



The case for gold

A special report for institutionally managed superannuation funds



Dear Investor,

Thank you for taking the time to read this in-depth report that reviews the role gold can play in diversified superannuation strategies.

The findings presented are based on historical analysis of market data and superannuation funds across the risk spectrum from the early 1990s through to the end of 2020.

Found in the section titled Gold in diversified superannuation strategies (p31), the report demonstrates that gold can improve risk adjusted returns at the portfolio level, primarily due to its historical ability to minimise overall portfolio downside in environments where diversified strategies decline in value.

This section also includes an overview of developments in financial markets from the introduction of compulsory superannuation in the early 1990s through to the end of 2020, contextualising the environment under review.

This report also contains other sections pertinent to questions about the potential role of gold in Australian superannuation funds, including:

- A review of the developments in the precious metal market in the past two and a half years, with gold firmly back on the investment radar after topping USD 2,000 per troy ounce for the first time ever in 2020.
- The stand-alone attributes of gold as an asset class, from long-term returns to its relationship with real interest rates, and its correlation to equities.
- Non-performance attributes of gold, including liquidity and investment costs.
- A look at the gold price, its performance in previous market cycles, and whether the all-time high in the nominal price seen last year is indicative of a bubble.
- Whether gold should be seen as a defensive or growth asset, or a hybrid of the two, as well as its unique qualities relative to other alternative assets.
- How institutional investors can allocate to gold, looking at the pros and cons of gold futures, gold exchange traded funds (ETFs) and direct depository accounts.
- How The Perth Mint can facilitate institutional investment into precious metals.

We hope that you find this report of interest and welcome the opportunity to discuss with you The Perth Mint's industry leading investment solutions.



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Executive summary

- Gold is back on the radar of investors worldwide after a strong rally between September 2018 and August 2020 saw the precious metal hit all-time highs in nominal terms above USD 2,000 per troy ounce. The pullback in late 2020 and early 2021 appears to be healthy correction in an ongoing bull market trend.
- Demand for gold among developed market investors has increased notably alongside the rise in the gold price, best seen through inflows into gold ETFs like Perth Mint Gold (ASX:PMGOLD), with total investments into gold ETFs approaching USD 50 billion in 2020, more than double the previous record for a calendar year.
- Gold has a number of performance related attributes that can make it a worthwhile investment in its own right, including a positive correlation to rising equity markets, and a history of outperformance when risk assets fall or when the economy is in a low real interest rate environment.
- Gold also has a number of non-performance related attributes that can be beneficial for institutional investors, from high liquidity to low costs, the absence of credit risk and its simplicity to incorporate in a portfolio.
- While gold is no longer cheap, a variety of metrics suggest it is still inexpensive relative to history, and could move meaningfully higher in this cycle.
- Institutional investors may be best served viewing gold as a hybrid asset from an asset allocation perspective, as it has some growth and some defensive attributes, with the precious metal able to play a useful role in portfolio construction.
- An allocation to gold will likely improve the liquidity, as well as lower the investment costs, volatility, maximum drawdowns, dispersion and credit risk of a portfolio.
- Analysis of historical data highlights the fact gold can help improve risk adjusted returns for all diversified investment strategies, from conservative through to all growth portfolios.
- Gold's ability to improve risk adjusted returns in diversified superannuation strategies proved superior to bonds and commodities over the time period studied, which was from mid-1993 to the end of 2020.
- The beneficial role that gold can play in a diversified portfolio may be enhanced in the decade ahead, given the economic, financial market and monetary environment investors must navigate.
- Institutional investors looking to hold strategic allocations to gold are likely best served ignoring the futures market, and allocating via ETFs or direct depository solutions, where they can hold legal title to allocated bullion.



Gold: Back on the radar

The price of gold rose at its fastest pace in a decade in 2020, increasing by 25% in US dollar terms to end the year trading at USD 1,887.60 per troy ounce. In Australian dollar terms gold rose by 14%, its fifth straight calendar year gain, with the precious metal ending 2020 trading at AUD 2,446.20 per troy ounce.

Gold's rally in 2020 continued a strong period of performance that dates back to Q4 2018, when the precious metal was trading below USD 1,200 and AUD 1,650 per troy ounce.

From September 2018 through to December 2020, the gold price increased by 59% in US dollar terms and 49% in Australian dollar terms, with the rally driven by multiple factors, including:

- A sharp decline in equities during Q4 2018, with the S&P 500 falling by almost 14%, and the ASX 200 price index falling by 9% over this time period.
- A large decline in global bond yields, with US and Australian 10-year government bond yields dropping by circa 70%, from 3.06% in the US and 2.63% in Australia at end Q4 2018, to just 0.93% in the US and 0.98% in Australia by the end of 2020.
- An increase in the value of negative yielding debt, which grew from circa USD 6 trillion to USD 18 trillion between September 2018 and December 2020. Debt trading with a negative real yield is larger still, with JP Morgan estimating it hit USD 31 trillion in value in October 2020, double the levels seen two years earlier.
- A return to monetary easing by global central banks, which began in earnest in 2019 when the US Federal Reserve (Fed) and the Reserve Bank of Australia (RBA) both cut interest rates three times.
- Expanded fiscal and monetary stimulus in 2020, as governments and central banks fought to minimise the economic fallout from COVID-19.

On the last point, in its October Fiscal Monitor, the International Monetary Fund (IMF) estimated that government stimulus in 2020 amounted to almost USD 12 trillion (circa 12% of global GDP), with deficits on average surging by 9% of GDP.

On the monetary front, developed market central banks engaged in a combination of policy rate reductions, expanded liquidity operations and use of US dollar FX Swap lines, large-scale public sector asset purchases, private sector asset purchases, and implementation of term funding schemes.

According to Yardeni Research, the total balance sheets of the Fed, the European Central Bank, the Bank of Japan and the People's Bank of China grew by approximately USD 8 trillion in 2020.

While all these policies helped mitigate the scale of the economic downturn seen in 2020, their impact in lowering real yields, and the concern that they may foster higher levels of inflation in the years ahead (US 10-year breakeven inflation rate rose from 0.50% in March 2020 to 1.99% by December 2020) helped drive the gold price higher for most of last year.

This can be expected to continue in the future, even though the pace of monetary expansion may slow. Morgan Stanley, for example, estimates that central bank government bond purchases alone across the G-10 will approach USD 2.8 trillion in 2021, with total balance sheet expansion likely to top USD 3.5 trillion.





Investment demand for gold

The rally in gold and the tailwinds that drove it are evident in the increased investment demand seen in precious metal markets over the past few years.

Examples of this include central bank (official sector) gold buying, with 2018 and 2019 both seeing more than 650 tonnes of net purchases – the highest annual figures since the 1970s.

Demand from central banks did pull back in 2020 due to the impact of COVID-19, though net purchases still totalled more than 270 tonnes last year.

High net worth (HNW) and Family Office investors also added to their precious metal holdings, with the UBS Global Family Office report for 2020 suggesting an average 3% allocation to gold and precious metals, up from just below 1% the year before.

Goldman Sachs also alluded to the trend of higher gold allocations amongst HNW investors. Its research, which estimated gold demand based on trade flows, suggested that some 2,000 tonnes of gold had been purchased by HNW investors in the three years to late 2019.

Gold ETFs also saw strong demand, especially in 2020, with inflows of just over 850 tonnes. This was a record in terms of total tonnes, and in terms of the US dollar value of the inflows, easily exceeding prior records set in 2009 (tonnes) and 2016 (value).

This can be seen in the table below which highlights calendar year net flows in tonnes and USD billions from 2003, when the first gold ETFs including Perth Mint Gold (ASX: PMGOLD) were listed on global stock exchanges, through to the end of 2020.

Calendar year net flows (in tonnes and US dollars) into gold ETFs

Year	Net flows (tonnes)	Net flows (USD billion)
2003	42.5	0.4
2004	125.4	1.8
2005	218.9	3.2
2006	260.2	4.9
2007	251.5	5.8
2008	311.0	8.8
2009	649.0	19.8
2010	388.6	15.2
2011	259.9	14.1
2012	252.0	13.8
2013	-887.1	-40.6
2014	-149.3	-5.8
2015	-129.3	-4.5
2016	541.1	21.7
2017	271.6	11.0
2018	70.1	3.1
2019	398.3	18.5
2020	877.1	48.1

Source, The Perth Mint, World Gold Council

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Futures market participants also increased net long positioning between September 2018 and the end of 2020. Gross long positions ended last year sitting at more than 187,000 contracts, well short of record highs which would indicate excess froth in the market, but nonetheless still an increase of more than 80,000 contracts relative to end September 2018 positioning.

Over the same time period, gross short positions dropped from more than 182,000 contracts to just over 51,000. Combined, this saw positioning in the gold futures market switch from net short more than 75,000 contracts in September 2018 to net long more than 135,000 contracts by the end of 2020.

Trends in The Perth Mint Depository holdings

The Perth Mint has seen first-hand the increase in gold demand over the past two years, with the US dollar value of gold custodied in The Perth Mint Depository increasing by more than 100%, while holdings in troy ounces were up 37%. By the end of 2020, total precious metal holdings custodied by The Perth Mint topped USD 4.5 billion or AUD 5.9 billion.

This was driven by inflows from a range of investors, including central banking, HNW family office and regulated institutional clients, most of whom use direct Perth Mint depository accounts.

Retail investors and the financial planning community, many of whom prefer to use PMGOLD, also contributed to the growth in Perth Mint Depository inflows, with holdings in the ASX listed product rising by 180% between Q4 2018 and the end of 2020.

The Perth Mint has seen first-hand the increase in gold demand over the past two years, with the US dollar value of gold custodied in The Perth Mint Depository increasing by more than 100%.





Gold: Defensive or growth asset?

The difficulty in working out a fair value given the absence of a cashflow is only one of the challenges that can make it difficult for institutional investors to allocate to gold.

A second challenge is the categorisation of gold as a growth or a defensive asset. This too is understandably difficult for many investors given the precious metal doesn't fit neatly into either of these categories.

Some view the metal as part of the broader commodity complex and, therefore, see it predominantly as a growth asset. Others, including the majority of the world's central banks, tend to see gold as a currency, or a form of money.

Viewed through this lens, gold is typically seen as a defensive asset.

Growth asset characteristics

Supporting the argument that gold is a growth asset is the fact that the total return on gold is driven exclusively by capital gains or losses, with returns solely driven by changes in the gold price.

The fact that gold generates no income for most investors (noting there is a robust market for gold leasing amongst central banks and other financial institutions) and exhibits price volatility similar to equity markets, also support the notion that gold is a growth asset.

Those who believe gold is a growth asset could also point to the fact that gold held in jewellery form accounts for almost half of all the gold that has ever been mined, which is highlighted in the table below.

Gold ownership by sector as at end 2020

Sector	Holdings (tonnes)	Share of total holdings (%)
Jewellery	93,253.1	46
Official Holdings	34,210.6	17
Private Investment	44,384.4	22
- Bars + coins	40,620.5	20
- Gold ETFs	3,763.8	2
Fabrication and other	29,448.0	15
Total	201,296.1	100

Source: World Gold Council. Private investment is made up of bars + coins and gold ETFs

The majority of this jewellery demand takes place in Asia (especially India and the Middle East) where gold demand is highly correlated to rising incomes and economic growth.





Defensive asset characteristics

Gold remains widely recognised as a safe haven asset that investors typically turn to when their desire to protect wealth increases. It also has a long history as a monetary asset, and to this day is treated as such by central banks which hold more than 34,000 tonnes of the precious metal as part of their monetary reserves.

Factors like this suggest gold is a defensive asset.

This view is reinforced by the data contained in this research paper, which demonstrates gold's ability to reduce drawdowns suffered by diversified strategies during periods when those strategies decline in value.

Gold's strong historical outperformance in periods of heightened equity market stress between 1971 and 2020 also attests to its defensive qualities.

The fact that gold behaves in a unique way from a market return perspective in risk off environments relative to the broader commodity complex furthers the argument that the precious metal is more a defensive asset from a portfolio management perspective.

This divergent performance in periods of heightened market stress can be seen in the table below, which comes from a 2019 World Gold Council (WGC) report titled [Gold: the most effective commodity investment](#). The table below highlights the returns of the S&P 500, gold and the Bloomberg Commodity Index across a number of high profile risk off periods that have afflicted markets in the past 30 plus years.

S&P 500, gold and commodity returns (%) during periods of heightened market risk

Crisis Event	S&P 500	Gold (USD)	Commodities (USD)
Black Monday	-31.6	9.1	0.0
LTCM Crisis	-18.0	2.8	-2.8
Dot-com bubble	-23.1	-6.7	15.1
September 11 Terrorist attacks	-8.0	5.2	1.8
2002 recession	-31.7	7.8	1.7
Global Financial Crisis	-47.8	47.5	-36.1
Sovereign debt crisis v1	-11.1	6.4	-10.4
Sovereign debt crisis v2	-9.0	30.2	-2.1
2018 pullback	-19.6	6.6	-10.1
COVID market crash	-20.0	6.2	-23.5
Average return	-22.0	11.5	-6.6

Source: The Perth Mint, World Gold Council

Gold's strong historical outperformance in periods of heightened equity market stress between 1971 and 2020 attests to its defensive qualities.

The following table reinforces this point, looking at the correlation of both gold and commodities to the S&P 500 during periods when equity market performance falls within two standard deviations of the mean, as well as when the market rises or falls by more than two standard deviations.

S&P 500, gold and commodity correlations during differing periods for equities

Equity market environment	Correlation	Correlation
	Gold (USD) to S&P 500	Commodities (USD) to S&P 500
S&P 500 between 2 SD	-0.01	+0.09
S&P 500 up by more than 2 SD	+0.21	+0.04
S&P 500 down by more than 2 SD	-0.20	+0.32

Source: The World Gold Council, data based on weekly returns from 1971 to end 2019

Gold's unique ability to protect a portfolio from downside risk in equity markets, both in absolute terms and relative to other commodities is evident in the above tables.

Historically, gold in Australian dollars has performed even better in extreme risk off environments, owing to the fact risk off periods typically coincide with weakness in the Australian dollar. The WGC issued a report in [February 2021](#) which found that gold unhedged in Australian dollars delivered average returns of more than 16% in risk off events since the Long-Term Capital Management (LTCM) crisis of 1998, outperforming commodities and bonds, with the latter only rising 6.9% in such periods.

The historical interplay between gold prices, commodity prices and inflation is another factor suggesting gold is a defensive asset. While both commodities and gold have historically risen in periods of high inflation (with gold the higher performer of the two), only gold has delivered positive returns in periods of low inflation.

This can be seen in the table below, which looks at the performance of gold and commodities during years where inflation in the US was 3% or higher, and in years when inflation there was less than 3%.

Average annual return (%) for gold and commodities in high/low inflation environments

Inflation environment	Gold (USD)	Commodities (USD)
High inflation (>3% p.a.)	+15.1	+12.9
Low inflation (<3% p.a.)	+5.6	-2.6

Source: The World Gold Council

While the above table is based on US dollar price data from 1971 to 2018, the performance of gold in the last two years (rising by 18% in 2019 and 25% in 2020 despite CPI increases of less than 3% in both years, versus a broadly flat Bloomberg Commodities Index over the same time frame) reinforces the point that relative to a basket of commodities, the precious metal has a unique ability to perform in both high and low inflation environments.

WGC analysis based on the return of gold and commodities priced in Australian dollars highlights similar results to those seen in the table above, with gold returning 20.3% in high inflation environments and 3.7% in low inflation environments. By contrast commodities returned 12.98% in high inflation environments but fell -0.82% when inflation was low.

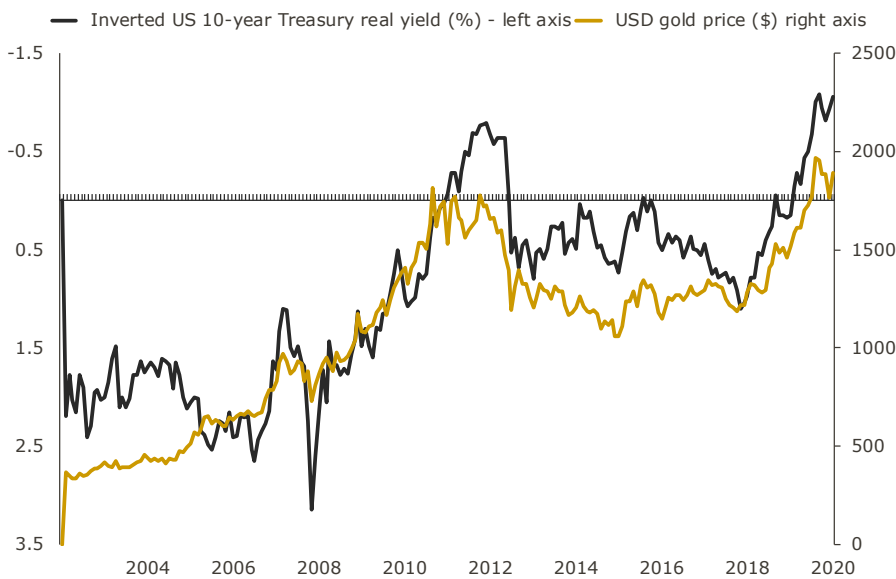
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Furthering the argument that gold is a defensive asset is the fact that the precious metal tends to trade like a bond and has many bond-like attributes. It is highly liquid, has no maturity date (like a perpetual bond), a credit risk of zero (like a sovereign bond) and offers no income stream (like a zero-coupon bond).

Given these attributes it is not surprising that historical analysis demonstrates investors' willingness to pay more for such an asset in environments where the real yield available on zero credit risk (but not zero inflation risk) bonds is declining. This is demonstrated in the following chart, which plots the correlation between the US dollar gold price and the real yield (which is inverted on the chart) on US 10-year Treasury bonds from January 2003 to December 2020.

US dollar price of gold and real yield on 10 year US Treasury – 2003 to 2020



Source: The Perth Mint, Reuters, US Treasury, St Louis Federal Reserve

Gold's high liquidity and absence of credit risk also support the notion that gold is a defensive asset.

While these attributes don't show up directly in ex-post analysis, a good argument can be made that the desire by investors to hold an asset with these characteristics is a key driver of the outperformance that gold has historically delivered in periods of heightened economic instability and/or equity market stress.

This paper explores this in more detail in the section titled Gold's attributes (Pg16).

Gold's high liquidity and absence of credit risk also support the notion that gold is a defensive asset.



Hybrid asset with a distinct portfolio role

A rational argument can be made that gold is a growth asset and a defensive asset.

Rather than needing to categorise it exclusively in one camp or the other, Australian institutional portfolio managers may be better served seeing it as a hybrid of the two.

Treating gold in such a manner would align it with the way many superannuation funds now look at other assets they already include in their portfolio, including unlisted infrastructure and unlisted property.

Many sophisticated investors who own gold have at the very least made the distinction between the precious metal and the broader commodity complex.

Examples include Shayne McGuire, an Emerging Markets portfolio manager, who also runs the Gold Fund for the Teachers Retirement System of Texas, the eighth largest pension fund in the US. In the June 2016 WGC edition of [Gold Investor](#), he was interviewed about why the fund invests in gold.

The quote below is an edited extract from that interview, with McGuire noting (bolded emphasis ours): "...there is the issue of where gold should reside in asset allocation. The precious metal is listed on the FX page on the Bloomberg financial system, but also on its Commodities page. It is an inflation hedge (it rose 2,300% during the inflationary 1970s), and yet a deflation hedge in times of deep economic stress (such as the early 1930s and 2008) – it tends to rise as investors begin to anticipate the need for dramatic inflationary monetary intervention.

Ultimately, our decision to invest in gold as an asset separate from commodities was based on the diversification benefits to the overall portfolio".

In Australia, Davin Hood, Founder and Manager of The Cor Capital Fund, which maintains a strategic gold allocation, has stated: "...the portfolio managers at Cor Capital view gold bullion as a unique form of insurance. Historically, it has delivered positive returns when risk assets are rising, but also pays off in a range of less positive environments; from deflationary shocks to rising inflation, carry crash / liquidity squeeze, financial system instability etc. This asymmetry makes gold a valuable tool in any diversified portfolio, while the opportunity it provides for volatility capture when held in larger weightings is particularly attractive for absolute return strategies like ours".

The logic of treating gold as a hybrid asset is arguably enhanced by the fact it has shown it can add value in environments where traditional *defensive* assets flourish, and inversely, in environments where traditional *growth* assets flourish. Crucially, it can also add value in environments where no traditional asset classes flourish.

This can be seen in the following table, which comes from a [Bridgewater](#) paper published in 2020. The table highlights the average annualized real returns on gold, stocks, bonds and cash in environments of deflation, reflation and stagflation. The results are based on returns in the US, UK and Japan across relevant cycles from 1929 onward.

“The portfolio managers at Cor Capital view gold bullion as a unique form of insurance. Historically, it has delivered positive returns when risk assets are rising, but also pays off in a range of less positive environments; from deflationary shocks to rising inflation, carry crash / liquidity squeeze, financial system instability etc. This asymmetry makes gold a valuable tool in any diversified portfolio”

*Davin Hood
Founder and Manager of
The Cor Capital Fund*



Average annualised real returns (%) for multiple asset classes in various environments

Market Environment	Cash	Bonds	Equities	Gold
Deflationary	3.7	7.2	-8.6	2.7
Reflationary	-1.4	2.3	11.9	6.5
Stagflationary	-1.7	-2.1	-1.6	21.7

Source: Bridgewater *Some Perspective on Gold in the New Paradigm* - September 2020

No traditional defensive or growth asset offered the kind of return profile that gold did in these periods, with the precious metal the only asset class that generated positive real returns in all environments.

Moving forward, an asset class with these return attributes could be particularly valuable, given the highly uncertain economic environment, current valuations in equity markets, real yields on fixed income assets, and the monetary environment institutional investors must navigate on behalf of their clients.

No traditional defensive or growth asset offered the kind of return profile that gold did in deflationary, reflationary or stagflationary periods, with the precious metal the only asset class that generated positive real returns in all environments.







Gold's attributes

Gold has a number of performance and non-performance specific attributes that help justify its inclusion in a well-diversified investment portfolio. These include:

Performance attributes

Long-term returns

The price of gold has increased from below USD 40 per troy ounce at the end of 1970 to USD 1887.60 per troy ounce by the end of 2020, a compound annual return of more than 8%. The precious metal has delivered similar results in most developed markets, including Australia, with the price of gold unhedged in Australian dollars increasing by 9% per annum over the same time period.

On a relative basis, gold has also performed well, though like all asset classes it will go through periods where it underperforms. This can be seen in the two tables below, which compare the returns on the precious metal to traditional growth and defensive assets over multiple timeframes to the end of December 2020.

Annualised returns to the end of 2020 (%) – US dollar returns

Time period	Gold (USD)	Equities	Cash	US Treasuries
5 years	12.2	15.0	1.0	4.8
10 years	3.0	13.8	0.5	4.4
20 years	10.1	7.4	1.3	4.9
30 years	5.1	10.6	2.4	6.1
40 years	3.0	11.4	3.9	7.8
50 years	8.3	10.8	4.5	6.9

Source: The Perth Mint, World Gold Council, NYU Stern historical market returns

Annualised returns to the end of 2020 (%) – Australian dollar returns

Time period	Gold (AUD)	Equities	Cash	Bonds
5 years	10.9	8.7	1.4	4.6
10 years	6.0	7.5	2.4	6.3
20 years	8.3	8.1	3.9	6.0
30 years	5.4	9.9	4.7	8.2
40 years	4.1	10.2	7.1	9.8
50 years	9.0	11.1	7.3	9.2

Source: The Perth Mint, World Gold Council, Reuters

While gold can go through bear market cycles, does not deliver regular income and has similar volatility to equities, it has proved to be a source of long-term returns in its own right.





Historical outperformance in low real interest rate environments

Gold has historically performed particularly well whenever real interest rates are low, which is unsurprising given low real rates minimise and potentially even eliminate the opportunity cost of investing in gold.

A Perth Mint study of historical market returns quantifies how strong the historical performance of gold has been in low real rate environments, both in absolute and relative terms.

The study found that:

- In the US between 1971 and 2020 there were 34 years when real interest rates were 2% or lower. The gold price in US dollars on average rose by almost 18% in nominal terms and 14% in real terms during those years. Gold also outperformed both stocks and bonds, as the table below highlights.

Average annual returns (%) for US asset classes in years real rates were below 2%

Average annual gain (%)	Gold (USD)	Equities	US Treasuries
Nominal	17.9	9.7	5.0
Real	14.0	5.8	1.1

Source: The Perth Mint, World Gold Council, NYU Stern historical market returns

- In Australia, between 1971 and 2020, there were 23 years when real interest rates were 2% or lower. The gold price in Australian dollars on average rose by more than 20% in nominal terms and by almost 15% in real terms during those years. Gold also outperformed both stocks and bonds, as the table below highlights.

Average annual returns (%) for Australian asset classes in years real rates were below 2%

Average annual gain (%)	Gold (AUD)	Equities	Bonds
Nominal	20.5	14.1	5.9
Real	14.5	8.2	0.0

Source: The Perth Mint, Reuters

The above research aligns with the findings from a WGC study released in October 2019 titled [It may be time to replace bonds with gold](#), where the study analysed market data from January 1971 through to the end of September 2019.

It found that the average monthly return for gold in US dollar terms was +1.2% in environments where real interest rates were below zero, and +1.0% in months where real interest rates were between 0% and 2.5%.

With gold rising 25% in US dollar terms and 14% in Australian dollar terms last year, 2020 was another demonstration of the historically strong performance for gold in low real interest rate environments.

The average monthly return for gold in US dollar terms was +1.2% in environments where real interest rates were below zero, and +1.0% in months where real interest rates were between 0% and 2.5%.



Positive real returns in high and low inflation environments

While gold is recognised as a strong performer in high inflation environments, it has also historically generated positive real returns in low inflation environments. The table below, which shows gold's average annual returns in US dollar terms between 1971 and 2019 highlights this clearly.

Average annual US dollar spot price performance of gold (%) in high and low inflation environments – 1971 to 2019

Inflation environment	Nominal return	Real return
High inflation (>3% p.a)	15.1	8.3
Low inflation (<3% p.a)	5.6	3.6

Source: World Gold Council

The 25% nominal (23% real) increase in the USD gold price last year is another reminder of the precious metal's ability to deliver positive real returns in low inflation environments, with non-seasonally adjusted consumer price inflation in the US increasing by just 1.4% across the full 2020 calendar year.

This is relevant given US Treasuries ended last year with negative real yields across the maturity spectrum, as highlighted in the table below.

Nominal and real yields (%) for United States Treasury bonds at end 2020

Treasury yield	5 year	7 year	10 year	20 year	30 year
Nominal yield	0.4	0.7	0.9	1.5	1.7
Real yield	-1.6	-1.3	-1.1	-0.6	-0.4

Source: United States Treasury

If inflation remains benign in the years ahead, gold may well outperform US Treasuries by 4% to more than 5% per annum (depending which maturity it's compared to) if the precious metal can simply match its historical returns in such environments.

If inflation remains benign in the years ahead, gold may well outperform US Treasuries by 4% to more than 5% per annum (depending which maturity it's compared to) if the precious metal can simply match its historical returns in low inflation environments.



Historical outperformance when equities decline

There are many research papers highlighting the fact that gold has historically been amongst the best performing assets when equities suffer their most significant drawdowns.

Examples include an AQR paper titled *Good Strategies for Tough Times*. Published in 2015, it looked at the ten worst calendar quarters for global equities between 1972 and 2014, when equities on average fell by just over 19% in those quarters.

The paper found that gold was the highest performing single asset during those quarters, returning +4.2% on average, outperforming global fixed income (+3.9%), and a hedge fund composite (-5.9%).

Perth Mint research looking at US and Australian market returns until the end of 2020 aligns with the findings of the AQR study, with gold performing exceptionally well during periods of heightened equity market weakness.

The tables below illustrate this, highlighting the worst five calendar years for US and Australian equity markets between 1971 and 2020, and the returns delivered by gold and US Treasuries in the same years.

Asset class performance (%) during worst five calendar years for equities – United States

Year	Equities	Gold (USD)	US Treasuries
2008	-37.0	4.9	15.8
1974	-27.8	66.2	4.9
2002	-21.0	25.6	13.6
1973	-18.2	73.0	3.9
2001	-11.0	0.8	6.3
Average	-23.0	34.1	8.9

Source: The Perth Mint, LBMA, Reuters, Portfolio Visualizer

In US dollar terms, gold rose in every one of the five worst calendar years for US equities, delivering average gains of almost 35%. Gold also strongly outperformed the US Treasury market, which delivered average gains of almost 9%.

Asset class performance (%) during worst five calendar years for equities – Australia

Year	Equities	Gold (AUD)	Bonds
2008	-40.4	31.4	26.3
1974	-26.9	87.0	1.7
1973	-23.3	49.0	-0.3
1990	-17.5	0.4	19.4
1982	-13.9	28.7	22.9
Average	-24.4	39.3	14.0

Source: The Perth Mint, Reuters

Gold has been one of if not the best performing liquid asset in environments equity markets sell off.



In Australian dollar terms, gold rose in four of the five worst calendar years for Australian equities, with the precious metal essentially flat during 1990.

Across the five years, gold generated average gains of almost 40%, with the precious metal on average outperforming the equity market by 60%. Gold also strongly outperformed bonds in these years, with the latter generating average gains of only 14%.

Non-performance attributes

Gold has a number of non-performance related attributes that are relevant for institutional asset managers, including Australian superannuation funds. These include the liquidity and size of the gold market, the cost to incorporate an allocation into a portfolio, and its simplicity.

We cover each of these items below.

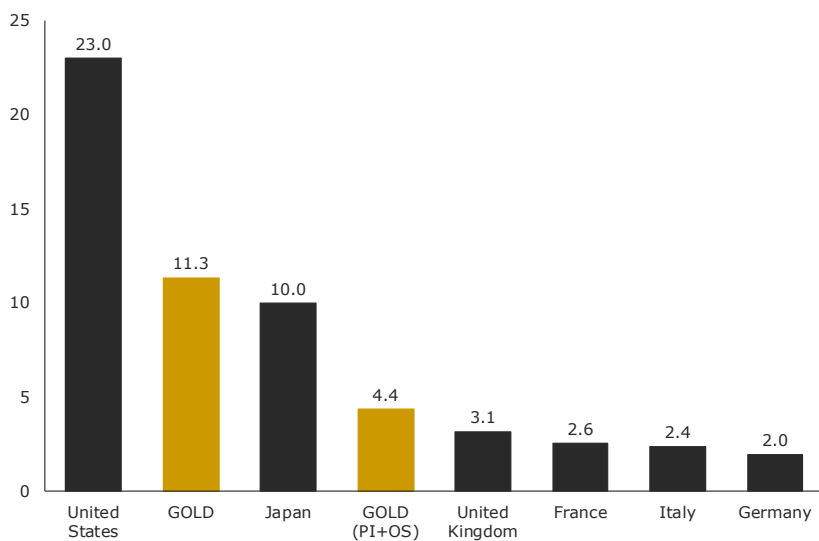
Investable: The gold market can absorb institutional flows

The gold market is incredibly large, with just over 200,000 tonnes of the precious metal estimated to have been mined across the course of human history. Based on 31 December 2020 London Bullion Market Association (LBMA) Gold Price of USD 1,887.60 per troy ounce, this stockpile of gold was valued at more than USD 12.2 trillion (AUD 15.96 trillion) at the end of last year.

The chart below helps put the size of the gold market into perspective, comparing it to some of the largest sovereign bond markets in the world. The bond market figures represent Q2 2020 general government debt securities outstanding, with the data sourced from the Bank for International Settlement (BIS).

Note that the chart highlights the size of the entire gold market, as well as what the market typically refers to as monetary and investment gold. This latter category excludes jewellery and gold used in industrial applications, including only gold which is held by private investors in bar, coin and ETF form, as well as official reserve holdings by central banks. Monetary and investment gold is referred to as GOLD (PI + OS) in the chart.

Size of government debt markets and gold - USD trillion



Source: The Perth Mint, World Gold Council; BIS total credit statistics, end Q2 2020. Gold values based on average of end 2019 and 2020 holdings for each category of demand, and end June 2020 US dollar gold price to align with BIS data

Across the five worst calendar years for equities, gold generated average gains of almost 40%, with the precious metal on average outperforming the equity market by 60%.



Even if one only counts monetary and investment gold, the precious metal would be the third largest bond market on earth, with a market value greater than any individual European sovereign bond market. Include gold held in all forms and its market value exceeds that of the Japanese Government Bond (JGB) market.

This is an important characteristic as unlike some other markets, the size of the gold market means that it can easily absorb institutional investment.

Zero credit risk

Physical gold is one of if not the only highly liquid, globally tradable zero credit risk investments available to investors. This is something well understood and accepted by global central banks, as well as supranational entities.

As an example, a November 2020 BIS paper titled [What share for gold](#) referenced the IMF's *Balance of Payments Manual*, which not only explicitly acknowledges that gold is a component of monetary reserves, but that it **"is the only case of a financial asset with no counterparty liability"**.

Physical gold's absence of credit risk, which will not change irrespective of what happens to the gold price or the size of above ground gold holdings, is particularly relevant for institutional investors looking to manage capital in coming years.

There are multiple reasons for this, including the more than USD 15 trillion in negative yielding sovereign debt that existed in the world at the end of 2020, the fiscal response to the COVID-19 crisis across the developed world, and the increasing likelihood that central banks will need to continue to monetise deficits for the foreseeable future, even if done indirectly.

Highly liquid

Gold is an exceptionally liquid market, with turnover that averaged more than USD 180 billion per day in 2020, an increase of more than 25% relative to daily average turnover of USD 146 billion seen in 2019.

The table below breaks down liquidity in the gold market, with OTC trading driving 60% of all turnover. Exchange based trading (predominantly COMEX futures) accounts for another 38% of daily liquidity, with the residual driven by turnover in ETFs.

Average daily liquidity (USD billion) in the gold market – Financial Year 2020

Liquidity source	Daily turnover (USD billion)	Share of total turnover (%)
Over the counter (OTC)	110.4	60.4
Exchanges including COMEX	69.1	37.8
Gold ETFs	3.3	1.8
Total	182.8	100.0

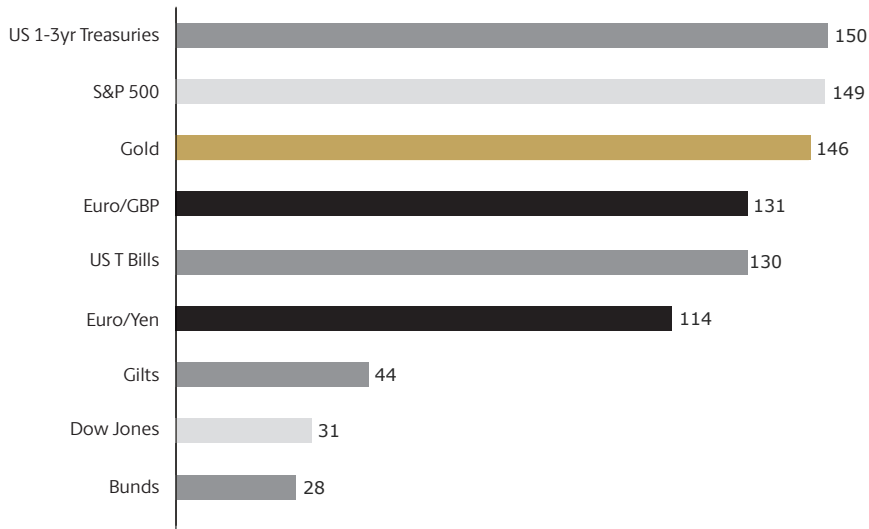
Source: The World Gold Council, data taken as at 8 February 2021

Physical gold's absence of credit risk, which will not change irrespective of what happens to the gold price or the size of above ground gold holdings, is particularly relevant for institutional investors looking to manage capital in coming years.



The chart below puts the liquidity of gold into context, comparing the daily average turnover for the precious metal to currency pairs (black columns), US equities (pale grey columns), and many of the largest bond markets in the world (dark grey columns).

Average daily trading volumes in USD billion – 2019 data



Source: *The Perth Mint, World Gold Council*

On a relative basis, it is clear that gold's liquidity compares very favourably to the majority of sovereign bond markets. It also exceeds that of almost all developed world stock market indices other than the S&P 500, which has similar daily liquidity.

This has obvious implications for institutional investors as it is clear that gold is an asset class they can easily allocate capital to, and just as importantly, deallocate capital from, should they so wish.

Low cost

Physical gold is a low-cost investment to incorporate into a portfolio.

This is easily visualised via analysis of the management expense ratios (MER) and spreads that are charged for ETFs, with these products now the investment vehicle of choice for many self-directed investors and financial planners looking to incorporate gold into a portfolio.

Perth Mint Gold (ASX ticker: PMGOLD) as an example has a MER of just 0.15%, which compares favourably to the more than 200 ETFs listed on the ASX, which had an average MER of 0.51% as at the end of December 2020.

Gold's low-cost attributes become even more evident when compared to the average MER of ETFs offering exposure to other alternative assets, as the table below highlights.

Gold is a low cost investment, and can be accessed by institutional investors for a fraction of the cost of a basket of alternative assets.

Average management expense ratio and trading spread for ASX listed ETFs

Asset class	Management expense ratio (%)	Trading spread (%)
PMGOLD - Gold ETF	0.15	0.08
Average of all ETFs	0.51	0.26
Average commodity ETF	0.51	0.28
Average Infrastructure ETF	0.62	0.24

Source: *The Perth Mint, ASX: December 2020 Investment Products monthly update*

Going forward, the low-cost nature of gold as an investment may prove particularly relevant for institutional portfolio managers in Australia, for two reasons.

The first is the fee pressures that have built in the industry, which are only likely to intensify in the years ahead, as total funds managed head toward AUD 9 trillion by 2040.

The second reason is the growing popularity of alternative asset exposures within superannuation portfolios, which grew from 8.3% to 14.8% of not-for-profit fund asset allocations between 2006 and 2018 (3.7% to 11.7% for retail funds), according to a 2019 article published by [Chant West](#).

While the cost of an alternatives bucket will vary based on the individual superannuation fund, and the choice of alternative assets they invest in, there is little doubt that as a whole, these assets are typically at the higher end of the fee spectrum. Media reports in 2020 quoted a study from Rainmaker that suggested alternative assets were on average costing funds more than 1.30% per annum.

Gold can be accessed for a fraction of that cost.

Simple and transparent

As one of, if not the only pure beta asset classes on the planet, physical gold is a simple and transparent investment. It will always be, and only ever be chemical symbol Au and element number 79 on the periodic table.

As such, the only discrepancy in the net return investors will earn by holding gold over a given time period comes down to the transaction and storage costs they will pay.

This is unique relative to other asset classes, where manager dispersion is an additional risk for investors to consider, particularly when it comes to alternative assets.

As evidence of this, a Blackrock Global Insights report from December 2017 titled [Extracting returns in private markets](#) suggested that dispersion can be three to five times higher in the alternative asset space relative to traditional assets. As an example, the Blackrock paper quoted figures for private credit markets, where top decile funds generated average returns of 21% per annum between 2004 and 2016, versus just 3% for bottom decile funds.

Given these attributes, it is reasonable to assume that an allocation to physical gold would, all other things being equal, lower investment costs, increase liquidity, decrease credit risk, minimise dispersion risk, and increase the transparency of a basket of alternative assets.

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Is gold cheap or expensive?

The gold price traded at all-time nominal highs above USD 2,000 per troy ounce in 2020 and has risen by more than 550% in the last 20 years. Given this background, it is only natural that investors want to review where the price sits today, relative to where it has traded in the past.

Below, we analyse the gold price as at the end of 2020 based on a number of metrics, and look at portfolio allocations to the precious metal. This helps formulate a view on whether the gold price could be seen as cheap, fairly valued, or expensive.

Inflation adjusted gold price

In August 2019, Deutsche Bank released a research report titled 6 Golden Nuggets, which stated that gold would need to hit USD 2,764 per troy ounce to make a new peak in real terms, with the previous peak (in today's dollars) seen on 21 January 1980.

The chart below, which tracks the real US dollar gold price from 1970 to the end of last year, comes to a similar conclusion. It suggests the precious metal would need to rise by almost USD 1,000 per troy ounce, or by just over 50% to match the real price peak of more than USD 2,750 per troy ounce seen in January 1980.

Real gold price – 1970 to 2000



Source: The Perth Mint, Reuters, St Louis Federal Reserve, US Bureau of Labour Statistics

Gold would need to rise by almost USD 1,000 per troy ounce, or by just over 50% to match the real price peak of more than USD 2,750 per troy ounce seen in January 1980.



Gold price based on historical cycles

The WGC produced a study in [2016](#) which looked at previous bull and bear market cycles in the US dollar price of gold. It highlighted the length of these cycles in months, the returns seen in each cycle, and the average and median returns across all cycles.

The data contained in that study is reproduced in the table below.

Previous bull and bear market cycles for gold priced in US dollars – 1970 to 2016

Bull cycles			Bear cycles		
Time Period	Months	Return (%)	Time Period	Months	Return (%)
Jan 70 to Jan 1975	61	451.4	Jan 75 to Sep 76	20	-46.4
Oct 76 to Feb 80	41	721.3	Feb 80 to Mar 85	61	-55.9
Mar 85 to Dec 87	33	75.8	Dec 87 to Mar 93	63	-34.7
Apr 93 to Feb 96	35	27.2	Feb 96 to Sep 99	43	-39.1
Oct 99 to Sep 2011	144	649.6	Sep 11 to Dec 15	52	-44.1
Average	63	385.1	Average	48	-44.0
Median	41	451.4	Median	52	-44.1

Source: World Gold Council

The current bull market in gold, which began in December 2015 when the precious metal traded below USD 1,050 per troy ounce, has seen the metal rise by 78% in the five years to the end of last year.

While that return essentially matches the bull market seen in the mid-1980s and exceeds the rally in the mid-1990s (both of which were in effect counter trend rallies within a 20-year secular bear market), the current rally falls well short of the returns delivered during the bull markets in the 1970s, and the returns seen from late 1999 through to September 2011.

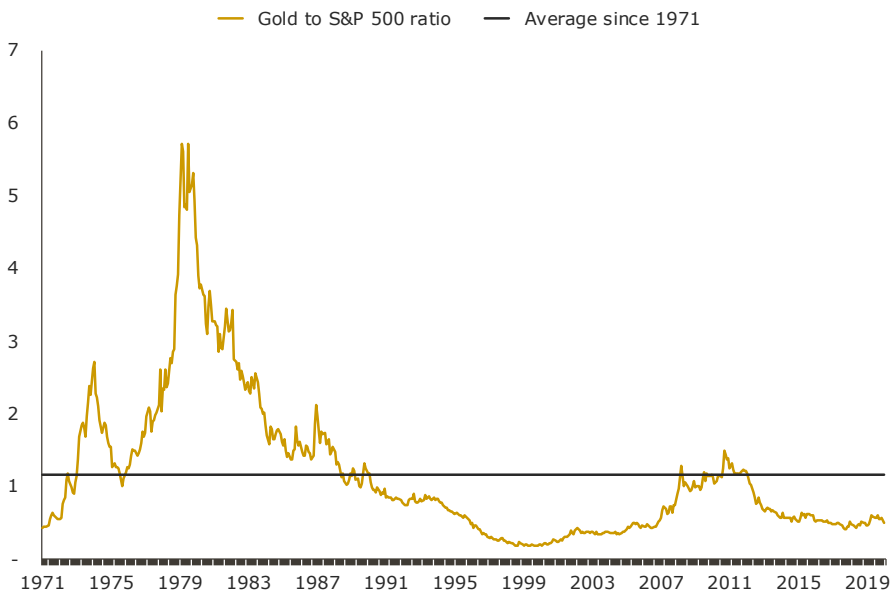
For gold to replicate the average return seen in all previous bull market cycles, it would need to trade at approximately USD 5,000 per troy ounce during this cycle.

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Gold versus equities

The ratio between the price of gold and the price level of the S&P 500 is another metric investors can use to gauge how expensive or cheap gold is. The ratio finished 2020 at 0.50, with movements in the ratio from 1972 to the end of last year seen in the chart below.

Gold to S&P500 ratio – 1972 to 2020



Source: The Perth Mint, Reuters

Since 1971 the ratio has averaged 1.16. The highest ever reading was 5.72, which occurred in June 1980, when the gold price closed above USD 650 per troy ounce, while the S&P 500 was trading at 114.24 points.

The lowest ever reading occurred almost 20 years later, with the ratio falling to 0.18 in August 2000. Back then the gold price was languishing below USD 300 per troy ounce, while the S&P 500 was trading just above 1,500 points.

Since August 2000 the ratio has essentially tripled, demonstrating gold's outperformance relative to equities in the new millennium, even though the S&P 500 price index itself has increased by almost 150% over this time period.

Despite the outperformance in the past 20 years, this ratio makes it clear that gold is still cheap relative to the equity market.

Gold would need to more than double the price performance of the equity market in the coming years for the ratio to return to its historical average, while a return to the highs seen in 1980 would require the precious metal to outperform by a factor of ten.

Gold would need to more than double the price performance of the equity market in the coming years for the gold to S&P 500 ratio to return to its historical average, while a return to the highs seen in 1980 would require the precious metal to outperform by a factor of ten.



Gold as a percentage of global financial assets and portfolio allocations

In September 2020 Bridgewater Associates published a paper titled [Some Perspective on Gold in the New Paradigm](#). This report noted that gold's share of global assets (looking at equities, debt and gold alone) was approaching 3% by Q3 2020. Their analysis suggested that gold's share of global assets was closer to 10% around the end of World War II, and closer to 7% by the end of the 1970s.

Another relevant metric investors can draw insight from is looking at gold's allocation within portfolios today. There are multiple ways to review this, including analysis of the gold ETF market.

In late June 2020, TopDown Charts published a research note titled [The Implications of Gold Implied Allocations](#). The note found that US gold ETFs represented just over 2% of the total US ETF universe in mid-2020. This is barely one quarter of the 8% level it was sitting at in 2011, when gold last traded up toward USD 2,000 per troy ounce.

While part of the explanation to the much lower allocation lies in the explosion in the popularity and the assets under management of ETFs in the past decade, there can be little doubt that gold allocations remain modest in portfolios today.

Research by The Perth Mint conducted in mid-2020 and published on [Livewire Markets](#) suggested that gold ETFs made up comfortably less than 0.50% of the total funds market in Australia and the United States at the time.

This was based on the gold ETF share of the ETF market, and the ETF market's share of the regulated funds market.

Gold ETF share of the total regulated funds market

Country	Gold ETF share of total ETF market (%)	ETF market as share of total funds market (%)	Gold ETF market as share of total funds market (%)
United States	2.0	16.5	0.3
Australia	4.0	2.0	0.1

Source: The Perth Mint, ETFGI ICI 2019 Fact Book

External publications speak to the low allocation to gold within portfolios globally. This includes Australia, where APRA and ATO data looking at institutionally managed superannuation funds, as well as SMSF portfolios, have at most 2% invested in 'other' assets. Gold would be but a small fraction of this 'other' assets figure.

Family Offices, while holding more gold than institutionally managed portfolios, also have modest allocations, with a 2020 Global Family Office report from UBS Wealth Management suggesting just 3% of portfolio assets was invested in gold and precious metals.

By contrast, 30% of Family Office assets were sitting in cash and fixed income, a meaningful portion of which is now generating negative real yields, while a further 35% was sitting in alternative assets other than gold, predominantly private equity and real estate.

Gold holdings in investor portfolios, and gold's share of global financial assets remains modest today, relative to historical levels.



Summary

Investors looking to assess the outlook for gold and model its potential price trajectory may wish to utilise the [Qaurum](#) gold valuation framework developed by the World Gold Council.

Based on the metrics presented, gold would appear to be reasonably priced today, with historical patterns highlighting the potential, though not the guarantee, that the precious metal could move meaningfully higher in the years to come.

Relative to consumer price inflation, the real gold price, while sitting above its long-term average, still offers upside potential. It would need to rise by almost 50% from the end of December 2020 price to match the previous all-time high.

Analysis of gold returns in prior bull market cycles suggests the potential for upside in the years ahead. Should the current bull market in gold end now it would be amongst the weakest on record.

Indeed, the price would need to rise by almost 170% from levels seen at the end of 2020 to match the average return seen in the five prior gold bull market cycles since the early 1970s.

Gold appears undervalued relative to the stock market, with the ratio between gold and stocks needing to at least double in order for gold to return to its long-run average.

Relative to the size of financial asset markets, gold appears fairly valued, if not cheap, with the precious metals share of global investable assets sitting at barely one half to one third of levels seen at bull market tops in the past.

This is reflected in the share of investor portfolios allocated to gold, which remains low today both in absolute terms and relative to historical observation.





Gold in diversified superannuation strategies

Time period studied and background

The analysis contained within this section covers differing time periods depending on the superannuation strategy, with strategies analysed from the point at which there were a minimum of eight funds reporting quarterly performance data.

The table below indicates the quarter each superannuation strategy is analysed, the number of funds when analysis commenced, and the number of funds at the end of 2020.

The longest time period is for growth superannuation strategies, with analysis beginning in Q3 1993. It therefore covers almost the entire duration of the Superannuation Guarantee era.

Strategy	Quarter analysis started	Funds in strategy when analysis started	Funds in strategy at end of 2020
Conservative	Q3 1998	11	53
Balanced	Q2 2001	8	37
Growth	Q3 1993	8	69
High growth	Q3 1998	11	48
All growth	Q1 1999	8	28

Source: Chant West

The analysis looks at the impact that allocating 1-5% of total portfolio assets to gold (both in US dollars, as well as unhedged in Australian dollars) would have had on a number of portfolio metrics from performance, to volatility, maximum drawdowns and risk adjusted returns across all strategies.

It analyses what impact dedicating these allocations to commodities (both in US dollars, as well as unhedged in Australian dollars) or bonds (both global fixed income hedged and Australian fixed income) would have had, given the debate about whether gold should be treated as a defensive or growth asset.

This section contains a brief background on developments in financial markets, in the economy, and in the three distinct asset classes (gold, bonds, commodities) being studied over the relevant time period.

Background

The table below features a range of key Australian and US financial market and economic indicators, both at the end of June 1993 and at the end of December 2020. It contextualises the environment that we have studied, and the changes that have occurred.

June 1993 versus Dec 2020 – Financial and economic metrics

Economic Indicator	June 1993	End 2020	Source
RBA cash rate	5.25	0.10	RBA
Australian 10 year bond yield (nominal)	7.37	0.97	RBA
Average Australian house price	161,000	787,000	REIA, Core Logic
Household debt to income (%)	73.7	179.9	RBA, ABS
ASX 200 price index	1,734.6	6,587.1	ASX, Yahoo finance
Size of superannuation industry (AUD)	\$169bn	\$2.89tn	Parliament, ISC Annual Report, ASFA
Gold price (AUD)	573.6	2,446.2	World Gold Council
AUDUSD	0.67	0.77	RBA
Fed funds rate	3.04	0.09	St Louis Federal Reserve
US 10 year bond yield (nominal)	5.80	0.93	US Treasury Department
S&P 500 - price index level	448.1	3,756.1	Reuters, Yahoo
S&P 500 (Shiller CAPE)	20.6	33.7	Shiller, Yale
Bloomberg Commodity Total Return Index	99.9	166.3	Bloomberg
Gold price (USD)	378.5	1,887.6	World Gold Council

** Note some data only to end September 2020 (e.g. household debt to income) as end 2020 data not available at time of publication*

From June 1993 to December 2020, the value of the Australian dollar measured against a basket of consumer goods almost halved, with the RBA inflation calculator suggesting that consumer price inflation totalled 92.8%, or 2.4% per annum over this period.

Gold since June 1993

Since the early 1990s, gold has completed three primary price cycles and now appears to be in the midst of a fourth.

The first cycle was a bear market, with origins dating back to 1980 when gold peaked above USD 660 per troy ounce, based on end of month prices. By the end of June 1993, the US dollar gold price had fallen to USD 378 per troy ounce, with this cycle ending in August 1999, by which point gold was trading at just USD 255 per troy ounce.

Over the next 12 years, gold enjoyed a bull market run, with the precious metal trading at USD 1,814 per troy ounce at the end of August 2011.

Following this, gold entered a four-year cyclical bear market, with the precious metal bottoming out in December 2015 near USD 1,050 per troy ounce. Since then, a bull trend in gold has re-emerged, with the precious metal rising by 78% between December 2015 and December 2020.

In Australian terms, the gold price was trading at just AUD 400 per troy ounce in August 1999, having fallen approximately 30% from the end of June 1993.

In the following 12-year bull market that peaked in US dollar terms in August 2011, unhedged Australian dollar gold underperformed US dollar gold (though still rose by more than 300%), owing to the rise in the Australian dollar from USD 0.64 to USD 1.07 over this time period.

The investment landscape portfolio managers must navigate today is vastly different compared to the early 1990s.



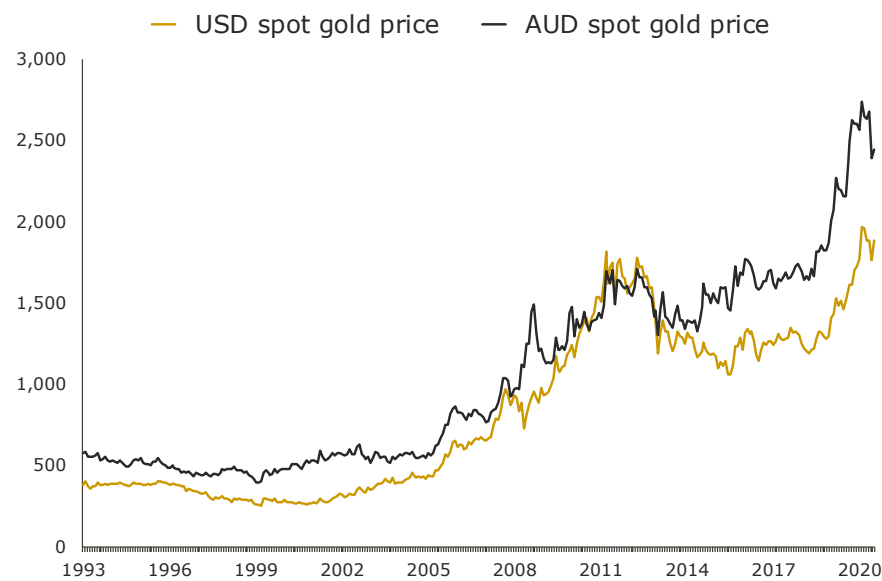
Between 2011 and 2015, the Australian dollar gold price outperformed the US dollar price, falling by just 14%, with a sharp decline in the value of the Australian dollar cushioning the drawdown. From the end of 2015 through to the end of 2020, the Australian dollar gold price rose by 68%.

The price of gold in US dollar and Australian dollar terms at some of the key dates mentioned above, as well as the performance between these dates can be seen in the table below, while the chart tracks movements in the spot price of gold in both currencies across the entire time period.

Date	Gold Price		FX Rate	Price return		Notes
	USD	AUD	AUDUSD	USD	AUD	
30/6/93	378	574	0.67			Beginning of analysis period
31/8/99	255	400	0.64	-33%	-30%	End of 20 year gold bear market
31/8/11	1,814	1,693	1.07	612%	323%	12 year bull market peak
31/12/15	1,060	1,457	0.73	-42%	-14%	Four year bear market
31/12/20	1,888	2,446	0.77	78%	68%	Five year return to end 2020

Source: The Perth Mint, RBA, World Gold Council

Australian dollar and US dollar gold price 30 June 1993 to 31 December 2020



Source: The Perth Mint, World Gold Council

Across the entire time period from June 1993 to December 2020, the US dollar gold price rose by 399% (6.0% per annum) while gold priced in Australian dollars rose by 326% (5.4% per annum)

Fixed income since June 1993

From June 1993 through to June 2020, a diversified Australian fixed income portfolio delivered total returns of approximately 449% (6.5% per annum), while a portfolio of global fixed income assets hedged into Australian dollars returned 581% (7.4% per annum).

Gold has been through three cycles since compulsory superannuation was put in place.

It now appears to be in the midst of a fourth (bull) cycle.

This performance was driven by the huge decline in bond yields across the risk and maturity spectrum over this time period, which can be seen in the chart below.

Australian and US 10-Year government bond yields 30 June 1993 to 31 December 2020



Source: The Perth Mint, Reuters

From June 1993 to December 2020, US and Australian 10-year government bond yields declined from 5.80% to 0.93% in the US and 7.37% to 0.97% in Australia, a decline of 84% and 87% respectively.

Commodity prices since June 1993

Note that we have used the Bloomberg Commodities Total Return Index (BCOMTR) in our statistical analysis. We chose the BCOMTR Index over the Goldman Sachs Commodity Index (GSCI) for two key reasons:

- The BCOMTR is more balanced in terms of its weighting to the subsectors of the commodity universe, with energy alone accounting for more than 60% of the GSCI.
- The BCOMTR has a substantially higher weight to precious metals (17.4% versus 4.5% for the GSCI). This means gold's performance and the impact it can have on a portfolio as part of a broader commodity allocation is better highlighted using BCOMTR.

The table below highlights the contrasting allocations between the two indexes.

2020 Commodity index allocations (%) to various sectors

Sector	Bloomberg Commodity Index	Goldman Sachs Commodity Index
Energy	30	62
Agriculture (Grains/softs)	29	16
Industrial metals	18	11
Precious metals	17	5
Livestock	6	7
Total	100	100

Source: Bloomberg, Goldman Sachs, The Perth Mint. Gold is a subsector of precious metals, accounting for 13.6% of the BCOMTR index and 4.08% of the GSCI index

Bond yields have declined for most of the last 40 years. This decline, and the returns it has helped generate are unlikely to be repeated in the decade to come.



Commodity prices experienced a solid rally from June 1993 through to May 1997, with the BCOMTR increasing by 70%, from 100 to 170 points. Prices were not able to hold onto these gains, falling by 36% between May 1997 and February 1999, with the BCOMTR bottoming out at 108 points.

What followed was one of the greatest commodity bull markets on record, which ran for more than nine years until June 2008. Over this time period, the BCOMTR rose to 464 points, a return of 328%.

In the following eight months, prices crashed by over 50%, as the GFC wrought havoc on financial markets, with the BCOMTR falling toward 210 points by February 2009.

The market then rallied for just over two years, rising by 66% to 353 points by April 2011.

From then on, commodity prices fell almost uninterrupted for nine straight years, with the market dropping 63% to just 130 points by the end of April 2020. This correction brought the market back to levels first seen in the mid-1990s, with movements in the BCOMTR from June 1993 to December 2020 seen in the chart below.

Bloomberg Commodities Total Return Index 30 June 1993 to 31 December 2020



Source: *The Perth Mint, Investing.com, Bloomberg*

From the April lows through to the end of December 2020, the BCOMTR increased by 28% to 167 points.

Commodity prices went through an extreme bull and bear cycle in the past twenty years. Their role in a portfolio is less clear compared to the role gold can play.

Key findings: All strategies

Key findings that hold true across all strategies from conservative to all growth include:

- Gold has on average been the best performing asset in the quarters that median funds declined in value, irrespective of strategy (see charts and table below).
- Gold on average saw positive returns in quarters median funds increased in value.
- Gold allocations of 1-5% improved risk adjusted returns (see table below).
- Gold allocations of 1-5% were more effective in improving risk-adjusted returns than an equivalent commodity allocation would have been.
- Gold allocations of 1-5% were either more, or as effective in improving risk-adjusted returns as an increased bond allocation would have been.
- Gold allocations of 1-5% reduced overall portfolio volatility.
- Gold allocations of 1-5% reduced maximum drawdowns.
- Gold allocations of 1-5% were more effective in reducing maximum drawdowns than an equivalent bond or commodity allocation would have been.
- Gold allocations of 1-5% provided more significant downside protection across all quarters median funds fell compared to the upside foregone in all quarters median funds rose, relative to bonds and commodities.

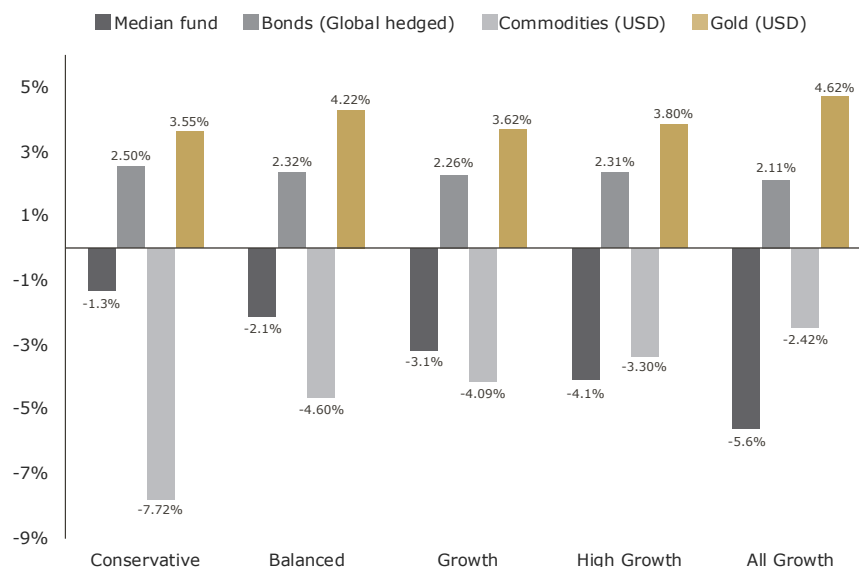
Gold has on average been the best performing asset in the quarters median funds declined, and improved risk adjusted returns across all strategies from conservative through to all growth.

Risk adjusted returns since inception for actual median fund and median fund with 2.5% gold allocations for all superannuation strategies

Strategy	Actual median fund	Median fund with 2.5% gold (AUD) allocation	Median fund with 2.5% gold (USD) allocation
Growth	1.14	1.19	1.17
Conservative	1.76	1.91	1.83
Balanced	1.10	1.18	1.15
High Growth	0.78	0.83	0.81
All Growth	0.62	0.65	0.64

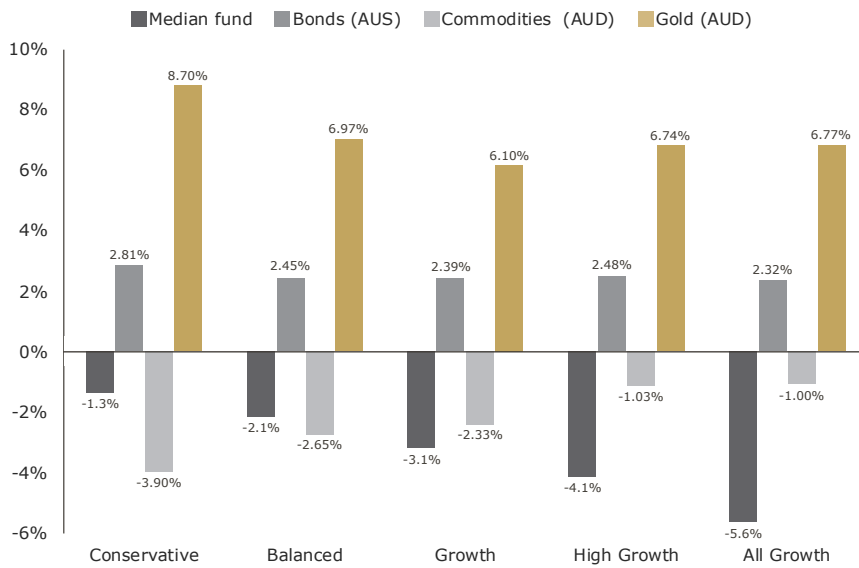
Source: The Perth Mint, Chant West

US dollar and global asset class and median fund returns (%) in quarters median funds declined in value



Source: The Perth Mint, Chant West

Australian asset class and median fund returns (%) in quarters median funds declined in value



Source: The Perth Mint, Chant West

Gold's outperformance in periods markets decline is significant. Generally speaking, the more markets fall, the more gold rallies.

Average return in quarters median funds fell in value

Fund Style	Conservative	Balanced	Growth	High growth	All growth
Median fund	-1.3%	-2.1%	-3.1%	-4.1%	-5.6%
Equities	-10.1%	-7.9%	-7.4%	-6.8%	-6.8%
Bonds (AUS)	2.8%	2.4%	2.4%	2.5%	2.3%
Bonds (Global hedged)	2.5%	2.3%	2.3%	2.3%	2.1%
Commodities (USD)	-7.7%	-4.6%	-4.1%	-3.3%	-2.4%
Commodities (AUD)	-3.9%	-2.7%	-2.3%	-1.0%	-1.0%
Gold (USD)	3.5%	4.2%	3.6%	3.8%	4.6%
Gold (AUD)	8.7%	7.0%	6.1%	6.7%	6.8%

Key findings: Growth strategies

Quarter analysis started	Funds in strategy when analysis started	Funds in strategy at end of 2020
Q3 1993	8	69

Growth strategies - performance and risk figures: Actual median fund and median fund with 2.5% gold allocations

Performance and risk figures	Actual median fund	Median fund with 2.5% gold (AUD) allocation	Median fund with 2.5% gold (USD) allocation
1 year return	3.73	4.13	4.26
3 year return	6.12	6.39	6.33
5 year return	7.40	7.54	7.55
7 year return	7.36	7.45	7.38
10 year return	7.85	7.85	7.77
15 year return	6.32	6.43	6.42
Return since inception	7.58	7.57	7.57
Annualised volatility since inception	6.67	6.37	6.48
Risk adjusted return	1.14	1.19	1.17
Average move - Best 10 quarters	6.63	6.39	6.49
Average move - Worst 10 quarters	-5.69	-5.14	-5.36
Max drawdown	-23.26	-21.74	-22.28

Source: The Perth Mint, Chant West

Key findings for growth strategies incorporating gold allocations of 1-5% include:

• Risk adjusted returns (RARs)

- An improvement in RARs, which ranged from 1.16 to 1.24 (Australian dollar gold) and 1.15 to 1.20 (US dollar gold), versus an actual RAR of 1.14 for the median fund.
- The improvements in RARs from an AUD gold allocation exceeded the improvements that would have been delivered had bond allocations been increased instead of gold.
- The improvements in RARs from a US dollar gold allocation matched the improvements that would have been delivered had bond allocations been increased instead of gold.
- The improvement in RARs from Australian dollar or US dollar gold allocations exceeded improvements that would have come had commodity allocations been increased instead of gold, with RARs declining with the use of commodities.

• Volatility and downside protection

- A reduction in annualised portfolio volatility, which ranged from 6.54% to 6.08% (Australian dollar gold) and 6.59% to 6.32% (US dollar gold), versus an actual figure of 6.67% for the median fund.
- The reductions in volatility were either more significant or matched the reductions in volatility that would have been delivered had bond allocations been increased instead of gold.
- The reductions in volatility were more significant than the reductions in volatility that would have been delivered had commodity allocations been increased instead of gold.

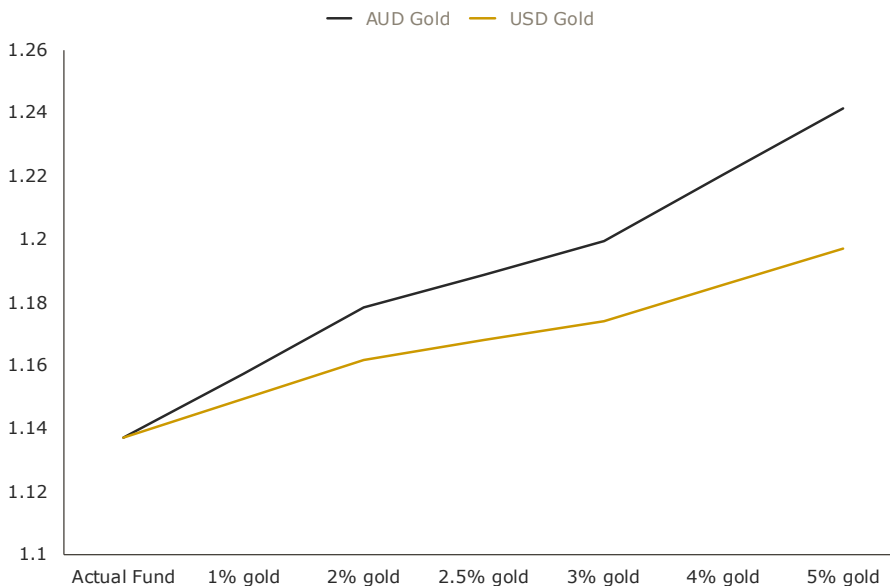


- A reduction in maximum drawdowns, which ranged from -22.66% to -20.30% (Australian dollar gold) and -22.87% to -21.35% (US dollar gold), versus an actual figure of -23.26% for the median fund.
- The reduction in maximum drawdowns from a gold allocation was more significant than the reductions allocations to commodities or bonds would have delivered.

• Returns

- Gold allocations did not meaningfully change annualised total returns since inception, which ranged from 7.57% to 7.55% (Australian dollar gold) and 7.58% to 7.56% (US dollar gold), versus an actual figure of 7.58% for the median fund.
- The change in total returns from a gold allocation broadly matched the total returns that would have been delivered had bond allocations been increased instead of gold and exceeded the returns that allocations to commodities would have delivered.

Growth strategies - RARs for median fund and median fund with range of US dollar and Australian dollar gold allocations



Source: The Perth Mint, Chant West

Growth strategies - change to median fund return with 2.5% portfolio allocation to various asset classes in different market environments

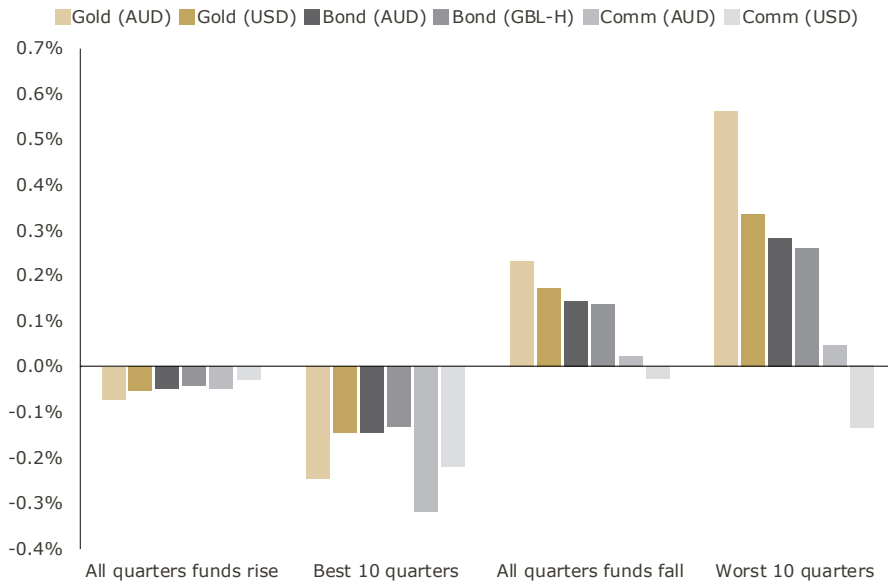
Asset class	All quarters funds rise	Best 10 quarters	All quarters funds fall	Worst 10 quarters
Gold (AUD)	-0.07%	-0.25%	0.23%	0.56%
Bonds (AUD)	-0.05%	-0.14%	0.14%	0.28%
Commodities (AUD)	-0.05%	-0.32%	0.02%	0.04%
Gold (USD)	-0.05%	-0.15%	0.17%	0.33%
Bonds (global hedged)	-0.04%	-0.13%	0.14%	0.26%
Commodities (USD)	-0.03%	-0.22%	-0.02%	-0.13%

Source: The Perth Mint, Chant West

Growth funds would have seen risk adjusted returns increase with modest gold allocations, primarily through reductions in overall portfolio volatility.



Growth strategies - change to median fund return with 2.5% allocations to various asset classes in different market environments



Source: The Perth Mint, Chant West

Appendix B contains more detail on growth strategies, including:

- RARs for median fund and theoretical portfolios with 1-5% allocations to gold, fixed income and commodities.
- Average returns in rising quarters and falling quarters for median fund and theoretical portfolios with 1-5% allocations to gold, fixed income and commodities.
- Average returns in best and worst ten quarters for median fund and theoretical portfolios with 1-5% allocations to gold, fixed income and commodities.
- Maximum drawdowns for median fund and theoretical portfolios with 1-5% allocations to gold, fixed income and commodities.

Key findings: Conservative strategies

Quarter analysis started	Funds in strategy when analysis started	Funds in strategy at end of 2020
Q3 1998	11	53

Conservative strategies - performance and risk figures: Actual median fund and median fund with 2.5% gold allocations

Performance and risk figures	Actual median fund	Median fund with 2.5% gold (AUD) allocation	Median fund with 2.5% gold (USD) allocation
1 year return	2.27	2.63	2.80
3 year return	4.00	4.28	4.24
5 year return	4.60	4.79	4.81
7 year return	4.75	4.88	4.82
10 year return	5.36	5.40	5.33
15 year return	4.94	5.07	5.07
Return since inception	5.44	5.52	5.54
Annualised volatility since inception	3.10	2.89	3.03
Risk adjusted return	1.76	1.91	1.83
Average move - Best 10 quarters	3.38	3.19	3.37
Average move - Worst 10 quarters	-1.74	-1.32	-1.53
Max drawdown	-8.19	-7.16	-7.75

Source: The Perth Mint, Chant West

Key findings for conservative strategies from incorporating gold allocations of 1-5% include:

• Risk adjusted returns (RARs)

- An improvement in RARs, which ranged from 1.82 to 2.04 (Australian dollar gold) and 1.79 to 1.88 (US dollar gold), versus an actual RAR of 1.76 for the median fund.
- The improvements in RARs from an Australian dollar gold allocation exceeded the improvements that would have been delivered had bond allocations been increased instead of gold.
- The improvements in RARs from a US dollar gold allocation of up to 4% of a portfolio exceeded the improvements that would have been delivered had bond allocations been increased instead of gold, with RARs equivalent at a 5% level.
- The improvement in RARs from Australian or US dollar gold allocations exceeded improvements that would have come had commodity allocations been increased instead of gold, with RARs declining with the use of commodities.

• Volatility and downside protection

- A reduction in annualised portfolio volatility, which ranged from 3.01% to 2.74% (Australian dollar gold) and 3.06% to 3.01% (US dollar gold), versus an actual figure of 3.10% for the median fund.
- The reduction in volatility from an Australian dollar gold allocation was more significant than the reductions in volatility that would have been delivered had bond or commodity allocations been increased instead of gold.
- The reductions in volatility from a US dollar gold allocation were more significant than the reductions in volatility that would have been delivered had commodity allocations been increased instead of gold.

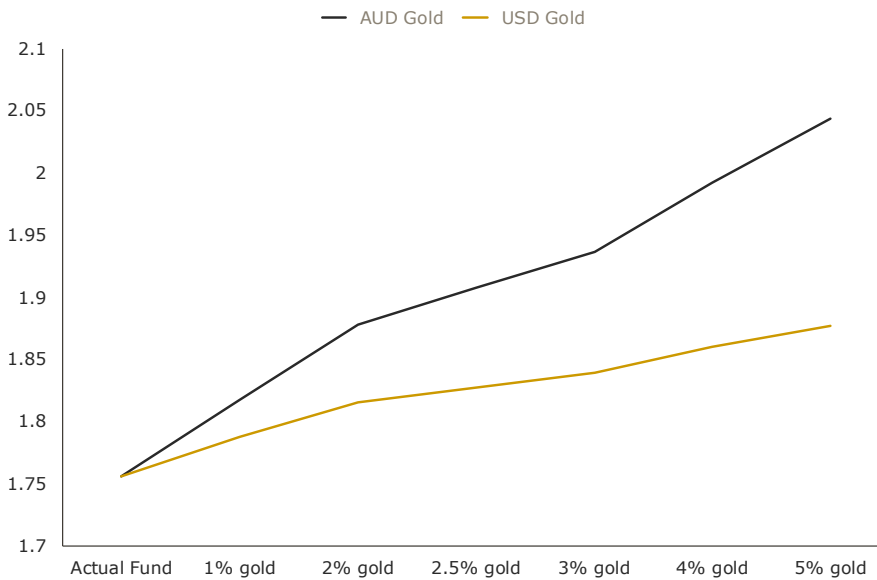


- A reduction in maximum drawdowns, which ranged from -7.78% to -6.13% (Australian dollar gold) and -8.02% to -7.30% (US dollar gold), versus an actual figure of -8.19% for the median fund.
- The reduction in maximum drawdowns from a gold allocation was more significant than the reductions allocations to commodities or bonds would have delivered.

• Returns

- An improvement in annualised total returns since inception, which ranged from 5.47% to 5.61% (Australian dollar gold) and 5.48% to 5.64% (US dollar gold), versus an actual figure of 5.44% for the median fund.
- The improvement in total returns from a gold allocation exceeded the improvements that would have been delivered had bond or commodity allocations been increased instead of gold.

Conservative strategies - RARs for median fund and median fund with range of US dollar and Australian dollar gold allocations



Source: The Perth Mint, Chant West

Conservative strategies - change to median fund return with 2.5% portfolio allocation to various asset classes in different market environments

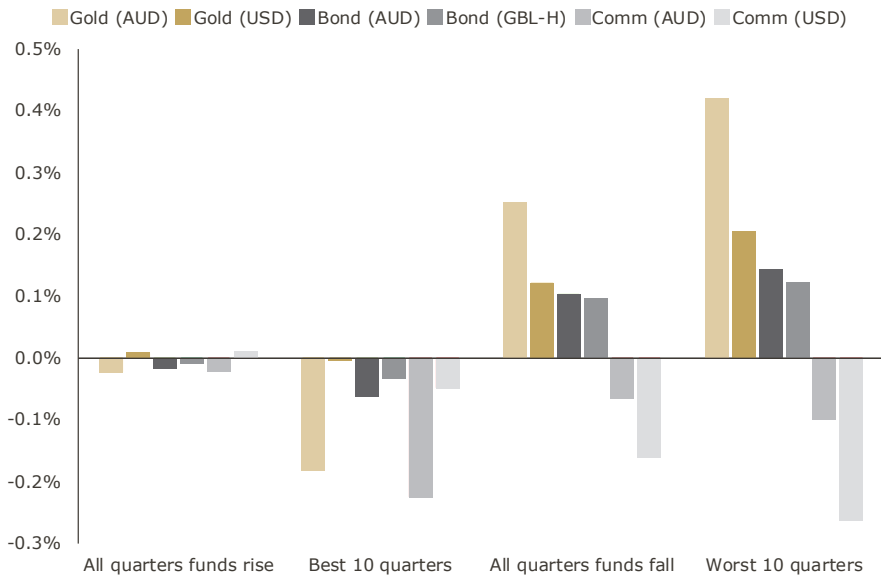
Asset class	All quarters funds rise	Best 10 quarters	All quarters funds fall	Worst 10 quarters
Gold (AUD)	-0.02%	-0.18%	0.25%	0.42%
Bonds (AUD)	-0.02%	-0.06%	0.10%	0.14%
Commodities (AUD)	-0.02%	-0.23%	-0.06%	-0.10%
Gold (USD)	0.01%	0.00%	0.12%	0.20%
Bonds (global hedged)	-0.01%	-0.03%	0.10%	0.12%
Commodities (USD)	0.01%	-0.05%	-0.16%	-0.26%

Source: The Perth Mint, Chant West

Gold allocations within conservative strategies would have increased portfolio returns, as well as reduced volatility and maximum drawdowns.



Conservative strategies - change to median fund return with 2.5% allocations to various asset classes in different market environments



Source: The Perth Mint, Chant West

Appendix C contains more detail on conservative strategies, including:

- RARs for median fund and theoretical portfolios with 1-5% allocations to gold, fixed income and commodities.
- Average returns in rising quarters and falling quarters for median fund and theoretical portfolios with 1-5% allocations to gold, fixed income and commodities.
- Average returns in best and worst ten quarters for median fund and theoretical portfolios with 1-5% allocations to gold, fixed income and commodities.
- Maximum drawdowns for median fund and theoretical portfolios with 1-5% allocations to gold, fixed income and commodities.

Key findings: Balanced strategies

Quarter analysis started	Funds in strategy when analysis started	Funds in strategy at end of 2020
Q2 2001	8	37

Balanced strategies - performance and risk figures: Actual median fund and median fund with 2.5% gold allocations

Performance and risk figures	Actual median fund	Median fund with 2.5% gold (AUD) allocation	Median fund with 2.5% gold (USD) allocation
1 year return	3.43	3.80	3.95
3 year return	5.05	5.32	5.28
5 year return	5.94	6.11	6.12
7 year return	5.94	6.05	5.99
10 year return	6.53	6.55	6.48
15 year return	5.55	5.67	5.67
Return since inception	5.85	5.94	5.99
Annualised volatility since inception	5.33	5.05	5.20
Risk adjusted return	1.10	1.18	1.15
Average move - Best 10 quarters	4.83	4.73	4.82
Average move - Worst 10 quarters	-3.73	-3.25	-3.46
Max drawdown	-16.28	-14.97	-15.52

Source: The Perth Mint, Chant West

Key findings for balanced strategies from incorporating gold allocations of 1-5% include:

- **Risk adjusted returns (RARs)**
 - An improvement in RARs, which ranged from 1.13 to 1.26 (Australian dollar gold) and 1.12 to 1.21 (US dollar gold), versus an actual RAR of 1.10 for the median fund.
 - The improvements in RARs from an Australian dollar or US dollar gold allocation exceeded the improvements that would have been delivered had bond allocations been increased instead of gold.
 - The improvement in RARs from Australian dollar or US dollar gold allocations exceeded improvements that would have come had commodity allocations been increased instead of gold, with RARs declining with the use of commodities.
- **Volatility and downside protection**
 - A reduction in annualised portfolio volatility, which ranged from 5.21% to 4.79% (Australian dollar gold) and 5.27% to 5.09% (US dollar gold), versus an actual figure of 5.33% for the median fund.
 - The reduction in volatility from an Australian dollar gold allocation was more significant than the reductions in volatility that would have been delivered had bond or commodity allocations been increased instead of gold.
 - The reductions in volatility from a US dollar gold allocation were more significant than the reductions in volatility that would have been delivered had commodity allocations been increased instead of gold.



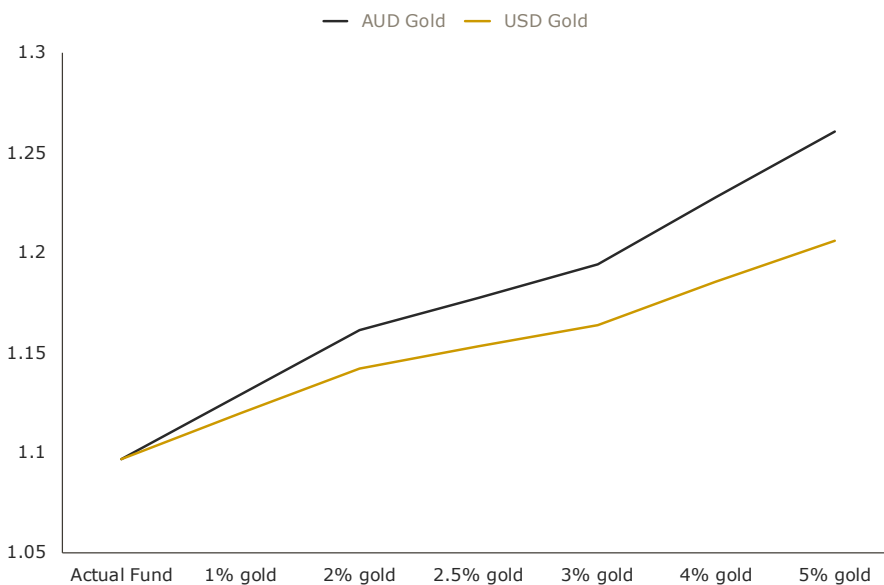
- A reduction in maximum drawdowns, which ranged from -15.70% to -13.80% (Australian dollar gold) and -15.93% to -14.92% (US dollar gold), versus an actual figure of -16.28% for the median fund.
- The reduction in maximum drawdowns from a gold allocation was more significant than the reductions allocations to commodities or bonds would have delivered.

• Returns

- An improvement in annualised total returns since inception, which ranged from 5.88% to 6.04% (Australian dollar gold) and 5.90% to 6.14% (US dollar gold), versus an actual figure of 5.85% for the median fund.
- The improvement in total returns from a gold allocation exceeded the improvements that would have been delivered had bond or commodity allocations been increased instead of gold.

Balanced strategies would have seen total portfolio returns increase over all time periods measured with strategic gold allocations.

Balanced strategies - RARs for median fund and median fund with range of US dollar and Australian dollar gold allocations



Source: The Perth Mint, Chant West

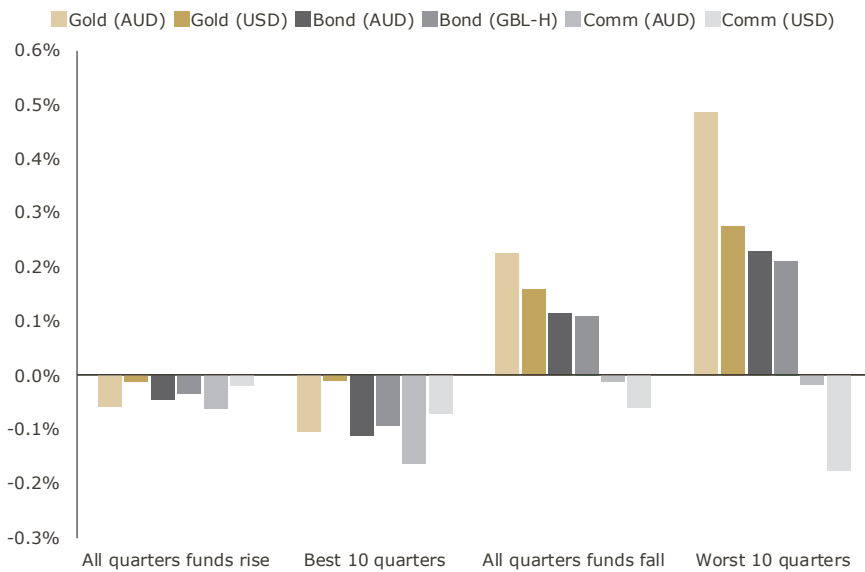
Balanced strategies - change to median fund return with 2.5% portfolio allocation to various asset classes in different market environments

Asset class	All quarters funds rise	Best 10 quarters	All quarters funds fall	Worst 10 quarters
Gold (AUD)	-0.05%	-0.10%	0.22%	0.48%
Bonds (AUD)	-0.04%	-0.11%	0.11%	0.23%
Commodities (AUD)	-0.06%	-0.16%	-0.01%	-0.02%
Gold (USD)	-0.01%	-0.01%	0.16%	0.27%
Bonds (global hedged)	-0.03%	-0.09%	0.11%	0.21%
Commodities (USD)	-0.02%	-0.07%	-0.06%	-0.17%

Source: The Perth Mint, Chant West



Balanced strategies - change to median fund return with 2.5% allocations to various asset classes in different market environments



Source: *The Perth Mint, Chant West*

Appendix D contains more detail on balanced strategies, including:

- RARs for median fund and theoretical portfolios with 1-5% allocations to gold, fixed income and commodities.
- Average returns in rising quarters and falling quarters for median fund and theoretical portfolios with 1-5% allocations to gold, fixed income and commodities.
- Average returns in best and worst ten quarters for median fund and theoretical portfolios with 1-5% allocations to gold, fixed income and commodities.
- Maximum drawdowns for median fund and theoretical portfolios with 1-5% allocations to gold, fixed income and commodities.



Key findings: High growth strategies

Quarter analysis started	Funds in strategy when analysis started	Funds in strategy at end of 2020
Q3 1998	11	48

High growth strategies - performance and risk figures: Actual median fund and median fund with 2.5% gold allocations

Performance and risk figures	Actual median fund	Median fund with 2.5% gold (AUD) allocation	Median fund with 2.5% gold (USD) allocation
1 year return	4.01	4.44	4.54
3 year return	6.91	7.18	7.11
5 year return	8.42	8.55	8.56
7 year return	8.25	8.31	8.24
10 year return	8.71	8.70	8.61
15 year return	6.71	6.82	6.81
Return since inception	7.24	7.30	7.31
Annualised volatility since inception	9.24	8.84	8.98
Risk adjusted return	0.78	0.83	0.81
Average move - Best 10 quarters	8.05	7.73	7.89
Average move - Worst 10 quarters	-7.84	-7.23	-7.44
Max drawdown	-30.24	-28.66	-29.16

Source: The Perth Mint, Chant West

Key findings for high growth strategies from incorporating gold allocations of 1-5% include:

• Risk adjusted returns (RARs)

- An improvement in RARs, which ranged from 0.80 to 0.87 (Australian dollar gold) and 0.80 to 0.84 (US dollar gold), versus an actual RAR of 0.78 for the median fund.
- The improvements in RARs from Australian dollar or US dollar gold allocations exceeded the improvements that would have been delivered had bond allocations been increased instead of gold.
- The improvement in RARs from Australian dollar or US dollar gold allocations exceeded improvements that would have come had commodity allocations been increased instead of gold, with RARs largely unchanged with the use of commodities.

• Volatility and downside protection

- A reduction in annualised portfolio volatility, which ranged from 9.08% to 8.46% (Australian dollar gold) and 9.13% to 8.74% (US dollar gold), versus an actual figure of 9.24% for the median fund.
- The reductions in volatility from an Australian dollar gold allocation were more significant than the reductions in volatility that would have been delivered had bond allocations been increased instead of gold.
- The reductions in volatility from a US dollar gold allocation were more significant than the reductions in volatility that would have been delivered had bond allocations been increased instead of gold, up to a portfolio weight of 3%.

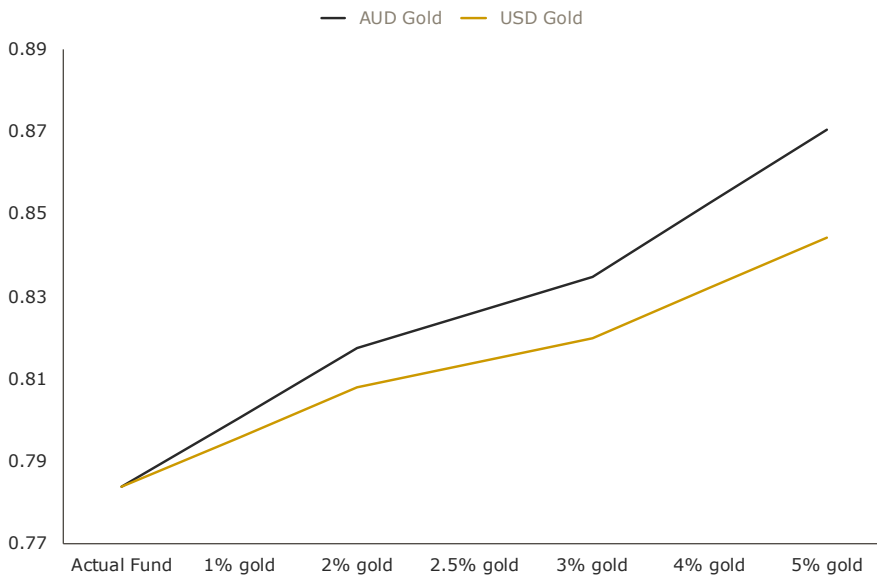


- The reductions in volatility were more significant than the reductions in volatility that would have been delivered had commodity allocations been increased instead of gold.
- A reduction in maximum drawdowns, which ranged from -29.61% to -27.05% (Australian dollar gold) and -29.81% to -28.07% (US dollar gold), versus an actual figure of -30.24% for the median fund.
- The reduction in maximum drawdowns from a gold allocation was more significant than the reductions allocations to commodities or bonds would have delivered.

• Returns

- An improvement in annualised total returns since inception, which ranged from 7.27% to 7.36% (Australian dollar gold) and 7.27% to 7.38% (US dollar gold), versus an actual figure of 7.24% for the median fund.
- The improvement in total returns from a gold allocation exceeded the improvements that would have been delivered had bond or commodity allocations been increased instead of gold.

High growth strategies - RARs for median fund and median fund with range of US dollar and Australian dollar gold allocations



Source: The Perth Mint, Chant West

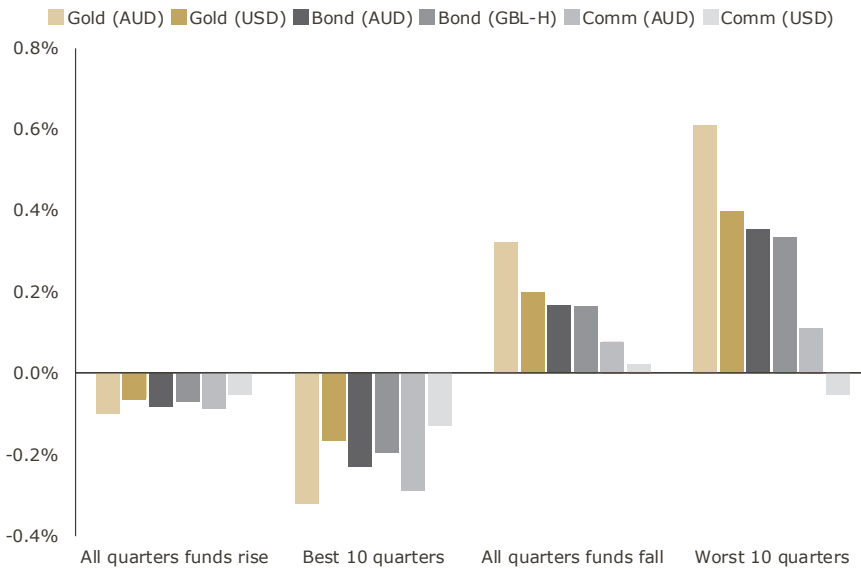
High growth strategies - change to median fund return with 2.5% portfolio allocation to various asset classes in different market environments

Asset class	All quarters funds rise	Best 10 quarters	All quarters funds fall	Worst 10 quarters
Gold (AUD)	-0.10%	-0.32%	0.27%	0.61%
Bonds (AUD)	-0.08%	-0.22%	0.16%	0.35%
Commodities (AUD)	-0.09%	-0.29%	0.08%	0.11%
Gold (USD)	-0.06%	-0.16%	0.20%	0.40%
Bonds (global hedged)	-0.07%	-0.19%	0.16%	0.33%
Commodities (USD)	-0.05%	-0.13%	0.02%	-0.05%

Source: The Perth Mint, Chant West

For high growth strategies, the performance benefit from a gold allocation in quarters funds declined was approximately three times more substantial than the performance drag in rising markets.

High growth strategies - change to median fund return with 2.5% allocations to various asset classes in different market environments



Source: The Perth Mint, Chant West

Appendix E contains more detail on high growth strategies, including:

- RARs for median fund and theoretical portfolios with 1-5% allocations to gold, fixed income and commodities.
- Average returns in rising quarters and falling quarters for median fund and theoretical portfolios with 1-5% allocations to gold, fixed income and commodities.
- Average returns in best and worst ten quarters for median fund and theoretical portfolios with 1-5% allocations to gold, fixed income and commodities.
- Maximum drawdowns for median fund and theoretical portfolios with 1-5% allocations to gold, fixed income and commodities.

Key findings: All growth strategies

Quarter analysis started	Funds in strategy when analysis started	Funds in strategy at end of 2020
Q1 1999	8	28

All growth strategies - performance and risk figures: Actual median fund and median fund with 2.5% gold allocations

Performance and risk figures	Actual median fund	Median fund with 2.5% gold (AUD) allocation	Median fund with 2.5% gold (USD) allocation
1 year return	4.17	4.64	4.72
3 year return	7.18	7.46	7.38
5 year return	8.91	9.04	9.04
7 year return	8.58	8.65	8.57
10 year return	9.02	9.00	8.92
15 year return	6.62	6.75	6.73
Return since inception	6.99	7.07	7.08
Annualised volatility since inception	11.31	10.86	11.00
Risk adjusted return	0.62	0.65	0.64
Average move - Best 10 quarters	9.58	9.24	9.37
Average move - Worst 10 quarters	-9.96	-9.29	-9.50
Max drawdown	-36.09	-34.47	-34.94

Source: The Perth Mint, Chant West

Key findings for all growth strategies from incorporating gold allocations of 1-5% include:

• Risk adjusted returns (RARs)

- An improvement in RARs, which ranged from 0.63 to 0.69 (Australian dollar gold) and 0.63 to 0.67 (US dollar gold), versus an actual RAR of 0.62 for the median fund.
- The improvements in RARs from Australian dollar or US dollar gold allocations exceeded the improvements that would have been delivered had bond allocations been increased instead of gold.
- The improvement in RARs from Australian dollar or US dollar gold allocations exceeded improvements that would have come had commodity allocations been increased instead of gold, with RARs largely unchanged with the use of commodities.

• Volatility and downside protection

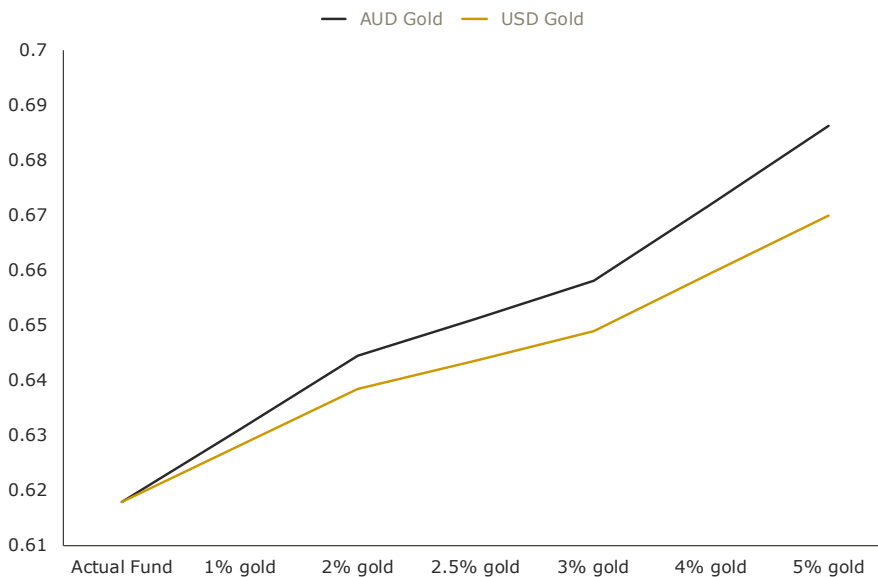
- A reduction in annualised portfolio volatility, which ranged from 11.13% to 10.43% (Australian dollar gold) and 11.18% to 10.70% (US dollar gold), versus an actual figure of 11.31% for the median fund.
- The reductions in volatility were either more significant or matched the reductions in volatility that would have been delivered had bond allocations been increased instead of gold.
- The reductions in volatility were more significant than the reductions in volatility that would have been delivered had commodity allocations been increased instead of gold.

- A reduction in maximum drawdowns, which ranged from -35.44% to -32.82% (Australian dollar gold) and -35.63% to -33.77% (US dollar gold), versus an actual figure of -36.09% for the median fund.
- The reduction in maximum drawdowns from a gold allocation was more significant than the reductions allocations to commodities or bonds would have delivered.

• **Returns**

- An improvement in annualised total returns since inception, which ranged from 7.02% to 7.16% (Australian dollar gold) and 7.02% to 7.17% (US dollar gold), versus an actual figure of 6.99% for the median fund.
- The improvement in total returns from a gold allocation exceeded the improvements that would have been delivered had bond or commodity allocations been increased instead of gold.

All growth strategies - RARs for median fund and median fund with range of US dollar and Australian dollar gold allocations



Source: The Perth Mint, Chant West

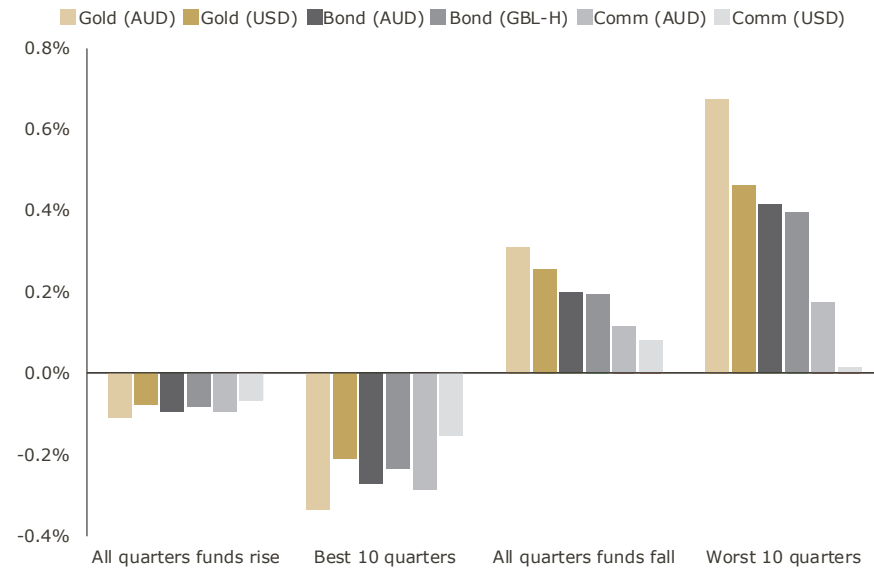
All growth strategies - change to median fund return with 2.5% portfolio allocation to various asset classes in different market environments

Asset class	All quarters funds rise	Best 10 quarters	All quarters funds fall	Worst 10 quarters
Gold (AUD)	-0.11%	-0.33%	0.31%	0.67%
Bonds (AUD)	-0.09%	-0.27%	0.20%	0.41%
Commodities (AUD)	-0.09%	-0.28%	0.11%	0.17%
Gold (USD)	-0.08%	-0.21%	0.26%	0.46%
Bonds (global hedged)	-0.08%	-0.23%	0.19%	0.39%
Commodities (USD)	-0.06%	-0.15%	0.08%	0.01%

Source: The Perth Mint, Chant West

Risk adjusted returns for all growth strategies increased notably with gold allocations, with long-term returns benefitting, and volatility declining.

All growth strategies - change to median fund return with 2.5% allocations to various asset classes in different market environments



Source: The Perth Mint, Chant West

Appendix F contains more detail on all growth strategies, including:

- RARs for median fund and theoretical portfolios with 1-5% allocations to gold, fixed income and commodities.
- Average returns in rising quarters and falling quarters for median fund and theoretical portfolios with 1-5% allocations to gold, fixed income and commodities.
- Average returns in best and worst ten quarters for median fund and theoretical portfolios with 1-5% allocations to gold, fixed income and commodities.
- Maximum drawdowns for median fund and theoretical portfolios with 1-5% allocations to gold, fixed income and commodities.





How institutional investors can allocate to gold

Institutional investors have three main ways they can allocate to gold within their portfolio. The three options are:

- An investment into gold futures.
- An investment into a gold ETF like Perth Mint Gold (ASX:PMGOLD).
- An investment into gold directly from an organisation like The Perth Mint.

Below we explore some of the advantages and drawbacks of each approach.

Option 1. Gold futures

There are some advantages to investing in gold via the futures market.

The first is that gold futures have very low transaction costs. They provide investors with a large notional exposure relative to the actual capital outlaid.

Gold futures are extremely liquid, with turnover on the COMEX alone averaging more than USD 54 billion per day in FY 2020.

There are, however, drawbacks to using futures.

Investors who own a gold futures contract don't have legal title to physical gold, merely exposure to its price, with the option to take delivery.

The second drawback is the regular requirement to roll forward price exposure. This rolling process incurs a cost, and an unpredictable one at that, as it depends on the constantly changing shape of the gold futures curve.

Given these roll costs, there is no expected performance advantage to be gained by allocating to gold via the futures market, with an August 2018 PIMCO study titled [Why Commodity Carry May Be Higher Than You Think](#) stating that **"the choice between owning gold futures and owning physical gold is a wash"** from a performance perspective.

Given these factors, most institutional investors who want to own gold as a strategic long-term asset are likely better served looking at gold ETFs, or a direct investment solution with a reputable gold custodian and market maker.

Gold futures are highly liquid, but require ongoing maintenance, with roll cost that vary. Investors also do not hold legal title to gold itself.



Option 2. Gold ETFs

There are some advantages to using a gold ETF.

The first is that they operate within a financial ecosystem that is familiar to institutional investors and their service providers. From a trade execution, settlement and custody perspective, an investment into a gold ETF will operate the same way as investments into other listed products that institutional investors already allocate to.

Gold ETFs trade on regulated exchanges, which adds a degree of comfort as important elements of these products like size, turnover, market depth and trading spreads are able to be regularly tracked and independently monitored.

There are, however, several drawbacks to using gold ETFs.

The first of those is that like a gold future, investors don't have legal title to physical gold when they purchase a gold ETF. Instead, they own a financial asset (such as a share, a unit or an option) that aims to track the price of gold, with that financial asset typically backed by gold, which the investor may or may not have a beneficial interest in, depending on the legal structure.

A second drawback is that ETFs only trade during the hours the exchange that they are listed on are open. Given gold essentially trades 24/7 like the foreign exchange market, an Australian institutional investor using an ASX listed gold ETF will find themselves unable to trade the product for much of the time period during which European and North American markets are operating. The only way around this would be to use multiple gold ETFs, listed on multiple exchanges, which adds complexity from an execution perspective.

A third drawback of many gold ETFs are the multiple counterparties one must consider and risk assess if looking to allocate to gold in this manner. While not every product has the same structure, most gold ETFs have at least four counterparties. These include the product issuer, the gold custodian, the market makers, and the trustee, who are typically recognised by the custodian as the legal owner of the gold backing the product.

A final consideration regarding gold ETFs, and one that is particularly relevant for institutional investors, is liquidity. As highlighted in the section of this report dealing with gold's investment attributes, turnover in the gold market averages more than USD 180 billion per day. Only 2% of that turnover goes through gold ETFs.

Given this liquidity profile, most institutional investors are likely better served trading over-the-counter in order to most efficiently allocate to gold.

**Gold ETFs
trade only
during exchange
hours. There are
also multiple
counterparties to
consider and
risk assess.**



Option 3. Depository accounts

For institutional investors there are several benefits to buying physical gold directly.

The first of those is legal title. The institution can own the precious metal outright with a list of physical bars (each with their own serial number) directly assigned to the investor.

The second advantage is cost. Many gold ETFs still charge management fees around 0.40%. Institutional investors can access allocated gold at a lower cost, with their fees scaling down as their investment grows.

The ability to deal with a single organisation that can both make a market in gold and provide a custodial service is another advantage of investing directly. By taking this path, an institutional investor need only perform a risk assessment on a single counterparty, rather than multiple entities as would be the case with a gold ETF.

Investing directly also offers enhanced trade flexibility.

This includes the ability to execute transactions in more than one currency, rather than needing different ETFs and multiple exchanges depending on which currency they want to trade in. They could also use limit orders based on the spot price which can be monitored and executed around the clock.

Institutional investors that invest directly should also be able to trade at the LBMA Gold Price. Previously known and still commonly referred to as the London Gold Fix, the LBMA Gold Price is a regulated benchmark that is set twice daily at 10.30am and 3.00pm London time. This price is still seen as the global reference point for gold, with 15 accredited price participants (mostly banks and trading houses) involved in the price setting process.

By trading at the LBMA Gold Price (plus or minus an agreed spread), institutional investors can ensure the performance of their gold holdings directly correlates with the movement in this benchmark price, thus eliminating tracking error risk from their gold allocation.

The primary disadvantage for an institutional investor wanting to allocate to gold directly is that there will be a separate account opening and management process. This, however, should only be a minor issue, with APRA regulated superannuation funds and ASIC regulated managed funds already allocating to gold in this manner, with the blessing of the relevant trustees, responsible entities, custodians and auditors.

Given the above benefits, most institutional investors wanting to allocate to gold are likely best served by investing directly, rather than using a gold ETF or the gold futures market.

Indeed, these factors are key reasons why The Cor Capital Fund, a client of The Perth Mint, chooses to utilise The Perth Mint Depository, with the fund stating: *“For any investment committee with diversification as a priority, holding a proportion of liquid real asset exposure away from the usual financial institutions and counterparties makes sense. It is particularly attractive given our portfolio holds legal title to allocated physical gold at a lower cost than financial products that track the gold price.”*

Investing directly offers institutional investors enhanced trade flexibility, allows them to have legal title to the gold, and can be done at a cost that matches or is lower than investing via a futures contract or an ETF.



The Perth Mint and institutional investors

For institutional investors using a depository account, The Perth Mint offers:

- The ability to trade via phone during Western Australian business hours (GMT +8), with institutional investors provided direct access to The Perth Mint Treasury team.
- The ability to use limit orders which The Perth Mint will monitor and execute 24/7.
- The ability to trade in multiple currencies, including Australian dollars and US dollars.
- The ability to trade at either the LBMA AM or LBMA PM Gold Price (in US dollars only).
- Zero storage fees for unallocated gold, which is fully backed by metal that The Perth Mint has in its refining and minting operations, as well as physical gold sitting in its central bank grade vaults and gold held in The Perth Mint's London metal accounts.
- Legal title to allocated gold, including 1 kilo and 400 troy ounce gold bars. These bars are individually serialized, with clients receiving regular allocated portfolio holdings reports that highlight the size, purity and serial number of each bar they own.
- Storage fees for allocated gold which typically start at 0.30% of the metal value per annum. Portfolios with holdings worth over AUD 100 million will pay a lower cost than 0.30% (on the value of the metal exceeding AUD 100 million), with fees declining as the size of the holdings grow.
- Allocated gold storage in Perth, Western Australia, one of the safest geopolitical locations in the world, rather than an overseas bank vault.
- The ability for institutional investors to arrange their own independent audit of their allocated gold holdings on an annual basis, on top of the external audit The Perth Mint undertakes as part of the preparation of its annual report.
- Protection of allocated and unallocated gold by the unique government guarantee that underpins all Perth Mint depository holdings and is mandated under Western Australian State Government legislation.

The Perth Mint can also facilitate institutional investment into gold via our ASX listed product, Perth Mint Gold (ASX:PMGOLD). The product ended 2020 with a market value of approximately AUD 580 million (almost 7.5 tonnes of gold), making up almost 10% of the total value of precious metal holdings custodied by The Perth Mint Depository at the time.

PMGOLD is backed by unallocated gold held by The Perth Mint, and is structured as a call option. It is in essence a right to gold (every 100 units entitles the owner, upon exercise, to one troy ounce of physical gold from The Perth Mint), with no expiry date, and a price that tightly tracks the Australian dollar spot price of gold. With a management fee of just 0.15%, it is one of the lowest cost ETFs on the market, and trades with spreads that are typically sub 0.10%.

The Perth Mint makes a market directly in PMGOLD, with liquidity offered to investors via the ASX part of the more than AUD 23 billion in turnover that The Perth Mint is responsible for on an annual basis.

Perth Mint financials – FY 2017 to FY 2020

Financial Metrics	FY 2020	FY 2019	FY 2018	FY 2017
Income	23.8bn	18.1bn	18.9bn	18.3bn
Net profit	47.5m	13.3m	10.1m	24.5m
Total assets	6.8bn	4.7bn	4.1bn	3.8bn
Total liabilities	6.7bn	4.6bn	4.0bn	3.7bn
Equity	152.9m	128.4m	126.6m	132.9m

Source: The Perth Mint. All numbers are in Australian dollars





Summary

Key findings

This report has highlighted a number of key findings, including:

- Allocations to gold would have improved historical risk adjusted returns for diversified investment strategies regardless of risk profile.
- Gold has traditionally lowered the overall volatility of a diversified investment portfolio.
- Gold has typically been the best performing asset in environments diversified investment strategies fell in value, minimising overall portfolio drawdowns.

The last point is particularly relevant given:

- End December 2020 data from APRA suggests 20% of the assets within institutionally managed superannuation portfolios are already invested in fixed income.
- The report studied a period that saw yields on certain fixed income assets fall by more than 80%, with Australian and global bond indexes delivering annualised returns of more than 6.5% per annum. Gold held its own against bonds during a halcyon era for fixed income.

Combined, the findings highlight the fact that gold can play a beneficial role in an institutionally managed diversified portfolio.

Importantly, the findings also highlight that the role gold can play is not easily replicated by any other asset class, with the precious metal displaying a unique combination of growth and defensive characteristics.

This report has made it clear that gold is not overly expensive, despite the all-time high seen in the nominal US dollar gold price in 2020.

On balance, it would appear that gold is at best fairly priced, if not cheap when assessed on a range of metrics including comparisons to the stock market, its share of global financial assets, its price relative to previous bull market cycles, its price in real-terms, or its share of investor portfolios.

Outlook

While no one can be certain what will happen going forward, it could be argued that the macroeconomic, market and monetary environment investors must navigate in the decade ahead remains supportive of the investment case for gold.

From an economic standpoint, whilst growth rates are undoubtedly on the rise in 2021, it may be years before the global economy catches up to its pre COVID-19 trajectory. Ageing demographics, high private and public debt levels, and the likelihood of a continued pushback against globalisation are likely to provide headwinds to growth for the foreseeable future.

From a monetary perspective, policy makers continue to stress to market participants that we will remain in a low to negative real interest rate environment for years to come, with central bank balance sheets continuing to expand.

Finally, from a market perspective, current valuations and real yields suggest traditional diversified investment strategies are set to deliver lower returns in the future, something that institutional portfolio managers themselves are openly discussing.

The findings in this report highlight the fact that gold can play a positive role in institutionally managed portfolios, minimising drawdowns and improving risk-adjusted returns. This role is not easily replicated by any other asset class.



Examples of this include Vanguard, with their 2020 economic and market outlook, titled [The new age of uncertainty](#) suggesting a median performing fund with a 60% equity/40% fixed income allocation would return just 4.9% in the next ten years. That is barely half the return such a portfolio generated between 1970 and 2019.

This October 2020 AMP Capital released a publication warning of lower expected returns in the years to come. Their findings projected medium term returns of just 4.8% per annum, down from 10.3% per annum in 2009.

Combined, this backdrop should be favourable for an asset that has a proven track record of:

- Generating strong long-term returns in its own right.
- Generating positive absolute returns and outperforming other assets in low real interest rate environments.
- Generating positive real returns in periods of high inflation and during deflationary shocks.
- Being positively correlated to rising equity markets and negatively correlated to falling equity markets.

The fact that physical gold is highly liquid, has zero credit risk, is easy to trade and to store, and is a low-cost investment to incorporate into a diversified institutionally managed portfolio should only add to its appeal.

Jordan Eliseo
Manager – Listed Products and Investment Research
The Perth Mint

The fact that physical gold is highly liquid, has zero credit risk, is easy to trade and to store, and is a low-cost investment to incorporate into a diversified institutionally managed portfolio should only add to its appeal.







Appendices

Appendix A: Asset class and fund return quilt (%)

Calendar Year	Gold (AUD)	Gold (USD)	Commodities (AUD)	Commodities (USD)	Fixed Income (Australian)	Fixed Income (Global hedged)	Growth Funds
1993*	0.3	3.5	-5.2	-3.2	5.7	5.4	7.3
1994	-14.1	-2.2	2.2	16.6	-4.7	-2.5	0.8
1995	5.3	1.0	20.3	15.2	18.6	20.6	14.2
1996	-10.6	-4.6	15.2	23.2	11.9	9.5	12.5
1997	-4.2	-21.4	17.8	-3.4	12.2	10.7	13.6
1998	5.3	-0.8	-22.4	-27.0	9.5	10.1	11.4
1999	-5.5	0.9	16.5	24.3	-1.2	0.3	10.1
2000	11.3	-5.4	54.7	31.8	12.1	9.7	7.4
2001	9.4	0.7	-12.2	-19.5	5.4	8.3	4.5
2002	14.2	25.6	14.9	25.9	8.8	11.6	-4.6
2003	-10.4	19.9	-7.8	23.9	3.0	6.6	9.0
2004	0.6	4.6	5.4	9.1	7.0	8.9	15.3
2005	25.9	17.8	28.9	21.4	5.8	6.6	14.4
2006	14.7	23.2	-5.0	2.1	3.1	4.4	14.0
2007	18.4	31.9	4.5	16.2	3.5	6.6	8.1
2008	31.4	4.3	-19.9	-35.6	14.9	9.2	-20.0
2009	-3.1	25.0	-6.7	18.9	1.7	8.0	13.9
2010	13.4	29.2	2.5	16.8	6.0	9.3	4.8
2011	8.9	8.9	-13.5	-13.3	11.4	10.5	-1.3
2012	6.9	8.3	-2.3	-1.1	7.7	9.7	12.3
2013	-15.7	-27.3	5.2	-9.5	2.0	2.3	16.7
2014	9.5	0.1	-9.3	-17.0	9.8	10.4	8.7
2015	-1.1	-12.1	-15.6	-24.7	2.6	3.3	5.9
2016	8.6	8.1	12.9	11.8	2.9	5.2	7.7
2017	4.3	12.7	-6.0	1.7	3.7	3.7	11.0
2018	10.1	-0.9	-1.6	-11.2	4.5	1.6	0.6
2019	18.6	18.4	8.0	7.7	7.3	7.2	14.5
2020	13.5	24.6	-11.6	-3.1	4.5	5.1	3.7
Total return	326.5	398.8	44.3	66.8	454.8	590.6	647.0
Annualised return	5.5	6.1	1.4	1.9	6.6	7.4	7.7
Average return	5.9	6.9	2.5	3.5	6.4	7.2	7.7
Best year	31.4	31.9	54.7	31.8	18.6	20.6	16.7
Worst year	-15.7	-27.3	-22.4	-35.6	-4.7	-2.5	-20.0
Volatility	11.5	14.7	16.5	18.2	5.0	4.4	7.7



Appendix B: Detailed results – Growth strategies

Risk adjusted return						
Median fund	1.14					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	1.16	1.18	1.19	1.20	1.22	1.24
Bonds (AUD)	1.15	1.16	1.17	1.17	1.18	1.20
Commodities (AUD)	1.14	1.14	1.14	1.13	1.13	1.13
Gold (USD)	1.15	1.16	1.17	1.17	1.19	1.20
Bonds (global hedged)	1.15	1.16	1.17	1.17	1.19	1.20
Commodities (USD)	1.13	1.13	1.12	1.12	1.11	1.10

Maximum drawdown						
Median fund	-23.26%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	-22.66%	-22.05%	-21.74%	-21.44%	-20.82%	-20.30%
Bonds (AUD)	-22.93%	-22.59%	-22.42%	-22.26%	-21.92%	-21.58%
Commodities (AUD)	-23.20%	-23.14%	-23.11%	-23.08%	-23.01%	-22.96%
Gold (USD)	-22.87%	-22.48%	-22.28%	-22.08%	-21.69%	-21.35%
Bonds (global hedged)	-22.95%	-22.63%	-22.48%	-22.32%	-22.01%	-21.69%
Commodities (USD)	-23.34%	-23.41%	-23.45%	-23.49%	-23.57%	-23.66%

Average returns - best 10 quarters						
Median fund	6.63%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	6.55%	6.47%	6.39%	6.43%	6.30%	6.22%
Bonds (AUD)	6.58%	6.53%	6.49%	6.51%	6.44%	6.39%
Commodities (AUD)	6.53%	6.42%	6.32%	6.37%	6.21%	6.11%
Gold (USD)	6.58%	6.53%	6.49%	6.51%	6.44%	6.39%
Bonds (global hedged)	6.59%	6.54%	6.50%	6.52%	6.46%	6.41%
Commodities (USD)	6.56%	6.49%	6.41%	6.45%	6.34%	6.27%



Appendix B: Detailed results – Growth strategies – continued

Average returns - worst 10 quarters						
Median fund	-5.69%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	-5.51%	-5.32%	-5.14%	-5.23%	-4.95%	-4.76%
Bonds (AUD)	-5.60%	-5.51%	-5.42%	-5.46%	-5.32%	-5.23%
Commodities (AUD)	-5.68%	-5.67%	-5.65%	-5.66%	-5.64%	-5.62%
Gold (USD)	-5.58%	-5.47%	-5.36%	-5.42%	-5.25%	-5.14%
Bonds (global hedged)	-5.61%	-5.52%	-5.44%	-5.48%	-5.35%	-5.26%
Commodities (USD)	-5.74%	-5.78%	-5.83%	-5.81%	-5.87%	-5.92%

Rising markets - average return						
Median fund	3.23%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	3.21%	3.18%	3.16%	3.15%	3.12%	3.09%
Bonds (AUD)	3.22%	3.20%	3.19%	3.18%	3.16%	3.14%
Commodities (AUD)	3.22%	3.20%	3.19%	3.18%	3.16%	3.14%
Gold (USD)	3.21%	3.19%	3.18%	3.17%	3.15%	3.13%
Bonds (global hedged)	3.22%	3.20%	3.19%	3.19%	3.17%	3.16%
Commodities (USD)	3.22%	3.21%	3.21%	3.20%	3.19%	3.18%

Falling markets - average return						
Median fund	-3.14%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	-3.05%	-2.96%	-2.91%	-2.87%	-2.77%	-2.68%
Bonds (AUD)	-3.09%	-3.03%	-3.01%	-2.98%	-2.92%	-2.87%
Commodities (AUD)	-3.14%	-3.13%	-3.12%	-3.12%	-3.11%	-3.10%
Gold (USD)	-3.08%	-3.01%	-2.98%	-2.94%	-2.87%	-2.81%
Bonds (global hedged)	-3.09%	-3.04%	-3.01%	-2.98%	-2.93%	-2.87%
Commodities (USD)	-3.15%	-3.16%	-3.17%	-3.17%	-3.18%	-3.19%



Appendix C: Detailed results – Conservative strategies

Risk adjusted return						
Median fund	1.76					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	1.82	1.88	1.91	1.94	1.99	2.04
Bonds (AUD)	1.78	1.80	1.82	1.83	1.85	1.88
Commodities (AUD)	1.74	1.73	1.72	1.70	1.68	1.65
Gold (USD)	1.79	1.82	1.83	1.84	1.86	1.88
Bonds (global hedged)	1.78	1.80	1.81	1.83	1.85	1.87
Commodities (USD)	1.72	1.68	1.66	1.64	1.60	1.56

Maximum drawdown						
Median fund	-8.19%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	-7.78%	-7.37%	-7.16%	-6.96%	-6.54%	-6.13%
Bonds (AUD)	-7.98%	-7.76%	-7.65%	-7.54%	-7.32%	-7.10%
Commodities (AUD)	-8.33%	-8.47%	-8.54%	-8.61%	-8.75%	-8.89%
Gold (USD)	-8.02%	-7.84%	-7.75%	-7.66%	-7.48%	-7.30%
Bonds (global hedged)	-8.02%	-7.85%	-7.76%	-7.68%	-7.51%	-7.34%
Commodities (USD)	-8.48%	-8.77%	-8.91%	-9.05%	-9.34%	-9.63%

Average returns - best 10 quarters						
Median fund	3.38%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	3.32%	3.25%	3.19%	3.22%	3.13%	3.07%
Bonds (AUD)	3.35%	3.33%	3.31%	3.32%	3.29%	3.27%
Commodities (AUD)	3.30%	3.23%	3.15%	3.19%	3.07%	3.00%
Gold (USD)	3.37%	3.37%	3.37%	3.37%	3.37%	3.37%
Bonds (global hedged)	3.36%	3.35%	3.34%	3.35%	3.33%	3.32%
Commodities (USD)	3.36%	3.34%	3.33%	3.33%	3.31%	3.29%



Appendix C: Detailed results – Conservative strategies – continued

Average returns - worst 10 quarters						
Median fund	-1.74%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	-1.60%	-1.46%	-1.32%	-1.39%	-1.18%	-1.04%
Bonds (AUD)	-1.69%	-1.64%	-1.60%	-1.62%	-1.55%	-1.50%
Commodities (AUD)	-1.77%	-1.80%	-1.84%	-1.82%	-1.87%	-1.90%
Gold (USD)	-1.67%	-1.60%	-1.53%	-1.57%	-1.47%	-1.40%
Bonds (global hedged)	-1.70%	-1.66%	-1.62%	-1.64%	-1.58%	-1.54%
Commodities (USD)	-1.83%	-1.91%	-2.00%	-1.96%	-2.09%	-2.17%

Rising markets - average return						
Median fund	1.83%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	1.82%	1.81%	1.81%	1.80%	1.80%	1.79%
Bonds (AUD)	1.83%	1.82%	1.82%	1.81%	1.81%	1.80%
Commodities (AUD)	1.82%	1.82%	1.81%	1.81%	1.80%	1.79%
Gold (USD)	1.84%	1.84%	1.84%	1.84%	1.84%	1.85%
Bonds (global hedged)	1.83%	1.83%	1.83%	1.82%	1.82%	1.82%
Commodities (USD)	1.84%	1.84%	1.84%	1.84%	1.85%	1.85%

Falling markets - average return						
Median fund	-1.30%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	-1.20%	-1.10%	-1.05%	-1.00%	-0.90%	-0.80%
Bonds (AUD)	-1.26%	-1.22%	-1.20%	-1.18%	-1.14%	-1.10%
Commodities (AUD)	-1.33%	-1.36%	-1.37%	-1.38%	-1.41%	-1.43%
Gold (USD)	-1.26%	-1.21%	-1.18%	-1.16%	-1.11%	-1.06%
Bonds (global hedged)	-1.27%	-1.23%	-1.21%	-1.19%	-1.15%	-1.11%
Commodities (USD)	-1.37%	-1.43%	-1.46%	-1.50%	-1.56%	-1.62%

Appendix D: Detailed results – Balanced strategies

Risk adjusted return						
Median fund	1.10					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	1.13	1.16	1.18	1.19	1.23	1.26
Bonds (AUD)	1.11	1.12	1.13	1.14	1.15	1.17
Commodities (AUD)	1.09	1.08	1.07	1.07	1.05	1.04
Gold (USD)	1.12	1.14	1.15	1.16	1.19	1.21
Bonds (global hedged)	1.11	1.13	1.13	1.14	1.16	1.17
Commodities (USD)	1.08	1.07	1.06	1.05	1.03	1.02

Maximum drawdown						
Median fund	-16.28%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	-15.70%	-15.20%	-14.97%	-14.74%	-14.27%	-13.80%
Bonds (AUD)	-15.99%	-15.71%	-15.56%	-15.42%	-15.14%	-14.85%
Commodities (AUD)	-16.28%	-16.29%	-16.29%	-16.30%	-16.35%	-16.41%
Gold (USD)	-15.93%	-15.65%	-15.52%	-15.40%	-15.16%	-14.92%
Bonds (global hedged)	-16.01%	-15.75%	-15.62%	-15.49%	-15.23%	-14.97%
Commodities (USD)	-16.43%	-16.58%	-16.66%	-16.74%	-16.91%	-17.11%

Average returns - best 10 quarters						
Median fund	4.83%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	4.79%	4.76%	4.73%	4.74%	4.69%	4.66%
Bonds (AUD)	4.79%	4.76%	4.72%	4.74%	4.68%	4.65%
Commodities (AUD)	4.77%	4.72%	4.67%	4.69%	4.61%	4.56%
Gold (USD)	4.83%	4.82%	4.82%	4.82%	4.82%	4.81%
Bonds (global hedged)	4.80%	4.77%	4.74%	4.75%	4.71%	4.68%
Commodities (USD)	4.81%	4.78%	4.76%	4.77%	4.74%	4.71%



Appendix D: Detailed results – Balanced strategies – continued

Average returns - worst 10 quarters						
Median fund	-3.73%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	-3.57%	-3.41%	-3.25%	-3.33%	-3.09%	-2.92%
Bonds (AUD)	-3.66%	-3.58%	-3.51%	-3.54%	-3.43%	-3.36%
Commodities (AUD)	-3.74%	-3.74%	-3.75%	-3.74%	-3.75%	-3.76%
Gold (USD)	-3.64%	-3.55%	-3.46%	-3.50%	-3.37%	-3.27%
Bonds (global hedged)	-3.66%	-3.59%	-3.52%	-3.56%	-3.45%	-3.39%
Commodities (USD)	-3.79%	-3.85%	-3.90%	-3.88%	-3.96%	-4.02%

Rising markets - average return						
Median fund	2.77%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	2.74%	2.72%	2.71%	2.70%	2.68%	2.66%
Bonds (AUD)	2.75%	2.73%	2.72%	2.71%	2.70%	2.68%
Commodities (AUD)	2.74%	2.72%	2.71%	2.69%	2.67%	2.65%
Gold (USD)	2.76%	2.76%	2.75%	2.75%	2.75%	2.74%
Bonds (global hedged)	2.75%	2.74%	2.73%	2.73%	2.71%	2.70%
Commodities (USD)	2.76%	2.75%	2.75%	2.75%	2.74%	2.73%

Falling markets - average return						
Median fund	-2.12%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	-2.03%	-1.94%	-1.90%	-1.85%	-1.76%	-1.67%
Bonds (AUD)	-2.08%	-2.03%	-2.01%	-1.99%	-1.94%	-1.90%
Commodities (AUD)	-2.12%	-2.13%	-2.13%	-2.13%	-2.13%	-2.14%
Gold (USD)	-2.06%	-2.00%	-1.96%	-1.93%	-1.87%	-1.81%
Bonds (global hedged)	-2.08%	-2.03%	-2.01%	-1.99%	-1.95%	-1.90%
Commodities (USD)	-2.14%	-2.17%	-2.18%	-2.19%	-2.21%	-2.24%



Appendix E: Detailed results – High growth strategies

Risk adjusted returns						
Median fund	0.78					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	0.80	0.82	0.83	0.83	0.85	0.87
Bonds (AUD)	0.79	0.80	0.81	0.81	0.82	0.83
Commodities (AUD)	0.78	0.78	0.78	0.78	0.78	0.78
Gold (USD)	0.80	0.81	0.81	0.82	0.83	0.84
Bonds (global hedged)	0.79	0.80	0.81	0.81	0.82	0.83
Commodities (USD)	0.78	0.78	0.77	0.77	0.77	0.76

Maximum drawdown						
Median fund	-30.24%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	-29.61%	-28.98%	-28.66%	-28.34%	-27.70%	-27.05%
Bonds (AUD)	-29.86%	-29.48%	-29.29%	-29.10%	-28.72%	-28.33%
Commodities (AUD)	-30.12%	-30.00%	-29.94%	-29.88%	-29.75%	-29.63%
Gold (USD)	-29.81%	-29.38%	-29.16%	-28.94%	-28.51%	-28.07%
Bonds (global hedged)	-29.88%	-29.52%	-29.34%	-29.16%	-28.80%	-28.43%
Commodities (USD)	-30.25%	-30.26%	-30.26%	-30.27%	-30.28%	-30.29%

Average returns - best 10 quarters						
Median fund	8.05%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	7.94%	7.84%	7.73%	7.78%	7.62%	7.52%
Bonds (AUD)	7.97%	7.90%	7.83%	7.86%	7.75%	7.68%
Commodities (AUD)	7.95%	7.86%	7.76%	7.81%	7.67%	7.57%
Gold (USD)	7.99%	7.94%	7.89%	7.91%	7.83%	7.78%
Bonds (global hedged)	7.99%	7.92%	7.86%	7.89%	7.79%	7.73%
Commodities (USD)	8.01%	7.96%	7.92%	7.94%	7.88%	7.84%



Appendix E: Detailed results – High growth strategies – continued

Average returns - worst 10 quarters						
Median fund	-7.84%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	-7.63%	-7.43%	-7.23%	-7.33%	-7.03%	-6.82%
Bonds (AUD)	-7.72%	-7.60%	-7.49%	-7.55%	-7.37%	-7.26%
Commodities (AUD)	-7.80%	-7.77%	-7.73%	-7.75%	-7.69%	-7.66%
Gold (USD)	-7.70%	-7.57%	-7.44%	-7.51%	-7.31%	-7.17%
Bonds (global hedged)	-7.73%	-7.62%	-7.51%	-7.56%	-7.40%	-7.29%
Commodities (USD)	-7.85%	-7.87%	-7.89%	-7.88%	-7.90%	-7.92%

Rising markets - average return						
Median fund	4.17%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	4.13%	4.10%	4.08%	4.06%	4.02%	3.98%
Bonds (AUD)	4.14%	4.11%	4.09%	4.08%	4.05%	4.02%
Commodities (AUD)	4.14%	4.10%	4.09%	4.07%	4.04%	4.00%
Gold (USD)	4.15%	4.12%	4.11%	4.10%	4.08%	4.05%
Bonds (global hedged)	4.15%	4.12%	4.10%	4.09%	4.06%	4.04%
Commodities (USD)	4.15%	4.13%	4.12%	4.11%	4.09%	4.07%

Falling markets - average return						
Median fund	-4.11%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	-4.00%	-3.89%	-3.84%	-3.79%	-3.68%	-3.57%
Bonds (AUD)	-4.05%	-3.98%	-3.95%	-3.91%	-3.85%	-3.78%
Commodities (AUD)	-4.08%	-4.05%	-4.04%	-4.02%	-3.99%	-3.96%
Gold (USD)	-4.03%	-3.95%	-3.91%	-3.87%	-3.80%	-3.72%
Bonds (global hedged)	-4.05%	-3.98%	-3.95%	-3.92%	-3.86%	-3.79%
Commodities (USD)	-4.10%	-4.10%	-4.09%	-4.09%	-4.08%	-4.07%



Appendix F: Detailed results – All growth strategies

Risk adjusted return						
Median fund	0.62					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	0.63	0.64	0.65	0.66	0.67	0.69
Bonds (AUD)	0.62	0.63	0.64	0.64	0.65	0.65
Commodities (AUD)	0.62	0.62	0.62	0.62	0.62	0.62
Gold (USD)	0.63	0.64	0.64	0.65	0.66	0.67
Bonds (global hedged)	0.62	0.63	0.64	0.64	0.65	0.66
Commodities (USD)	0.62	0.62	0.61	0.61	0.61	0.61

Maximum drawdown						
Median fund	-36.09%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	-35.44%	-34.79%	-34.47%	-34.14%	-33.48%	-32.82%
Bonds (AUD)	-35.67%	-35.26%	-35.05%	-34.85%	-34.43%	-34.01%
Commodities (AUD)	-35.92%	-35.75%	-35.66%	-35.58%	-35.41%	-35.24%
Gold (USD)	-35.63%	-35.17%	-34.94%	-34.70%	-34.24%	-33.77%
Bonds (global hedged)	-35.69%	-35.30%	-35.10%	-34.90%	-34.51%	-34.11%
Commodities (USD)	-36.04%	-35.99%	-35.97%	-35.94%	-35.90%	-35.86%

Average returns - best 10 quarters						
Median fund	9.58%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	9.46%	9.35%	9.24%	9.30%	9.13%	9.02%
Bonds (AUD)	9.49%	9.40%	9.31%	9.35%	9.22%	9.13%
Commodities (AUD)	9.48%	9.39%	9.29%	9.34%	9.20%	9.11%
Gold (USD)	9.51%	9.44%	9.37%	9.40%	9.30%	9.23%
Bonds (global hedged)	9.50%	9.42%	9.34%	9.38%	9.27%	9.19%
Commodities (USD)	9.53%	9.47%	9.42%	9.45%	9.37%	9.32%



Appendix F: Detailed results – All growth strategies – continued

Average returns - worst 10 quarters						
Median fund	-9.96%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	-9.74%	-9.52%	-9.29%	-9.40%	-9.07%	-8.85%
Bonds (AUD)	-9.83%	-9.69%	-9.55%	-9.62%	-9.41%	-9.28%
Commodities (AUD)	-9.91%	-9.85%	-9.79%	-9.82%	-9.73%	-9.68%
Gold (USD)	-9.81%	-9.66%	-9.50%	-9.58%	-9.35%	-9.19%
Bonds (global hedged)	-9.83%	-9.70%	-9.57%	-9.63%	-9.44%	-9.31%
Commodities (USD)	-9.96%	-9.95%	-9.95%	-9.95%	-9.94%	-9.94%

Rising markets - average return						
Median fund	4.66%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	4.62%	4.57%	4.55%	4.53%	4.49%	4.45%
Bonds (AUD)	4.62%	4.59%	4.57%	4.55%	4.52%	4.48%
Commodities (AUD)	4.62%	4.59%	4.57%	4.55%	4.51%	4.48%
Gold (USD)	4.63%	4.60%	4.58%	4.57%	4.54%	4.50%
Bonds (global hedged)	4.63%	4.60%	4.58%	4.56%	4.53%	4.50%
Commodities (USD)	4.63%	4.61%	4.59%	4.58%	4.56%	4.53%

Falling markets - average return						
Median fund	-5.58%					
Theoretical portfolios	Various allocations					
	1%	2%	2.5%	3%	4%	5%
Gold (AUD)	-5.46%	-5.34%	-5.28%	-5.21%	-5.09%	-4.97%
Bonds (AUD)	-5.51%	-5.43%	-5.39%	-5.35%	-5.27%	-5.19%
Commodities (AUD)	-5.54%	-5.49%	-5.47%	-5.45%	-5.40%	-5.36%
Gold (USD)	-5.48%	-5.38%	-5.33%	-5.28%	-5.18%	-5.07%
Bonds (global hedged)	-5.51%	-5.43%	-5.39%	-5.35%	-5.28%	-5.20%
Commodities (USD)	-5.55%	-5.52%	-5.51%	-5.49%	-5.46%	-5.43%





Data sources and disclaimers

Data Sources

The Perth Mint has sourced data used in calculations from a number of sources, including, but not limited to, Global Financial Data, IRESS, Bloomberg, Chant West, the Australian Bureau of Statistics and Reuters.

All data has been obtained from sources The Perth Mint deems to be reliable, but we do not guarantee their accuracy or completeness.

Australian Equity Data is All Ordinaries Accumulation Index from 1970 to June 2013. ASX 200 Accumulation Index onward. Australian Fixed Income data is The Bloomberg (ex UBS) Composite Bond Index. Global bonds is Barclays Global Aggregate Index (hedged) into Australian dollars.

Australian Cash Data is Australian Total Return Bills Index from 1970 to June 2013. 90 Day Bank Bill Index onward. Australian and US dollar gold price data is sourced from the World Gold Council. Commodities is Bloomberg Commodities Total Return Index in US dollars and in Australian dollars.

Notes on calculations

Returns longer than one year are annualised.

Return since inception reflects time period from which relevant superannuation strategy has been analysed.

Volatility and risk adjusted returns are calculated since inception.

Actual median fund returns do not represent published median performance figures by Chant West for a given time period, but the compound return of quarterly median fund returns over a given time period.

Actual median fund volatility does not represent volatility of median fund over relevant time period, but volatility of quarterly median fund returns over said time period.

Theoretical return, volatility and risk adjusted return figures for portfolios with 1-5% allocations to gold, bonds, or commodities are calculated using relevant weights and quarterly median returns for relevant strategies and asset class. For example, a growth fund with a 1% allocation to gold unhedged in Australian dollars would be calculated by multiplying the actual median return for a given quarter by 99% and multiplying the return on unhedged Australian dollar gold by 1% gold and adding these two numbers together.

Historical analysis was limited to the time periods from which a minimum of eight superannuation funds reported quarterly performance data, as this was deemed the minimum number required for a useful median figure to be derived. Given this limitation, it is arguable that the findings in this report that pertain to growth strategies are the most relevant, as they cover the longest time period.



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