

# THE INSTITUTIONAL CASE FOR BITCOIN

## How Bitcoin Exposure May Improve Traditional Investment Portfolios

In this article Ecstatus Capital COO, Jonathan Hobbs, CFA, explores the diversification benefits of adding Bitcoin to traditional investment portfolios.

### Introduction

The price appreciation of bitcoin has so far been extraordinary. One bitcoin was worth five cents in July 2010<sup>i</sup>. At the height of the Bitcoin bubble in December 2017, its value fell just shy of \$20,000. An investor with the foresight to buy Bitcoin in July 2010, and then sell his position at the all-time-high in December 2017, would have grown his investment nearly 400,000 times over. This potential for outsized returns, coupled with seemingly low correlations to traditional asset classes like stocks and bonds, presents a compelling argument for including bitcoin in traditional investment portfolios.

However, the potential for large capital losses looms over institutional investors as they weigh the risks of entering the crypto space. Bitcoin—often among the least volatile of digital assets—crashed approximately 84% from December 2017 to December 2018. As shown in Table 1, this was not the first time that Bitcoin has shed a significant amount of dollar value:

**Table 1 — Bitcoin corrections >40% (2013 - 2020)**

Correction start	Days of Correction	BTC high price	BTC low price	% Decline
Apr 2013	2	\$263	\$45	83%
Nov 2013	1	\$760	\$379	50%
Nov 2013	410	\$1,172	\$152	87%
Nov 2015	7	\$502	\$295	41%
June 2016	45	\$782	\$465	41%
Sep 2017	13	\$4,978	\$2,969	40%
Dec 2017	363	\$19,761	\$3,097	84%
June 2019	261	\$13,884	\$3,815	73%

The above data was sourced from Tradingview using the BTCUSD Bitstamp chart. All figures are approximate and rounded to the nearest whole integer.

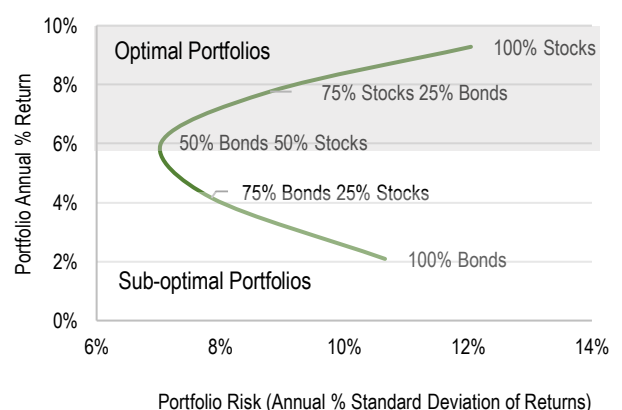
In this article, we will assess whether—despite such drawdowns—bitcoin exposure can improve the risk-adjusted returns of traditional portfolios. In other words, does the potential reward of adding bitcoin exposure to more traditional portfolios outweigh the risks?

### Modern Portfolio Theory

Harry Markowitz pioneered Modern Portfolio Theory (MPT) in 1952<sup>ii</sup>. MPT shows the benefits of diversification by constructing 'optimal portfolios' on the Efficient Frontier. Per MPT, optimal portfolios have the highest average return for each level of risk.

Figure 1 below shows how five portfolios, each comprised of different combinations of global stocks and global bonds, rebalanced monthly, produced different risk and return profiles over the five-year period from January 2015 to January 2020. For global stocks, we used the iShares MSCI World ETF (URTH) and, for global bonds, we used the Xtrackers II Global Aggregate Bond Swap UCITS ETF 1D (XBAG). The three portfolios plotted on the green line, which are also inside the grey box, are optimal portfolios according to MPT:

**Figure 1 — Efficient Frontier Jan 2015 to Jan 2020. Diversification benefits of combining global stocks and global bonds**



The above data was sourced from Yahoo Finance. Monthly returns data were used to calculate the Compound Annual Growth Rate (CAGR) and annual % standard deviations. All portfolios assume monthly rebalancing to their respective weights and zero transaction fees. These assumptions apply to all forthcoming diagrams shown in this article.

The Efficient Frontier diagram on the last page shows how combining stocks and bonds produced more optimal portfolios over the time period measured. For example, the portfolio with 75% in stocks and 25% in bonds had a higher compound annual return (7.76%) and a lower risk (8.80%) than the portfolio with 100% in bonds, which had a lower return (2.09%) and a higher risk (10.66%).

Per MPT, each investor must decide where on the Efficient Frontier they wish to plot their portfolio—in this case that will depend on which combination of stocks and/or bonds is best suited to their unique risk profiles. Given the combinations shown in Figure 1, the most conservative investor would own the ‘Minimum Variance Portfolio’ with 50% in bonds and 50% in stocks, as this had the lowest risk of all five portfolios. The most adventurous investor would hold 100% in stocks, as he is willing to accept more risk to achieve a higher return.

### Bitcoin and the MPT Framework

The MPT framework can also be applied to portfolios that include Bitcoin. Before exploring this idea, we should first note that diversification benefits are more pronounced when assets are less correlated with each other.

**Table 2 – Correlations of monthly returns (Jan 2015 to Jan 2020)**

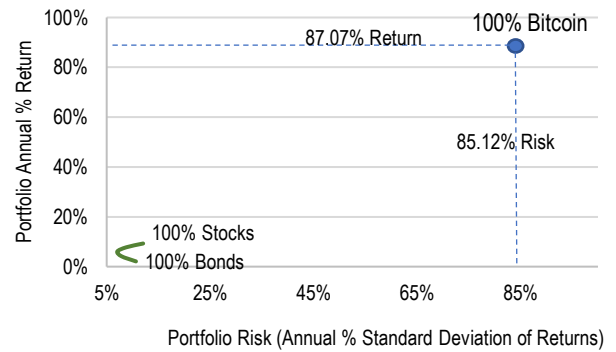
	Global Stocks	Global Bonds	Bitcoin	Gold
Global Stocks (URTH)	1.00	-0.23	0.14	-0.13
Global Bonds (XBAG)	-0.23	1.00	0.12	0.29
Bitcoin (CoinMarketCap)	0.14	0.12	1.00	-0.03
Gold (GLD)	-0.13	0.29	-0.03	1.00

The above data was sourced from Yahoo Finance with tickers shown in the first column. Correlations are based on monthly returns data in US dollars.

The above Correlation Matrix shows that stocks and bonds were uncorrelated (-0.23) over the time period measured, which is why combinations of the two asset classes showed such positive diversification benefits in Figure 1 on the previous page. Bitcoin also showed low correlations to other asset classes at 0.14 to stocks, 0.12 to bonds and -0.03 to gold.

Figure 2 below contains the same green line plotted in Figure 1, which consisted of portfolios with different combinations of stocks and/or bonds. But in the top right-hand corner, the blue dot shows where a portfolio with 100% in Bitcoin would show up using the same assumptions. Clearly, the annual return of Bitcoin far exceeded those of traditional portfolios over the period measured, but then again so has the risk:

**Figure 2 – Bitcoin vs. Efficient Frontier Jan 2015 to Jan 2020**



Institutional portfolios with defined risk criteria are typically not going to stomach an 85% yearly standard deviation of returns. But as we shall see in the analysis to follow, these investors may still be able to benefit from higher portfolio returns whilst remaining within their risk limits when allocating smaller portions of their portfolios to Bitcoin.

### Global Equity Portfolio with Bitcoin

We will now explore what happens when we replace bonds for Bitcoin in a global equity portfolio (URTH), albeit with a smaller allocation to Bitcoin than for bonds. We will use the following four portfolios for this analysis:

- Portfolio A: 100% Global Stocks
- Portfolio B: 99% Global Stocks, 1% Bitcoin
- Portfolio C: 98% Global Stocks, 2% Bitcoin
- Portfolio D: 95% Global Stocks, 5% Bitcoin

**Figure 3 – Efficient Frontier Jan 2015 to Jan 2020. Diversification benefits of combining global stocks and bitcoin**

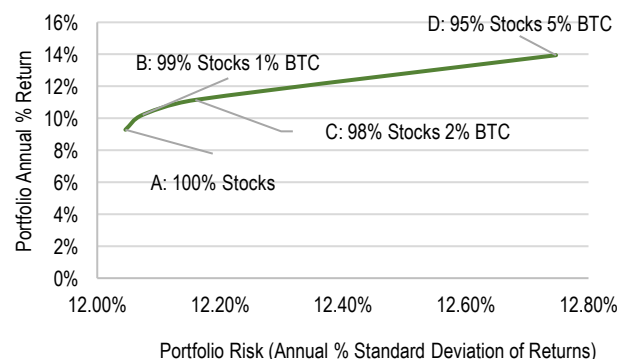


Figure 3 shows that risk increased with the addition of more Bitcoin to each portfolio. However, relative to the increases in return for each portfolio, the increases in risk were marginal. Table 2 confirms this by showing

improved Sharpe and Sortino ratios, with minor impacts on drawdown:

**Table 3 – Adding Bitcoin to Global Stocks (Jan 2015 to Jan 2020)**

	A: 100% Stocks	B: 99% Stocks 1% BTC	C: 98% Stocks 2% BTC	D: 95% Stocks 5% BTC	100% Bitcoin
5 Year Return	55.86%	62.63%	69.63%	92.07%	2,191%
GAGR	9.28%	10.22%	11.15%	13.94%	87.07%
Monthly. StDev	3.48%	3.49%	3.51%	3.68%	24.39%
Annual. StDev	12.05%	12.07%	12.16%	12.75%	84.49%
Sharpe	0.77	0.85	0.92	1.09	1.03
Downside Dev.	2.68%	2.71%	2.71%	2.78%	11.36%
Annual Downside dev.	9.3%	9.4%	9.4%	9.6%	39.4%
Sortino	1.00	1.09	1.19	1.45	2.21
Max Drawdown	14.08%	14.50%	15.11%	16.95%	74.46%

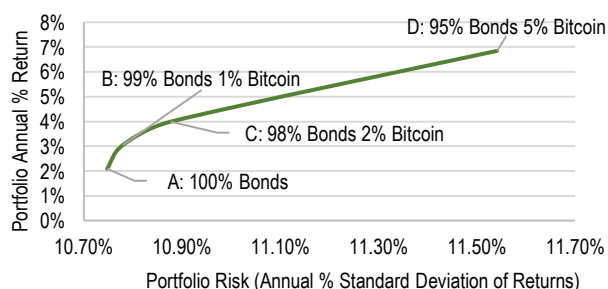
The above figures were calculated from price data sourced from Yahoo Finance. All portfolios assume monthly rebalancing to their respective weights and zero transaction fees. Sharpe and Sortino calculations assume a risk-free rate of zero. These assumptions apply to all forthcoming tables in this article.

### Global Bond Portfolio with Bitcoin

In the same way as we assessed the impact of combining small amounts of Bitcoin with global stocks, we can also assess the impact of adding Bitcoin to a global bond (XBAG) portfolio:

- Portfolio A: 100% Global Bonds
- Portfolio B: 99% Global Bonds, 1% Bitcoin
- Portfolio C: 98% Global Bonds, 2% Bitcoin
- Portfolio D: 95% Global Bonds, 5% Bitcoin

**Figure 4 – Efficient Frontier Jan 2015 to Jan 2020. Diversification benefits of combining global bonds and bitcoin**



Given the low returns of global bonds over the 5-year period, Bitcoin significantly boosted portfolio returns. As with the global equity portfolios there was an increase in risk as more Bitcoin was added, but this was marginal compared to the increases in return. From a risk-adjusted standpoint, the Sharpe and Sortino ratios again improved when more of the global bond portfolio was allocated to Bitcoin. Drawdowns were also lower for portfolios B and C:

**Table 4 – Adding Bitcoin to Global Bonds (Jan 2015 to Jan 2020)**

	A: 100% Bonds	B: 99% Bonds 1% BTC	C: 98% Bonds 2% BTC	95% Bonds 5% BTC	100% Bitcoin
5 Year Return	10.90%	16.15%	21.60%	39.24%	2,191%
GAGR	2.09%	3.04%	3.99%	6.84%	87.07%
Monthly. StDev	3.10%	3.11%	3.14%	3.33%	24.39%
Annual. StDev	10.75%	10.78%	10.88%	11.54%	84.49%
Sharpe	0.19	0.28	0.37	0.59	1.03
Downside Dev.	2.32%	2.31%	2.30%	2.32%	11.36%
Annual Downside dev.	8.0%	8.0%	8.0%	8.0%	39.4%
Sortino	0.26	0.38	0.50	0.85	2.21
Max Drawdown	-9.33%	-9.01%	-9.13%	-9.61%	74.46%

### 60:40 Portfolio with Bitcoin

As a final step in this analysis, we will now investigate the results of adding Bitcoin to a portfolio with 60% in Global Equities (URTH) and 40% in Global Bonds (XBAG):

- Portfolio A: 60% Global Equity 40% Global Bonds ("60:40")
- Portfolio B: 99% 60:40, 1% Bitcoin
- Portfolio C: 98% 60:40, 2% Bitcoin
- Portfolio D: 95% 60:40, 5% Bitcoin

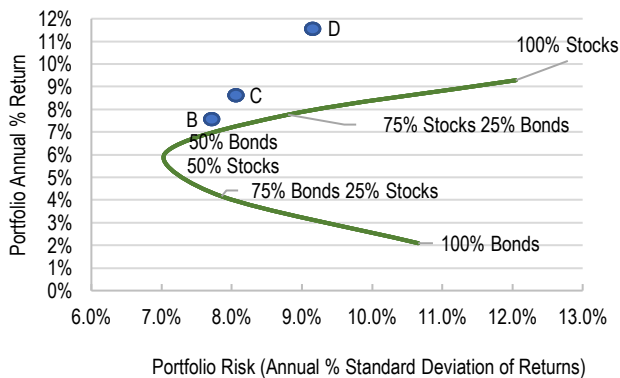
**Table 5 – Adding Bitcoin to 60:40 (Jan 2015 to Jan 2020)**

	A: 60:40	B: 99% 60:40 1% BTC	C: 98% 60:40 2% BTC	D: 95% 60:40 5% BTC	100% BTC
5 Year Return	38.70%	44.88%	51.29%	71.87%	2,191%
GAGR	6.76%	7.70%	8.63%	11.44%	87.07%
Monthly. StDev	2.16%	2.20%	2.27%	2.60%	24.57%
Annual. StDev	7.48%	7.63%	7.86%	8.99%	85.12%
Sharpe	0.90	1.01	1.10	1.27	1.02
Downside Dev.	1.42%	1.45%	1.50%	1.67%	11.36%
Annual Downside dev.	4.9%	5.0%	5.2%	5.8%	39.4%
Sortino	1.38	1.54	1.66	1.98	2.21
Max Drawdown	8.37%	8.72%	9.08%	10.38%	74.46%

As expected, adding Bitcoin improved the Sharpe and Sortino ratios of the 60:40 Portfolio over the 5-year period. Further, comparing the results of Table 5 with those of a 100% pure equity portfolio (URTH) provides some interesting insight. For example, Portfolio D, with 5% in Bitcoin and 95% in 60:40, had an annual return of 11.44%, with a relatively low annual risk of 8.99% and a drawdown of just 10.88%. This outperformed the results of the 100% global stock portfolio (Portfolio A in Table 3). Portfolio D had a 2.16% higher annual return than the pure equity investment, a 3.06% lower annual standard deviation and a 3.70% lower drawdown. Portfolio D also had higher Sharpe and Sortino ratios.

Revisiting the original Efficient Frontier drawn in Figure 1, portfolios B, C and D, which all included Bitcoin, produced more optimal results over the 5-year period:

**Figure 5 – Efficient Frontier Revisited (Jan 2015 to Jan 2020)**



### Conclusion:

The outcomes from this analysis would vary depending on the time period measured (in this case January 2015 to January 2020). However, the main conclusion—that Bitcoin could offer diversification benefits to traditional investment portfolios—would likely be the same. This is because to date Bitcoin has appreciated substantially over any rolling 5-year period since it first started trading in 2010. We also feel that 1) using a five-year time period for this analysis is appropriate for longer-term equity and bond investors and 2) Bitcoin price data prior to 2015 is less relevant as the market has evolved considerably since then.

Given Bitcoin's relatively short lifespan, there is limited data with which to forecast how it might perform in the years to come and under different macroeconomic conditions. For now, Bitcoin behaves very much like a risk on asset. However, in today's backdrop of "QE unlimited", there is a strong fundamental argument that Bitcoin will evolve into both a store of value and inflation hedge like gold. And so long as there are fundamental reasons for owning a secure, decentralized digital currency with a finite supply, then institutional portfolios could stand to benefit from owning some Bitcoin.

**Notes:**

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i En.bitcoin.it. (2017). Category:History - Bitcoin Wiki. [online] Available at: <<https://en.bitcoin.it/wiki/Category:History>>

ii Markowitz, H., 1952. PORTFOLIO SELECTION\*. [online] Available at: <<https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1540-6261.1952.tb01525.x>>

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