

## Uncommon truths

### Why is gold so expensive?

**Gold is approaching long-term historical real peaks, recently helped by US crises. We think inflation, geopolitics and falling cryptocurrencies may help explain why it held up so well in 2022, despite the rise in real yields and the dollar. However, those factors may prove ephemeral.**

Gold has been among the better performing assets this year and continues to hold up well (see Precious Metals in **Figure 3**). That it is doing so well in the face of US problems (mini banking crisis and government debt ceiling saga) should come as no surprise. Nor that it has gained nearly a quarter since the low of late September 2022, since when US treasury yields and the US dollar have fallen (we were Overweight gold in our Model Asset Allocation since mid-November but reduced it to zero in mid-March – see **Figure 6**).

Harder to explain is why it did so well last year in the face of a sharp rise in real treasury yields and an appreciating US dollar. While our model based fair value for gold fell below \$1000 in 2022, the actual price ranged between \$1620 and \$2050 (the model based fair value is currently around \$1000). Our econometric model is based on the historical relationship between gold and three variables: real US treasury yields (the 10-year TIPS yield), inflation expectations (the 10-year US treasury inflation breakeven) and the trade-weighted US dollar. We also introduced a dummy variable in November 2016 to capture the sudden boost to gold that came at around the time that President Trump was elected (see [Could gold reach \\$7000?](#)). All explanatory variables were statistically significant.

Maybe there has been a change in the way that gold reacts to the chosen explanatory variables or some

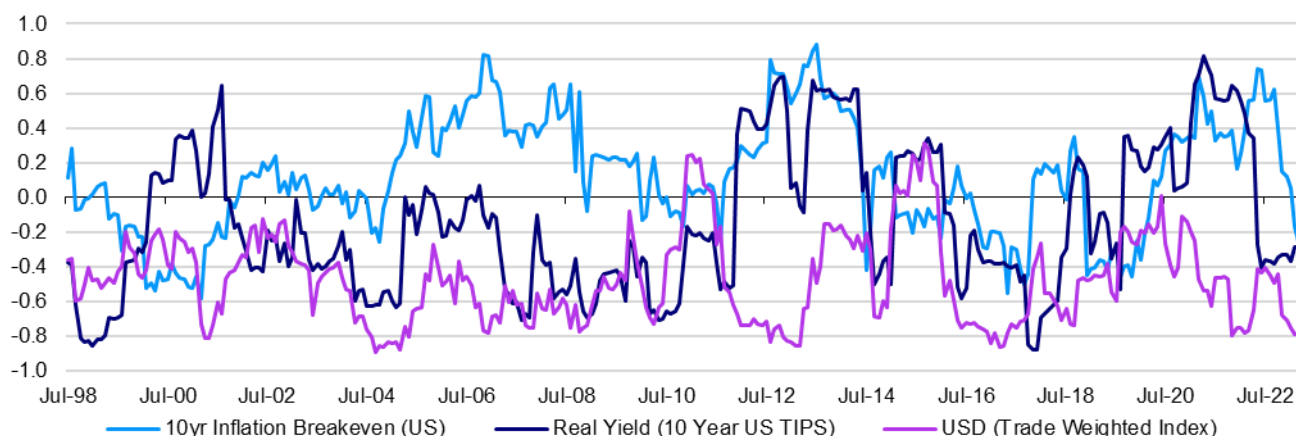
new variable has entered the picture. In essence, this is a good example of what happens when in-sample testing confronts out-of-sample reality (the sample used for our model was from January 2007 to April 2020).

Obvious candidates for how things may have changed are: inflation, central bank purchases and cryptocurrencies. The relationship with inflation is not as straightforward as might be imagined. We use inflation expectations, as measured in the US treasury market (inflation breakevens), but the coefficient in our model is negative, suggesting that gold has tended to fall when inflation expectations rise and vice-versa. We would have expected the opposite.

**Figure 1** suggests that the correlation between gold and inflation expectations is less consistent (positive versus negative) than that between gold and the US dollar. Over the full period shown, the 12-month correlation between gold and inflation expectations has tended to be positive (average of 0.12), whereas for real yields and USD it has averaged -0.14 and -0.47, respectively. However, it had been predominantly negative for inflation in the years before the pandemic, which we had interpreted as a sign that purchases of gold were out of fear of deflation rather than inflation.

The onset of the pandemic saw a return to a positive correlation with inflation, which may or may not have had fundamental underpinnings: gold may have been rising in reaction to a weakening dollar, rather than as a result of rising inflation expectations. Indeed, a more complex partial correlation analysis that includes inflation expectations, real yields and USD as explanatory variables is less conclusive about the results for inflation expectations at that time.

**Figure 1 – Correlation coefficients between gold and select variables (rolling 12-month)**



Notes: **Past performance is no guarantee of future results.** Monthly data from July 1998 to April 2023. The chart shows simple correlations based on monthly percentage changes and are calculated on a rolling 12-month basis. “10yr Inflation Breakeven (US)” is a measure of inflation expectations over the next 10 years, as revealed within the US treasury market. “USD” is a trade weighted index of the US dollar that we have constructed based on series provided by the Bank of England and JP Morgan. Source: Bank of England, JP Morgan, Refinitiv Datastream and Invesco Global Market Strategy Office

Clearer cut is the positive correlation with inflation expectations during 2022, with the partial correlation analysis supporting the evidence in **Figure 1**. Bearing in mind that US CPI inflation moved from 0.1% in May 2020 to 9.1% in June 2022, investors may have turned to gold as a store of value and this could explain why it outperformed our model. However, it should be noted that the correlation with inflation has recently dipped back into negative territory, as has that with real yields.

Central banks had an outsized presence in the gold market in 2022, with net purchases of 1136 tonnes, up from 450 tonnes the year before (according to World Gold Council data). To put that into perspective, WGC estimates suggest total supply in 2022 was up 2% at 4755 tonnes (including mine production, net producer hedging and recycled gold).

Those 2022 central bank (CB) net purchases were a record, with the previous highest in recent years being around 650 tonnes (2018). It is also a far cry from the systematic net sales that occurred throughout the 1990s and up to the Global Financial Crisis. Of note is that emerging market (EM) central banks are the dominant buyers (and have been for some time).

So, why the surge in CB demand in 2022? Perhaps it was an attempt by EM central banks to mitigate the effect of inflation upon the value of their reserves (or more simply reflects momentum purchases after sustained gold price gains). As an aside, the Turkish central bank was the largest reported net buyer in 2022 (148 tonnes) and it had an extreme bout of inflation. As global inflation eases, these sorts of precautionary purchases may decline.

However, there were 741 tonnes of unreported central bank purchases in 2022, which raises the suspicion

that Russia was very active. According to Visual Capitalist, it had been the biggest central bank buyer in the 2000-2021 period, accounting for 28% of net purchases, and had more reason than most to diversify its reserves during 2022 (after sanctions imposed when it invaded Ukraine). This may also have been an incentive for China, which bought 62 tonnes in 2022. Such purchases may ebb and flow with geopolitical tensions but could be an important source of underlying demand as EM countries seek to reduce the influence of the US (“de-dollarisation”).

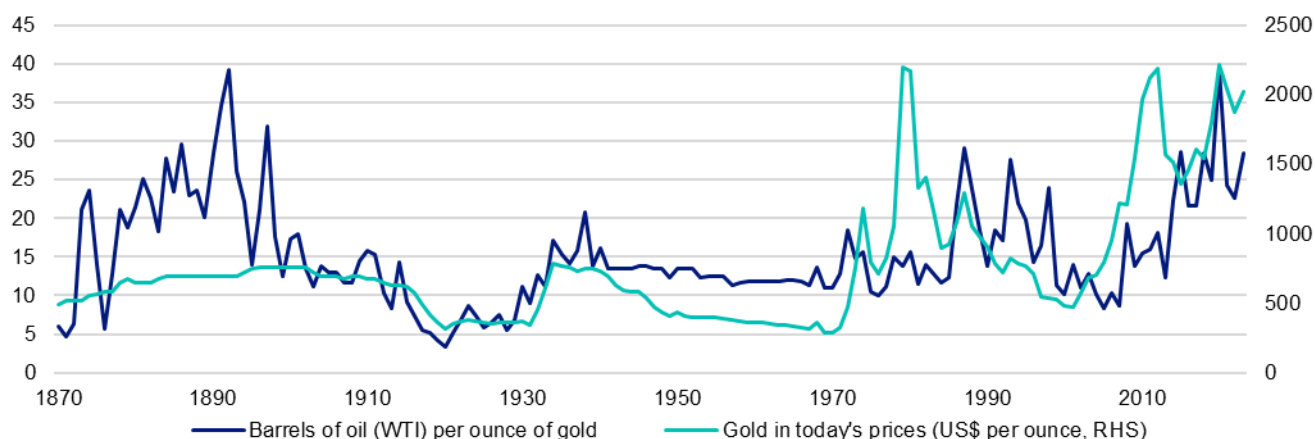
Finally, gold may have benefited during 2022 from the collapse of cryptocurrencies, given that both are thought by some to offer mitigation against inflation and financial crises. If that were a factor, it should now be working against gold as cryptocurrencies have enjoyed something of a rebound.

In conclusion, the surprising strength of gold relative to our model may have been due to a number of factors: the rise in inflation (and a switch to using gold to mitigate against inflation by central banks and others); geopolitical tensions, which may have increased the desire among EM central banks to diversify reserves and, perhaps, the debunking of the idea that cryptocurrencies can act as a store of value.

However, inflation is now easing, geopolitical tensions ebb and flow and cryptocurrencies have rebounded. Of course, we now have a banking crisis and the debt ceiling to worry about. But gold appears expensive compared to historical norms (see **Figure 2**)... unless you believe in a return to some form of gold standard – our calculations suggest that gold would need to be valued at \$8800 if it were to fully back US currency in circulation (up from the \$7000 referred to earlier).

*All data as of 12 May 2023, unless stated otherwise.*

**Figure 2 – Measuring the real price of gold (1870-2023)**



Note: **Past performance is no guarantee of future returns.** Annual data from 1870 to 2023 (as of 11 May 2023). “Gold in today’s prices” rebases the price of gold into 2023 prices using US consumer prices (as of April 2023).

Source: Global Financial Data, Refinitiv Datastream and Invesco Global Market Strategy Office

**Figure 3 – Asset class total returns (%)**

Data as at 12/05/2023			Total Return (USD, %)					Total Return (Local Currency, %)				
	Index	Current Level/Ry	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
<b>Equities</b>												
World	MSCI	649	-0.4	0.5	0.7	8.2	8.0	-0.1	0.8	0.8	8.0	8.0
Emerging Markets	MSCI	973	-0.9	-1.9	-1.4	2.5	1.9	-0.5	-1.5	-0.9	2.9	3.7
China	MSCI	62	-2.3	-4.5	-6.6	-2.2	3.2	-2.2	-4.4	-6.5	-1.7	3.6
US	MSCI	3912	-0.2	0.9	0.3	8.1	6.6	-0.2	0.9	0.3	8.1	6.6
Europe	MSCI	1936	-1.0	0.7	2.9	14.0	18.9	0.2	1.3	2.5	11.5	14.0
Europe ex-UK	MSCI	2392	-0.9	1.0	2.9	15.4	20.6	0.3	1.8	2.6	13.4	14.8
UK	MSCI	1156	-1.4	-0.5	3.1	9.4	13.3	-0.2	-0.6	2.3	5.6	11.1
Japan	MSCI	3398	0.7	3.0	3.0	9.6	10.6	1.0	4.5	4.7	12.4	16.8
<b>Government Bonds</b>												
World	BofA-ML	2.82	-0.5	-0.5	-0.2	2.8	-4.3	0.0	0.1	0.2	2.8	-4.0
Emerging Markets	BBloom	7.83	0.4	0.0	0.6	3.6	2.3	0.4	0.0	0.6	3.6	2.3
China	BofA-ML	2.58	-0.3	0.1	0.1	2.0	1.6	0.3	1.0	1.2	2.0	4.0
US (10y)	Datastream	3.47	-0.2	-0.2	0.5	4.8	-1.4	-0.2	-0.2	0.5	4.8	-1.4
Europe	BofA-ML	3.00	-1.2	-0.5	0.2	4.0	-4.9	0.2	0.5	0.2	2.2	-8.8
Europe ex-UK (EMU, 10y)	Datastream	2.27	-1.0	0.0	0.5	5.7	-5.6	0.3	1.0	0.5	3.9	-9.6
UK (10y)	Datastream	3.78	-1.1	-1.4	-1.1	4.9	-12.6	0.1	-1.4	-1.9	1.2	-14.3
Japan (10y)	Datastream	0.39	0.0	-0.8	-1.7	0.9	-2.9	0.3	0.7	-0.1	3.5	2.6
<b>IG Corporate Bonds</b>												
Global	BofA-ML	4.94	-0.5	-0.4	0.5	3.9	-0.1	-0.1	-0.1	0.5	3.3	-1.1
Emerging Markets	BBloom	7.62	-0.3	-0.5	0.6	3.9	1.8	-0.3	-0.5	0.6	3.9	1.8
China	BofA-ML	3.37	-0.3	0.0	0.1	2.1	0.7	0.3	1.0	1.2	2.1	3.0
US	BofA-ML	5.27	-0.1	-0.5	0.2	3.7	0.1	-0.1	-0.5	0.2	3.7	0.1
Europe	BofA-ML	4.10	-1.2	-0.3	0.9	4.3	0.3	0.1	0.8	0.9	2.5	-3.9
UK	BofA-ML	5.67	-1.0	-0.2	0.8	6.3	-7.2	0.1	-0.2	0.0	2.5	-9.0
Japan	BofA-ML	0.75	-0.1	-1.0	-1.4	-1.1	-5.6	0.2	0.5	0.2	1.4	-0.3
<b>HY Corporate Bonds</b>												
Global	BofA-ML	8.79	-0.3	-0.3	0.4	4.0	3.1	0.0	-0.1	0.4	3.5	2.2
US	BofA-ML	8.63	0.0	0.0	0.5	4.3	3.2	0.0	0.0	0.5	4.3	3.2
Europe	BofA-ML	7.43	-1.1	-0.6	0.7	5.3	5.1	0.2	0.5	0.8	3.4	0.8
<b>Cash (Overnight LIBOR)</b>												
US		4.81	0.1	0.4	0.2	1.3	3.0	0.1	0.4	0.2	1.3	3.0
Euro Area		2.97	1.0	2.8	1.6	3.5	2.5	0.1	0.2	0.1	0.7	0.9
UK		4.30	0.1	2.5	0.8	3.8	-2.6	0.1	0.4	0.2	1.1	2.5
Japan		-0.20	-1.2	0.3	-0.7	-2.0	-6.0	0.0	0.0	0.0	0.0	-0.1
<b>Real Estate (REITs)</b>												
Global	FTSE	1548	-1.9	-0.4	0.2	0.9	-7.9	-0.6	0.7	0.2	-0.9	-11.7
Emerging Markets	FTSE	1292	-3.2	-5.1	-1.1	-3.6	-7.2	-1.9	-4.1	-1.1	-5.2	-11.0
US	FTSE	2859	-1.4	0.6	-0.3	2.4	-6.9	-1.4	0.6	-0.3	2.4	-6.9
Europe ex-UK	FTSE	1985	-5.2	-5.2	-1.2	-6.1	-25.6	-4.0	-4.2	-1.2	-7.7	-28.7
UK	FTSE	711	-4.8	-1.7	2.6	4.0	-18.6	-3.7	-1.7	1.7	0.4	-20.2
Japan	FTSE	2151	0.3	3.2	3.7	0.7	-3.9	0.6	4.7	5.4	3.3	1.5
<b>Commodities</b>												
All	GSCI	3150	-1.2	-9.3	-5.2	-9.9	-18.4	-	-	-	-	-
Energy	GSCI	519	-0.8	-14.0	-7.1	-15.1	-24.7	-	-	-	-	-
Industrial Metals	GSCI	1559	-4.4	-5.7	-7.6	-6.9	-12.7	-	-	-	-	-
Precious Metals	GSCI	2276	-0.8	-0.4	2.0	9.6	10.7	-	-	-	-	-
Agricultural Goods	GSCI	545	-1.6	-2.7	-2.1	-2.5	-16.5	-	-	-	-	-
<b>Currencies (vs USD)*</b>												
EUR		1.09	-1.5	-1.3	0.1	1.4	4.5	-	-	-	-	-
JPY		135.72	-0.6	-1.9	-2.2	-3.4	-5.4	-	-	-	-	-
GBP		1.25	-1.2	0.0	0.9	3.7	2.0	-	-	-	-	-
CHF		1.11	-0.8	-0.2	1.9	2.9	11.7	-	-	-	-	-
CNY		6.96	-0.7	-1.2	-1.3	-0.9	-2.5	-	-	-	-	-

Notes: **Past performance is no guarantee of future results.** \*The currency section is organised so that in all cases the numbers show the movement in the mentioned currency versus USD (+ve indicates appreciation, -ve indicates depreciation). Please see appendix for definitions, methodology and disclaimers. Source: Refinitiv Datastream and Invesco

**Figure 4 – Global equity sector total returns relative to market (%)**

Data as at 12/05/2023	Global				
	1w	1m	QTD	YTD	12m
<b>Energy</b>	<b>1.0</b>	<b>-0.1</b>	<b>2.8</b>	<b>-4.6</b>	<b>-5.0</b>
<b>Basic Materials</b>	<b>-2.0</b>	<b>-4.6</b>	<b>-3.4</b>	<b>-4.7</b>	<b>-4.2</b>
Basic Resources	-2.8	-5.9	-4.1	-5.8	-0.4
Chemicals	-1.0	-2.7	-2.3	-3.3	-8.9
<b>Industrials</b>	<b>-0.4</b>	<b>-0.4</b>	<b>-1.3</b>	<b>-1.6</b>	<b>2.8</b>
Construction & Materials	-0.1	2.5	1.6	4.5	6.6
Industrial Goods & Services	-0.5	-0.8	-1.7	-2.4	2.3
<b>Consumer Discretionary</b>	<b>0.4</b>	<b>1.0</b>	<b>-1.1</b>	<b>5.8</b>	<b>3.8</b>
Automobiles & Parts	0.3	-2.4	-6.6	8.5	-12.8
Media	-1.3	-4.4	-5.9	1.2	1.8
Retailers	1.9	3.3	0.5	2.5	-0.6
Travel & Leisure	-0.3	1.9	1.1	5.9	13.8
Consumer Products & Services	-0.3	1.3	0.9	9.5	19.1
<b>Consumer Staples</b>	<b>-0.3</b>	<b>1.0</b>	<b>1.7</b>	<b>-2.6</b>	<b>-0.5</b>
Food, Beverage & Tobacco	-0.5	1.1	1.8	-1.7	0.3
Personal Care, Drug & Grocery Stores	0.0	0.7	1.6	-4.4	-2.3
<b>Healthcare</b>	<b>-0.5</b>	<b>-0.7</b>	<b>2.4</b>	<b>-5.0</b>	<b>1.5</b>
<b>Financials</b>	<b>-0.3</b>	<b>-0.9</b>	<b>0.3</b>	<b>-7.0</b>	<b>-2.3</b>
Banks	-0.3	-0.6	0.6	-7.9	-4.8
Financial Services	-0.1	-1.5	-1.0	-6.3	-1.7
Insurance	-0.5	-0.6	1.9	-6.0	3.6
<b>Real Estate</b>	<b>-1.3</b>	<b>-1.8</b>	<b>-0.9</b>	<b>-6.6</b>	<b>-13.6</b>
<b>Technology</b>	<b>0.9</b>	<b>2.3</b>	<b>-0.6</b>	<b>13.6</b>	<b>3.9</b>
<b>Telecommunications</b>	<b>-0.5</b>	<b>-2.7</b>	<b>-1.8</b>	<b>-0.7</b>	<b>-6.1</b>
<b>Utilities</b>	<b>0.3</b>	<b>-0.2</b>	<b>2.1</b>	<b>-3.9</b>	<b>-1.2</b>

Notes: **Past performance is no guarantee of future results.** Returns shown are for Datastream sector indices versus the total market index. Source: Refinitiv Datastream and Invesco

**Figure 5a – US factor index total returns (%)**

Data as at 12/05/2023	Absolute					Relative to Market				
	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
<b>Growth</b>	-0.8	-0.8	-2.4	9.5	12.6	-0.6	-1.7	-2.9	1.3	5.5
<b>Low volatility</b>	-0.3	1.0	2.0	1.5	3.7	-0.1	0.0	1.5	-6.0	-2.8
<b>Price momentum</b>	0.4	0.4	0.1	0.0	6.1	0.6	-0.5	-0.5	-7.5	-0.6
<b>Quality</b>	-1.2	-3.4	-3.4	3.0	3.1	-0.9	-4.3	-3.9	-4.7	-3.4
<b>Size</b>	-2.1	-5.2	-6.4	-3.5	-5.6	-1.9	-6.1	-6.9	-10.7	-11.6
<b>Value</b>	-2.1	-5.7	-5.4	-7.3	-8.9	-1.9	-6.5	-5.9	-14.2	-14.6
<b>Market</b>	-0.2	0.9	0.5	8.1	6.8					
<b>Market - Equal-Weighted</b>	-1.1	-1.8	-2.1	0.7	2.3					

Notes: **Past performance is no guarantee of future results.** All indices are subsets of the S&P 500 index, they are rebalanced monthly, use data in US dollars and are equal-weighted. Growth includes stocks in the top third based on both their 5-year sales per share trend and their internal growth rate (the product of the 5-year average return on equity and the retention ratio); Low volatility includes stocks in the bottom quintile based on the standard deviation of their daily returns in the previous three months; Price momentum includes stocks in the top quintile based on their performance in the previous 12 months; Quality includes stocks in the top third based on both their return on invested capital and their EBIT to EV ratio (earnings before interest and taxes to enterprise value); Size includes stocks in the bottom quintile based on their market value in US dollars. Value includes stocks in the bottom quintile based on their price to book value ratios. The market represents the S&P 500 index.

Source: Refinitiv Datastream and Invesco








































**Figure 5b – European factor index total returns relative to market (% annualised)**

Data as at 12/05/2023	Absolute					Relative to Market				
	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
<b>Growth</b>	-1.2	0.2	0.8	10.1	7.9	-1.5	-1.4	-2.0	-1.4	-4.8
<b>Low volatility</b>	0.1	2.2	4.0	12.7	9.9	-0.2	0.5	1.1	0.9	-3.0
<b>Price momentum</b>	1.2	1.8	1.8	5.2	3.9	0.9	0.1	-1.0	-5.8	-8.3
<b>Quality</b>	-0.6	-1.1	-1.8	6.8	3.4	-1.0	-2.7	-4.6	-4.4	-8.8
<b>Size</b>	-0.8	0.4	0.6	6.6	2.6	-1.1	-1.2	-2.2	-4.5	-9.5
<b>Value</b>	-1.1	-0.7	0.5	5.7	3.8	-1.4	-2.3	-2.3	-5.3	-8.4
<b>Market</b>	0.3	1.7	2.9	11.7	13.3					
<b>Market - Equal-Weighted</b>	-0.2	1.4	1.8	9.5	6.8					






Notes: **Past performance is no guarantee of future results.** All indices are subsets of the STOXX 600 index, they are rebalanced monthly, use data in euros and are equal-weighted. Growth includes stocks in the top third based on both their 5-year sales per share trend and their internal growth rate (the product of the 5-year average return on equity and the retention ratio); Low volatility includes stocks in the bottom quintile based on the standard deviation of their daily returns in the previous three months; Price momentum includes stocks in the top quintile based on their performance in the previous 12 months; Quality includes stocks in the top third based on both their return on invested capital and their EBIT to EV ratio (earnings before interest and taxes to enterprise value); Size includes stocks in the bottom quintile based on their market value in euros; Value includes stocks in the bottom quintile based on their price to book value ratios. The market represents the STOXX 600 index.

Source: Refinitiv Datastream and Invesco

**Figure 6 – Model asset allocation**

	Neutral	Policy Range		Allocation	Position vs Neutral
<b>Cash Equivalents</b>	<b>5%</b>	<b>0-10%</b>	↑	<b>10%</b>	
Cash	2.5%		↑	10%	
Gold	2.5%		↓	0%	
<b>Bonds</b>	<b>40%</b>	<b>10-70%</b>		<b>48%</b>	
Government	25%	10-40%		25%	
US	8%		↑	12%	
Europe ex-UK (Eurozone)	7%			5%	
UK	1%			2%	
Japan	7%		↓	2%	
Emerging Markets	2%			4%	
China**	0.2%			0%	
Corporate IG	10%	0-20%		15%	
US Dollar	5%			9%	
Euro	2%			2%	
Sterling	1%			2%	
Japanese Yen	1%			0%	
Emerging Markets	1%			2%	
China**	0.1%			0%	
Corporate HY	5%	0-10%		8%	
US Dollar	4%		↓	6%	
Euro	1%		↑	2%	
<b>Equities</b>	<b>45%</b>	<b>25-65%</b>	↓	<b>34%</b>	
US	25%		↓	12%	
Europe ex-UK	7%		↑	5%	
UK	4%		↑	5%	
Japan	4%		↓	4%	
Emerging Markets	5%			8%	
China**	2%			4%	
<b>Real Estate</b>	<b>8%</b>	<b>0-16%</b>	↓	<b>8%</b>	
US	2%			3%	
Europe ex-UK	2%			1%	
UK	1%			2%	
Japan	2%		↓	1%	
Emerging Markets	1%		↓	1%	
<b>Commodities</b>	<b>2%</b>	<b>0-4%</b>		<b>0%</b>	
Energy	1%			0%	
Industrial Metals	0.3%			0%	
Precious Metals	0.3%			0%	
Agriculture	0.3%			0%	
<b>Total</b>	<b>100%</b>			<b>100%</b>	

<b>Currency Exposure (including effect of hedging)</b>					
USD	48%		↓	45%	
EUR	20%		↑	18%	
GBP	7%		↑	14%	
JPY	15%		↓	10%	
EM	9%		↓	15%	
<b>Total</b>	<b>100%</b>			<b>100%</b>	

Notes: \*\*China is included in Emerging Markets allocations. This is a theoretical portfolio and is for illustrative purposes only. See the latest [The Big Picture](#) document for more details. It does not represent an actual portfolio and is not a recommendation of any investment or trading strategy. Arrows indicate the direction of the most recent changes.

Source: Invesco

**Figure 7 – Model allocations for Global sectors**

	<b>Neutral</b>	<b>Invesco</b>	<b>Preferred Region</b>
<b>Energy</b>	<b>7.5%</b>	<b>Underweight</b>	<b>EM</b>
<b>Basic Materials</b>	<b>4.5%</b>	<b>Underweight</b> ↓	<b>Europe</b>
Basic Resources	2.6%	Underweight ↓	Europe
Chemicals	1.9%	Neutral	Europe
<b>Industrials</b>	<b>13.0%</b>	<b>Neutral</b>	<b>Japan</b>
Construction & Materials	1.6%	Underweight	US
Industrial Goods & Services	11.5%	Neutral	Europe
<b>Consumer Discretionary</b>	<b>14.7%</b>	<b>Overweight</b>	<b>Europe</b>
Automobiles & Parts	2.7%	Neutral	Europe
Media	1.1%	Neutral	Japan
Retailers	4.7%	Overweight	Europe
Travel & Leisure	2.2%	Underweight	EM
Consumer Products & Services	4.0%	Overweight	Europe
<b>Consumer Staples</b>	<b>6.5%</b>	<b>Overweight</b>	<b>US</b>
Food, Beverage & Tobacco	4.3%	Overweight	US
Personal Care, Drug & Grocery Stores	2.2%	Overweight	US
<b>Healthcare</b>	<b>10.0%</b>	<b>Overweight</b>	<b>US</b>
<b>Financials</b>	<b>15.0%</b>	<b>Underweight</b>	<b>Japan</b>
Banks	7.2%	Underweight	EM
Financial Services	4.9%	Underweight	EM
Insurance	2.9%	Neutral	Europe
<b>Real Estate</b>	<b>3.0%</b>	<b>Neutral</b>	<b>EM</b>
<b>Technology</b>	<b>18.8%</b>	<b>Overweight</b>	<b>US</b>
<b>Telecommunications</b>	<b>3.5%</b>	<b>Neutral</b> ↑	<b>Europe</b>
<b>Utilities</b>	<b>3.6%</b>	<b>Underweight</b>	<b>Europe</b>

Notes: These are theoretical allocations which are for illustrative purposes only. They do not represent an actual portfolio and are not a recommendation of any investment or trading strategy. See the latest [Strategic Sector Selector](#) for more details.

Source: Refinitiv Datastream and Invesco

---

## Appendix

---

### Methodology for asset allocation, expected returns and optimal portfolios

#### Portfolio construction process

The optimal portfolios are theoretical and not real. We use optimisation processes to guide our allocations around “neutral” and within prescribed policy ranges based on our estimations of expected returns and using historical covariance information. This guides the allocation to global asset groups (equities, government bonds etc.), which is the most important level of decision. For the purposes of this document the optimal portfolios are constructed with a one-year horizon.

#### Which asset classes?

We look for investibility, size and liquidity. We have chosen to include equities, bonds (government, corporate investment grade and corporate high-yield), REITs to represent real estate, commodities and cash (all across a range of geographies). We use cross-asset correlations to determine which decisions are the most important.

#### Neutral allocations and policy ranges

We use market capitalisation in USD for major benchmark indices to calculate neutral allocations. For commodities, we use industry estimates for total ETP market cap + assets under management in hedge funds + direct investments. We use an arbitrary 5% for the combination of cash and gold. We impose diversification by using policy ranges for each asset category (the range is usually symmetric around neutral).

#### Expected/projected returns

The process for estimating expected returns is based upon yield (except commodities, of course). After analysing how yields vary with the economic cycle, and where they are situated within historical ranges, we forecast the direction and amplitude of moves over the next year. Cash returns are calculated assuming a straight-line move in short term rates towards our targets (with, of course, no capital gain or loss). Bond returns assume a straight-line progression in yields, with capital gains/losses predicated upon constant maturity (effectively supposing constant turnover to achieve that). Forecasts of corporate investment-grade and high-yield spreads are based upon our view of the economic cycle (as are forecasts of credit losses). Coupon payments are added to give total returns. Equity and REIT returns are based on dividend growth assumptions. We calculate total returns by applying those growth assumptions and adding the forecast dividend yield. No such metrics exist for commodities; therefore, we base our projections on US CPI-adjusted real prices relative to their long-term averages and views on the economic cycle. All expected returns are first calculated in local currency and then, where necessary, converted into other currency bases using our exchange rate forecasts.

#### Optimising the portfolio

Using a covariance matrix based on monthly local currency total returns for the last 5 years and we run an optimisation process that maximises the Sharpe Ratio. Another version maximises Return subject to volatility not exceeding that of our Neutral Portfolio. The optimiser is based on the Markowitz model.

#### Currency hedging

We adopt a cautious approach when it comes to currency hedging as currency movements are notoriously difficult to accurately predict and sometimes hedging can be costly. Also, some of our asset allocation choices are based on currency forecasts. We use an amalgam of central bank rate forecasts, policy expectations and real exchange rates relative to their historical averages to predict the direction and amplitude of currency moves.



---

**Definitions of data and benchmarks for Figure 3**

**Sources:** we source data from Datastream unless otherwise indicated.

**Cash:** returns are based on a proprietary index calculated using the Intercontinental Exchange Benchmark Administration overnight LIBOR (London Interbank Offer Rate). The global rate is the average of the euro, British pound, US dollar and Japanese yen rates. The series started on 1st January 2001 with a value of 100.

**Gold:** London bullion market spot price in USD/troy ounce.

**Government bonds:** Current levels, yields and total returns use Datastream benchmark 10-year yields for the US, Eurozone, Japan and the UK, and the ICE BofA government bond total return index for the World and Europe. The emerging markets yields and returns are based on the Bloomberg emerging markets sovereign US dollar bond index.

**Corporate investment grade (IG) bonds:** ICE BofA investment grade corporate bond total return indices, except for in emerging markets where we use the Bloomberg emerging markets corporate US dollar bond index.

**Corporate high yield (HY) bonds:** ICE BofA high yield total return indices

**Equities:** We use MSCI benchmark gross total return indices for all regions.

**Commodities:** Goldman Sachs Commodity total return indices

**Real estate:** FTSE EPRA/NAREIT total return indices

**Currencies:** Global Trade Information Services spot rates

---

**Important information**

This document is intended only for Professional Investors in Hong Kong, for Institutional Investors and/or Accredited Investors in Singapore, for certain specific sovereign wealth funds and/or Qualified Domestic Institutional Investors approved by local regulators only in the People's Republic of China, for certain specific Qualified Institutions and/or Sophisticated Investors only in Taiwan, for Qualified Professional Investors in Korea, for certain specific institutional investors in Brunei, for Qualified Institutional Investors and/or certain specific institutional investors in Thailand, for certain specific institutional investors in Malaysia upon request, for certain specific institutional investors in Indonesia and for qualified buyers in Philippines for informational purposes only. This document is not an offering of a financial product and should not be distributed to retail clients who are resident in jurisdiction where its distribution is not authorized or is unlawful. Circulation, disclosure, or dissemination of all or any part of this document to any unauthorized person is prohibited.

This document may contain statements that are not purely historical in nature but are "forward-looking statements," which are based on certain assumptions of future events. Forward-looking statements are based on information available on the date hereof, and Invesco does not assume any duty to update any forward-looking statement. Actual events may differ from those assumed. There can be no assurance that forward-looking statements, including any projected returns, will materialize or that actual market conditions and/or performance results will not be materially different or worse than those presented.

All material presented is compiled from sources believed to be reliable and current, but accuracy cannot be guaranteed. Investment involves risk. Please review all financial material carefully before investing. The opinions expressed are based on current market conditions and are subject to change without notice. These opinions may differ from those of other Invesco investment professionals.

The distribution and offering of this document in certain jurisdictions may be restricted by law. Persons into whose possession this marketing material may come are required to inform themselves about and to comply with any relevant restrictions. This does not constitute an offer or solicitation by anyone in any jurisdiction in which such an offer is not authorised or to any person to whom it is unlawful to make such an offer or solicitation.

This document is issued in the following countries:

- in Hong Kong by Invesco Hong Kong Limited 景順投資管理有限公司, 45/F, Jardine House, 1 Connaught Place, Central, Hong Kong. This document has not been reviewed by the Securities and Futures Commission.
- in Singapore by Invesco Asset Management Singapore Ltd, 9 Raffles Place, #18-01 Republic Plaza, Singapore 048619.
- in Taiwan by Invesco Taiwan Limited, 22F, No.1, Songzhi Road, Taipei 11047, Taiwan (0800-045-066). Invesco Taiwan Limited is operated and managed independently.

**Authors**

Paul Jackson  
Global Head of Asset Allocation Research  
Telephone +44(0)20 3370 1172  
[paul.jackson@invesco.com](mailto:paul.jackson@invesco.com)  
London, EMEA

**Global Market Strategy Office**

Kristina Hooper  
Chief Global Market Strategist  
[kristina.hooper@invesco.com](mailto:kristina.hooper@invesco.com)  
New York, Americas

Brian Levitt  
Global Market Strategist, Americas  
[brian.levitt@invesco.com](mailto:brian.levitt@invesco.com)  
New York, Americas

Talley Léger  
Investment Strategist, Equities  
[talley.leger@invesco.com](mailto:talley.leger@invesco.com)  
New York, Americas

Ashley Oerth  
Senior Investment Strategy Analyst  
[ashley.oerth@invesco.com](mailto:ashley.oerth@invesco.com)  
London, EMEA

Arnab Das  
Global Market Strategist  
[arnab.das@invesco.com](mailto:arnab.das@invesco.com)  
London, EMEA

Adam Burton  
Senior Economist  
[adam.burton@invesco.com](mailto:adam.burton@invesco.com)  
London, EMEA

Paul Jackson  
Global Head of Asset Allocation Research  
[paul.jackson@invesco.com](mailto:paul.jackson@invesco.com)  
London, EMEA

András Vig  
Multi-Asset Strategist  
[andras.vig@invesco.com](mailto:andras.vig@invesco.com)  
London, EMEA

David Chao  
Global Market Strategist, Asia Pacific  
[david.chao@invesco.com](mailto:david.chao@invesco.com)  
Hong Kong, Asia Pacific

Thomas Wu  
Market Strategies Analyst, Asia Pacific  
[thomas.wu@invesco.com](mailto:thomas.wu@invesco.com)  
Hong Kong, Asia Pacific

Tomo Kinoshita  
Global Market Strategist, Japan  
[tomo.kinoshita@invesco.com](mailto:tomo.kinoshita@invesco.com)  
Tokyo, Asia Pacific

Cyril Birks  
Global Thought Leadership Intern  
[cyril.birks@invesco.com](mailto:cyril.birks@invesco.com)  
London, EMEA

Telephone calls may be recorded.