

BITCOIN INVESTMENT THESIS

BITCOIN'S ROLE AS AN ALTERNATIVE INVESTMENT

OCTOBER 2020, RIA BHUTORIA, DIRECTOR OF RESEARCH



At Lumos Digital Assets SM, we have conversations with people at distinct stages in their digital asset journey who are proactively working on their investment thesis, seeking validation of their thesis or have yet to embark on the process. In response, we are compiling a series of reports to examine the perspectives that are driving interest and investment in bitcoin ¹ today and those that may evolve and gain traction in the future. In doing so, we hope to help people establish a comprehensive evidence-based thesis and understanding, especially as bitcoin becomes increasingly integrated with traditional markets and portfolios.

Bitcoin is many things to many people; why they choose to hold bitcoin depends on their circumstances and views of what bitcoin is today and what it could become in the future. These views have been the subject of misunderstanding, confusion, and debate. Historically, such debates have revolved around whether bitcoin, the native asset, is a store of value, medium of exchange, financial asset, all of the above, or none of the above. Additionally, it is still undetermined whether the underlying blockchain is best used to facilitate wholesale clearing and settlement, consumer payments or the anchoring and timestamping of data.

The truth is, as the ecosystem matures, Bitcoin may simultaneously serve many functions – either foundationally or through incremental layers. One of the beautiful things about Bitcoin is that its success is not predicated on serving a singular purpose.

In our [Institutional Digital Asset Survey](#), we found that almost 60% of the investors surveyed who think digital assets have a place in a portfolio ² believe they should be considered alongside other alternative

¹ We refer to the Bitcoin network, protocol and system as a whole as “Bitcoin.” We refer to the system’s unit of account, BTC, as “bitcoin.”

² 65% of investors surveyed believe digital assets belong in a portfolio.

investments. This insight from our survey led us to focus this report on the narrative that bitcoin, the first and most prominent digital asset, is an uncorrelated asset that can serve a similar role as an alternative investment in improving a portfolio's risk-adjusted returns and to discuss:

- Investors' rationale for including alternative investments in a portfolio
- The growth in appetite for alternative investments
- The characteristics of bitcoin that may make a sustainable portfolio diversifier
- Historical analysis of bitcoin's impact on a portfolio

In conducting research for this report, we interviewed a few of the top investors and thinkers in the industry and incorporated their investment perspectives. We offer a special thank you to Cathie Wood and Yassine Elmandjra (ARK Invest), Meltem Demirors (CoinShares), Michael Robertson (Lumos Investments), Elisabeth Préfontaine (Octonomics), and Jeff Dorman (Arca) for sharing their thoughts and feedback.

WHAT ARE ALTERNATIVE INVESTMENTS?

The broadest classification of an alternative investment is anything that is not a traditional investment. Traditional investments consist of a long position in public equities, investment-grade fixed income (public debt issued by corporations and governments), or cash. Any investment or strategy that does not fall within these segments is often deemed an alternative investment. More specifically, investments can have one or multiple attributes that make them “alternative.” The investments may:

1. Provide exposure to non-traditional returns that are not highly correlated with those that underlie traditional stocks and bonds (e.g., venture capital, art, farmland)
2. Provide unusual risk exposures (e.g., hedge funds via leverage/short sales)
3. Generate nontraditional payouts (e.g., collateralized debt obligations)

While there is no definitive list, certain investments are widely accepted as alternatives for the reasons outlined above. For example, the CFA Research Foundation broadly divides alternatives into

hedge funds, private equity (venture capital, leveraged buyouts, risky debt), real assets (real estate, infrastructure, commodities, natural resources, intangible assets), and structured products. ⁱⁱ

Alternatives also require customized tools to evaluate and manage risks and returns. Alternatives may have a limited track record of established analysis and the tools used to evaluate traditional investments may be inadequate for alternative investments due to structural differences.

GROWTH IN ALTERNATIVE INVESTMENT INTEREST

Demand for alternatives grew following the Great Financial Crisis given the drawdown in equity markets and historically low yields on fixed income securities. This drove institutional investors to seek out ways to mitigate systematic risk and meet annual return targets. ⁱⁱⁱ

In 2003, alternative investments comprised 6% (\$4.8 trillion) of the global investible markets, according to CAIA Association. CAIA estimates that alternative investments grew to \$13.4 trillion by the end of 2018, or 12% of the global investible market due to factors such as “low interest rates, pension funding ratios, the maturation of emerging markets, and a structural shift in capital formation.” CAIA members expect alternatives to grow to 18-24% of the market by 2025. CAIA includes private equity, hedge funds and liquid alternatives, real estate, infrastructure, natural resources, private debt, and commodities derivatives in its calculation of alternative investments. ^{iv}

Pension funds are a key example of the increasing demand for alternatives to improve risk diversification. The 2020 Global Pension Assets Study by Willis Towers Watson's Thinking Ahead Institute reported that pensions included in the study allocated 23% to alternative investments on average, up from 6% in 1999. The study covers 22 major pension markets, which comprise almost \$47 trillion in pension assets. ^v

Endowments are another institutional investor segment with an appetite for alternative investments. A NACUBO study of 774 U.S. university endowments found that the largest endowment cohort had a 43% allocation to venture capital, private equity³ and marketable alternatives, the highest of all cohorts by size as of 2019. Portfolios with meaningfully higher exposures to these investments outperformed peers in the short and long term.^{vi}

In the current economic environment where investors are worried about the lasting impact of the pandemic, unprecedented quantitative easing and other central bank intervention, and historically low interest rates on public equity and fixed income markets, identifying alternative sources of return has become paramount.

Prequin's June 2020 survey of 50 investors found increased affinity for alternatives by investors compared with pre-COVID times. Almost 80% of investors surveyed plan to maintain or increase the size of their planned commitments to alternatives in 2020 and more than 90% of investors plan to maintain or increase their commitments to alternatives longer term even though more than 40% of investors expect COVID-19 to have a long-term negative effect on their private capital portfolios.^{vii}

RATIONALE FOR ALLOCATING TO ALTERNATIVES

Investors may use alternatives to fulfill one or more roles in a portfolio. Broadly, these roles include diversification and risk reduction, return enhancement, and yield or income generation.

“The careful and informed use of alternative investments in a diversified portfolio can reduce risk, lower volatility, and improve returns over the long-term, enhancing investors’ ability to meet their return outcomes.”

CAIA ASSOCIATION^{viii}



³ Venture capital (13.4%) and private equity (10.2%) were the top two performing endowment asset classes in 2019 according to NACUBO.

Portfolio diversification

Modern Portfolio Theory (MPT), developed by Harry Markowitz and published in the *Journal of Finance* in 1952, argues that investors can design a diversified portfolio of investments that generates maximum returns while minimizing unsystematic risk. ^{ix}

One of the key reasons for including alternatives in a portfolio is to increase diversification by allocating to assets or investments that are driven by different risk and return factors relative to traditional investments, and are thus imperfectly correlated. The inclusion of assets that are imperfectly correlated may offer downside protection when traditional assets fall and may help reduce volatility. Diversification can lower risk without necessarily causing an offsetting reduction in expected return and is therefore generally viewed as a highly desirable method of generating improved risk-adjusted returns.

Return enhancement

Alternatives can improve a portfolio's risk and return profile and increase its total return by accessing a broader set of investments and strategies. In times of stock market distress, alternatives have often been more resilient to downside while still participating in stock market upside. ^x Venture capital may generate higher returns based on the idea that, on average, the upside potential (and risk) of early stage companies is higher than later stage companies and most early stage companies are private. Private equity firms generate strong returns by investing in less efficient markets where there is less price discovery and greater opportunity to identify undervalued assets.

In a late 2019 survey conducted by Natixis Investment Managers, 71% of the 500 institutional investors surveyed said the potential for higher returns from private assets makes them worth the liquidity risk. According to the same survey, 63% of investors believe the returns justify the higher fees associated with alternatives. ^{xi}

Investors are also aware of the trend that more capital formation is happening in private markets, with the delay in IPOs directing a much larger portion of profits to private market investors than in the previous generation. The average age of a private technology company has quadrupled from 3 years in

2001 to 13 years in 2018.^{xii} Private equity firms are investing in businesses at earlier stages in their lives and remaining invested longer, squeezing out more returns. ^{xiii}

Income generation

Alternatives such as private debt, real estate, and infrastructure may offer higher yields than traditional investments—especially during periods of low interest rates. According to JP Morgan Asset Management, investments in real assets such as real estate and infrastructure can generate income that is two to three times higher relative to financial assets, with less than half the volatility of public equities, lower correlations with traditional asset classes, and lower equity beta. ^{xiv}

RATIONALE FOR ALLOCATING TO BITCOIN

The rationale of certain bitcoin holders for allocating to bitcoin is similar to their rationale for allocating to alternative investments—notably, portfolio diversification and return enhancement. Additionally, the interest in bitcoin and other non-yield-generating alternative investments could also increase in response to the Federal Reserve (and many other central banks) cutting their benchmark interest rate to zero (or below zero) this year. In a world where benchmark interest rates globally are near, at, or below zero, the opportunity cost of not allocating to bitcoin is higher.

“Most people have an overallocation to bonds relative to where they should be. It can’t go all into equities and people are thinking about inflation to begin with. It will be very natural for bitcoin to absorb some of the money flowing out of bonds.”

CATHIE WOOD, ARK INVEST



Portfolio diversification

There are few assets that offer consistent lack of correlation to traditional assets over longer periods of time (e.g., months or years), despite short periods of movement with other assets. Thus, investors looking to recalibrate their portfolios should evaluate the validity and impact of an allocation to bitcoin to determine if it can play a role in a multi-asset portfolio.

“I view bitcoin as my safest asset. It is a low or no negative carry store of value.”

ELISABETH PRÉFONTAINE, OCTONOMICS



Bitcoin's correlation to other assets from January 2015 to September 2020 (displayed in the table below) is an average of 0.11, indicating there is almost no relationship between the returns of bitcoin and other assets. As a reminder, correlations fall within the range of -1 to 1. A correlation of 1 indicates perfect positive correlation, or that variables will move together. A correlation of -1 refers to perfect negative correlation such that variables move in opposite directions. A correlation of or near zero (non-correlated or uncorrelated) means that there is no relationship between the variables.

Correlations of daily returns from January 2015 to September 2020 (Rolling 30D)

	BTC	US Stocks	US Sm Cap	HY Bnd	REIT	Gold	Int'l Stocks	EM
BTC	1.00	0.15	0.14	0.05	0.11	0.11	0.14	0.10
US Stocks	0.15	1.00	0.95	0.53	0.77	-0.03	0.88	0.79
US Sm Cap	0.14	0.95	1.00	0.53	0.78	-0.03	0.85	0.76
HY Bnd	0.05	0.53	0.53	1.00	0.50	0.01	0.59	0.55
REIT	0.11	0.77	0.78	0.50	1.00	0.09	0.68	0.57
Gold	0.11	-0.03	-0.03	0.01	0.09	1.00	0.04	0.05
Int'l Stocks	0.14	0.88	0.85	0.59	0.68	0.04	1.00	0.88
EM	0.10	0.79	0.76	0.55	0.57	0.05	0.86	1.00

Source: Morningstar, Portfolio Visualizer (October 2020)

Low correlation is an encouraging first sign in evaluating alternative investments with portfolio diversification utility. It is also important to explore why bitcoin has exhibited low correlation to traditional assets and whether it will continue:

1. Differing return and risk factors: The factors that explain bitcoin returns have differed from the factors that drive returns in other asset classes.

2. Evolving narratives: Bitcoin has various narratives of what people expect bitcoin to be and to do. Bitcoin's dynamic narratives could explain why bitcoin has been uncorrelated to other assets.

3. Greater overlap between market participants: Bitcoin is a young asset that, until recently, was untethered to traditional markets. As it is integrated in institutional portfolios, it could become increasingly correlated with other assets.

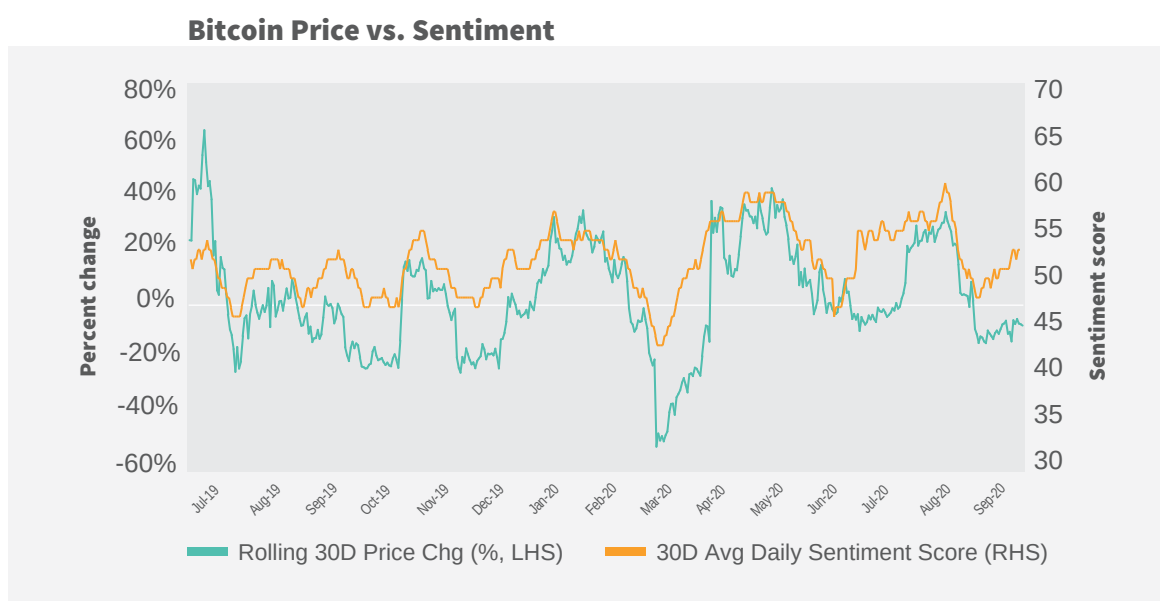
4. Retail driven phenomenon: Bitcoin is unusual as an asset in that it first had favor with retail investors ahead of institutional players.

DIFFERING RETURN AND RISK FACTORS

As we mentioned in our section 'What are alternative investments?', alternatives generate returns that do not mirror the returns of traditional assets and provide unusual risk exposures. A Yale study conducted by economists Aleh Tsyvinski and Yukun Liu examined whether the returns of digital assets (specifically bitcoin, ether, and ripple) behave like the returns of other asset classes (stocks, traditional currencies, and precious metal commodities). Based on their analysis, the return behavior of all digital assets, including bitcoin, could not be explained by the risk factors that account for the returns in stocks, currencies, or precious metal commodities *or* by macroeconomic factors such as non-durable consumption growth, durable consumption growth, industrial production growth, and personal income growth.

Rather, the economists found that bitcoin's performance is driven by "cryptocurrency-specific factors," such as the momentum effect and proxies for average and negative investor attention. The momentum effect refers to the trend that an asset is likely to continue increasing in value if it has just

increased in value. This is in line with the idea that bitcoin is **reflexive**^{xvi} in that price and sentiment experience a self-reinforcing effect. The second factor that influences bitcoin price is investor attention as measured by Twitter post counts for “bitcoin” and Google search data series (e.g., if bitcoin mentions are abnormally high, the value of the asset will increase).^{xvii}



Source: The TIE (September 2020)

Note: The TIE's daily sentiment score is a measure of how positive or negative conversations on Twitter have been about a particular coin over the last 24 hours vs. the previous 20 days. A score above 50 implies that conversations have been more positive today vs. the last 20 days. A score below 50 implies that conversations are becoming more negative.

It is worth noting that the factors driving returns in digital assets like bitcoin may change as the asset matures. For example, performance has not been historically connected to the change in bitcoin's [fundamental metrics](#). We believe “fundamentals” in the context of digital assets refers to information, metrics, and models that provide insight into the health and growth of digital assets and networks. Close followers of digital assets know that the performance of digital assets hasn't always been driven by “fundamentals,” due to higher levels of speculative and sentiment driven trading activity. Over time, as the investors and market participants analyzing and participating in bitcoin markets evolve, its performance may be tied to a greater extent to fundamental adoption variables and to a lesser extent to reflexivity and sentiment.

Global investor sentiment certainly has an impact on bitcoin's price, but bitcoin has distinct underlying fundamentals that are not affected by the health and economic situation created by COVID-19 (e.g., bitcoin does not have any cash flows or production to cut).

Demand shocks (the decline in consumer demand for goods and services due to lockdowns and unemployment), supply shocks (production limitations or supply chain shutdowns), and the ensuing policy response by governments and central banks (quantitative easing and record low interest rates) have a direct and fundamentally negative impact on equities and fixed income, commodities, and fiat currencies.^{xviii} On the other hand, bitcoin's fundamentals and utility are not directly affected by a decline in profitability or production or an increase in the money supply. Rather, these headwinds may increase the attractiveness of an investment in bitcoin, and investors are taking note.

“Bitcoin to me is the only thing that I’ve seen so far that is really fundamentally uncorrelated to that decision-making process and to that decision-making body, because, at the end of the day, any other asset class, equities, debt, real estate, commodities, they’re all tightly, tightly coupled to a legislative framework and an interconnectedness in the financial markets that brings together many of the governments that are sort of behaving this way.”

CHAMATH PALIHAPITIYA, SOCIAL CAPITAL



In the first move of its kind, MicroStrategy (MSTR), a publicly traded business intelligence company, is turning to bitcoin for its unique risk/reward profile. In August 2020, the company announced^{xx} its plan to leverage bitcoin as a treasury reserve asset. In its second quarter earnings report, MicroStrategy detailed a new capital allocation strategy that included the decision to invest up to \$250 million “in one

or more alternative investments or assets, which may include stocks, bonds, commodities such as gold, digital assets such as bitcoin, or other asset types given excess free cash flow.^{xxi} Notably, MicroStrategy chose to invest the full \$250 million in 21,454 bitcoins in August 2020 and an additional \$175 million in 16,796 bitcoins in September 2020, for a total of 38,250 bitcoins or \$425 million,^{xxii} citing the economic and public health crisis, unprecedented levels of stimulus, and global political and economic uncertainty, and the resulting risk of storing excess free cash flow in fiat or other assets commonly used in corporate treasury.^{xxiii}

“We believe that, together, these and other factors may well have a significant depreciating effect on the long-term real value of fiat currencies and many other conventional asset types, including many of the assets traditionally held as part of corporate treasury operations. We find the global acceptance, brand recognition, ecosystem vitality, network dominance, architectural resilience, technical utility, and community ethos of Bitcoin to be persuasive evidence of its superiority as an asset class for those seeking a long-term store of value.”

MICHAEL SAYLOR, MICROSTRATEGY



EVOLVING NARRATIVES

Another angle on bitcoin's lack of movement with traditional assets is the absence of an agreed-upon narrative. One of the reasons we kicked off this series was to explore bitcoin's dynamic narratives. At any given time, the narratives have ranged from bitcoin as a means of payment, a reserve currency for digital assets, a store of value asset, or a portfolio optimization tool, among others.^{xxv} This lack of consensus could be an important reason why bitcoin has not traded in line with other assets to date. If the lack of consensus on bitcoin's narrative persists, it may continue to be uncorrelated with all other assets. On the other hand, if bitcoin's narrative converges on a single thesis, its correlations to other

assets with similar investment cases could converge as well. Jeff Dorman, the CIO of digital asset manager Arca, articulated in our conversation that changing narratives about an asset can dictate its behavior and correlations.

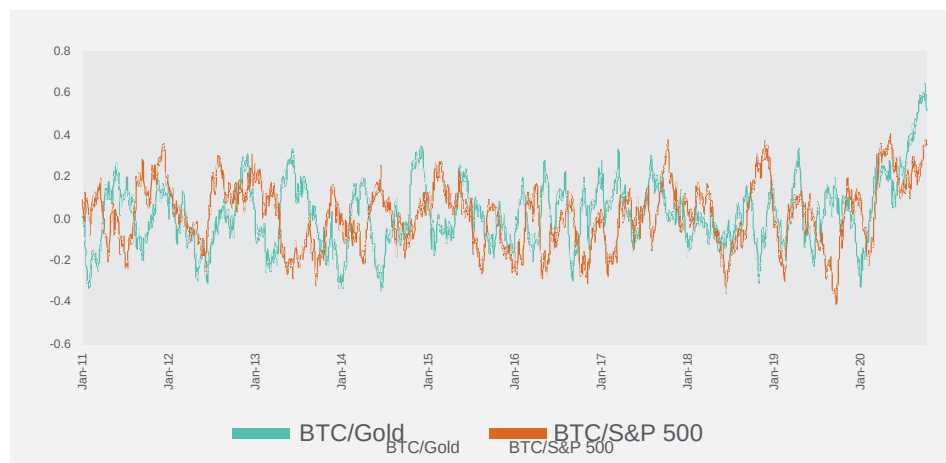
“Correlations are often narratives. They’re built off what people expect to happen. If bitcoin’s narrative starts to be more consistent, bitcoin’s correlations to certain asset classes could rise.”

JEFF DORMAN, ARCA



A salient narrative this year has been that bitcoin is an emerging store of value asset. We expand on this theory in detail in the first report in this series, [“Bitcoin as an Aspirational Store of Value.”](#) Most recently, bitcoin’s behavior has been [inconsistent](#), with prices moving in step with a different asset class week to week. However, more market participants are allocating to bitcoin for its [long-term potential](#). Interestingly, bitcoin’s 60-day correlation to gold reached record highs in early September, potentially driven by concerns about real interest rates and inflation.

Bitcoin 60D correlations with gold and S&P 500



Source: Coin Metrics (October 2020)

Note: This chart displays bitcoin's 60-day Spearman correlation with gold and with the S&P 500.

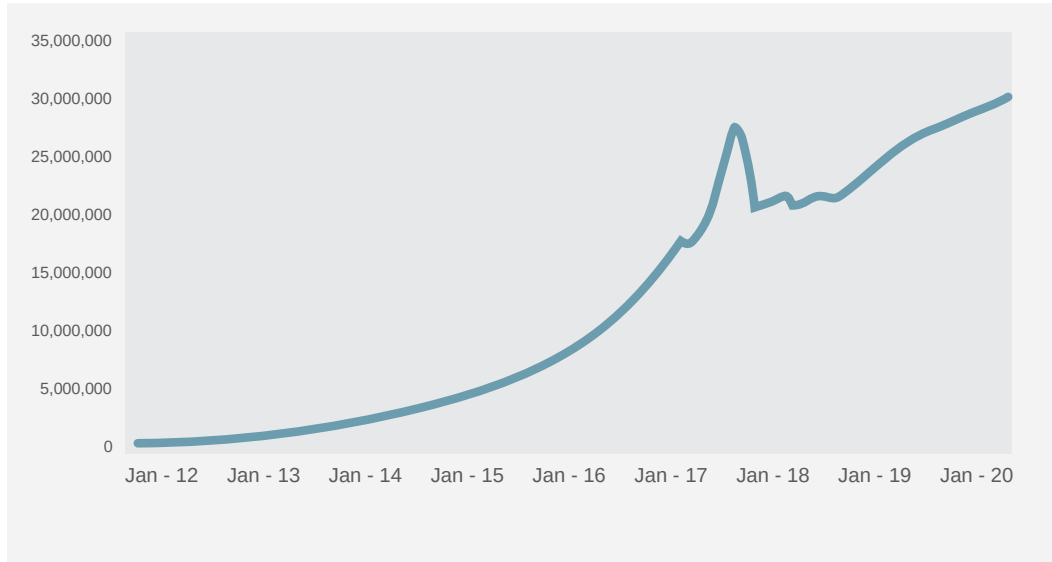
While this is a notable development, it is to be determined whether bitcoin/gold correlations will hold in the long run. In the past, bitcoin has experienced brief periods of elevated correlations with particular assets, including gold and equities, but the relationships break down over longer time horizons.

GREATER OVERLAP BETWEEN MARKET PARTICIPANTS

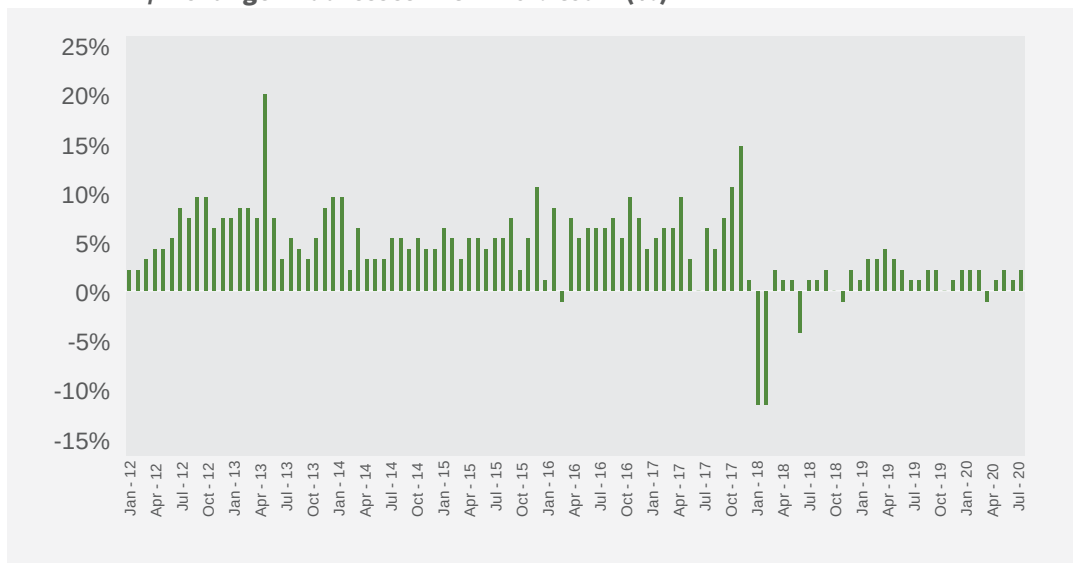
In the early days of bitcoin's existence, events and sentiment affecting traditional markets had little to no impact on bitcoin markets. Bitcoin's trading infrastructure was completely independent of traditional market infrastructure and bitcoin's ability to react to current events affecting traditional markets in real time was limited because bitcoin trading was not integrated into traditional market infrastructure. As the infrastructure has matured, participants in bitcoin markets and traditional markets have started to overlap. Institutional investors can trade bitcoin futures and options on the same platform they use to trade derivatives of other assets (e.g., CME, Bakkt). Retail investors can buy and sell bitcoin on certain platforms that allow them to trade stocks (e.g., Robinhood, Square Cash). As bitcoin matures and the profile of market participants in bitcoin expands to include more participants from traditional markets, bitcoin could become more correlated (positively or negatively) with other assets.

RETAIL DRIVEN PHENOMENON

As more institutions allocate to bitcoin, this investor segment will certainly have a greater impact on bitcoin markets. However, there is reason to believe retail investor influence will persist. Bitcoin started as a retail asset and continues to have the attention of many retail investors. One potential proxy to gauge retail interest is the number of addresses holding less than 10 bitcoins (though there is no way to say definitively that it is all retail). As displayed in the charts below, the number of addresses with less than 10 bitcoins has been steadily increasing. In fact, in plotting the month-over-month change, we can see that there have been only seven separate occasions since January 2012, where the change in the end-of-month count of addresses with a balance of less than 10 bitcoins has been negative.

Number of addresses with <10 bitcoin

Source: Coin Metrics (October 2020)

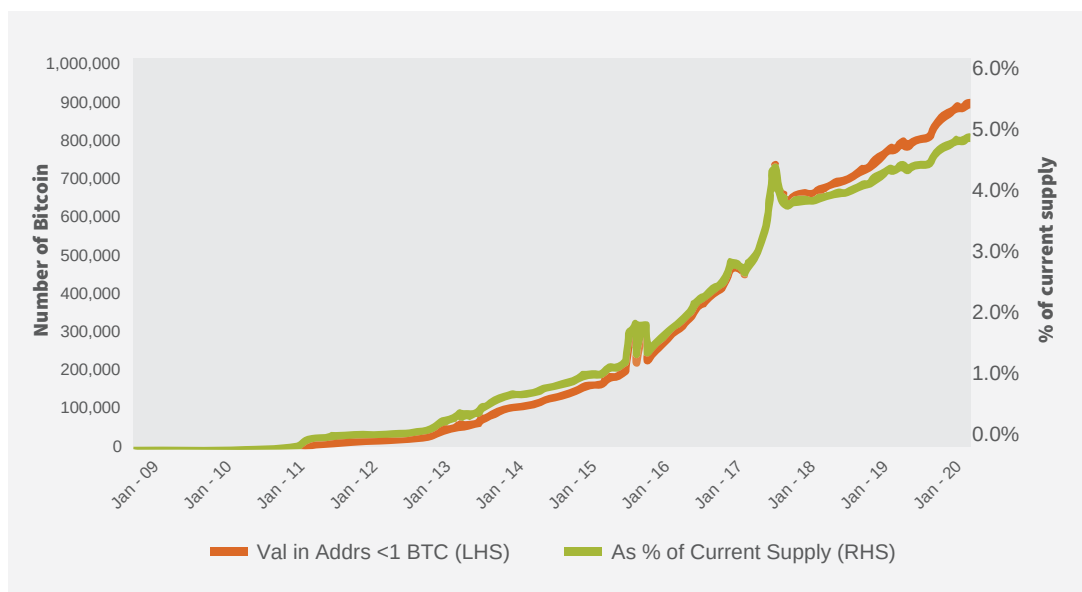
Month to month change in addresses with <10 bitcoin

Source: Coin Metrics (October 2020)

The behavior of retail investors and institutional investors can be different, which could be another factor contributing to bitcoin's lack of correlation to other assets that are mostly dominated by institutional sentiment. We saw evidence of the contrasting behavior of retail and institutional investors during the March 2020 sell-off. Retail-focused companies like [Coinbase](#), [River Financial](#), and [Simplex](#) reported record levels of retail investors buying the dip as traders and institutional investors unwinded their positions. Coinbase shared that its retail trading arm experienced a substantial increase in cash and crypto deposits, new user sign-ups, and total traded volume in the 48 hours following the sell-off versus the last 12-month average. Coinbase also highlighted that the majority of retail users active during this time were buyers. ^{xxvi}

However, the extent of the downturn suggests that even though there are many retail holders, non-retail holders account for significantly higher levels of bitcoin. In the chart below, we show the total number of bitcoin in addresses with <1 bitcoin is approximately 5% of the current supply (18.5 million). While the number is low, the number of bitcoin in addresses with <1 bitcoin has been rising over time.

Value in addresses with <1 bitcoin (in native units)



Source: Coin Metrics (October 2020)

We are also starting to witness an era of retail resurgence in traditional markets with the rise of zero-fee trading by major brokerages and easy-to-use platforms for trading—a trend that Meltem Demirors, Chief Strategy Officer of CoinShares, brought to light in our conversation. The channels that retail investors rely on for financial information and advice are also shifting to platforms such as Twitter, Reddit, Telegram, YouTube, and Tik Tok, where information dissemination is much more viral and rapid than it is in traditional closed channels. The adoption of bitcoin has been and continues to be driven by conversations taking place on the aforementioned platforms, explaining the connection between bitcoin performance and social media mentions discussed above. As this new wave of retail investors familiarize themselves with these channels, some of their attention will undoubtedly flow to bitcoin and other digital assets.

“What is unique about bitcoin is that it's retail driven. Financial media and the way people consume investment information is changing, and influencers command more attention than institutions. And this is happening against a backdrop of massive generational wealth transfer. As wealth and power move from older to younger generations, bitcoin is the first asset that will capitalize on this shift in how we create and consume investment narratives.”

MELTEM DEMIRORS, COINSHARES



Return enhancement

The acceptance of bitcoin in institutional portfolios today can be compared with the acceptance of emerging and frontier equities in portfolios in the late 1980s and early 1990s. The resistance to the inclusion of emerging markets was driven by concerns about factors such as volatility and liquidity. However, over time, investors recognized the growth rates and low correlations between developing

and developed market equities. ^{xxvii} As of 2018, emerging and frontier equities (~\$5 trillion) comprise about 11% of the global investible equities market (~\$43 trillion). ^{xxviii} According to Cathie Wood, Bitcoin could follow a similar path.

“Emerging markets were considered not worthy. There was this myopia around the US. You can make the same analogy now. 1% to emerging markets back then was considered an experiment. You can slot in bitcoin into that line of thinking.”

CATHIE WOOD, ARK INVEST



Bitcoin has a \$197 billion market cap (as of October 7, 2020). Bitcoin is a drop in the bucket compared with markets bitcoin could disrupt (e.g., stores of value, alternative investments, settlement networks). Let's take alternative investments as an example. As we highlighted earlier in this report, the CAIA Association sized the alternative investment market at \$13.4 trillion in 2018 (12% of the global investible market, sized at \$116 trillion). If bitcoin were to capture 5% of the alternatives market as measured by CAIA, that would equate to an incremental \$670 billion growth in its market size. If it were to capture 10%, that would expand its market size by \$1.3 trillion.

We can also consider the impact of bitcoin capturing a share of potential flows out of fixed income in investors' desperate search for yield and returns. As Cathie Wood and Chamath Palihapitiya highlight, as a result of central banks globally cutting benchmark interest rates to near, at, or below zero, interest in alternative investments like bitcoin and other digital assets could increase.

“The conventional approach to investing for retirement was 60% equities and 40% bonds. If your goal was 10% a year, this mix got the job done in the 80s, 90s and 00s. Not anymore... Now, bonds return zero. So does 40 go to zero with it? What do we replace bonds with?

“One idea could be to increase exposure to alternative assets. Crypto, cars, art, baseball cards, etc. Most people have 0-5% in alts. This allocation will probably change if bonds remain at 0...it's just the math.”

CHAMATH PALIHAPITIYA, SOCIAL CAPITAL^{XXIX}



The CAIA Association sized non-dollar and dollar bonds at \$50.3 trillion in 2018. A flow of 1% of bonds (as measured by CAIA) to bitcoin equates to an incremental \$500 billion in bitcoin's market cap.

While this is a simplified approach, the point of this exercise is to examine bitcoin's potential asymmetric upside as a feature that may appeal to investors, in addition to its lack of historical correlation to other assets.

Tying it together

The involvement of traditional institutions in bitcoin is at the highest level it has been. As bitcoin becomes more intertwined with traditional markets, external events could have an increasing impact on bitcoin, especially if bitcoin's narrative converges on a single use case. In other words, if bitcoin becomes more correlated with certain assets in light of this potential trend, its portfolio diversification benefits relative to certain assets could decline.

However, bitcoin is fundamentally less exposed to the prolonged economic headwinds that other assets will likely face in the next months and years. Combined with its multifaceted narratives and an interesting effect of persisting retail and growing institutional sentiment, it could be a potentially useful and uncorrelated addition to an investors' portfolio toolkit.

INCREMENTAL BENEFITS

In order to benefit from the enhanced return and diversification effects of certain conventional alternative investments, typically, investors must accept certain limitations, such as reduced liquidity, limited accessibility, and high fees. Bitcoin, on the other hand, allows allocators to complement their illiquid alternative investments with another liquid, accessible, and low fee asset that offers similar benefits in a portfolio.

Liquidity. Bitcoin trades 24/7 with substantial volume (\$200 million to \$12.4 billion per day as of July 2020),^{xxx} is relatively easy and inexpensive to enter and exit and has returns that are easy to observe. Depending on the channel used to gain exposure to bitcoin, there are no lockup provisions that prevent its immediate sale. Bitcoin can provide investors with the flexibility to meet unanticipated liquidity needs, make short-term tactical decisions, and rebalance portfolios.

Accessibility. Certain alternative investments are also limited in their accessibility. The most lucrative alternatives (e.g. venture capital and private equity, real estate, art and collectibles) may be reserved for the largest institutional investors. Bitcoin is unique because it democratizes access. While certain on-ramps and off-ramps restrict access (e.g., only to those within a given region or to those willing to undergo KYC), bitcoin itself does not discriminate based on investor profile or geography, and it has been open, public, and accessible by anyone with a cell phone or computer and internet connection from day one.

Low Fees. Alternative investments may be accompanied by fees that reduce the net returns investors receive, such as management and performance fees. The only fees associated with a direct investment in bitcoin are the cost of the trade and the cost to custody the assets if a third-party custody provider is used. Additionally, similar to natural resources, like oil, or commodities, like gold, that have sizable futures and options markets, investors can leverage bitcoin futures to replicate “physical” exposure to bitcoin.

IMPACT ON A TRADITIONAL PORTFOLIO

Now that we have discussed the qualitative explanation behind the rationale to consider allocating to bitcoin, we also show the quantitative impact of including bitcoin in a portfolio historically.

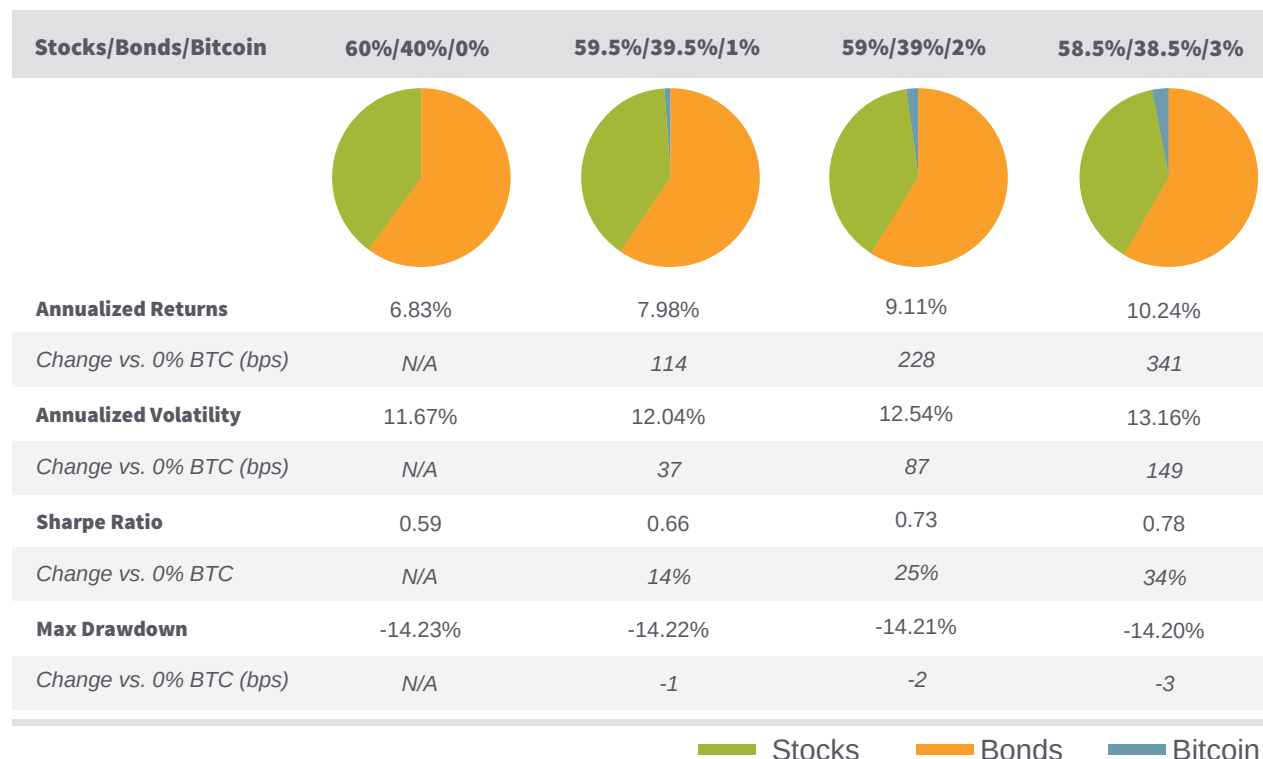
An allocation to bitcoin in a traditional 60/40 equity and fixed income portfolio from January 2015 to September 2020, rebalanced quarterly, would have improved risk-adjusted returns as measured by the Sharpe ratio by as much as 34%. Annualized returns were 341bps higher for the portfolio with the highest allocation to bitcoin (3%). While the volatility of portfolios with bitcoin was also incremental, the magnitude of the increase in volatility was significantly lower compared with the increase in returns. Surprisingly, the max drawdown (the greatest loss of a portfolio from peak to trough over a given period) was very slightly lower for all portfolios with bitcoin exposure.

In the charts below, we summarize the impact of varying allocations to bitcoin on the portfolio's annualized returns and cumulative excess returns, annualized volatility, and risk-adjusted returns, depending on the length of the investment (2020 YTD up to 5 years), with all holding periods ending in September 2020.

We measure the impact of a 1%, 2%, and 3% allocation to a portfolio with a ratio of 60/40 equities and fixed income. We use iShares MSCI ACWI ETF (ACWI), which includes the stocks of developed and emerging markets, as a proxy for global equities. We use the Vanguard Total Bond Market ETF (BND) as a proxy for the US dollar denominated bond market. We use data from the Lumos Bitcoin Index to represent bitcoin in portfolios. The index starts on December 31, 2014, which is why our analysis begins at the beginning of 2015.

We use total returns, which assumes all dividends are reinvested. However, the fees and expenses associated with building and maintaining the portfolio are not deducted in our hypothetical analysis. Bitcoin returns do not factor in hard forks or airdrops. Portfolios assume quarterly rebalancing.

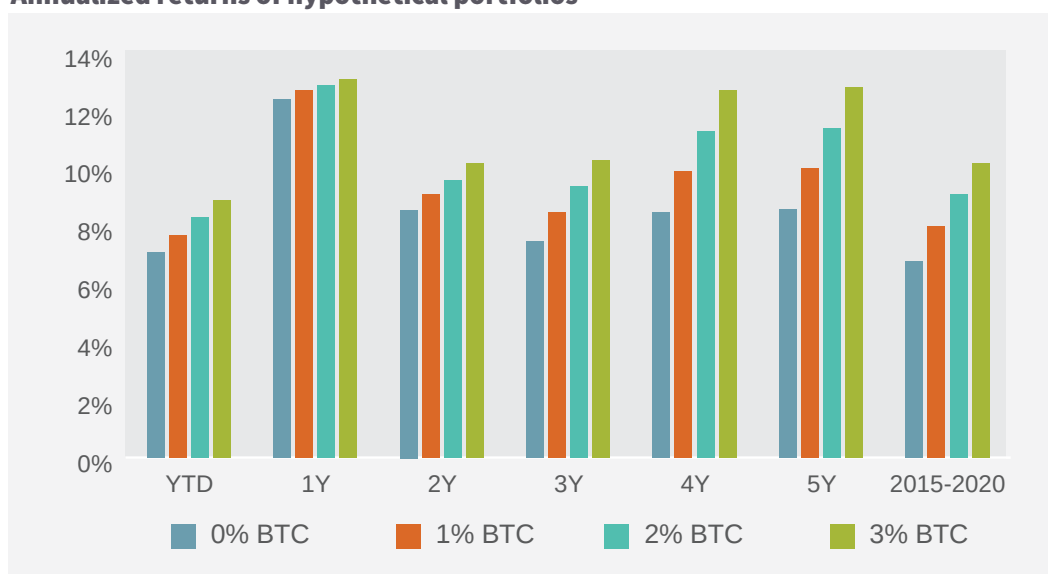
Summary Portfolio Metrics (January 2015 through September 2020)



Source: Bloomberg, Yahoo Finance (September 2020)

Past performance is no guarantee of future results. This chart is for illustrative purposes only and does not represent actual or future performance of any investment portfolio or strategy. The Lumos Bitcoin Index is not subject to fees and expenses typically associated with managed accounts or investment funds. An investment cannot be made in the Lumos Bitcoin Index.

The annualized returns of portfolios with an incrementing allocation to bitcoin outperformed a portfolio with no allocation to bitcoin over all time horizons displayed here, ending in September 2020. As we mentioned, while volatility was also elevated for portfolios with bitcoin, the magnitude of the increase was less than the increase in returns, resulting in risk-adjusted returns that improve with an increase in bitcoin exposure.

Annualized returns of hypothetical portfolios

Source: Bloomberg, Yahoo Finance (October 2020)

Note: The portfolio with 0% bitcoin has 60% stocks/40% bonds. The portfolio with 1% bitcoin has 59.5% stocks/39.5% bonds. The portfolio with 2% bitcoin has 59% stocks/39% bonds. The portfolio with 3% bitcoin has 58.5% stocks/38.5% bonds.

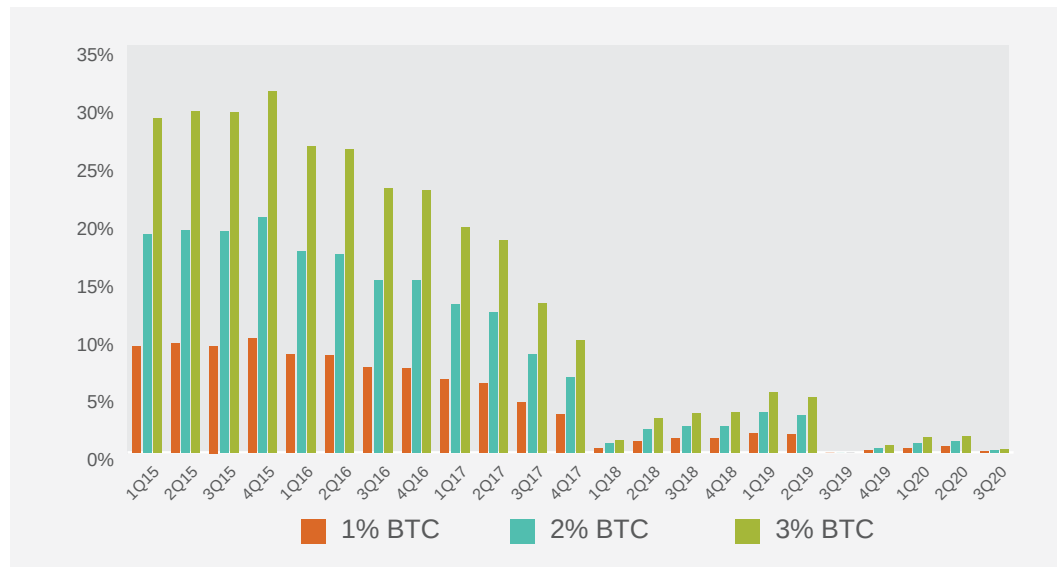
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We also plotted the cumulative excess returns generated by the hypothetical portfolios containing bitcoin relative to a portfolio with no exposure to bitcoin to evaluate the difference in returns based on when an investor made an allocation to bitcoin. In other words, if an investor set up a portfolio with 3% in bitcoin (and 58.5% in equities/38.5% in fixed income) in January 2015, the cumulative excess returns versus a portfolio with no bitcoin exposure would be 29% as of September 2020.

With regular rebalancing, a portfolio with 3% in bitcoin set up at the beginning of Q1 2018 would have outperformed a portfolio with no bitcoin by 1.1%, even though bitcoin's price subsequently declined by over 70% by the end of 2018. In fact, setting up a portfolio with an allocation to bitcoin at these percentages would have generated a positive cumulative excess return in all quarters versus a portfolio with no bitcoin to date (as of 3Q 2020).

Regular rebalancing explains the outperformance of a portfolio with bitcoin. When the price of bitcoin falls, the allocation to bitcoin in the portfolio declines relative to the target allocation. To maintain the target allocation, regular rebalancing suggests buying more bitcoin on the way to the bottom and selling as the price rises (e.g., as the allocation in the portfolio exceeds the target allocation).

Cumulative excess returns of hypothetical portfolios

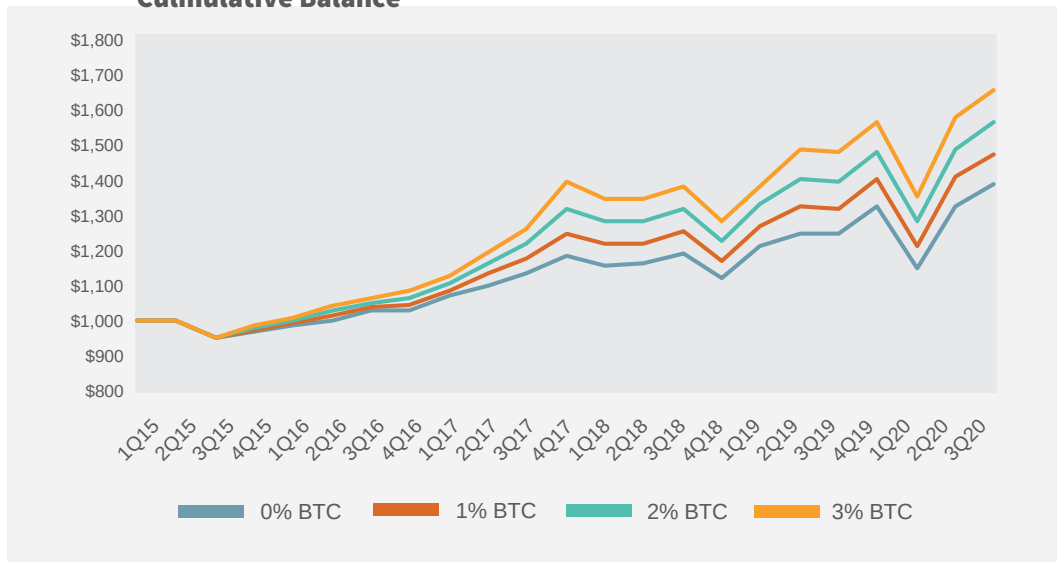


Source: Bloomberg, Yahoo Finance (October 2020)

Note: The portfolio with 1% bitcoin has 59.5% stocks/39.5% bonds. The portfolio with 2% bitcoin has 59% stocks/39% bonds. The portfolio with 3% bitcoin has 58.5% stocks/38.5% bonds.

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Cumulative balance of hypothetical portfolios



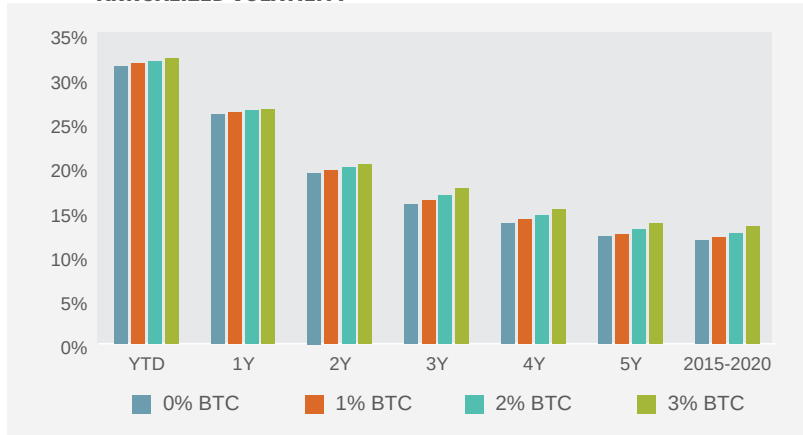
Source: Bloomberg, Yahoo Finance (September 2020)

Note: The portfolio with 0% bitcoin has 60% stocks/40% bonds. The portfolio with 1% bitcoin has 59.5% stocks/39.5% bonds. The portfolio with 2% bitcoin has 59% stocks/39% bonds. The portfolio with 3% bitcoin has 58.5% stocks/38.5% bonds.

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Annualized volatility was slightly higher in portfolios with any allocation to bitcoin. While an allocation to bitcoin leads to an increase in a portfolio's volatility, investors who can safely take on the marginal increase may be willing to accept it given the greater improvement in the portfolio's risk-adjusted returns as measured by the Sharpe ratio. The increase in Sharpe ratio indicates that the increase in returns are worth the additional volatility. Additionally, regular rebalancing also allows investors to limit bitcoin's impact on the portfolio volatility.

Annualized volatility of hypothetical portfolios

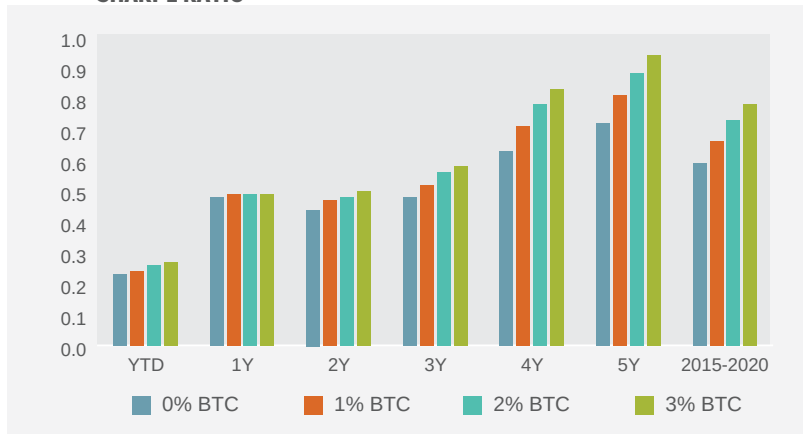


Source: Bloomberg, Yahoo Finance (October 2020)

Note: The portfolio with 0% bitcoin has 60% stocks/40% bonds. The portfolio with 1% bitcoin has 59.5% stocks/39.5% bonds. The portfolio with 2% bitcoin has 59% stocks/39% bonds. The portfolio with 3% bitcoin has 58.5% stocks/38.5% bonds.

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Sharpe ratio of hypothetical portfolios



Source: Bloomberg, Yahoo Finance (October 2020)

Note: The portfolio with 0% bitcoin has 60% stocks/40% bonds. The portfolio with 1% bitcoin has 59.5% stocks/39.5% bonds. The portfolio with 2% bitcoin has 59% stocks/39% bonds. The portfolio with 3% bitcoin has 58.5% stocks/38.5% bonds.

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CONSIDERATIONS

Maturation. Bitcoin's historical performance may be a consequence of early-stage behavior. Its ability to enhance the returns of a portfolio in the accelerated way it has over the period studied may not continue. In other words, bitcoin's performance going forward may be more gradual. However, another consequence of bitcoin entering a more mature and steady stage of its life cycle is that we expect its volatility to decline in tandem, resulting in continued favorable risk-adjusted returns.

Based on historical data. Our and similar analyses are back tests and are based on historical returns. The challenge is that historical performance is not necessarily indicative of future results. While the use of historical realized returns to make investment decisions is debatable, investment analysis and decision-making is at least partially informed by evaluating historical risk-adjusted returns.

Volatility. Given bitcoin's volatility relative to other assets, an allocation to bitcoin may deviate from its target allocation frequently, which requires an active rebalancing strategy. This requires investors to pay attention to actual versus target allocations on a more regular basis.

Consider a portfolio with a target allocation of 5% bitcoin. If bitcoin's allocation rises to 10% of the portfolio due to its outperformance relative to other assets, a disciplined rebalancing strategy would dictate selling bitcoin to bring its allocation back to the 5% target and using the funds to increase the allocation to other asset classes, which have drifted below their target allocation. If bitcoin underperforms and declines to 1% of the portfolio, investors would buy bitcoin and sell their position in other asset classes that are above their target allocation. An advantage of rebalancing is that it forces investors to have the discipline to buy low and sell high.

CONCLUSION

If investors view bitcoin as a component of their alternatives bucket, it could be beneficial given the growing interest in alternatives amidst overvalued public equities and low yields and the potential for funds to flow out of fixed income into other asset buckets.

Bitcoin's lack of correlation in the early days may be partially explained by the retail-driven market, bitcoin's separation from traditional markets, and the lack of overlap between institutional participants in traditional and bitcoin markets. Bitcoin's growing institutional investor base could lead to its growing correlation with other assets, depending on their narrative for bitcoin.

However, there are reasons why bitcoin could continue to serve as a portfolio diversifier and return enhancement tool. Notably, the factors that explain returns in bitcoin are distinct from those that explain returns in other asset classes. Bitcoin's fundamentals are relatively shielded from the economic impact of the COVID-19 pandemic as its functionality is not predicated on profitability or production and bitcoin is natively digital. Bitcoin is also unique in that it continues to be influenced by retail investor sentiment and can capitalize on the shift in the way retail investors interact with traditional markets and consume financial information as well as the transfer of wealth to the millennial generation over the next 10 years.

Our report explores the analytical reasons why investors believe bitcoin can serve a similar role as other alternative investments in a portfolio. A more uncomplicated explanation is that bitcoin simply does not fit into defined asset categories ([bitcoin is a platypus, as described by Spencer Bogart, GP at Blockchain Capital](#)). It also has dynamic narratives, which make it difficult to define (and easy to call an "alternative").

Today, bitcoin is very small in terms of market size and trading volume to be considered an independent asset class with a strategic allocation in portfolios. However, being classified as an alternative investment for now, as bitcoin grows and matures and as investors study its characteristics, does not preclude bitcoin from maturing into an independent asset class. Independent and alternative are not necessarily mutually exclusive—many independent asset classes (e.g., commodities, real estate, infrastructure) may simultaneously be classified as alternative investments, depending on the investor.

“Conservatism in allocating to ‘new’ institutional investment classes runs the risk of missing out on improved diversification and perhaps missing stellar early first-mover returns.”

DONALD R. CHAMBERS, CAIA; KEITH BLACK, CFA, CAIA; NELSON J. LACEY, CFA



Bitcoin is a unique investable asset with compelling differences relative to traditional asset classes as well as conventional alternative investments that could make it a beneficial addition to a portfolio.

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While hypothetical portfolios can provide insight on how asset classes have performed during historical market cycles, they do not take into account key factors such as portfolio expenses or portfolio manager investment decisions, and should not be considered representative of how a portfolio has, or will, perform.

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