BYTETREE ASSET MANAGEMENT

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BOLD

A Viable Asset for Investment Portfolios

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INTRODUCTION

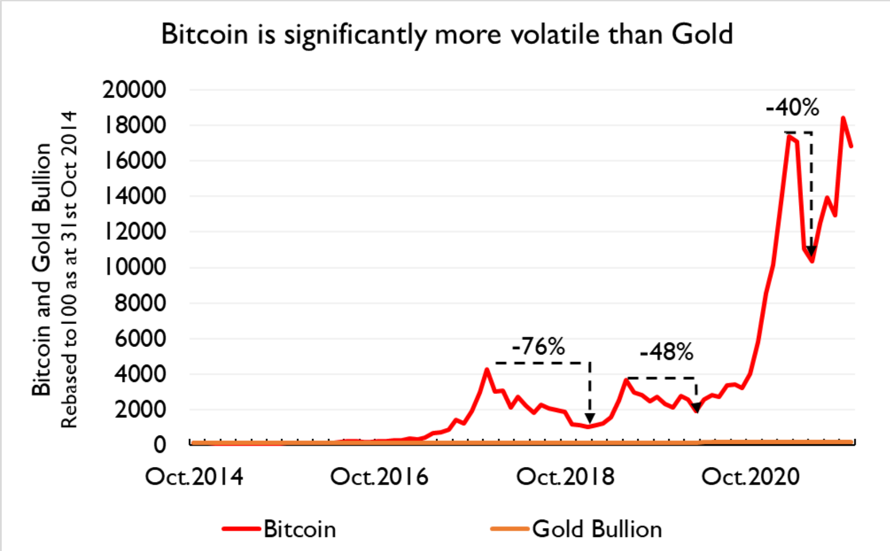
Ever since the launch of Bitcoin in January 2009, digital assets have matured and emerged as a distinct asset class to traditional ones. As they become more widely accepted across the globe, individual and institutional investors are looking for ways to gain exposure to this novel asset class in a practical and robust manner. Investing in these assets poses unique challenges owing to their significant price volatility, liquidity, valuation and legal risks. The former is especially of concern to institutional investors, given that the price volatility on many digital assets is over five times that of the World Equity Market, making them unsuitable for many investment portfolios.

Finding a practical solution to this problem, ByteTree Asset Management (BTAM) has created the BOLD investment product. This risk-based investment strategy, created by combining Bitcoin and Gold, using risk-adjusted weights, provides a lower volatility and more conservative way to gain exposure to Bitcoin and is thus likely to appeal to many investors.

THE INVESTMENT CASE FOR OWNING BITCOIN ALONGSIDE GOLD IN PORTFOLIOS

Bitcoin is a digital currency whose popularity has increased significantly since Satoshi Nakamoto first introduced the concept in 2008. The digital asset has delivered over 16,000% since November 2014, as demand has far outstripped supply. On the other hand, Gold is an asset that has been prized as a store of value for thousands of years. Whilst Bitcoin is gaining popularity as the digital equivalent of Gold, it certainly does not replace the role of Gold in investment portfolios. This is because the two assets share many similarities but also many differences.

Whilst both assets are liquid hard assets, Bitcoin is a higher risk asset that is much more volatile than its yellow-metal brethren (Figure 1). Measured over the period Nov 2014 – Nov 2021, Gold has demonstrated a volatility comparable to that of the World Equity Market (MSCI World), whereas Bitcoin has proven to be around six times as volatile over the same period. The high level of volatility makes it impractical for institutional investors to hold a significant weight in Bitcoin.



Source: ByteTree Asset Management, Refinitiv Datastream.

Figure 1: *Illustrating the volatility and drawdown of Bitcoin compared with Gold.*

Gold and Bitcoin are assets that prefer inflation to deflation. This is also one of the main reasons why some investors see them as interchangeable. However, the fundamental reality is that the two assets are effective in different economic environments. Whereas Gold tends to outperform in "risk-off" environments – when the economy is contracting and stock markets are falling – Bitcoin has historically performed better in "risk-on" environments, when the economy is expanding and stock markets are rising.

BITCOIN + GOLD = BOLD

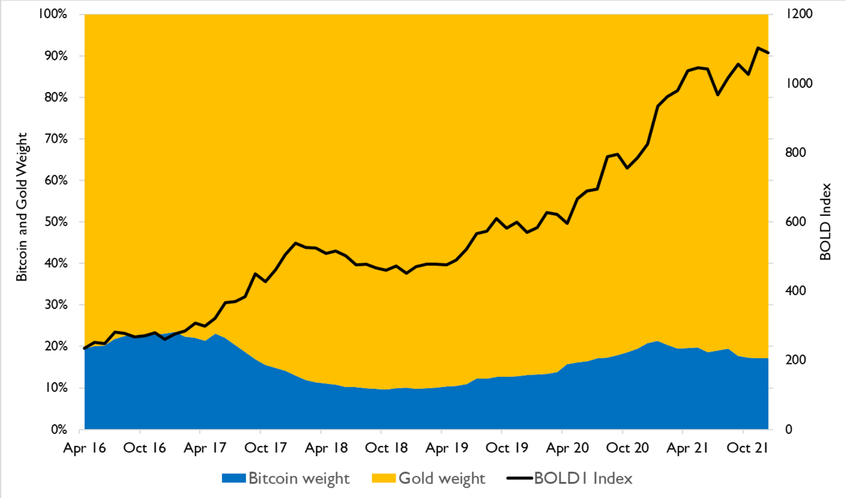
For the reasons cited above, Gold and Bitcoin complement each other in an investment portfolio. The two assets share many similarities but also serve completely different roles in a portfolio as they perform in different economic environments.

These distinct properties allow for the blending of Gold and Bitcoin to create a diversified investment product with a slightly higher risk than the former and materially lower risk than the latter. A suitably blended mix of the two assets stands to perform across a range of environments as the two assets do not move in sync over the long term.

BOLD is an investment product from BTAM that brings the theory to life, allowing investors to gain exposure to Bitcoin alongside Gold as a straightforward and robust product for investment portfolios.

BOLD tracks an index comprised of Bitcoin and Gold and is rebalanced monthly based on weights determined by the annual (360-day) inverse realised volatility of each asset. Under this methodology, the strategy continually favours the less risky asset, as measured by historic volatility. Whilst there are other ways to combine Bitcoin and Gold, this risk-weighted asset allocation technique is a tried-and-tested approach that has been shown to reduce portfolio volatility and drawdowns. Automatically rebalancing the weights each month aims to smooth and enhance combined returns over time.

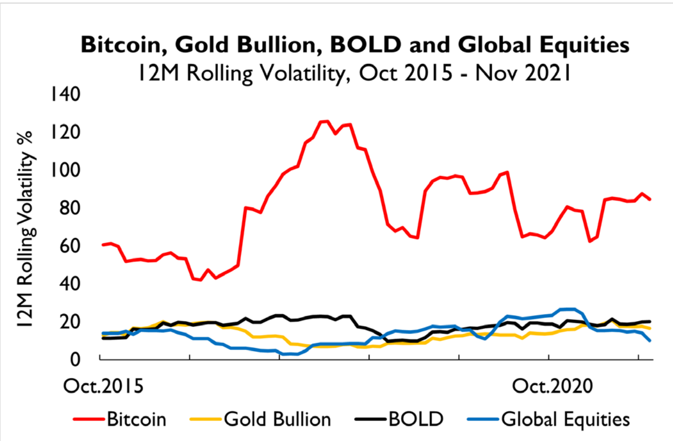
Figure 2 (below) illustrates the performance of BOLD from April 2016 alongside the historical weights of the two assets in the strategy over time. As can be seen, BOLD assigns a significantly higher weight to Gold, owing to its lower historical volatility. The Bitcoin weight has been highest when its volatility has enjoyed periods of calm and vice versa. If Bitcoin's volatility were one day able to equal Gold's, then the allocation would be 50-50. However, for as long as Bitcoin's volatility remains high, it will only get a modest allocation in BOLD.



Source: ByteTree Asset Management, Bloomberg

Figure 2: *Performance of BOLD from April 2016 to November 2021 along with the historical weights of Bitcoin and Gold*

The net result of this weighting strategy is that BOLD has been significantly lower risk than Bitcoin over a 12-month rolling basis (Figure 3a), as well as over the entire test period (Figure 3b). Over the entire test period, running from Nov 2014 – Nov 2021, BOLD has been 20% as volatile as Bitcoin and 30% more volatile than Gold (Figure 3b). More importantly, BOLD's volatility is not significantly higher than the World Equity Market (as shown in Figure 3a and 3b below), making it suitable for inclusion as a long-term holding in institutional investment portfolios.



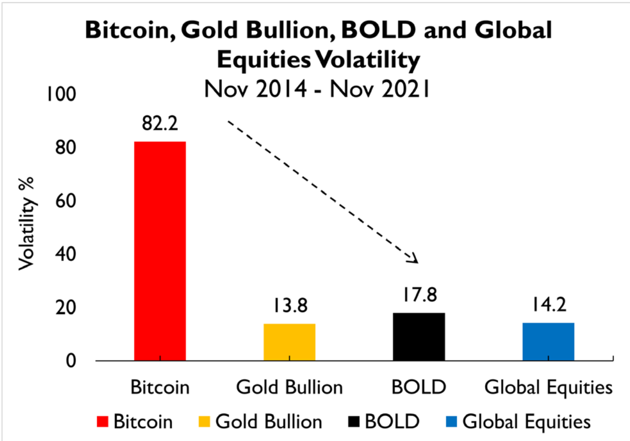
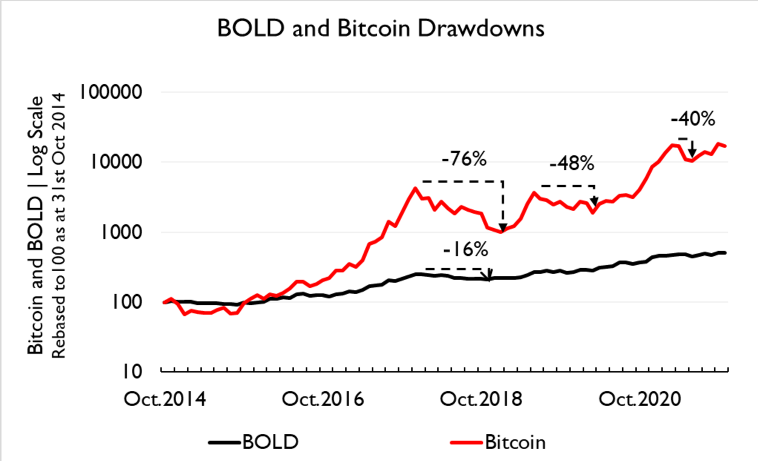


Figure 3a & 3b: *Bitcoin has been significantly more volatile than Gold over a twelve-month rolling basis (a) and over the period Nov 2014 - Nov 2021 (b). BOLD, however, has been significantly lower volatility than Bitcoin and 30% more volatile than Gold (b).*

Whilst volatility serves as one quantitative assessment of risk, drawdown provides the other. Figure 4 plots the performance of Bitcoin along with BOLD (on a log-scale) and shows that BOLD barely registered the sharp drawdowns experienced by Bitcoin in 2014, 2018 and 2020. The maximum drawdown incurred by BOLD over this period (Nov 2014- Nov 2021) was 16% – around 20% of that experienced by Bitcoin. Thus, the lower volatility profile of BOLD, compared to Bitcoin, is matched by a lower drawdown risk profile as well.

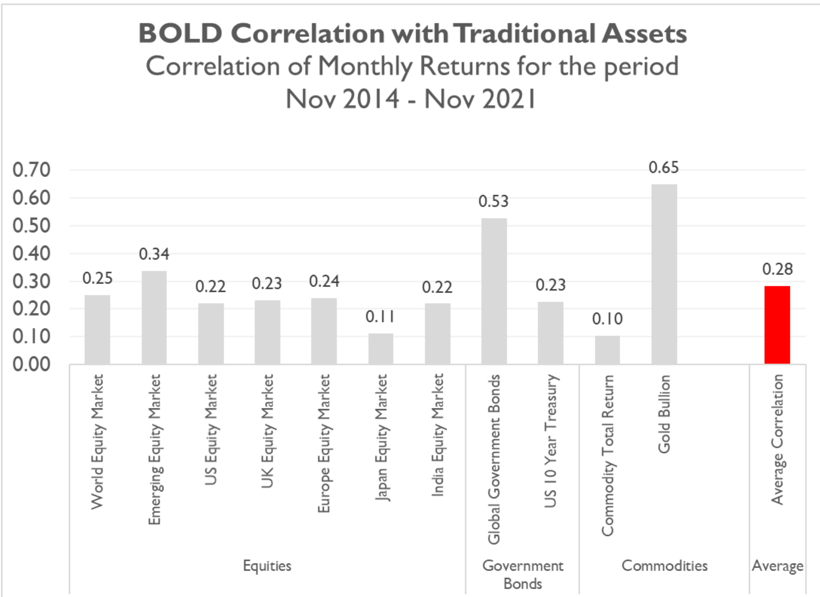


Source: ByteTree Asset Management, Refinitiv Datastream

Figure 4: *BOLD has barely registered the drawdowns experienced by Bitcoin over the period Nov 2014 – Nov 2021.*

DIVERSIFICATION BENEFITS OF BOLD

When assessing the diversification benefits of BOLD, a useful starting point is to analyse the correlation of this investment product compared to traditional asset classes. Doing this, using monthly returns and covering the period Nov 2014 to Nov 2021, we can confirm that the BOLD strategy has been very lowly correlated to traditional assets over this period, which covers a bull market as well as three significant corrections. The results are summarised in Figure 5 below. As can be seen, the average correlation of BOLD vs traditional assets has been 0.28 over this period, with the highest correlation being with Gold (unsurprisingly). This analysis supports the idea that BOLD is a useful diversifying asset to include in a portfolio of traditional asset classes.



Source: ByteTree Asset Management, Bloomberg, Refinitiv Datastream

Figure 5: *The average correlation of BOLD vs traditional assets has been very low over the period November 2014 – November 2021.*

However, to further assess the diversification benefits of BOLD, we need to measure the impact of including it in traditional asset portfolios. These can be measured using Compound Annual Growth Rate (return), volatility (risk), maximum drawdown (risk) and the Sharpe Ratio (risk-adjusted return).

In order to assess bold on these criteria, we have to first carry out an optimisation exercise to determine the optimal BOLD weight to include in a portfolio of traditional assets ("Traditional portfolio"), comprised of 60% Global Equities and 40% Global Government Bonds. For practical purposes, we constrain the maximum permissible weight of BOLD in the portfolio to 10% and allow the portfolio optimiser to set the ideal BOLD weight based on the criteria of maximising the portfolio risk-adjusted return (Sharpe Ratio). In order to keep the weights of the resulting portfolio ("Traditional Portfolio with BOLD") not too far off from the "Traditional Portfolio" we also constrain the Global Equity weight to no greater than 60%.

Next, we compute the portfolio performance of the "Traditional Portfolio" based on a 60% Global Equity and 40% Global Government Bond weight and use the performance of this portfolio as a benchmark to compare with the "Traditional portfolio with BOLD".

Finally, we repeat this exercise using Gold instead of BOLD, to determine which asset has better diversifying properties. Again, we constrain the maximum permissible weight of Gold in the portfolio to 10% and the Global Equity weight to no greater than 60% and allow the portfolio optimiser to choose the ideal Gold weight by maximising the portfolio risk-adjusted return. We call this portfolio "Traditional Portfolio with Gold".

We then analyse all three portfolios by comparing their compound annual growth rate, volatility, maximum drawdown and risk-adjusted return. The results are summarised in Table 1 (below), with the performance of each portfolio shown in Figure 6 that follows.

As can be seen, the portfolio optimiser allocates the maximum permissible weight (10%) to both the "Traditional Portfolio with BOLD" and "Traditional Portfolio with GOLD" by reducing the allocation to Global Government Bonds. In effect, this appears to suggest that both these assets have diversifying properties and should be included in a portfolio of traditional assets.

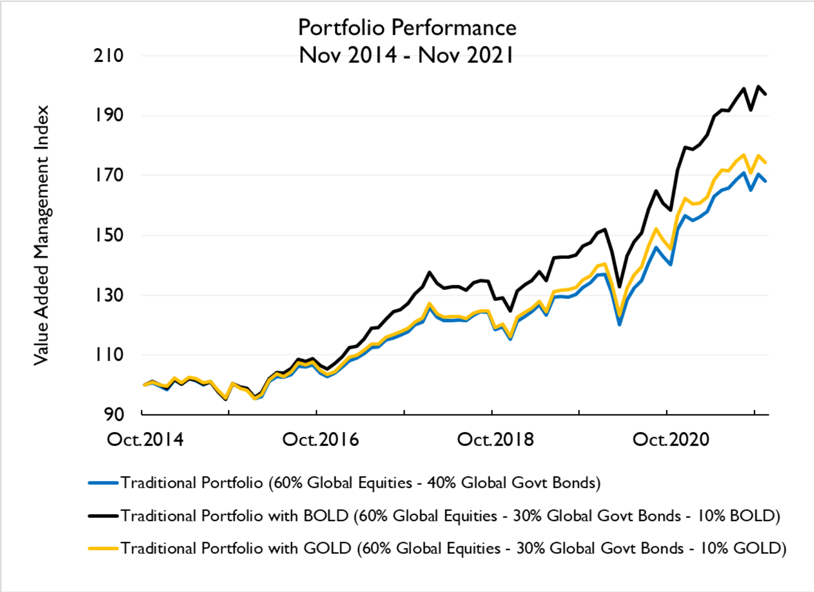
Furthermore, our analysis shows that allocating to BOLD increases the risk (volatility and maximum drawdown) of the portfolio marginally compared with allocating to Gold. However, this increase in risk is justified by the higher compound annual growth rate generated by the BOLD portfolio compared with the other two. The net result is that the Traditional portfolio with BOLD has the highest risk-adjusted return (Sharpe ratio).

	Traditional Portfolio *	Traditional Portfolio with BOLD**	Traditional Portfolio with GOLD***
Gloal Equities Weight	60	60	60
Global Government Bond Weight	40	30	30
BOLD Weight	0	10	0
Gold Weight	0	0	10
Compound Annual Growth Rate %	7.6	10.1	8.2
Volatility (Standard Deviation) %	8.9	9.5	9.0
Maximum Drawdown %	12.4	12.7	12.3
Sharpe Ratio (Risk free = 3.5%)	0.46	0.69	0.52

* 60% Global Equities and 60% Global Government Bonds
** BOLD portfolio weight determined by Portfolio Optimisation subject to constraints
*** GOLD portfolio weight determined by Portfolio Optimisation subject to constraints
Analysis period November 2014 - November 2021

Source: ByteTree Asset Management, Bloomberg, Refinitiv Datastream

Table 1: *Summary performance statistics of a 60%-40% Equity-Bond Portfolio ("Traditional Portfolio"), Traditional Portfolio with BOLD and Traditional Portfolio with Gold.*



Source: ByteTree Asset Management, Bloomberg, Refinitiv Datastream

Figure 6: *Performance of a 60%-40% Equity-Bond Portfolio ("Traditional Portfolio"), Traditional Portfolio with BOLD and Traditional Portfolio with Gold.*

Whilst our portfolio optimiser allocates the maximum permissible weight (10%) to BOLD, we do not have to follow suit. Table 2 (below) shows the result of allocating between 1% and 5% to BOLD in a traditional 60% – 40% Global Equity, Global Government Bond Portfolio. Our analysis (table below) shows that allocating as little as 1% improves the return and risk-adjusted return of the portfolio without altering the risk of the portfolio. As we increase the BOLD allocation, in increments of 1%, the return and risk-adjusted return improve further without an increase in the portfolio risk. Admittedly, this analysis is based on historical data, and past performance is not a guarantee of future results.

	Traditional Portfolio *	Traditional Portfolio with 1% BOLD	Traditional Portfolio with 2% BOLD	Traditional Portfolio with 3% BOLD	Traditional Portfolio with 4% BOLD	Traditional Portfolio with 5% BOLD
Gloal Equities Weight	60	59.5	59	58.5	58	57.5
Global Government Bond Weight	40	39.5	39	38.5	38	37.5
BOLD Weight	0	1	2	3	4	5
Compound Annual Growth Rate %	7.6	7.8	8	8.2	8.4	8.6
Volatility (Standard Deviation) %	8.9	8.9	8.9	8.9	8.9	8.9
Maximum Drawdown %	12.4	12.3	12.2	12.2	12	12
Sharpe Ratio (Risk free = 3.5%)	0.46	0.48	0.51	0.53	0.55	0.57

* 60% Global Equities and 60% Global Govemment Bonds
Analysis period November 2014 - November 2021

Source: ByteTree Asset Management, Bloomberg, Refinitiv Datastream

Table 2: *Summary performance statistics of Traditional 60%-40% Equity-Bond Portfolios with between 1-5% allocated to BOLD*

RISKS OF HOLDING BOLD

Investing in BOLD is not without risks, however. Whilst Bitcoin and Gold thrive during different times, both assets are inflation sensitive. Thus, the key downside risk to BOLD comes from a period of deflation. In such an environment, both Bitcoin and Gold are likely to fall as economic activity collapses and financial stresses rise. However, given that Central Banks frequently fight deflation by printing more fiat money – as we have amply seen over the last decade – we believe this risk is limited.

Regulatory risk is also a key threat to the viability of BOLD. Worried about the potential loss of control over the currency system, owing to decentralisation and anonymity benefits of Bitcoin, the rise of the digital currency has frequently been interrupted every time a government has cracked its regulatory whip. For example, in 2017 Bitcoin fell more than 10% when South Korea announced a crackdown on trading in the digital currency. In 2019, Bitcoin fell to a six-month low as Chinese authorities accelerated a crackdown on businesses involved in cryptocurrency operations. Two years later, China's central bank announced that all transactions of cryptocurrencies are illegal, effectively banning Bitcoin. Aside from China, seven other countries have banned cryptocurrencies, whilst 42 others have implicitly banned them (imposed restrictions).

In the short term, regulatory risk will continue to impact the price of Bitcoin and hence BOLD. However, this risk is likely to recede long-term as Bitcoin's ecosystem continues to mature and governments work out how to regulate these cryptocurrencies without the need to ban them. Some countries in Asia are already offering pointers on how to do this. Japan, for example, has recently passed the Virtual Currency Act, which defines and describes cryptocurrencies as well as their treatment for accounting purposes, whilst South Korea has finalised a legal amendment relating to the taxation of cryptocurrencies.

Finally, another risk is that both BOLD assets, Bitcoin and Gold, could gradually decline in a low volatility environment. Whilst highly unlikely, this risk is non-trivial. This could happen, for example, when Bitcoin has matured, and its price volatility has dropped significantly. If both assets are stuck in a low volatility regime, at this time, and trending lower, then BOLD is likely to continue to decline gradually.

CONCLUSION

Digital assets have emerged as a distinct asset class to traditional ones and are becoming more mainstream. However, their high level of volatility and large drawdowns make it a challenge for institutional investors to allocate to them.

BOLD, an investment product from BTAM, provides a practical solution to this problem. By combining Bitcoin with Gold, using risk-adjusted weights, BOLD gives investors optimal risk-adjusted exposure to Bitcoin and Gold. In essence, BOLD retains the diversification benefits of Gold along with the return-enhancing benefits of Bitcoin, at a level of volatility that is only slightly riskier than owning Gold and significantly less risky than owning Bitcoin. Even a modest holding of BOLD has shown the potential to improve portfolio returns without significantly increasing portfolio risk.

Bitcoin has indubitably beaten Gold since 2014, but that won't always be the case. Ever since the Great Financial Crisis, global stock markets have been inflated beyond any reasonable measure of value, and BOLD has benefitted from owning Bitcoin over this "risk-on" period. However, the stockmarket boom will inevitably come to an end one day, and we will see a period of "risk-off" return. When this happens, Gold will be where we want to be, and given that this is where BOLD allocates most of its money, investors can sleep safely at night knowing they are hedged.

Investing in BOLD is not without risks, however. BOLD thrives in an inflationary environment and not a deflationary one. Regulatory risk is also a key threat to the viability of BOLD. Nonetheless, we believe the rewards outweigh the risks. However, investors need to judge the suitability of this investment in the context of their investment objectives as well as the entire portfolio.

APPENDIX

Asset	Representative Index
World Equities	FTSE World $ Total Return
Emerging Market Equities	MSCI Emerging Market $ Total Return
US Equities	S&P 500 $ Total Return
UK Equities	FTSE 100 $ Total Return
EU Equities	FTSE Eur1st 300 ex UK $ Total Return
Japan Equities	TOPIX $ Total Return
India Equities	S&P BSE (Sensex) 30 $ Total Return
Global Government Bonds	S&P Global Developed Sovereign Bond $ Total Return
US Treasuries	US Datastream Benchmark 10 Year $ Total Return
Commodities	S&P GSCI Commodity $ Total Return
Gold Bullion	Gold Bullion LBM $/t oz

Source: Refinitiv Datastream