DYNAMIC CORRELATIONS: BITCOIN VS. OTHER ASSET CLASSES

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A critical topic coming up with investors:

How might bitcoin behave, from a returns standpoint, relative to other asset classes?

There is no certainty here, and the past is no guarantee of the future, but let's evaluate some examples of the past for relevant lessons.

THE CALENDAR YEAR RETURNS QUILT

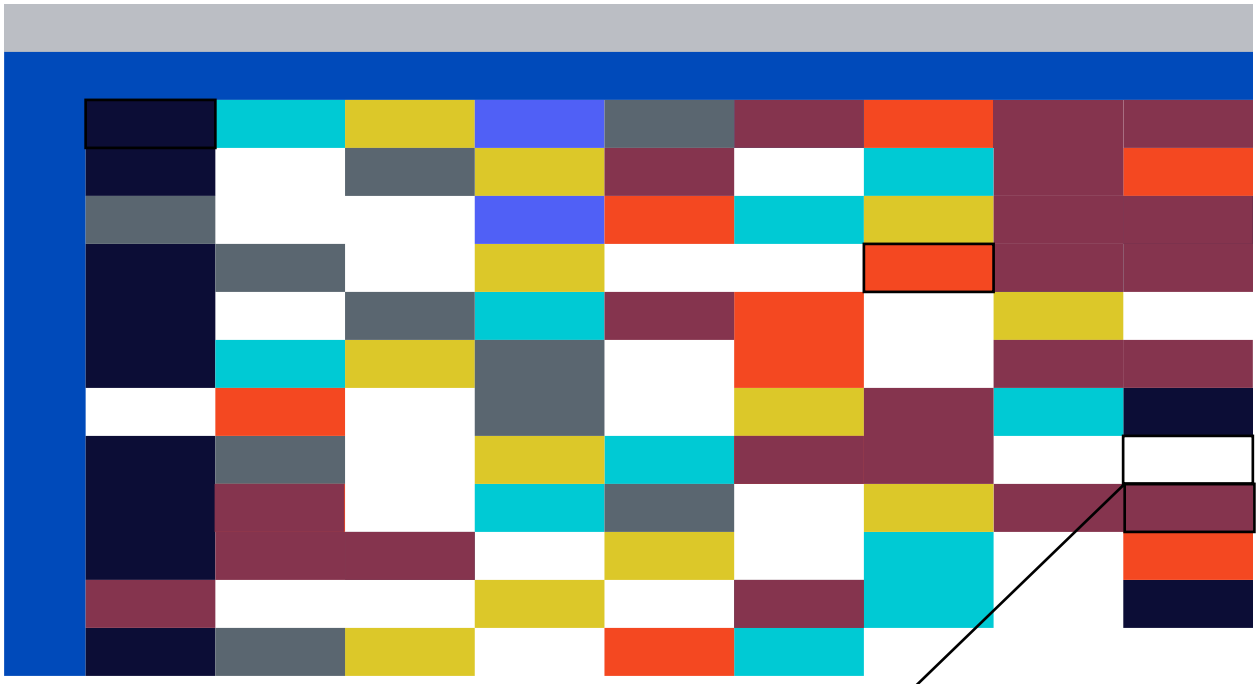
Calendar year quilts with di□erent indexes can help us display return patterns over time. The performances of di□erent financial assets can ebb and flow, but in general, an investor with a diversified portfolio is at less risk of having all of their eggs in the worst-performing basket in any given year.

We add bitcoin to the quilt in figure 1 to see how it has shaken out in recent years relative to other, more long-standing asset classes.

- For the calendar years 2012 through 2023, bitcoin had a very much all-or-nothing type of behavior when measured against these eight other asset classes. It was either the top-performer or the bottom-performer, and not by a slight margin—it was the top or bottom performer by a significant margin in all cases.
- Bitcoin was the top-performer in nine out of twelve calendar years. In those years, there were only two instances when the second position was not a measure of equities. In 2020, gold was in the number two position, with a 24.6% return, and in 2021, commodities were in the number two position, with a 40.4% return. That means in seven of those nine times when bitcoin outperformed, equities also delivered stronger performance relative to bonds and commodities.
- In three out of twelve calendar years (2014, 2018 and 2022), bitcoin was the bottom performer. The worst year was 2018, with a -73.8% return. In 2018, the next worst performer was the MSCI Emerging Markets Index at -14.2% and in 2022, the next worst performer was the Russell 2000 Index at -20.4%. It was only 2014 when something other than a measure of equities was in the second-worst slot, in that case commodities at -33.1%.

The lessons of the calendar year chart: bitcoin traded like a risk-on asset, like an equity, rather than a risk-o asset, like a U.S. Treasury.

While we don't know exactly how long this might continue, it's important to know the path of returns so far.



Source: Bloomberg. Bitcoin represents the measure of XBTUSD in Bloomberg. MSCI EM refers to the MSCI Emerging Markets Index. MSCI EAFE refers to the MSCI EAFE Index. Russell 2000 refers to the Russell 2000 Index. S&P 500 refers to the S&P 500 Index. U.S. Corporate refers to the Bloomberg U.S. Corporate Total Return Index. Gold refers to the London Bullion Market Association (LBMA) Gold Price. Treasuries refers to the Bloomberg U.S. Treasury Total Return Index. Commodities refers to the S&P GSCI Index. Past performance is not indicative of future results. Bitcoin is highly speculative and involves a high degree of risk, including the potential for loss of the entire investment. An investment in bitcoin involves significant risks (including the potential for quick, large losses) and may not be suitable for all investors.

CORRELATION AN EVER EVOLVING DANCE BETWEEN ASSETS

The hardest single thing to understand about correlation is that it is always shi ing.

- A +1.0 means that the two assets are moving together in lockstep.
- A 0.0 means that the two assets are moving in a way where the movement of one's price seems to show no relationship with the movement of the other's price.
- A -1.0 means the two assets are moving in completely opposite directions.

In theory, if two assets have lower or negative correlation, when used together, the overall volatility of the resulting multi-asset portfolio should be lower, since the assets are moving opposite to one another. Similarly, if two assets have a higher, positive correlation, there would be less of a dampening e ect on volatility when using them together.

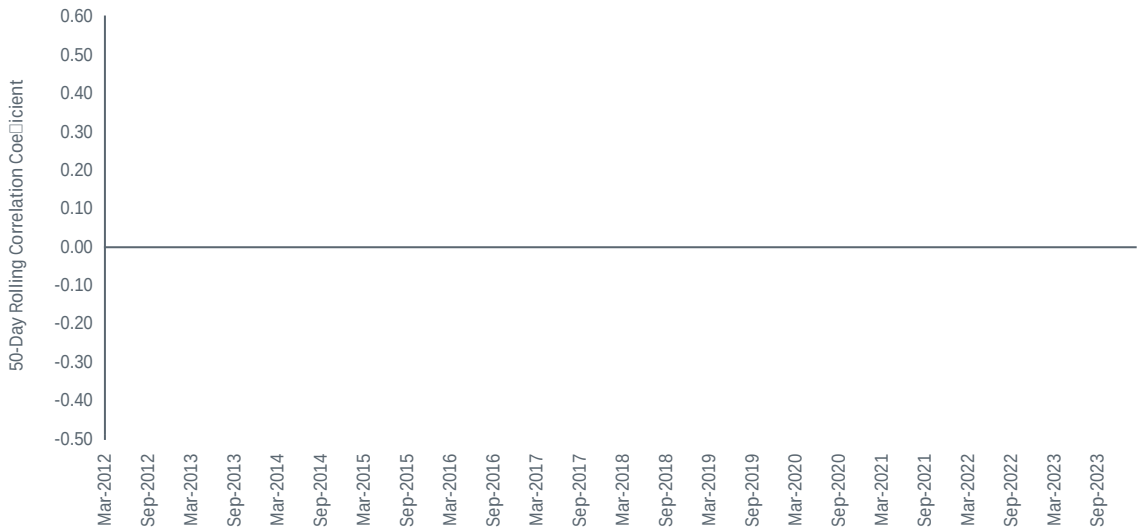
Figure 2 notes the rolling 50-day correlation between the movements in bitcoin's price relative to movements in the S&P 500 Index.

- The highest positive readings, observed roughly two times, were above 0.4 but not quite at 0.5.
- The majority of observations were fairly low, between 0.2 and -0.1. This tells us that over this period it would have been di□icult to look at the movement of bitcoin's price, for instance, and then have a good feel of what the S&P 500 Index might be doing solely based on that information.
- The lowest negative correlation figures observed were between -0.4 and -0.3.

From a portfolio theory perspective, the relatively low correlation over this period suggests there may have been portfolio diversification benefits that could come from combining bitcoin exposure with exposure to the S&P 500 Index.

We believe this low correlation from bitcoin is particularly intriguing as my colleague wrote about how bonds have seen a rising correlation to stocks lately with inflation a top concern for markets.

Figure 2: Correlation Analysis: Bitcoin's Price Movements vs. S&P 500 Index



Source: Bloomberg. Data from 12/30/11–1/23/24. Each point represents the correlation over a period of the 50 prior days of bitcoin prices changes and S&P 500 Index level changes. Past performance is not indicative of future results. Bitcoin is highly speculative and involves a high degree of risk, including the potential for loss of the entire investment. An investment in bitcoin involves significant risks (including the potential for quick, large losses) and may not be suitable for all investors.

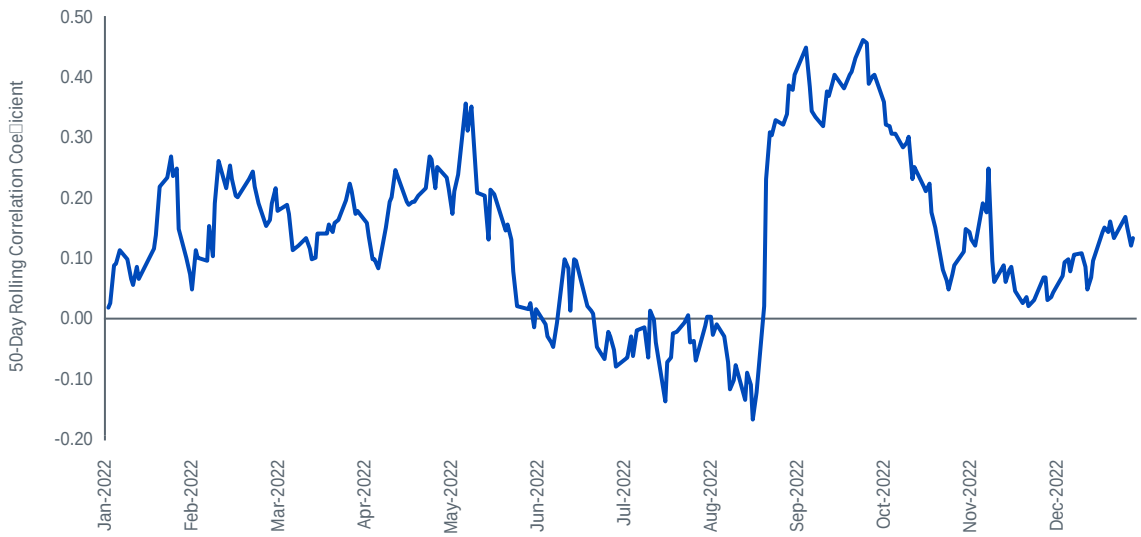
ZOOMING IN ON A FEW PERIODS

Since correlation is always moving, let's look more closely when something "bad" happened. 2022 was bad for most asset classes, as central banks were very focused on inflation levels that were higher than what had been experienced in most developed markets for decades.

- In our asset class quilt earlier, only commodities and gold had a positive return in 2022. It was a year when U.S. stocks were down AND U.S. bonds, including Treasuries, were down—and that has not happened o□en.[1]

- Figure 3 plots the rolling 50-day correlation between bitcoin's price movements and the S&P 500 Index in 2022. The average level was roughly around 0.1, with high levels breaching 0.4 and low levels breaching -0.1. For reference, bitcoin's return was -64.3%, whereas the return of the S&P 500 Index was -18.1%. Correlation spiked toward the end of the third and beginning of the fourth quarter, and we note that the biggest event in crypto markets around this time was the failure of the FTX exchange.

Figure 3: Correlation between Bitcoin & S&P 500 Index over 2022



Source: Bloomberg. Data from 12/31/21–12/31/22. Each point represents the correlation over a period of the 50 prior days of bitcoin prices changes and S&P 500 Index level changes. Past performance is not indicative of future results. Bitcoin is highly speculative and involves a high degree of risk, including the potential for loss of the entire investment. An investment in bitcoin involves significant risks (including the potential for quick, large losses) and may not be suitable for all investors.

[1] Source: Jay Kloepfer, "Unprecedented Territory—and the Inherent Limits of Diversification," *Callan,* 5/13/22.

CONCLUSION THINKING ABOUT A HEDGE FOR THE S P INDEX

Trillions of dollars in assets either benchmark to or seek to track the S&P 500 Index, one of the most widely followed in the world.[3] We believe that if one can find an asset with a -1.0 (inverse), fairly stable, correlation of returns to this benchmark, it would be much sought a□er because it would indicate a potential to be delivering a positive return when the S&P 500 Index's return is negative. This is a hedging type of characteristic.

While equities are considered risky, many look at U.S. Treasuries as closer to what some might call risk-free. The U.S. government can always print money to make good on its obligations, even if the actual market value of U.S. Treasuries—especially those further out in terms of maturity—do not have a volatility of zero. One of the biggest discussions of 2024—and you see it in figure 5—is that the S&P 500 Index returns and the U.S. Treasury returns have a correlation coe□icient that is getting close to 1.0—that is, POSITIVE. Because if one eeasury returns

[3] Source: "S&P Dow Jones Indices Annual Survey of Assets," as of 12/31/22. https://www.spglobal.com/spdji/en/documents/index-news-and-announcements/spdji-indexed-asset-survey-2022.pdf.

Glossary

Bitcoin: A digital currency (also called a cryptocurrency) created in 2009, which is operated by a decentralized authority as opposed to a traditional central bank or monetary authority. Bloomberg U.S. Corporate Total Return Index: The index seeks to measure the investment grade, fixed-rate, taxable corporate bond market. Commodity: A raw material or primary agricultural product that can be bought and sold. Correlation: Statistical measure of how two sets of returns move in relation to each other. Correlation coe□icients range from -1.0 to 1.0. A correlation of 1.0 means the two subjects of analysis move in lockstep with each other. A correlation of -1.0 means the two subjects of analysis have moved in exactly the opposite direction. Hedge: Making an investment to reduce the risk of adverse price movements in an asset. Normally, a hedge consists of taking an o□setting position in a related security, such as a futures contract. Inflation: Characterized by rising price levels. MSCI EAFE Index: A market capitalization-weighted index composed of companies representative of the developed market structure of developed countries in Europe, Australasia and Japan. MSCI Emerging Markets Index: A free-float weighted equity index that captures large and mid-cap representation across emerging markets (EM) countries. Overleveraged: A company is said to be overleveraged when it has too much debt, impeding its ability to make principal and interest payments and to cover operating expenses. Modern portfolio theory (MPT): A financial theory that seeks to juxtapose investors' attitudes toward risk and return by maximizing the expected returns of a portfolio for a given level of risk, since greater expected returns usually involve absorbing additional risk. Risk-on/risk-o□: Refers to changes in investment activity in response to perceived risk. During periods when risk is perceived as low, investors tend to engage in higher-risk investments. When risk is perceived as high, investors tend to gravitate toward lower-risk investments. Russell 2000 Index: Measures the performance of the small-cap segment of the U.S. equity universe. The Russell 2000 is a subset of the Russell 3000 Index representing approximately 10% of the total market cap of that index. It includes approximately 2000 of the smallest securities based on a combination of their market cap and current index membership. S&P 500 Index: A market cap-weighted benchmark of 500 stocks selected by the Standard and Poor's Index Committee designed to represent the performance of the leading industries in the U.S. economy. S&P GSCI Index: A composite index that measures the performance of the commodities market. Bloomberg U.S. Treasury Total Return Index: The index represents the performance of the U.S. Treasury component of the Barclays U.S. Aggregate Index. U.S. Treasury: A debt obligation issued by the U.S. government with payments of principal and interest backed by the full faith and credit of the U.S. government. Volatility: A measure of the dispersion of actual returns around a particular average level.

IMPORTANT INFORMATION

This material contains the opinions of the authors, which are subject to change, and should not be considered or interpreted as a recommendation to participate in any particular trading strategy or deemed to be an o□er or sale of any investment product, and it should not be relied on as such. There is no guarantee that any strategies discussed will work under all market conditions. This material represents an assessment of the market environment at a specific time and is not intended to be a forecast of future events or a guarantee of future results. This material should not be relied upon as research or investment advice regarding any security in particular. The user of this information assumes the entire risk of any use made of the information provided herein. Unless expressly stated otherwise, the opinions, interpretations or findings expressed herein do not necessarily represent the views of WisdomTree or any of its a□iliates.

Crypto assets, such as bitcoin and ether, are complex, generally exhibit extreme price volatility and unpredictability, and should be viewed as highly speculative assets. Crypto assets are frequently referred to as crypto "currencies," but they typically operate without central authority or banks, are not backed by any government or issuing entity (i.e., no right of recourse), have no government or insurance protections, are not legal tender and have limited or no usability as compared to fiat currencies. Federal, state or foreign governments may restrict the use, transfer, exchange and value of crypto assets, and regulation in the U.S. and worldwide is still developing.

Crypto asset exchanges and/or settlement facilities may stop operating, permanently shut down or experience issues due to security breaches, fraud, insolvency, market manipulation, market surveillance, KYC/AML (know your customer/anti-money laundering) procedures, non-compliance with applicable rules and regulations, technical glitches, hackers, malware or other reasons, which could negatively impact the price of any cryptocurrency traded on such exchanges or reliant on a settlement facility or otherwise may prevent access or use of the crypto asset. Crypto assets can experience unique events, such as forks or airdrops, which can impact the value and functionality of the crypto asset. Crypto asset transactions are generally irreversible, which means that a crypto asset may be unrecoverable in instances where: (i) it is sent to an incorrect address, (ii) the incorrect amount is sent or (iii) transactions are made fraudulently from an account. A crypto asset may decline in popularity, acceptance or use, thereby impairing its price, and the price of a crypto asset may also be impacted by the transactions of a small number of holders of such crypto asset. Crypto assets may be di□icult to value and valuations, even for the same crypto asset, may di□er significantly by pricing source or otherwise be suspect due to market fragmentation, illiquidity, volatility and the potential for manipulation. Crypto assets generally rely on blockchain technologyt or0hnololockchions (a)1-US -0.04 Tw 9.9566-1ort7yp)