ByteTree BOLD Inverse Volatility Weights Investment Strategy

April 2021

Contents

► Section 1: Introduction

The aim of this paper is to provide readers with a brief introduction to Bitcoin (BTC), the World's largest digital asset by market capitalisation[1], and the BOLD (Bitcoin-Gold) Inverse Volatility Investment Strategy from ByteTree Asset Management (BTAM). The latter is presented as an institutional-grade investment strategy that allows investors to gain exposure to BTC, alongside Gold, as a simple and robust product for investment portfolios.

BTC is a high risk asset, approximately five times as volatile as the World Equity Market and with an average drawdown of around eight times the same comparison benchmark[2]. When compared with Gold, considered a safe haven asset (Baur & McDermott, 2016), the digital asset has recorded a similar relative volatility and an average drawdown of approximately six times the yellow metal[2]. This high risk nature of BTC has made it impractical for institutional investors to maintain a passive holding of the digital asset in investment portfolios without significantly impairing the underlying investment mandate.

However, BTAM aims to show that by combining BTC with Gold in proportions determined by the Inverse Volatility of each asset, it is possible to gain exposure to the digital asset with significantly lower levels of volatility and drawdowns compared to passive holders of the digital asset. This strategy is demonstrated as being superior to a Fixed weight holding of BTC and Gold – explored as an alternative weighting criteria for combining the two assets with the aim of reducing the risk associated with a passive holding of BTC in investment portfolios.

The benefits of combining BTC with Gold are numerous. For one, both assets are seen as inflation sensitive (Acheson, 2020), primarily due to their limited supply. Both assets have demonstrably low correlation with traditional assets and whilst BTC has been described as "digital Gold", it does not resemble any other traditional asset from an econometric perspective (Klein, et al., 2018). Additionally, whilst Gold is seen as a safe haven asset, particularly during times of economic and political crisis (Baur & McDermott, 2016), BTC is not a safe haven asset and behaves very differently to Gold during periods of market distress (Klein, et al., 2018). At the same time, there

[1] https://www.cryptocompare.com/ , as of 8th May, 2020
[2] Measurement period 1st July 2014 to 31st December 2020. Data retrieved from Refinitiv, Datastream.

is a risk that the price of BTC can go to zero if governments decide to ban it. This risk does not exist for Gold.

This paper comes at a time when "Bitcoin is emerging as a distinct asset class among investors given its seemingly detached price behavior relative to market and economic fundamentals" (Koutmos, 2020). As BTC and digital assets become more widely accepted by the investment community, BTAM believes that the BOLD Inverse Volatility weights investment product will find appeal amongst investors as a simple and practical way to allocate to the digital asset with significantly reduced risk compared to BTC buy-and-hold investing.

We believe this report is primarily likely to appeal to investors, traders, the buy-side research community and index providers.

► Section 2: Context

2.1 Introduction to Bitcoin

BTC is a cryptocurrency whose popularity has increased significantly since Satoshi Nakamoto first introduced the concept in 2008 (Klein, et al., 2018) owing to the fact that it is a digital asset "removed from the consequences of a traditional banking system" (McNulty, 2013-2014). Bitcoins are created through a process referred to as mining which involves "committing hash-based proof of work computing power, generated through a Graphics Processing Unit (GPU) or Application Specific Integrated Circuit (ASIC)" (Morris & Bennett, 2020). McNulty (2013-2014) also notes that the popularity of BTC rides on the fact that there is a finite supply of 21 million coins. Morris and Bennett (2020) note that "the rate at which new BTC can be minted is controlled by the network's algorithmic programming". To date[3], around 18.6 million coins have been mined with around 900 new coins mined each day (Morris & Bennett, 2020). BTCs are hosted on a decentralized and distributed ledger with over 10,000 nodes across more than 100 countries (Morris & Bennett, 2020).

2.2 Bitcoin as a distinct asset class

Bitcoin has been labelled the "New Gold" (Klein, et al., 2018) and "Digital Gold" (Popper, 2016), however the cryptocurrency is not a replacement for the yellow metal. Klein et al. (2018) have compared BTC with traditional assets – with a focus on volatility, correlation and portfolio diversification – and shown that BTC correlations behave completely different from Gold, particularly during periods of market distress. The same authors note that from an econometric perspective, BTC does not resemble any conventional asset. A simple calculation of the correlation of BTC with traditional asset classes, using representative indices, confirms that the digital asset is very lowly correlated to traditional assets over the period 1st June 2014 to 30th March 2020 (Figure 2.1a). The average correlation is 0.07 and twice this figure during periods of market stress. The periods of market stress are highlighted in Figure 2.1b.

[3] 27th March 2021

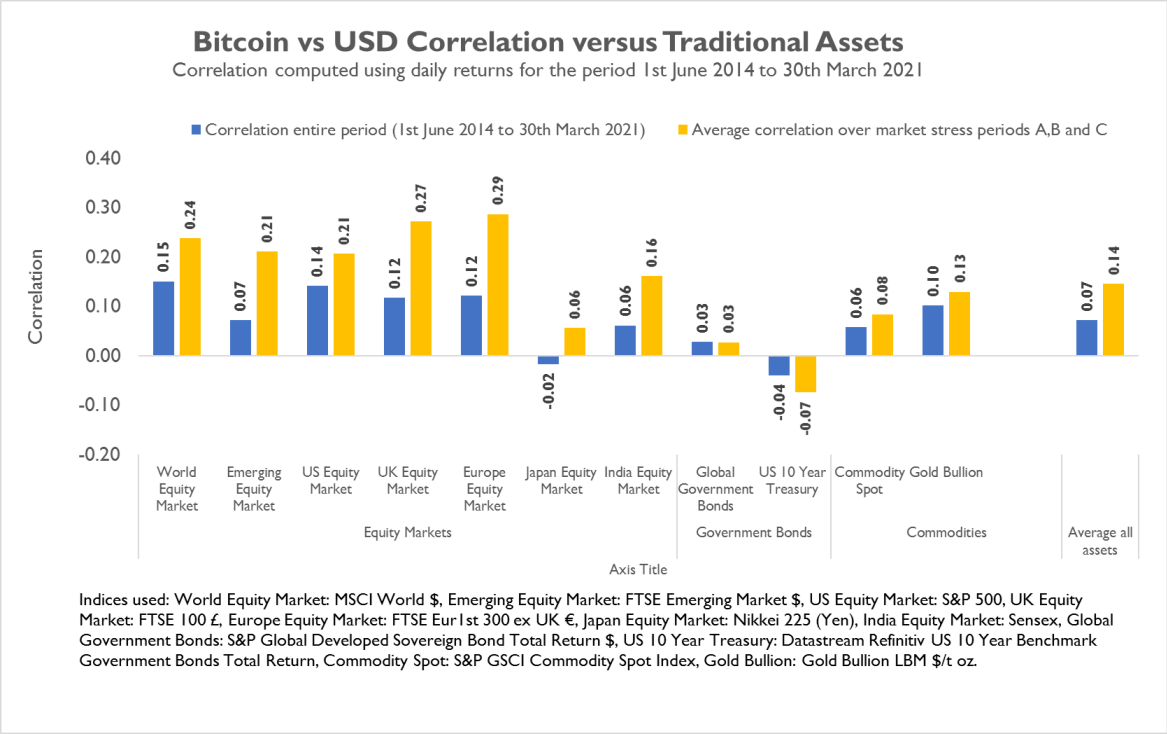


Figure 2.1a Correlation of Bitcoin versus key Traditional Asset Classes over the period 1st June 2014 to 30 March 2021 using daily returns

Figure 2.1b World Equity market represented using MSCI World $ overlaid with key periods of market stress between 1st June 2014 to 30 March 2021

Figure 2.1c plots the correlation of Gold with the same traditional assets shown in Figure 2.1a. As can be seen, over the entire period (1st June 2014 to March 2021), Gold has a similar average correlation to traditional assets as BTC. However, measured over periods of market stress, Gold is half as correlated as BTC to the same assets. What this appears to show is that whilst BTC is not the "New Gold", it does possess some of the same hedging abilities as Gold. Dyhrberg (2016) has come to the same conclusion after applying the asymmetric GARCH methodology used in the investigation of Gold. Furthermore, the low extreme correlation between bitcoin and gold "implies that both assets can be used together in times of turbulence in financial markets to protect equity positions" (Gkillasa & Longinb, 2019).

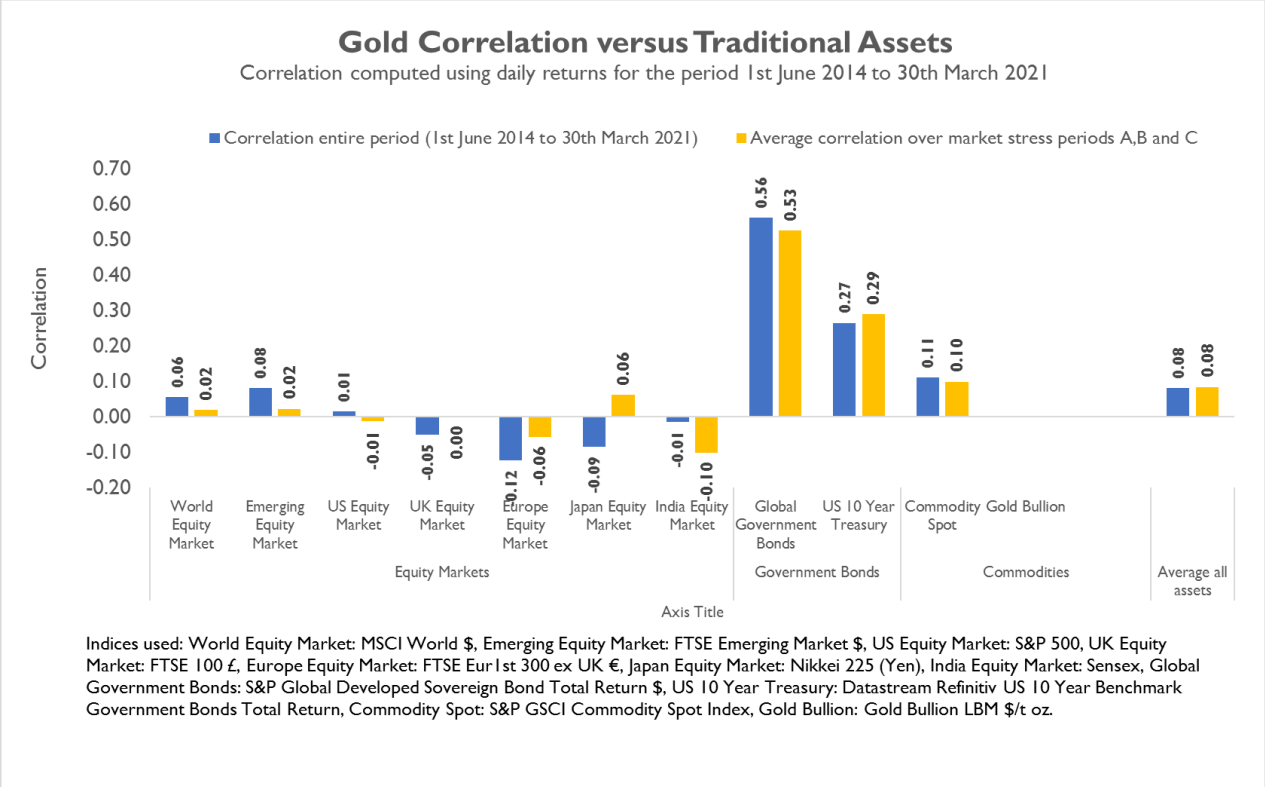


Figure 2.1c Correlation of Gold versus key Traditional Asset Classes over the period 1st June 2014 to 30 March 2021 using daily returns

2.3 Increasing acceptance of Bitcoin as an Institutional Asset

Institutional interest in BTC has grown since the asset was first introduced in 2008 (Acheson, 2020). The maturation of the digital asset, increased liquidity, high returns, improved investment landscape[4] and diversification benefits are some of the reasons that have led to increased demand for BTC from corporate investors. Measured from 18th August 2011 to 30th March 2021, Bitcoin has delivered a return of 538,987%, far outstripping the return delivered by any traditional asset class over the same period[5].

Liquidity is a key parameter that determines the investability of an asset class. The liquidity of BTC determines how easy it is to buy and sell the digital asset without significantly affecting its price. As the number of Bitcoins in circulation has increased over the years (Figure 2.3a), so has the liquidity of the digital asset. In January 2009 there were only 50 coins in circulation. By the end of the same year the number of coins had increased to 1.6 Million, and currently there are 18.6 Million coins in circulation. This dramatic increase in coins has significantly improved the liquidity of BTC making it easier for Institutional investors to trade in the asset class in larger volumes. The improvement in liquidity has also led to a halving of the volatility of BTC as shown in Figure 2.3a.

Morris and Bennett (2020) note that as BTC has matured, the investment landscape has evolved significantly in the last two years. As a result, BTC investors are now offered services such as insured custody, prime brokerages and order management systems making it easier to invest in the digital asset.

[4] "The investment landscape has evolved significantly in the last two years, now offering investors services such as insured custody, prime brokerages and order management systems" (Morris & Bennett, 2020).

[5] Bitcoin data is provided by Bitstamp via Thomson Reuters, Refinitiv. The data begins on 18th August 2011.

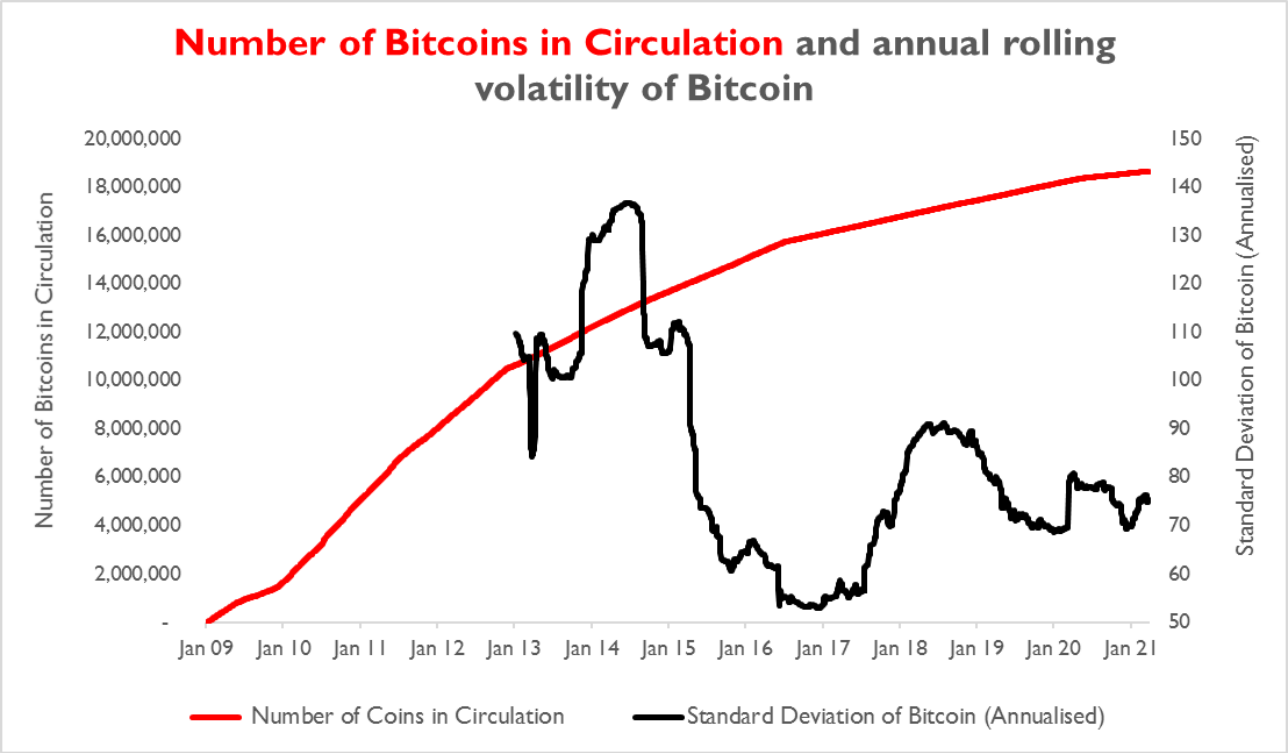


Figure 2.3a Number of Bitcoins in Circulation compared with the annual rolling volatility of Bitcoin

The lack of correlation between BTC and traditional assets has also increased the appeal of BTC for institutional investors. Brière et al. (2015) note that "the inclusion of even a small proportion of BTC may dramatically improve the risk-return trade-off of well diversified portfolios". Using multivariate extreme value theory[6], Gkillasa and Longib (2019) discovered that by combining each equity market with bitcoin, the correlation of extreme returns sharply decreases during both market booms and crashes. This appears to indicate that bitcoin could provide the sought-after diversification benefits during times of market stress.

2.4 Fixed vs Inverse Volatility Weighting

Despite the appeal of BTC as a high-return[7], distinct asset class to traditional investments, BTC is nonetheless a very volatile asset class. The data shows that BTC is around three times as

[6] The appropriate statistical approach used to model tail dependence
[7] Past performance is not a guarantee of future performance

volatile as Commodity prices and nearly five times as volatile as the World Equity Market[8] (Figure 2.4a). Passive investors have had a rough ride with this asset class, having had to endure a maximum drawdown of over 80% measured from 1st June 2014 to 30th March 2021 (Figure 2.4b).

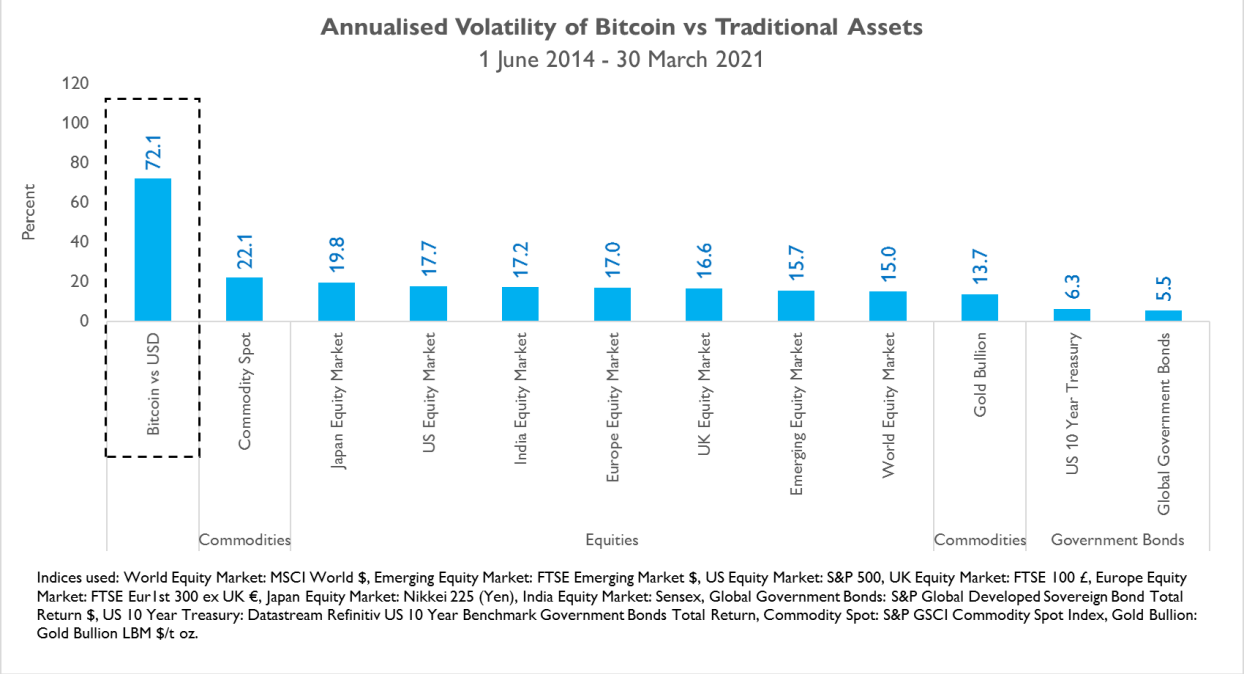


Figure 2.4a Bitcoin is a very volatile asset class, around five times as volatile as the World Equity Market.

[8] Volatility of BTC and World Equity Market calculated using daily percent change, annualised by multiplying with $\sqrt{252}$. The World Equity Market has been represented using the MSCI World $ Index and Commodity Prices using the S&P GSCI Commodity Spot Index.

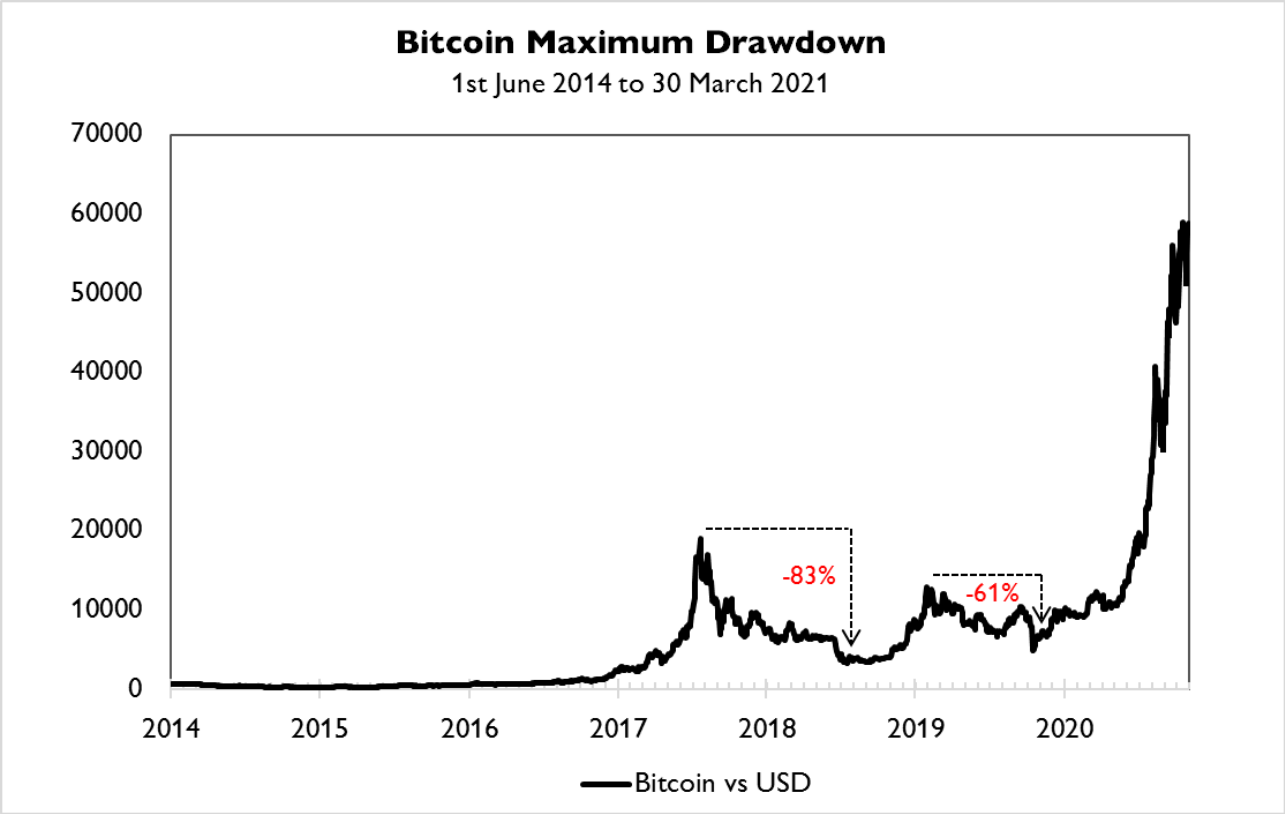


Figure 2.4b Bitcoin has provided investors with a rough ride having registered a maximum drawdown of over 80% measured from 1st June 2014 to 30 March 2021.

Given the high risk profile of BTC, it does not make sense to hold a Fixed weight in the digital asset in investment portfolios or when combining it with Gold as a portfolio hedge. Fixed weight portfolios while appealing for their simplicity, expose investors to the risk of large drawdowns when investing in BTC. Instead, a weighting methodology which controls for the risk (volatility) of BTC is likely to find more appeal with institutional investors who have strict investment risk mandates to adhere to.

In this respect, holding BTC alongside Gold as portfolio hedges, in weights inversely proportional to their volatility, is a practical solution to the problem and eliminates the need for market timing[9]. This weighting methodology – also known as Naïve Risk Parity[10] (Lee, 2011) as it does not take

[9] Market timing in this respect would be used to determine when to increase the weight to BTC and when to reduce it.

[10] Risk Parity portfolio weighting strategies, as the name suggests, determines portfolio asset weights by distributing portfolio risk equally among the asset classes.

into account asset correlations for ease of computation (Braga, 2016, p. 24) – assign larger portfolio weights to less volatile assets and smaller weights to more volatile ones (Lau, et al., 2017). Thus, under the inverse volatility weighting methodology, the weights of each asset in a BTC-and-Gold ("BOLD") hedge portfolio would be:

$$W_{Gold} = \frac{\frac{1}{\sigma_{gold}}}{\frac{1}{\sigma_{BTC}}+\frac{1}{\sigma_{Gold}}} \quad ; \qquad W_{BTC} = \frac{\frac{1}{\sigma_{BTC}}}{\frac{1}{\sigma_{BTC}}+\frac{1}{\sigma_{Gold}}}$$

where:

W_{Gold} = Weight of Gold in BOLD hedge portfolio
W_{BTC} = Weight of BTC in BOLD hedge portfolio
σ_{Gold} = Standard deviation of Gold measured over a specified period
σ_{BTC} = Standard deviation of BTC measured over a specified period

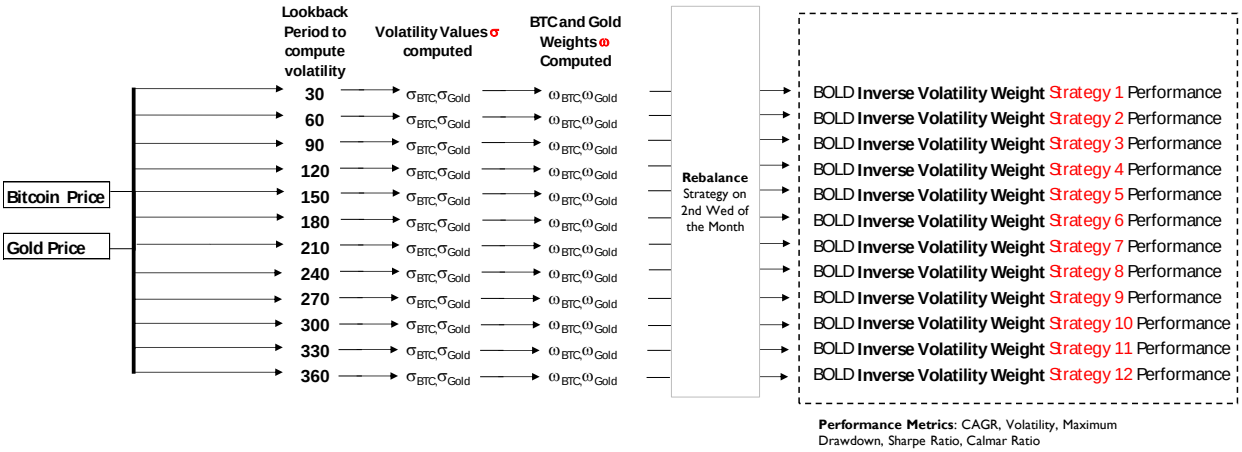
2.5 The benefits of Portfolio Rebalancing

Portfolio Rebalancing refers to the process of selling one or more portfolio assets and using the proceeds to buy other assets. This is done to prevent the portfolio risk and return characteristics deviating significantly from those set out in the investment policy statement (Tokat & Nelson, 2007). Whilst the advantages of portfolio rebalancing are widely known to improve portfolio returns and reduce portfolio risk, there is little agreement on the right balancing strategy (Masters, 2003). Rebalancing strategies that accommodate changes in financial market environments and asset class characteristics are common. This is frequently done by assessing the risk and return characteristics of the underlying portfolio assets on a periodic basis and making adjustments to the portfolio asset weights. Portfolio rebalancing, when done well can deliver substantial benefits, particularly when markets reverse suddenly and dramatically (Masters, 2003).

► Section 3: Methodology

3.1 Introduction

BTAM has constructed a BTC-Gold ("BOLD") portfolio hedge investment strategy for institutional investors as a simple way to gain exposure to BTC without the full risks associated with investing in the digital asset passively. This is achieved by taking advantage of the low inter-correlation between the two assets (Ch.2, Sec 2.2) and weighting the assets in proportions inverse to their respective volatilities as outlined in Ch.2, Sec 2.4. The strategy is rebalanced on the last working day of each month to adjust for market movements. To demonstrate the superiority of this strategy, compared to a Fixed weight BOLD portfolio, the performance of both strategies is computed and compared on a risk and return basis. For the Fixed weight BOLD portfolio, various combinations (weights) of BTC and Gold are tested, whilst for the inverse weight BOLD portfolio, various lookback periods – for the computation of the volatility of both assets – are tested. The performance of both BOLD strategies is presented in Section 4 and evaluated in Section 5. The strategies are tested over the period 1st July 2014 – 31st December 2020 and the buy-and-hold performance of BTC and Gold over the same period is also shown. The key steps involved in this process are shown in Figure 3.1 and expounded in Sections 3.2 – 3.5 that follow.



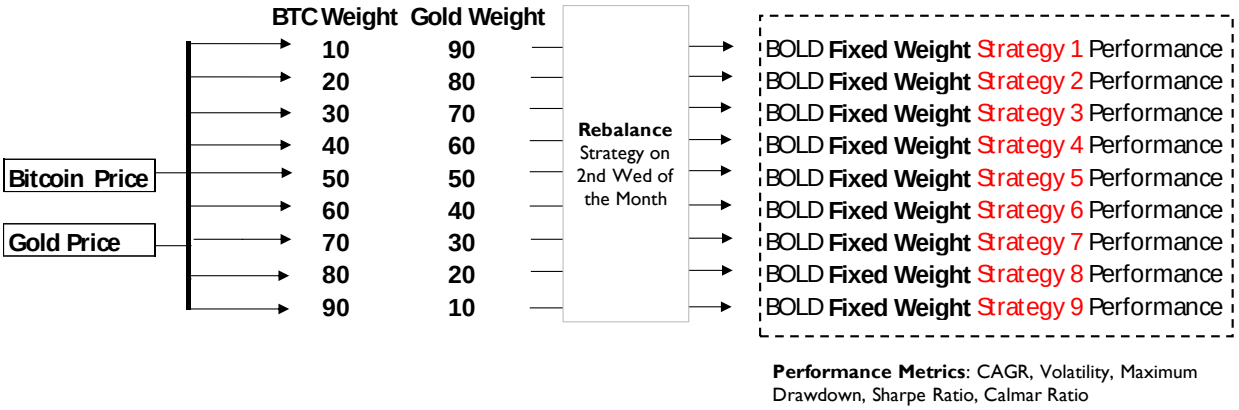


Figure 3.1: Process flow chart showing how the BOLD Inverse Volatility Weighting Strategy (top) and BOLD Fixed Weight Strategy (bottom) are computed

3.2 Data Collection

The data required for this stage was obtained from Thomson Reuters, Refinitiv (Datastream). The price of both Bitcoin versus USD (Bitstamp) and Gold Bullion LBM $/t oz were retrieved for the backtest period covering 1st July 2014 to 31st December 2020. The data was deemed to be clean and no additional data scrubbing was necessary.

3.3 BOLD Inverse Volatility Weight Strategy

The steps involved in the creation of the Bold Inverse Volatility Weight Strategy are outlined in Figure 3.1 (top). To begin with, the standard deviation of both BTC and Gold was calculated using daily returns and lookback periods ranging from 30 days to 360 days, in increments of 30 days. For each individual lookback period, the weights of BTC and Gold were computed using the formula outlined in Ch.2, Sec 2.4 and multiplied by their respective daily returns to compute the performance of the strategy. On every second Wednesday of the month, the portfolio weights were rebalanced to account for extreme market movements (drift in weights) in the interim period. This was done by recalculating the weights of the portfolio using the standard deviation values the day earlier and using the same formula outlined in Ch.2, Sec 2.4. In total, the performance of 12 strategies was calculated, based on the differing lookback period for each strategy. Finally, for each strategy, 5 metrics were calculated to assess the overall performance

of the strategy: Compound Annual Growth Rate (CAGR), Volatility, Maximum Drawdown, Sharpe Ratio and Calmar Ratio. A brief explanation of each metric is provided in the Appendix (Sec 8). The results are tabulated in Section 4 along with key charts to aid interpretation.

3.4 BOLD Fixed Weight Strategy

The steps involved in the creation of the Bold Fixed Weight Strategy are outlined in Figure 3.1 (bottom). Various combinations of BTC and Gold weights were tested, ranging from 10% to 90% in increments of 10%. For each individual combination, the weights of BTC and Gold were multiplied by their respective daily price returns to compute the performance of the overall strategy. On every second Wednesday of the month, the portfolio weights were rebalanced to account for extreme market movements (drift in weights) in the interim period. This was done by resetting the weights of the portfolio back to the values determined at the outset. In total, the performance of 9 strategies was calculated, based on the differing weight combinations outlined. Finally, for each strategy, 5 metrics were calculated to assess the overall performance of the strategy: Compound Annual Growth Rate (CAGR), Volatility, Maximum Drawdown, Sharpe Ratio and Calmar Ratio. A brief explanation of each metric is provided in the Appendix (Sec 8). The results are tabulated in Section 4 along with key charts to aid interpretation.

► Section 4: Results

In this section we present the results of the BOLD Inverse Volatility Weights Strategy and the BOLD Fixed Weights Strategy outlined in Section 3.1. Table 4.1 and Table 4.2 show the key performance metrics of these strategies overlaid with a heatmap to make it easier to analyze. Figure 4.1a and Figure 4.2a show the Value Added Management Index of these strategies beginning from 100 in 1st July 2014. Figure 4.1b and Figure 4.2b show the CAGR of the two strategies, Figures 4.1c and Figure 4.2c show the Volatility of these strategies whereas Figure 4.1d and Figure 4.2d plot the Maximum Drawdown. Finally, Figure 4.1e and Figure 4.2e plot key risk-adjust-return metrics of these strategies, notably the Sharpe Ratio and Calmar Ratio. These results are discussed in Section 5.

4.1 BOLD Inverse Volatility Weights Strategy performance

Volatility Lookback Period	CAGR	Volatility	Max Drawdown	Sharpe Ratio	Calmar Ratio	Avg. Sharpe and Calmar Ratio
30	22.4	18.5	-29.7	1.02	0.75	0.89
60	22.4	17.8	-26.5	1.06	0.84	0.95
90	22.3	17.6	-25.2	1.07	0.88	0.97
120	22.2	17.3	-25.8	1.08	0.86	0.97
150	22.5	17.1	-25.1	1.11	0.90	1.00
180	23.0	17.1	-23.7	1.14	0.97	1.06
210	22.9	16.9	-23.1	1.15	0.99	1.07
240	22.8	16.9	-23.5	1.14	0.97	1.06
270	23.6	16.9	-22.8	1.19	1.03	1.11
300	23.4	16.9	-22.9	1.18	1.02	1.10
330	23.2	16.9	-24.1	1.16	0.96	1.06
360	23.0	16.9	-23.6	1.15	0.98	1.06
BTC	76.2	71.3	-83.1	1.02	0.92	0.97
Gold	5.4	13.6	-21.4	0.14	0.25	0.20

Table 4.1: Key performance statistics of the BOLD Inverse Volatility Weights Strategy for varying volatility lookback periods. Performance of BTC and Gold included for comparison.

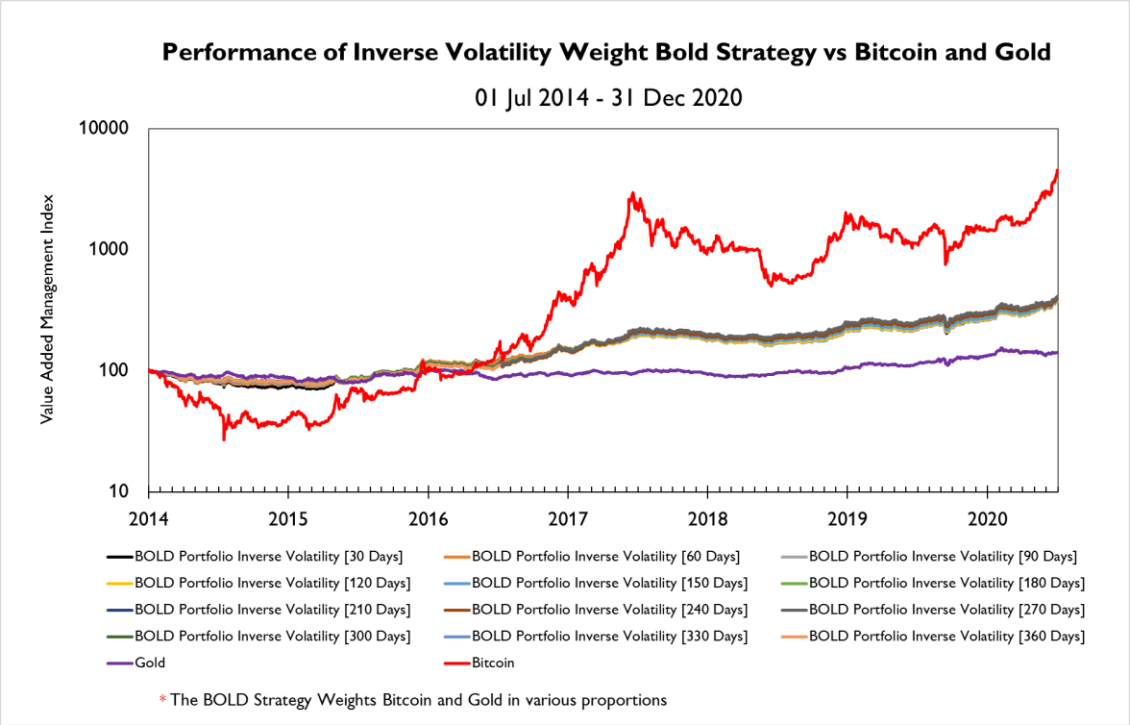


Figure 4.1a: Value Added Management Index of the BOLD Inverse Volatility Weights Strategy for varying volatility lookback periods

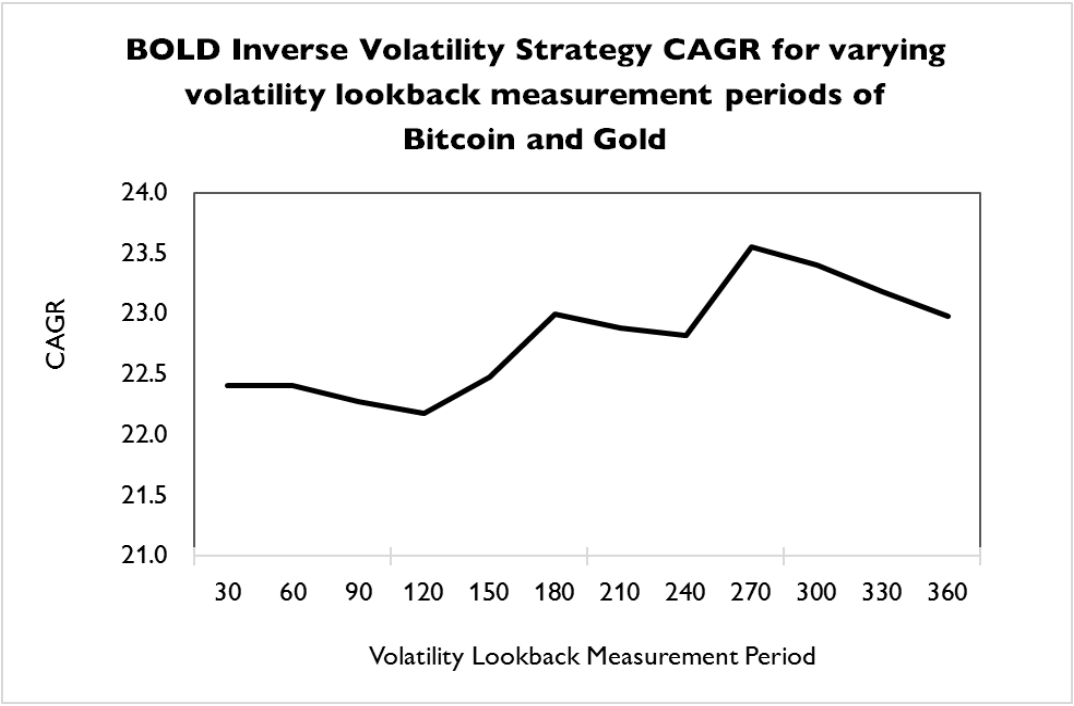


Figure 4.1b: Compound Annual Growth Rate of the BOLD Inverse Volatility Weights Strategy for varying volatility lookback periods

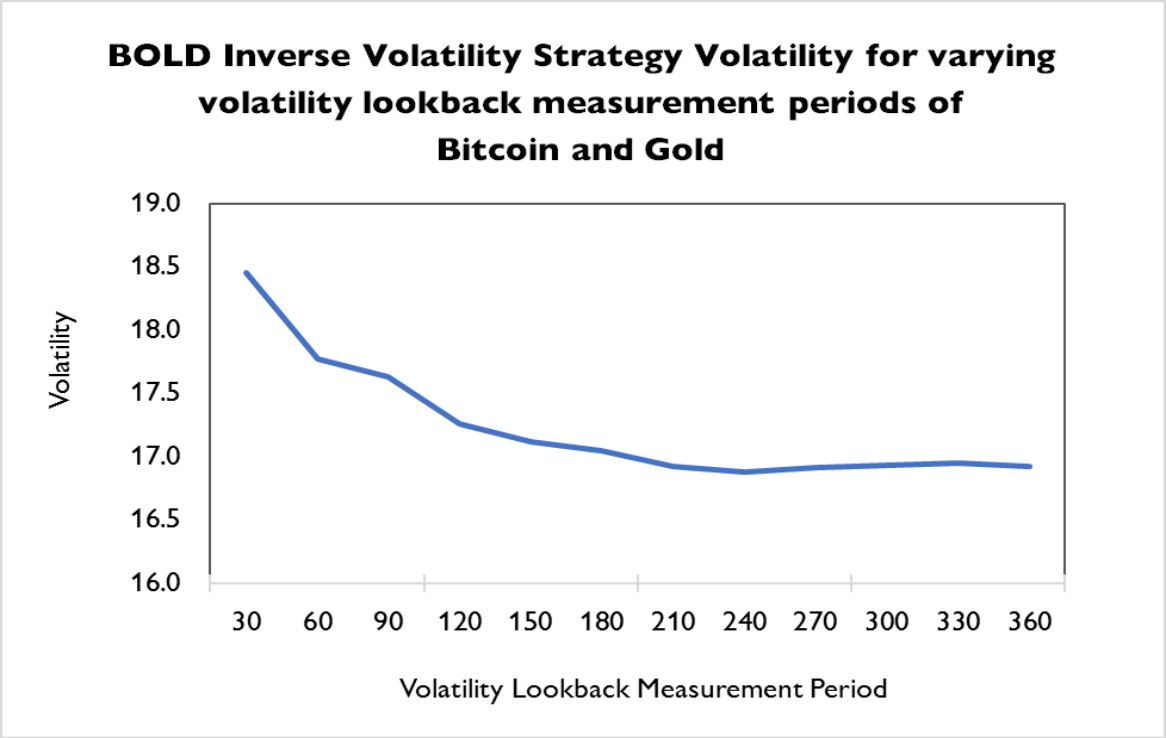


Figure 4.1c: Volatility of the BOLD Inverse Volatility Weights Strategy for varying volatility lookback periods

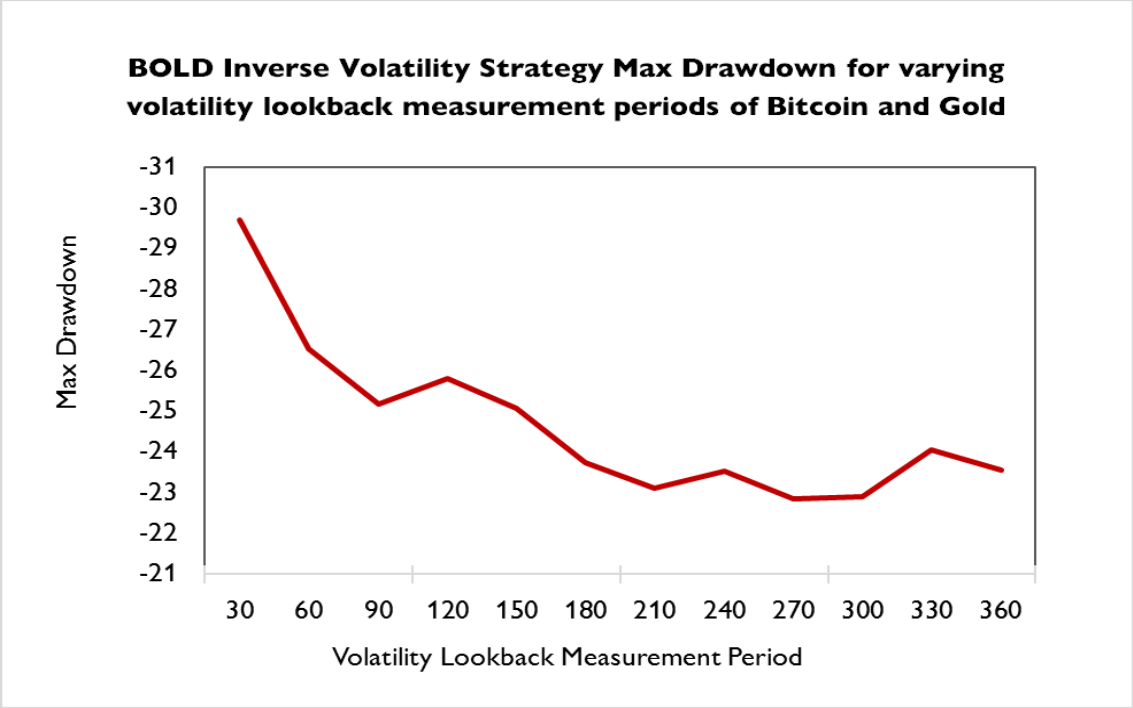


Figure 4.1d: Maximum Drawdown of the BOLD Inverse Volatility Weights Strategy for varying volatility lookback periods

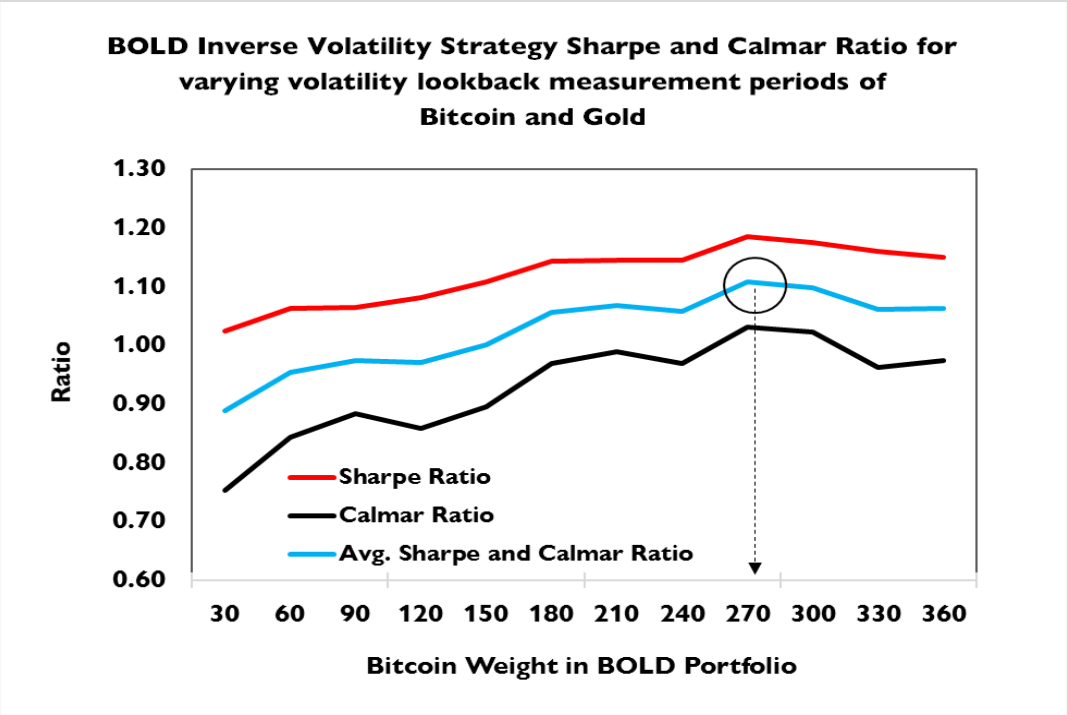


Figure 4.1e: Sharpe and Calmar Ratio of the BOLD Inverse Volatility Weights Strategy for varying volatility lookback periods

4.2 BOLD Fixed Weight Strategy performance

BTC Weight (Gold Weight = 100 - BTC Weight)	CAGR	Volatility	Max Drawdown	Sharpe Ratio	Calmar Ratio	Avg. Sharpe and Calmar Ratio
10	14.7	15.0	-22.0	0.75	0.67	0.71
20	23.7	19.2	-26.9	1.05	0.88	0.97
30	32.4	24.8	-35.7	1.17	0.91	1.04
40	40.7	30.9	-45.1	1.20	0.90	1.05
50	48.5	37.3	-53.5	1.21	0.91	1.06
60	55.7	43.9	-61.1	1.19	0.91	1.05
70	62.2	50.6	-67.8	1.16	0.92	1.04
80	67.8	57.4	-73.7	1.12	0.92	1.02
90	72.5	64.3	-78.7	1.07	0.92	1.00
BTC	76.2	71.3	-83.1	1.02	0.92	0.97
Gold	5.4	13.6	-21.4	0.14	0.25	0.20

Table 4.2: Key performance statistics of the BOLD Fixed Weights Strategy for varying BTC and Gold weight combinations. Performance of BTC and Gold included for comparison.

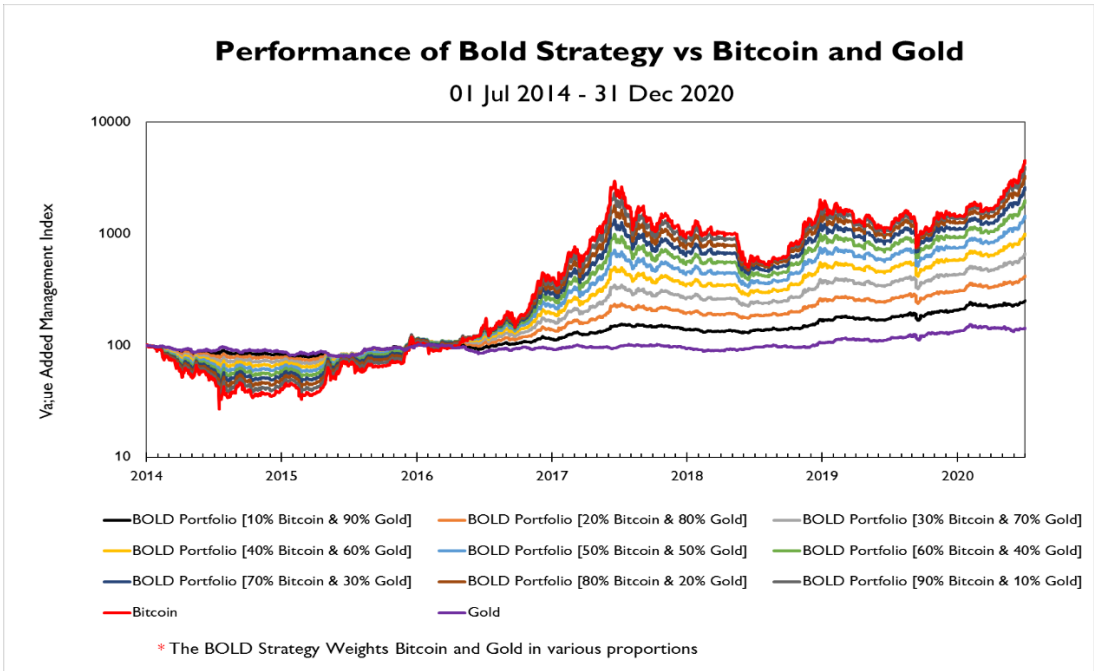


Figure 4.2a: Value Added Management Index of the BOLD Fixed Weight Strategy for varying volatility lookback periods

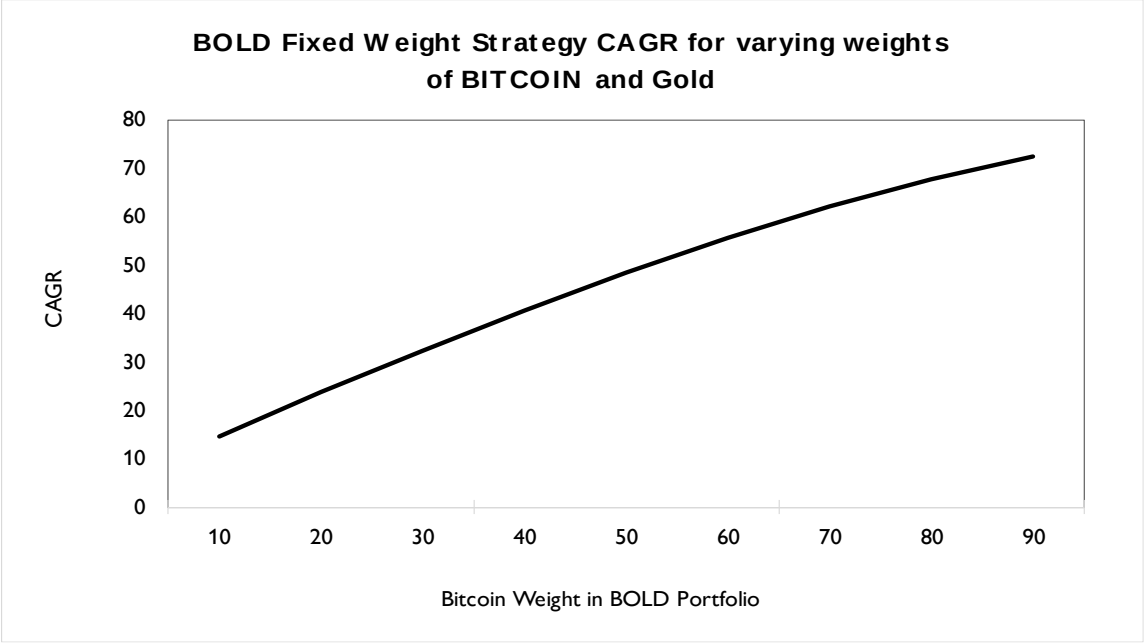


Figure 4.2b: Compound Annual Growth Rate of the BOLD Fixed Weight Strategy for varying volatility lookback periods

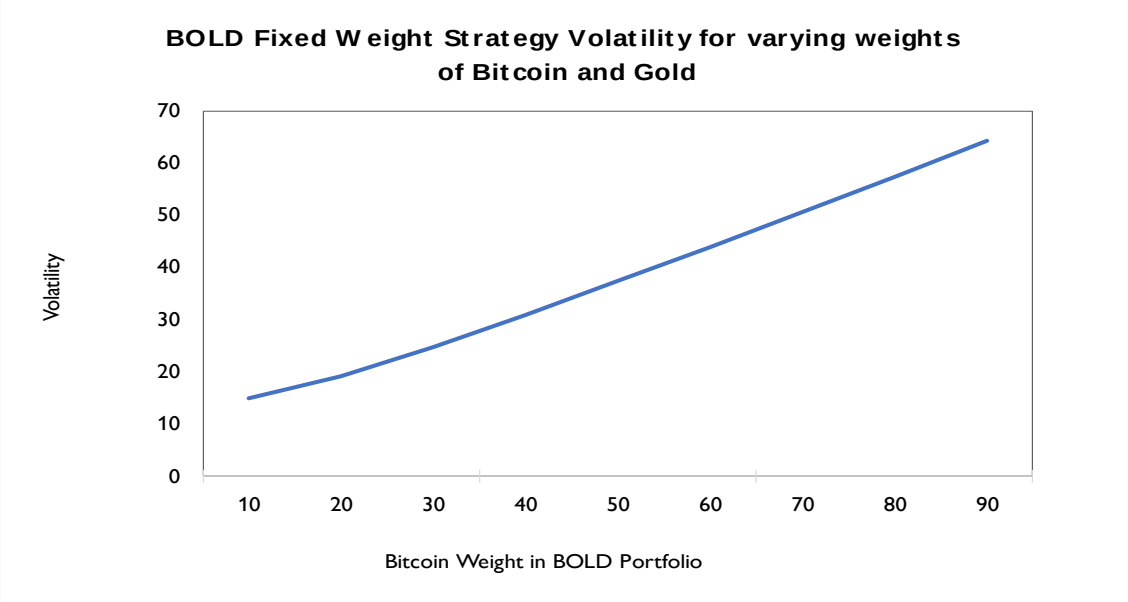


Figure 4.2c: Volatility of the BOLD Fixed Weight Strategy for varying volatility lookback periods

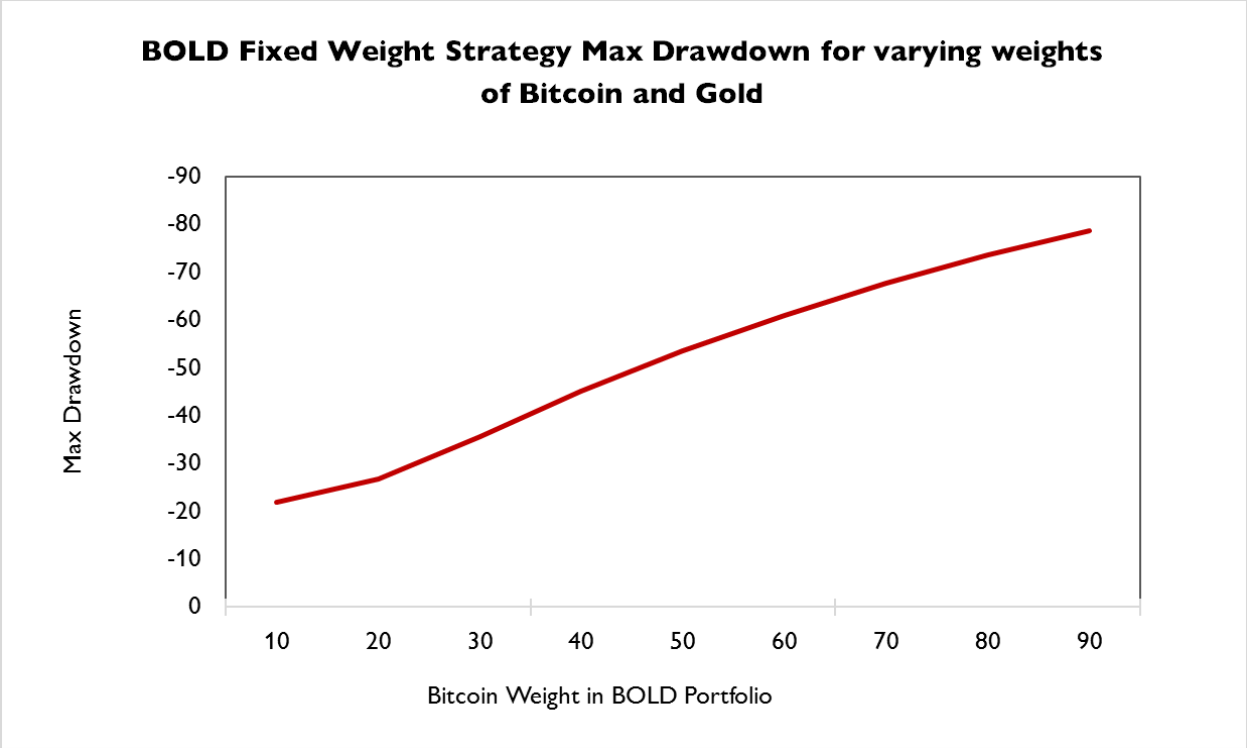


Figure 4.2d: Maximum Drawdown of the BOLD Fixed Weight Strategy for varying volatility lookback periods

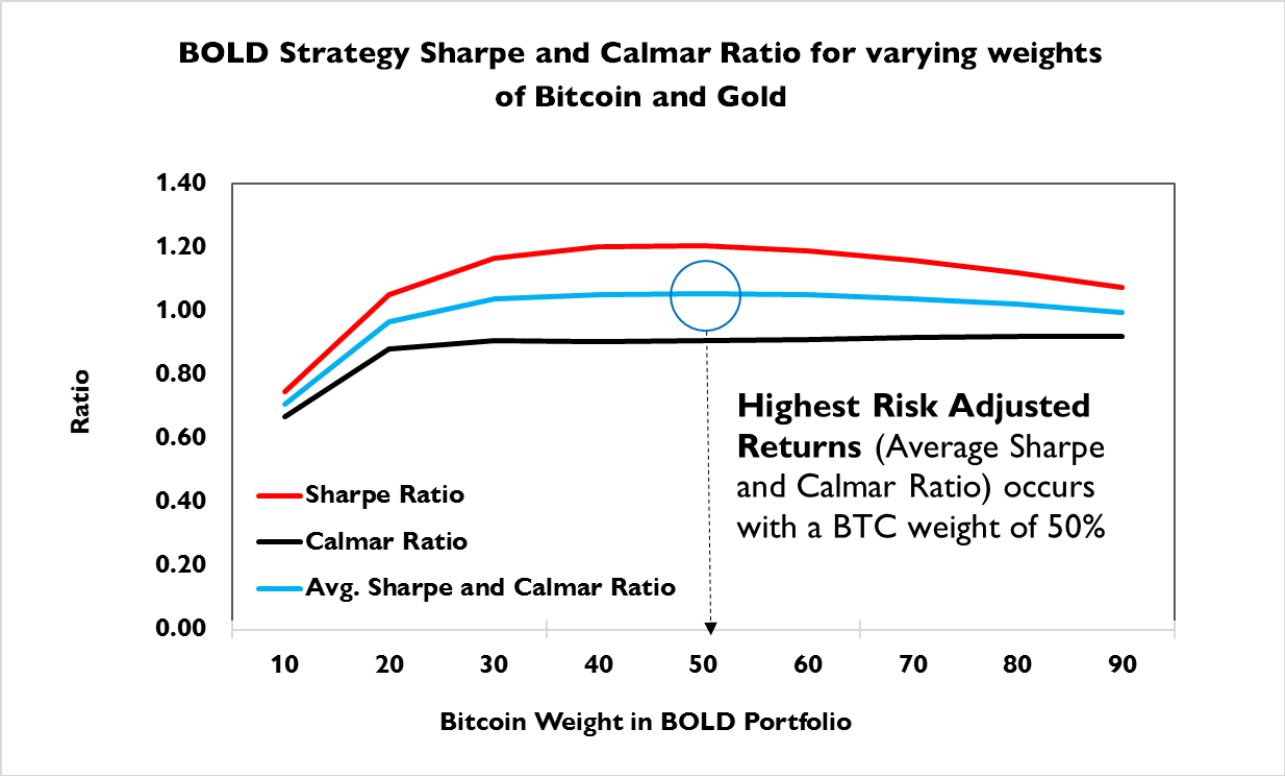


Figure 4.2e: Sharpe and Calmar Ratio of the BOLD Fixed Weight Strategy for varying volatility lookback periods

► Section 5: Discussion

5.1 Comparing the BOLD Fixed Weight and Inverse Volatility Weight Strategy Performance

A comparison of the performance of the BOLD Inverse Volatility Weight Investment Strategy (Ch.4, Sec 4.1) and the BOLD Fixed Weight Investment Strategy (Ch.4, Sec 4.2) reveals that the Fixed Weight Investment Strategy results in the highest CAGR overall. It is noteworthy that increasing the weight of BTC in the BOLD Fixed Weight Investment Strategy results in the strategy closer mirroring the performance of BTC, whereas for lower weights of BTC the same strategy closer mirrors the performance of Gold (Figure 4.2a). As a result, increasing the weight of BTC in the BOLD Fixed Weight Investment Strategy results in a higher CAGR, however this comes at the cost of a strategy with a higher volatility and Maximum Drawdown. The highest average risk-adjusted returns[11] for the BOLD Fixed Weight Investment Strategy occur with a BTC weight of 50%, however the associated volatility (37.3%) and Maximum Drawdown (53.5%) of this strategy makes it impractical for institutional investors. Finally, it is worth pointing out that combining even a small amount of BTC (e.g. 10% BTC) with Gold results in a significant improvement[12] in the return and risk-adjusted performance (Table 4.2), compared to holding Gold alone as a portfolio hedge. This appears to confirm the benefits of combining BTC with Gold as a portfolio hedge, owing to the low inter-correlation between the two assets as shown in Ch.2, Sec 2.2.

Turning to the performance of the BOLD Inverse Volatility Weights Investment Strategy (Table 4.1), the first thing that strikes us is how similar the CAGR of the strategies is, despite the varying lookback periods. This is confimed by the plot of the Value Added Management Indices of the various strategies plotted in Figure 4.1a. However, whilst the CAGR of the strategies is comparable, Figure 4.1c and Figure 4.1d reveal that the strategies have differing risk profiles for varying lookback periods. As the length of the lookback period increases, there is a noticeable

[11] The Average risk adjusted return is calculated as the average of the Sharpe Ratio and Calmar Ratio, both measures of risk-adjusted returns based on risk defined as volatility and Maximum Drawdown respectively. An explanation of each measure is provided in Ch. 8, Sec 8.1.
[12] Past performance is not a guarantee of future performance

decline in the volatility and maximum drawdown of the overall BOLD Inverse Volatility Weights Investment Strategy. An analysis of the risk-adjusted performance (Figure 4.1e), which takes into account the CAGR, volatility and Maximum Drawdown of the strategies, appears to show that the maximum benefit tapers off with a lookback period between 270-300 days. The corresponding volatility and Maximum Drawdown of the strategy with the highest Average risk-adjusted return (corresponding to a lookback period of 270 days) is 16.9% and 22.8% respectively (Table 4.1). This is not very far off from the volatility and Maximum Drawdown of Gold over the same period, which recorded a volatility and Maximum Drawdown of 13.6% and 21.4% respectively. However, the average risk-adjusted return of this strategy is significantly better than that of Gold – around five times better. Finally, it is noteworthy that the highest Average risk adjusted performance is delivered by the Inverse Volatility Weights Strategy (Table 4.1) and not the Fixed Weights Strategy (Table 4.2).

5.2 Selecting the Inverse Volatility Weight Strategy Optimal Lookback period

Based on the analysis outlined above, BTAM has opted to implement the Inverse Volatility Weight Strategy with a lookback period of 360 days. Whilst the optimal lookback period was determined to be between 270-300 days (Ch.5, Sec 5.1), based on the period analyzed, a longer lookback period has been chosen to further smooth the volatility numbers and reduce the variability in the associated weight calculations. As shown in Figure 5.1a, the weights of this strategy have historically oscillated between 5% - 30%, averaging 15%. The regular monthly rebalancing[13] of the weights adds significant alpha as the BTC weight of the strategy is increased during times of low volatility (bull markets) and reduced during times of high volatility (bear markets) as shown in Figure 5.1a.

[13] The weights are rebalanced on the 2nd Wednesday of each month

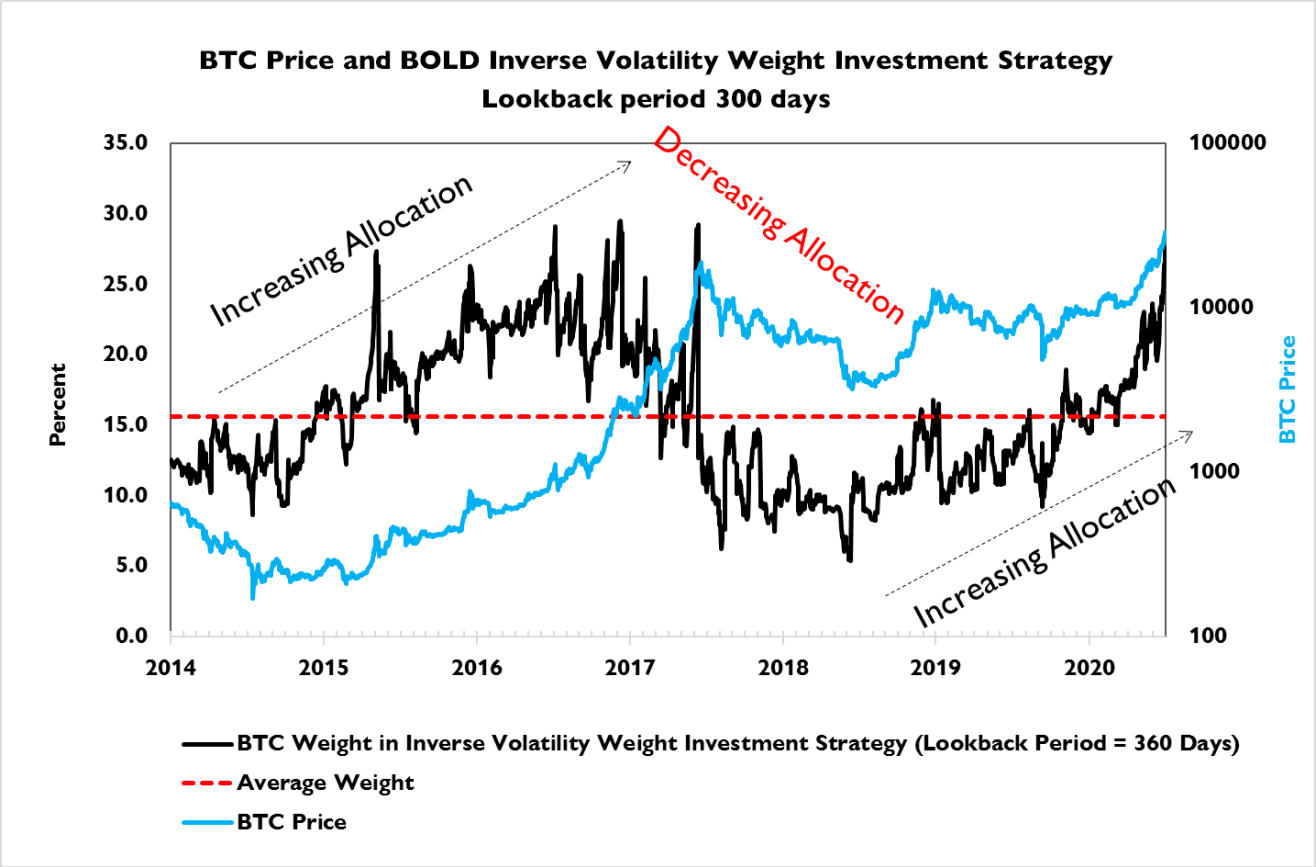


Figure 5.1a: The BOLD Inverse Volatility Weights Investment Strategy with a lookback period of 360 days has historically allocated between 5 – 30% to BTC, averaging 15%.

► Section 6: Conclusion

This report has introduced readers to BTC and the ByteTree Asset Management BOLD Inverse Volatility Weight Investment Strategy as a portfolio hedge created by combining BTC and Gold. BTAM has justified this strategy by showing BTC to be a distinct asset class to traditional assets, with increasing Institutional interest, which when combined with Gold has historically provided better risk-adjusted returns than owning Gold in isolation. As BTC has been shown to be an inherently volatile asset class, BTAM has argued that combining BTC with Gold using Inverse volatility weights trumps owning the two assets in Fixed proportions. The latter investment strategy has resulted in higher CAGR than the Inverse Volatility Weight Investment Strategy, however it has also been associated with higher volatility and Maximum Drawdowns. The higher risk profile of the BOLD Fixed Weight investment strategy makes it an impractical investment solution for Institutional Investors. Having selected the BOLD Inverse Volatility Weight Investment Strategy as the primary BTAM strategy, a period of 360 days was selected as the optimal lookback period to calculate the BOLD volatility parameters and associated weights. A longer lookback period was chosen to provide additional smoothing and reduce variability in the weights over time. Rebalancing was shown to be a significant contributor of the alpha of this strategy as the strategy allocates a larger weight to BTC during periods of low BTC volatility (bull markets) and lower weights to BTC during periods of high volatility (bear markets).

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► Section 8: Appendix

8.1 Performance Statistics

8.1.1 Compound Annual Growth Rate

A measure of the annualized return of an investment calculated as:

$$= \left[\left(\frac{Ending\ Portfolio\ Value}{Starting\ Portfolio\ Value} \right)^{\frac{1}{Duration\ of\ Investment\ in\ Years}} \right] - 1$$

A higher CAGR is indicative of a larger return on Investment.

8.1.2 Standard Deviation (σ)

A statistical measure of the risk of an investment based on an assessment of how much returns deviate from the mean return over a given period. It is calculated as:

$\sigma = \sqrt{\frac{\sum_{i=1}^{N}(R_i - \overline{R})}{N-1}}$ where Ri = return of an investment over a discrete period e.g. monthly

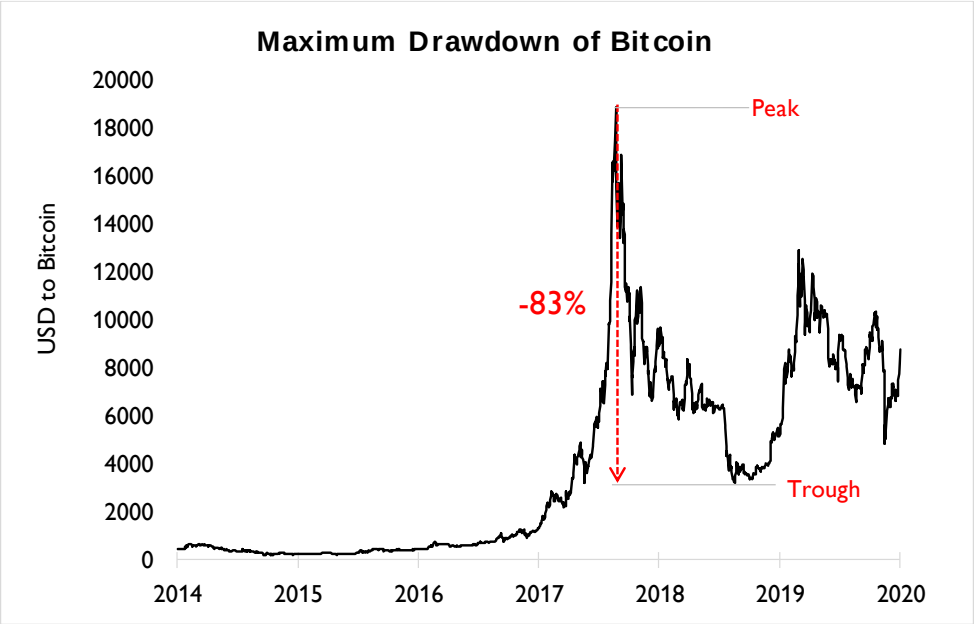
$\bar{R}$ = the mean return

N = Number of periods

A higher standard deviation is indicative of a more volatile (risky) investment.

8.1.3 Maximum Drawdown

Maximum Drawdown is another key measure of the risk of an investment and one that is more intuitive than Standard Deviation. It is calculated as the peak-to-trough loss of an investment before a new peak is reached as shown below. An investment that has incurred a larger maximum drawdown has historically been more risky. Minimizing drawdowns is a vital component of preserving and growing capital over the long term.



8.1.4 Sharpe Ratio

A key risk-adjusted performance measure of an investment calculated as the excess return generated by an investment (i.e. return in excess of return on cash) divided by the risk of the investment (standard deviation). The higher the Sharpe Ratio of an investment the higher the risk adjusted return i.e. excess return per unit of risk taken.

$$Sharpe\ Ratio_{\ Investment} = \frac{CAGR_{\ Investment} - CAGR_{\ Cash}}{\sigma_{\ Investment}}$$

8.1.5 Calmar Ratio

A key risk-adjusted performance measure of an investment calculated as the CAGR divided by the Maximum Drawdown. A Higher (lower) Calmar Ratio is indicative of an investment with a higher (lower) risk adjusted return.

$$Calmar\ Ratio_{\ Investment} = \frac{CAGR_{\ Investment}}{Max\ Drawdown_{\ Investment}}$$

8.2 About ByteTree

ByteTree is a leading provider of institutional-grade crypto-asset data. The ByteTree investor terminal tracks over 80 metrics for bitcoin in real-time. ByteTree's on-chain data platform was conceived in 2013 as a tool to assist a multi-asset fund manager with in managing risk in his portfolio. After yielding great success, the tool launched as a publicly accessible investor terminal in 2018. ByteTree brings rigorous practices in data quality and delivery to crypto-asset investing. The Terminal is currently the leading source of real-time data for UTXO-based blockchain networks.

8.3 Disclaimer

This document does not constitute an offer of investment advisory services by Crypto Composite Ltd. nor does it constitute an offering of limited partnership interests in the Fund; any such offering will be made solely pursuant to the Funds private placement memorandum. No undertaking, warranty or other assurance is given, and none should be implied, as to, and no reliance should be placed on, the accuracy, completeness or fairness of the information or opinions contained in the Document. Investments in crypto-assets and in the BYTE strategy are speculative and involve a high degree of risk. You should be aware that you could lose all, or a substantial amount, of your investment in the strategy. Crypto-assets can be extremely volatile and subject to rapid fluctuations in price, positively or negatively. Investment in one or more crypto-assets may not be suitable for even a relatively experienced and affluent investor and independent financial advice should be sought where applicable.