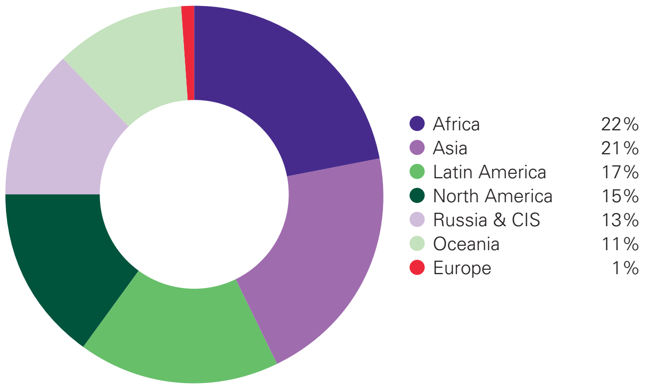
Fewer supply side shocks help reduce gold's volatility

Chart 15: 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 2009 to 2019.

**Computed using annual supply from 2009 to 2019.

Source: Metals Focus, Refinitiv GFMS, World Gold Council

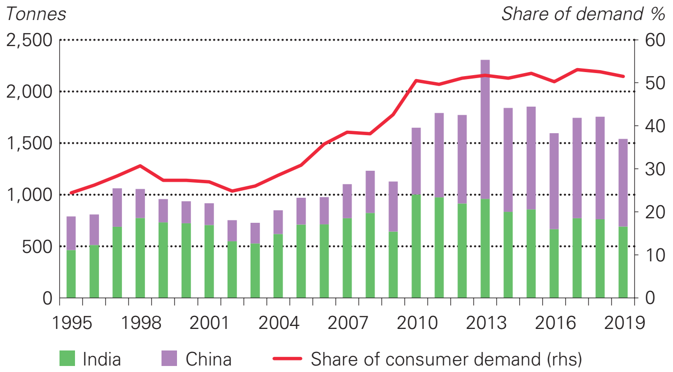
Three trends have reshaped gold demand

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%. 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.[29]

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 3,878t of gold, worth €201bn, since they were first launched in 2003 (**Chart 17**).[30] The growth is particularly pronounced in Europe, where market share has neared levels on par with North America, a sign of global acceptance.

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 18**).

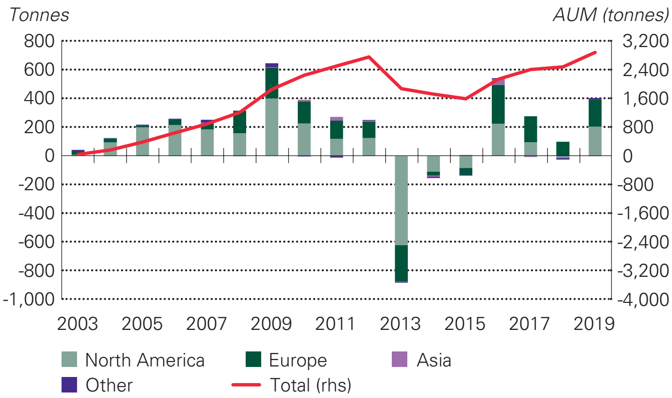
Chart 16: India and China have doubled their gold market share in less than two decades
Emerging market economic development has created consumer demand and market share in India and China*



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

Source: Metals Focus, Refinitiv GFMS, World Gold Council

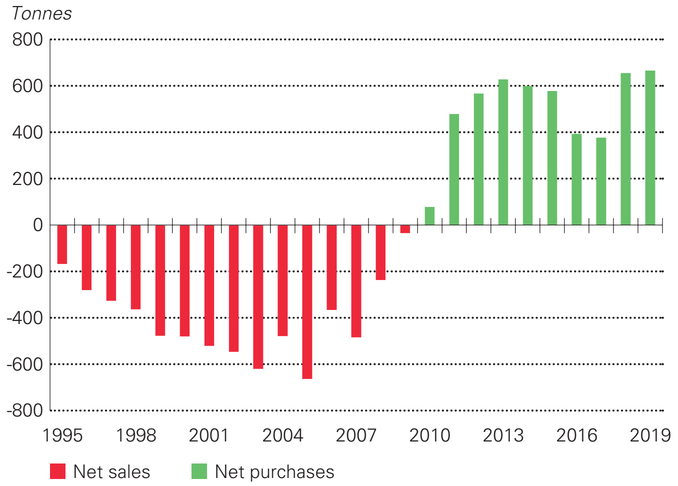
Chart 17: Gold-backed ETFs have introduced new investors to gold across the world
Annual ETF gold demand and cumulative holdings*



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

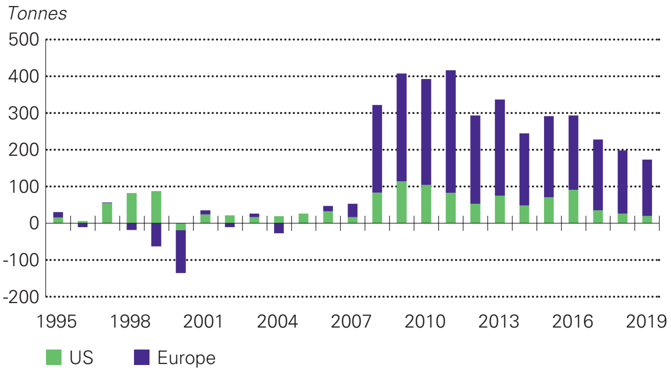
Source: Bloomberg, ETF regulatory fund filings, World Gold Council

Chart 18: Central banks have been a steady net source of demand since 2010, led by emerging markets
Net global central bank gold demand



Source: Metals Focus, Refinitiv GFMS, World Gold Council

Chart 19: 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: Metals Focus, Refinitiv GFMS, World Gold Council

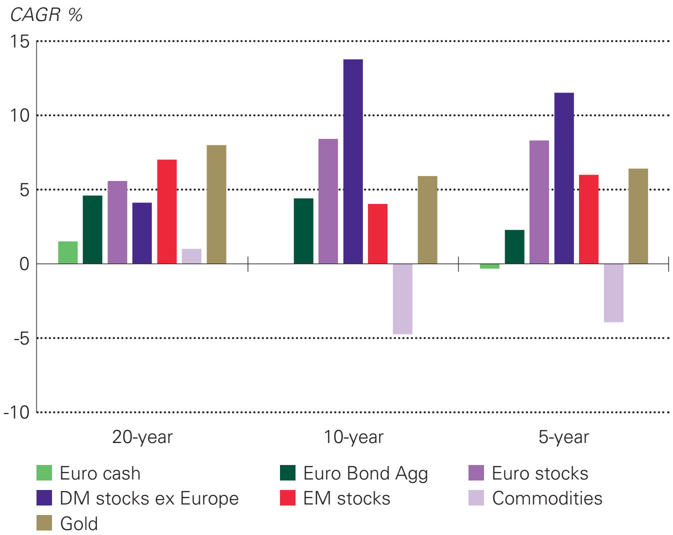
29 Ibid.

30 As of 30 September 2020. For more information visit Goldub.com

Appendix 2: Gold's performance over time

Annual growth rates and historical returns

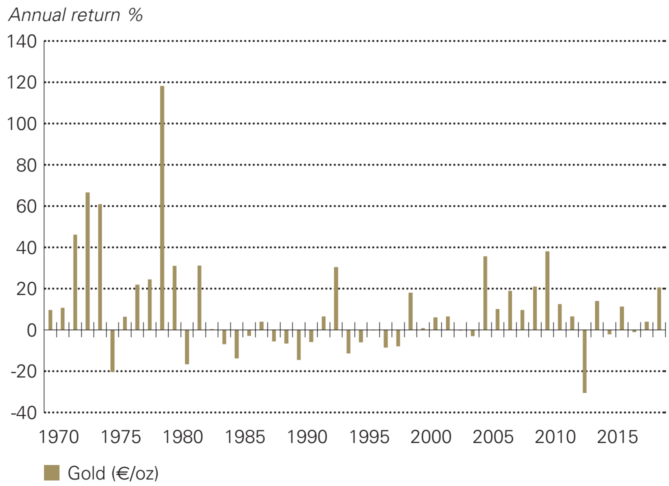
Chart 20: Gold's compounded returns compare favourably to many asset classes, including stocks
Compounded annual growth rate for major asset classes*



*As of 31 December 2019. Computations in euros of total return indices for Barclays EUR Cash Index, Barclays Pan-European Bond Aggregate Index, MSCI Europe Index, MSCI World ex Europe Index, MSCI Emerging Market Index, Bloomberg Commodity Index, and spot for LBMA Gold Price PM.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

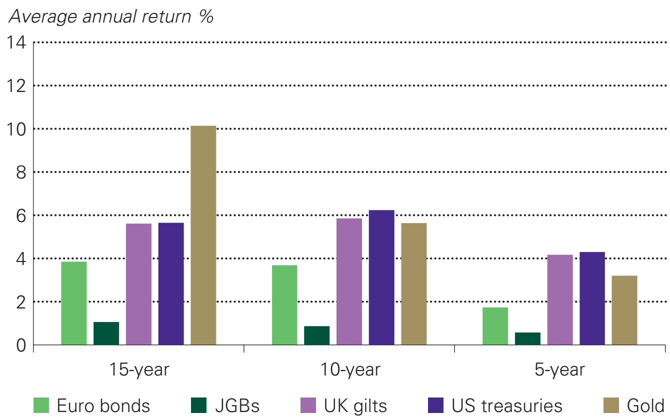
Chart 21: After high price volatility in the 1970s, gold returns have been steadier
Gold price return per year since 1971*



*As of 31 December 2019. Computations based on the LBMA Gold Price PM in Eurodollars to account for currency pricing prior to the creation of the euro.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

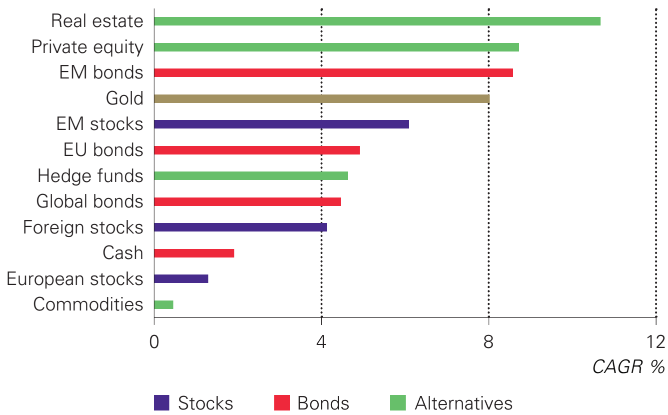
Chart 22: Gold significantly outperforms major global sovereign debt
Gold's long-term performance compared to major sovereign debt*



*Based on data from 31 December 2004 to 31 December 2019 due to limited bond data.

Source: All data measured in euros 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 Gold Price PM.

Chart 23: Gold has delivered strong returns against major asset classes over the past 20 years*

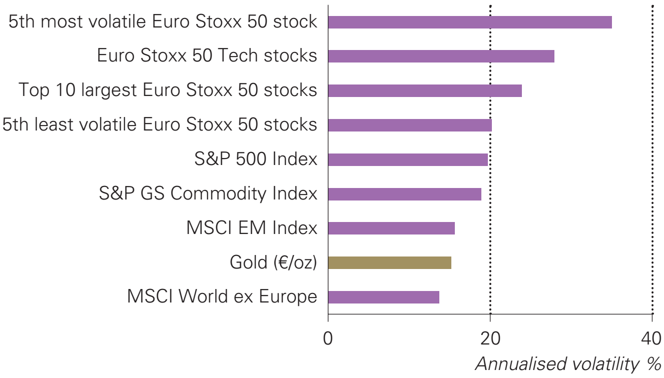


*As of 31 December 2019. Computations in euros of total return indices for Bloomberg Barclays Short Treasury, Bloomberg Barclays EU, Global and EM Bond Aggregate, MSCI World ex Europe and EM Indices, Euro Stoxx 50, FTSE REITs Index, HFRI Composite, S&P Private Equity Index, Bloomberg Commodity Index and spot for LBMA Gold Price PM.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

Less volatile than most stocks and commodities

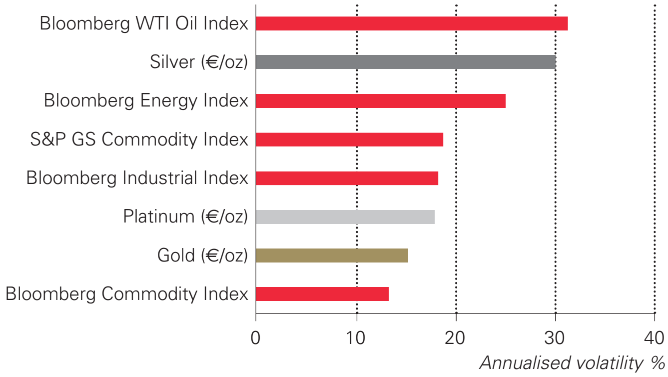
Chart 24: Gold's volatility sits below that of many individual stocks and stock indices
Realised volatility of stocks, stock indices and gold*



*Annualised volatility is computed based on daily returns in euros 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 25: Gold is also less volatile than individual commodities
Realised volatility of commodities and gold*

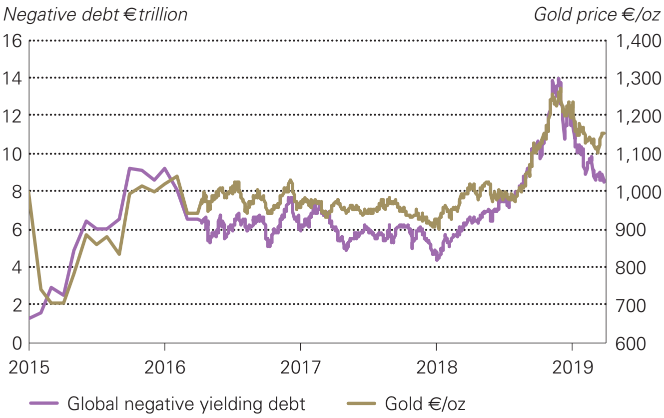


*Annualised volatility is computed based on daily returns in euros 31 December 2009 and 31 December 2019.

Source: Bloomberg, ICE Benchmark Administration, World Gold Council

Performs well in a low or negative real rate environment

Chart 26: Global negative yielding debt vs gold prices
Gold prices in euros 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 doubles in periods of low to moderate interest rates
Gold performance in various real rate environments*

	Long-term	Low (<0%)	Moderate (0% - 3.5%)	High (>3.5%)
Monthly Returns	0.5%	0.1%	0.7%	0.3%
Yearly Returns	6.2%	1.4%	9.0%	3.8%

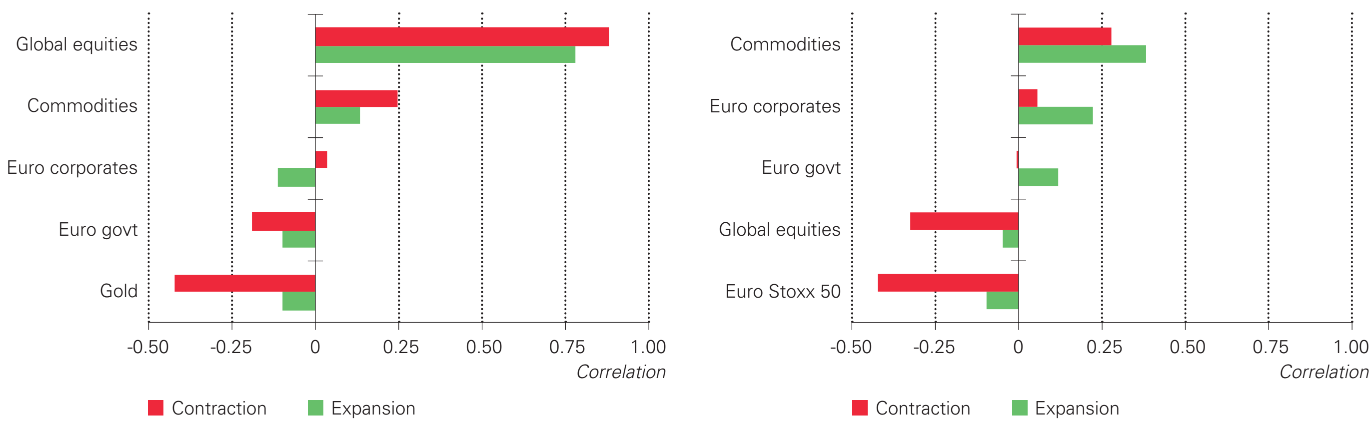
* Based on nominal gold returns in euros between September 1990 and December 2019 based on available data. Real rate regimes based on the 1-yr constant maturity ECB Euro area curve minus the corresponding y-o-y CPI inflation. Prior to 2000, the gold price was based on German Marks and the German 2-yr bond. Difference from zero computed as a two-way T test at a 5% significance level.

Source: Bloomberg, European Central Bank, ICE Benchmark Administration, World Gold Council

Effective correlation across economic cycles

Chart 27: Gold is an effective diversifier in periods of economic expansion and contraction

(a) Correlation between Euro Stoxx 50 stocks and major assets*　　(b) Correlation between gold and major assets*



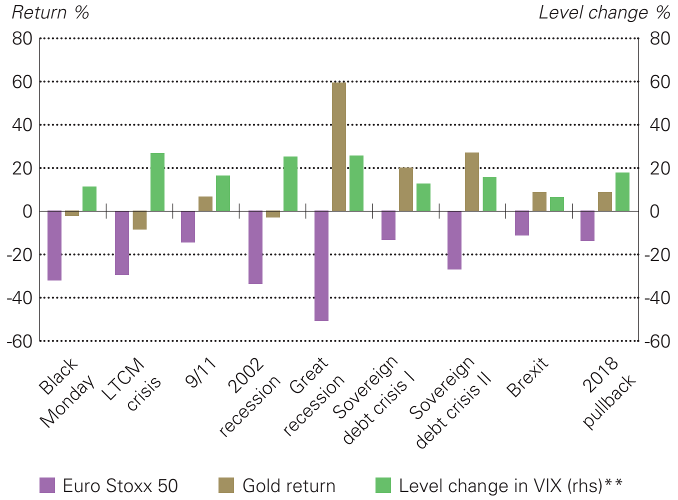
*Based on monthly returns in euros between 1 January 1990 and 31 December 2019. Economic expansions and contractions as determined by the National Bureau of Economic Research (NBER).

Source: Bloomberg, NBER, World Gold Council

Often viewed as a safe haven

Chart 28: The gold price tends to increase in periods of systemic risk

Euro Stoxx 50 and gold return vs change in VIX level*

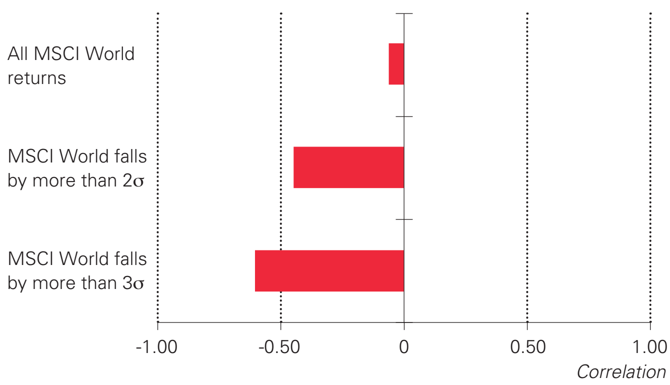


*The VIX is available only after January 1990. For events occurring prior to that date annualised 30-day S&P 500 volatility is used as a proxy. Dates used: Black Monday: 9/1987–11/1987; LTCM: 8/1998; Dot-com: 3/2000–3/2001; September 11: 9/2001; 2002 recession: 3/2002–7/2002; Great Recession: 10/2007–2/2009;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

Source: Bloomberg, World Gold Council

Chart 29: The price of gold tends to increase more when stocks pull down sharply

Conditional correlation between gold and the MSCI World relative to the magnitude of the stock pullback*



*Based on weekly returns between 1 January 1990 and 31 December 2019.

Source: Bloomberg, World Gold Council

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Published: November 2020