

Cryptocurrencies: A Q&A with our multi-asset allocation team

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though, investors need to understand the principal issues around the burgeoning world of cryptocurrencies and blockchain technology.



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When it comes to the virtues or hazards of cryptocurrencies, great minds do not at all think alike. World-class investors such as Warren Buffett, eminent economists such as Nourial Roubini, and prominent entrepreneurs including Elon Musk and Michael Saylor have remarkably different assessments and outlooks for today's hottest would-be investment. Before determining if crypto merits a role in a portfolio,

WHAT ARE CRYPTOCURRENCIES?

In its most basic form, a cryptocurrency is a digital representation of storable, recordable and transferable value located on a blockchain. We'll talk more about blockchain technology in the next question, but it's important to understand that cryptocurrency is used to transact on a blockchain. A blockchain is the technology that enables the existence of cryptocurrency.

The bitcoin cryptocurrency, used within the Bitcoin blockchain, is by far the most popular cryptocurrency, and was built for a specific and somewhat remedial purpose — to create a secure peer-to-peer payment platform without needing a centralized authority. Bitcoin was the first to solve that “problem,” creating the technology that enables the transfer of digital currency to anyone in the network without the assistance of a trusted intermediary.

Since Bitcoin was developed in 2009, many new blockchains with their own native cryptocurrencies have been developed. These blockchains, such as Ethereum, have moved beyond simply enabling peer-to-peer payments and have become platforms for smart contracts (think of apps on an iPhone).

With the advent of smart contracts, two new digital assets were created: Fungible Tokens and Non-Fungible Tokens (NFTs). The tokenization of assets on blockchains is growing rapidly, and we will discuss these tokens in subsequent questions.

WHAT ARE BLOCKCHAINS?

We are all familiar with a bank's ledger book (i.e., a series of deposits and withdrawals, stored in a database). A blockchain is simply a ledger database that doesn't require a centralized administrator. Multiple computers (i.e., distributed) store and simultaneously work to validate blocks of transactions at set time intervals. Upon validation, each block is appended to the prior block, creating a chain. Thus a full chronological history of validated transactions for a given system is available for all to see.

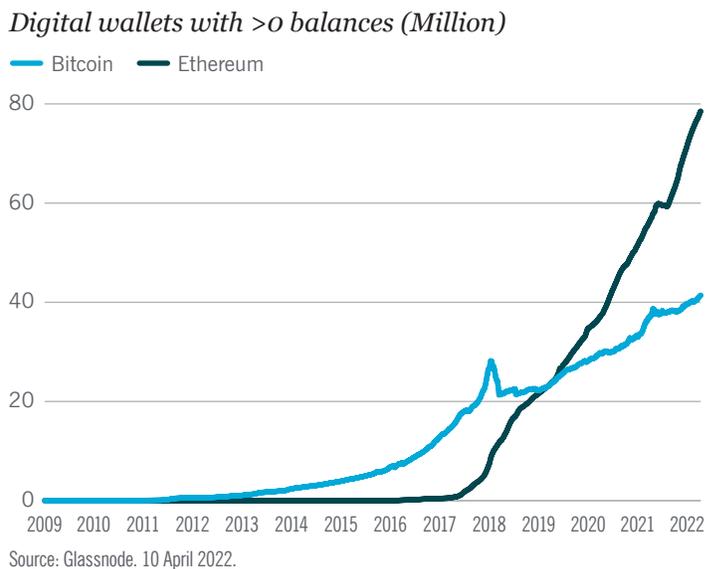
There are three key attributes that make blockchain technology novel:

- 1. Trustless:** There is no central authority that oversees and owns the ledger. Copies of these databases are maintained all over the world, from large servers to small individual laptops.
- 2. Immutable:** Once a transaction has been validated and added to the blockchain, it can never be changed.
- 3. Transparent:** Everything that occurs on the blockchain can be viewed by anyone at any time. A transfer of 1 Bitcoin from Wallet X to Wallet Y is completely visible to anyone who wishes to look. You may not know who owns Wallet X or Wallet Y, but the Wallet addresses, their holdings, and historical transactions are accessible.

HOW DO I BUY A CRYPTOCURRENCY?

The most common approach to gaining direct (physical) exposure to cryptocurrency is through centralized exchanges such as Coinbase, FTX, or Crypto.com. These are the most convenient on/off ramps from the fiat world to the digital asset world. Different exchanges offer different currencies with varied pricing and liquidity. Trading costs, even for the mega caps, can be substantial. For example, a \$100 million trade size for Bitcoin (BTC) could have a 100 basis point market impact, and orders greater than \$25 million on Ether (ETH) could have 150bps impact.¹

Figure 1: Wallet growth has been rapid



ETFs and private funds also provide exposure to cryptocurrency. However, ETFs are currently limited to investments in Bitcoin futures, which tend to significantly underperform the spot market due to futures roll yield, as well as fund fees and expenses.² While most wrapped products, or exchange-traded derivatives (i.e., futures) are currently single-coin, passive exposures, there will likely be an increase in market demand for non-capitalization-weighted, multi-coin portfolios, and thematic baskets.

Finally, there are publicly traded equities of companies geared to aspects of the digital asset ecosystem. However, broad market factors will determine how these stocks fare rather than the value of the coin. Like gold mining stocks versus physical gold, you aren't getting direct 1:1 exposure to crypto. Additionally, some investors may already own these companies as part of the mutual funds in their portfolios.

WHAT ROLE DOES CRYPTOCURRENCY MERIT IN AN INDIVIDUAL'S PORTFOLIO?

While every investment should be vetted based on the unique needs and circumstances of the investor, the most limiting consideration for cryptocurrency may be an investor's risk tolerance. Generally, for those nearing or in retirement with limited ability to tolerate risk, digital assets probably don't merit a role in the portfolio. Cryptocurrencies are often volatile, making them hard to manage from a risk standpoint, and they don't offer diversification. Correlations vary over time and do not capture non-linear dependencies. We believe most cryptocurrency investments represent a disruptive new technology not dissimilar to very volatile tech stocks.

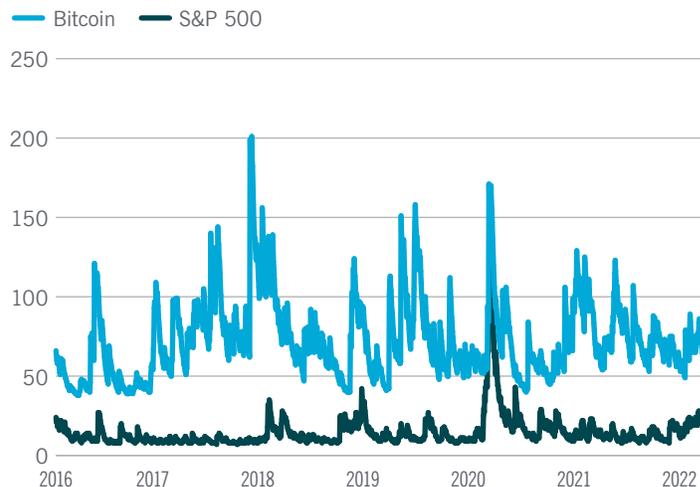
Since 2016, Bitcoin has averaged five times the daily volatility of the S&P 500. For smaller cryptocurrencies and tokens, like Ethereum, the volatility can exceed 10 times the volatility of the S&P 500. For investors with longer timeframes and sufficient risk tolerances, digital assets are worth consideration.

From 2012 to 2Q 2020, the correlation between Bitcoin and the S&P 500 was less than 0.1. However, over the past two years, the daily correlation has increased to 0.33, and by the end of 1Q 2022, Nuveen estimates the correlation to be 0.55.

Bitcoin as an inflation hedge is another common question. For the time being, gold remains the go-to-hedge for a global, catastrophic event: Crypto would likely experience significant declines in a global de-risking, particularly one driven by higher interest rates or a reduction in liquidity.

Figure 2: Bitcoin volatility 5x higher than equities

Daily volatility (% annualized)



Source: Bloomberg. Nuveen. 31 March 2022.

Figure 3: Trailing 3-month correlation vs. SPX



Source: Bloomberg. Nuveen. 31 March 2022.

IS VALUE SOLELY BASED UPON THE “GREATER FOOL THEORY”? ARE THERE ANY IDENTIFIABLE VALUE-DRIVERS?

It would be tough to fully dismiss the “Greater Fool Theory” for many cryptocurrencies. For example, Pump-and-Dump meme coins that offer no tangible value or technological innovation are common, and in our opinion should be avoided.

Even after filtering out the nonsense, projects that bring true innovation and solve real problems are still difficult to value. For protocols focused on peer-to-peer payments, one model for valuation follows Metcalfe's Law, which has been applied to telecommunications networks. Metcalfe's Law equates value to the number of connected users. The larger the network, the greater the value. There are a number of other approaches, from the Quantity Theory of Money to marginal cost of production models that could be used to assess the intrinsic value of a given cryptocurrency, but at this time there is no consensus on a universal valuation approach.

There are a number of other value drivers that warrant consideration:

- Crypto production entails mining coins using a "Proof of Work" protocol, which requires energy expenditure, and therefore must have some intrinsic value (money = energy) provided the system is a going concern.
- The extent to which a given cryptocurrency can reliably hedge alternative states of the world — there's value in diversification when viewed in a portfolio context.
- Value from technological innovation — an entirely new ecosystem is being developed that has the ability to revolutionize the way society behaves.
- Source code and software has value — it is intellectual capital.



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WHAT ARE THE RISKS?

The risks are many and varied. Participating in the digital asset ecosystem requires expertise in a number of disciplines, including finance, economics, computer science, and behavioral psychology. Obviously, this is a nascent technology and with any new technology there are implementation and adoption risks. Some broad areas to consider:

- **Regulations:** From regulating cryptocurrencies to outright banning them, governments around the world will play a meaningful role in cryptocurrency. The nature of regulation will push for a tradeoff between value creation through wider participation and value destruction through stifling innovation.
- **Scams:** Due in part to the lack of regulation, scams are prevalent among cryptocurrencies. These scams range from outright theft to rug-pulls, where the creators of a cryptocurrency raise capital and walk away from the project with their investors' money.
- **Competition:** There are thousands of cryptocurrencies. Many cryptocurrencies are competing along the same dimensions (smart contract platforms, decentralized exchanges, lending/borrowing platforms), and most will cease to exist at some point in the future.

Participating from an investment perspective carries a host of other risks to consider, including liquidity, fees and costs, volatility/price risks, and credit/counterparty risks.

HOW TO ALLEVIATE SECURITY CONCERNS?

There are practical security concerns from owning crypto and there are philosophical security concerns in the underlying technology. Practically speaking, custody is the key concern. We've all heard the stories of someone losing or forgetting

their private keys and losing millions.³ From a custody perspective, assets held on well-known exchanges have extensive security infrastructures, negating the need to manage your own private keys. Coinbase, for example, is a qualified custodian and a fiduciary under New York State banking laws; it is audited by Deloitte & Touche and backed by an insurance policy. Small or decentralized exchanges, on the other hand, have serious security deficiencies and are a constant focus of hackers. Securing assets at a well-known and highly regarded exchange is a first step in mitigating security concerns.

From a philosophical perspective, there is a blockchain trilemma.⁴ Designing and developing anything involves making tradeoffs. Broadly speaking, blockchains can be analyzed on three dimensions:

1. The level of network security
2. The speed and scalability of the blockchain network
3. The degree of decentralization the network exhibits

The trilemma states that we can optimize on only two of these, at a time, not all three concurrently. Different blockchains and projects will carry different levels of security. Many security concerns can be managed or alleviated, but it currently requires that the investor to do the work rather than relying on the opinion of an agent such as a regulator.



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WHAT ABOUT HIGH ENERGY USAGE?

Energy consumption in Bitcoin comes from the “mining” of blocks on the blockchain. Mining is the process wherein specialized computers attempt to solve a cryptographic math problem that validates the transaction block, thereby consuming energy in the form of computational power.

The first miner to solve the problem for a given block gets rewarded with Bitcoin. While much of the energy is wasted — in that the majority of mining efforts are unsuccessful — it is this competitive process that makes the blockchain secure.

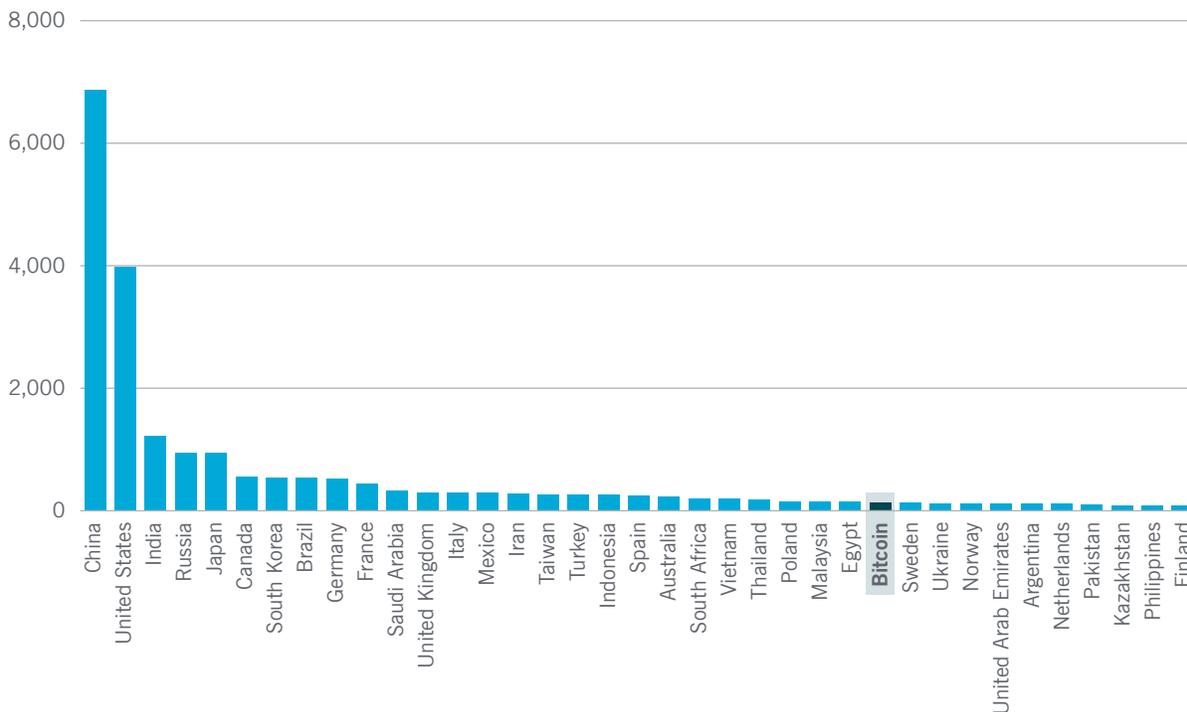
This bitcoin mining process is part of a consensus algorithm called “Proof of Work.” Other consensus algorithms are considerably more energy efficient.

It’s well known that current Bitcoin energy consumption exceeds most countries (i.e., if Bitcoin were a country, its energy consumption would be in the top 30 energy consumers), though as a payment system, Bitcoin consumes less than half the energy spent by the traditional banking system.

Finally, energy usage doesn’t necessarily equate to carbon emissions. Estimates vary widely, but some calculate that upwards of 70% of miners use renewable energy sources to power their mining.⁵

Figure 4: In 2019 Bitcoin consumed more energy than Sweden

Net electricity consumption (billion kWh)



Source: EIA.gov. Cambridge Bitcoin Energy Consumption Index.

WHAT ABOUT CENTRAL BANK DIGITAL CURRENCIES (CBDCS)?

CBDCs are an important development, spawned from the technological progress made and interest in the digital assets ecosystem. But while there are similarities to the underlying technology and use cases, central bank digital currencies fundamentally differ from the ethos and origins of cryptocurrencies. CBDCs are still highly centralized, and tied to the governments that sponsor them.

They are simply digital representations of fiat currencies.

The subsector of the digital asset ecosystem that most directly competes with CBDCs are stablecoins. These are cryptocurrencies that are pegged to a fiat reference rate, like the US dollar or euro. Stablecoins are useful to move around the digital asset ecosystem without incurring the relative volatility of other cryptocurrencies. We don't believe that CBDCs really compete with other sectors of the digital asset market and can co-exist.

For more information, please visit nuveen.com.

Endnotes

Sources

- 1 Market impact analysis conducted by Coinbase Institutional.
- 2 Futures need to be rolled each month and with an upward sloping curve you are systematically selling low and buying high.
- 3 A private key is a unique, complex password that enables you to access your digital wallet. If you lose your private key, it's like losing a physical stack of cash. There's no way to recover it.
- 4 First coined by Vitalik Buterin, the founder of Ethereum.
- 5 CoinShares, "Bitcoin mining network update." June 2019.

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A word on risk

All investments carry a certain degree of risk and there is no assurance that an investment will provide positive performance over any period of time. Investing in municipal bonds involves risks such as interest rate risk, credit risk and market risk, including the possible loss of principal. The value of the portfolio will fluctuate based on the value of the underlying securities. There are special risks associated with investments in high yield bonds, hedging activities and the potential use of leverage. Portfolios that include lower rated municipal bonds, commonly referred to as "high yield" or "junk" bonds, which are considered to be speculative, the credit and investment risk is heightened for the portfolio. Bond insurance guarantees only the payment of principal and interest on the bond when due, and not the value of the bonds themselves, which will fluctuate with the bond market and the financial success of the issuer and the insurer. No representation is made as to an insurer's ability to meet their commitments.

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