

Crypto vs. Currency: 2023 Digital Assets Outlook



Ashley Oerth, CFA
Senior Investment
Strategy Analyst
Investment Thought
Leadership



Cyril Birks
Global Thought
Leadership Intern
Investment Thought
Leadership

Executive summary

The 2020-2021 boom in digital assets came screeching to a halt in 2022 as financial conditions tightened and internal crypto market turbulence tested investor confidence. Cryptocurrencies experienced a rocky start to 2023 as markets digested renewed hawkish messaging from major central banks, but recent turmoil caused by the collapse of a handful of banks has helped propel prices higher. Moving forward, we expect the digital assets narrative to increasingly bifurcate into two separate but related dimensions: (1) investable decentralized assets and (2) deployments of distributed ledger technology.

Our view separates investable token-based assets—or simply "cryptocurrencies" such as Bitcoin, Ether, and others—from applications of the underlying blockchain technology, like tokenization. We expect cryptocurrencies to trade largely as macro assets, which are tied to broader risk appetite and monetary conditions with few idiosyncratic factors, while deployments of Distributed Ledger Technology (DLT) are likely to develop independently and result in greater value creation, which may or may not be captured by an associated cryptocurrency.

Internal & external turbulences

While 2020 and 2021 were strong years for digital assets, 2022 was a reminder of just how volatile they can be. Over the calendar year 2022, Bitcoin fell 49%, from about \$32,500 per coin to \$16,500, Non-Fungible Tokens (NFTs) rose and fell in popularity, and the total market capitalization for cryptocurrencies fell dramatically, starting the year at \$2.2T and ending at just under \$800B. This was after registering a peak in November 2021 of almost \$68,000 per Bitcoin and a total crypto market cap of just under \$3.0T¹.

We believe drawdowns were driven by 2022's rapid tightening of financial conditions. The first Fed hike in March was initially met with a continued uptrend in crypto prices, but the April announcement of the Fed's quantitative tightening brought a sea-change in cryptocurrency performance as money supply shifted into contraction (See Figure 1). Indeed, the global environment turned negative for most risk assets as central bankers shifted into tightening mode.

Today, digital assets—including cryptos—are still primarily speculative assets. While visions of decentralized finance and trustless transactions may have a certain allure, crypto markets have failed to escape the gravity of tightening financial conditions. Until digital assets have a realized role in the world economy, they are likely to behave as macro assets—subject to broader financial conditions.

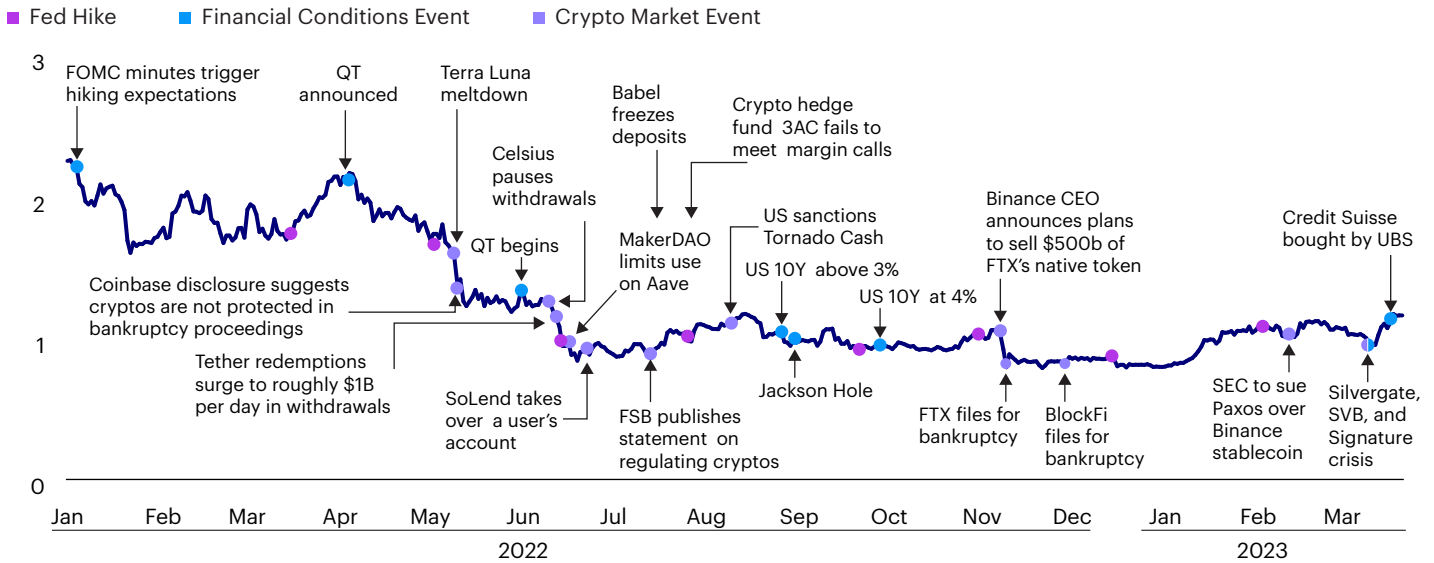
Another key driver of the crypto turmoil resulted from shocks to crypto market confidence. Cryptocurrencies especially experienced numerous stresses in 2022. In May, the TerraUSD/Luna meltdown wiped out a substantial amount of crypto market cap—about \$190B in two days—and triggered stresses in several crypto lending platforms¹. BlockFi and Celsius Networks, among others, consequently entered bankruptcy proceedings, and other high-profile crypto projects took unprecedented actions, such as SoLend's taking over a user account and MakerDAO limiting its use on Aave. Most recently, the November 2022 collapse of FTX was another, serious blow to crypto confidence. FTX was widely regarded as an institutional-quality exchange platform and its fall continues to seriously affect sentiment towards cryptocurrencies.

Looking forward, we expect digital assets to continue to face pressure until the policy backdrop shifts meaningfully.

1. Sources: Bloomberg and CoinMarketCap via Macrobond, as of 31 March 2023.

Figure 1: Cryptocurrency Internal and External Turbulences

Market Capitalization of All Cryptocurrencies (USD, Trillions)



Sources: CoinMarketCap via Macrobond, Coinbase SEC filings, and Invesco as of 21 March 2023. Market cap is captured as of midnight UTC+1 each day. 3AC = Three Arrows Capital.

Failures in context

2022 re-emphasized the divergence between centralized and decentralized finance. Crypto-focused centralized finance (CeFi) includes the likes of FTX, Celsius Networks, BlockFi, Voyager Digital, and others. Such businesses are operated and organized as traditional companies and are directly involved in and derive significant revenues from the crypto ecosystem. These are most often lenders and exchanges, though they may also operate their own mining operations, validation and mining pools, native tokens, NFTs, or some other digital asset-related function.

So far, it is these CeFi companies that have attracted some of the most negative headlines through failures of management, inadequate capital controls, and, in some cases, making use of aggressive or questionable accounting practices. In many cases, such projects have a series of cascading claims on one another, and when one business fails, others fall with them. For example: TerraLuna's collapse rendered Three Arrows Capital (3AC) insolvent, triggering a funding crisis at Voyager Digital as a significant portion of its assets were in 3AC.

Decentralized finance (DeFi) includes Bitcoin, Ethereum, Aave, Uniswap, Polkadot, and a variety of other decentralized protocols. These projects are typically encapsulated in one or more cryptocurrencies and are issued, operated, and governed via decentralized protocols. In other words, DeFi projects are not typically organized as legal entities, holding companies, or otherwise traditional ownership structures. Importantly, not every cryptocurrency or token is necessarily decentralized.

While decentralized projects tend to be more transparent by virtue of their operating structures, they are not without challenges. Such projects are often the victims of security and technical vulnerabilities that result in the theft of digital coins and tokens. For example, a \$570 million hack in October 2022 exploited a software vulnerability in one of the largest hacks in crypto history. These hacks emerge from vulnerabilities in software deployed as smart contracts or poor security of private keys, which are necessary to access crypto. In the early days of cryptocurrencies, many widely-publicized hacks of centralized exchanges were driven by the theft of private keys, which allowed hackers to transfer full ownership of the cryptocurrencies held at these exchanges. In our view, the respective failures in digital assets-focused projects are not from failures inherent or unique to blockchain technology.

Moving forward, we expect the digital assets narrative to increasingly emphasize the continuum of centralization versus decentralization and their respective challenges and benefits. We expect that increasing regulatory scrutiny biases the narrative in favor of CeFi entities, which are by definition more straightforward to regulate. In the short-term, this may cause pain for CeFi entities which are the low-hanging fruit for regulators. However, any entity that survives the regulatory gauntlet may be a winner in the long-term, earning legitimacy and credibility with the public.

Stablecoins

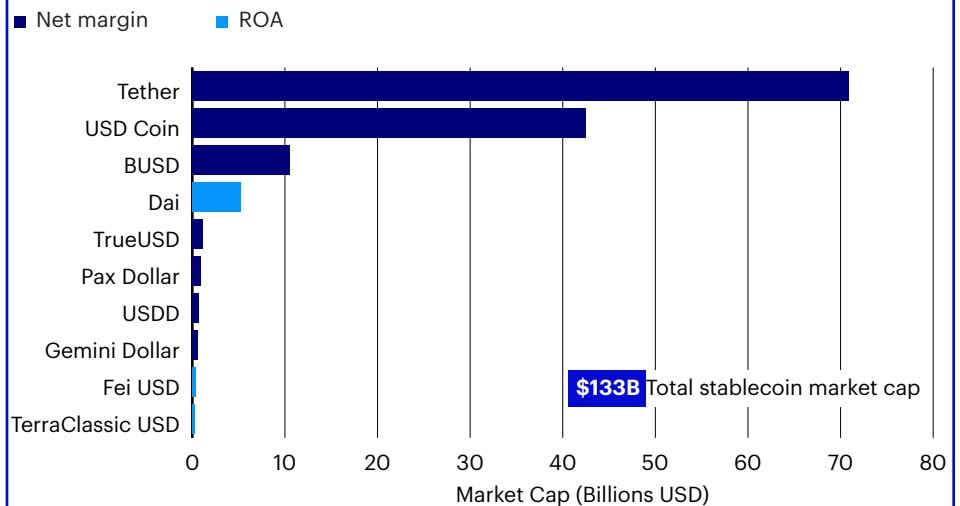
A stablecoin is a cryptocurrency with a single key difference versus other cryptocurrencies: its value is pegged 1:1 with another asset, such as the US dollar. Stablecoins are separated into asset-backed stablecoins, whose value is supported by a pool of reserve assets, and so-called algorithmic stablecoins, which attempt to maintain a peg by a series of automatic rules and procedures.

Following the spiral of TerraLuna, algorithmic stablecoins have been viewed with suspicion. However, Dai, another algorithmic stablecoin created and managed by the MakerDAO ecosystem, appears to have remained relatively resilient throughout recent crypto market stresses. Large asset-backed stablecoins, such as Tether, have also been scrutinized, and their pegs were tested throughout 2022 as they contended with large redemptions. Despite holding up so far, scepticism remains over the quality and amounts of their reserves. A recent example of this is USDC, another major stablecoin which broke its dollar peg over a weekend in March as a result of \$3B of reserve funds that were temporarily inaccessible (and briefly feared lost) at Silicon Valley Bank.

Asset-backed stablecoins are essentially deposit-takers. Stablecoin providers can mint new coins by depositing an amount of currency and issuing new coins of equal value. The deposit custodian—the stablecoin provider—may set this money aside or invest it in a portfolio of securities. In some high-profile cases the reserve custodian company has been found to have invested the reserve funds into various money market and fixed income securities. Because of stablecoins' deposit-taking function, we expect stablecoins to eventually be regulated similar to banks, as appears to already be underway in a US House Financial Services Committee bill and the EU's Markets in Crypto-Assets (MiCA). Further in the future, stablecoins' function as media of exchange may eventually be replaced by central bank digital currencies.

Figure 2: Largest Stablecoins by Market Capitalization

Market Capitalization by Stablecoin Type



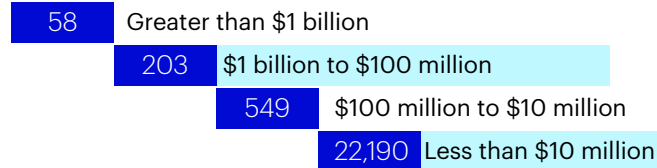
Source: CoinMarketCap via Macrobond, as of 28 February 2023

The many (and varied) cryptocurrencies

Investable assets—or, more simply, cryptocurrencies—have been the focus of the digital assets narrative so far and span across both centralized and decentralized projects. Such token-based assets are extremely heterogenous, have little history, and are unfamiliar to investors. At present there are over 22,000 cryptocurrencies counted on CoinMarketCap.com, many of which have small market capitalizations (see Figure 3), little to no volume, and unclear use cases.

Figure 3: Fewer Than You Think

Number of Cryptocurrencies by Market Capitalization (in USD)



Sources: Invesco, CoinMarketCap via Macrobond, as of 24 March 2023. Major wrapped tokens are excluded.

As cryptocurrencies have entered the mainstream, Bitcoin has become a kind of representation of all cryptos. A closer look at cryptocurrencies reveals a staggering level of heterogeneity. In Figure 4, we have categorized crypto market cap broadly by intended use case, which spans stores of value, software platforms, stablecoins, payments, and more. Within each of these categories it is possible to draw further distinctions. Much finer treatments have been developed by others, such as the CoinDesk Digital Assets Classification System (DACS).

Due to their heterogeneity, it is difficult to value cryptocurrencies with a broadly applicable and inclusive approach. Cryptos typically share several key characteristics: a decentralized ledger and a token-based, bearer-format. Beyond those qualities, cryptos can exist with wholly different use cases in mind, from yield-generation to accessing compute time to voting-rights in a decentralized autonomous organisation. In other words, cryptos appear to be less an asset class and more a vehicle or format.

Figure 4: Cryptocurrency Market Capitalization by Category

Bitcoin	Other Stores of Value†	Ethereum	Other Software Cryptos	Payments-Focused	Memecoins	All Others
39.6% of Crypto Universe*	2.1%	19.3%	6.3%	15.5%	7.8%	8.2%
Stores of Value†	Software Platforms	Stablecoins	Payments-Focused	Memecoins		
These cryptos seek to offer methods of storing value securely through a crypto, yet their values are quite volatile.	Such "software" cryptos act like a decentralized computer, with programs stored on and executed via blockchains.	Stablecoins sidestep the store of value debate by pegging their value to an underlying, such as the US dollar.	These cryptos focus on scalability for the sake of rapid payments and are often run or created by a business.	Borne out of their namesake, memecoins are perhaps the easiest to criticize for lacking a recognized value proposition.		
Top Contenders:	Top Contenders:	Top Contenders:	Top Contenders:	Top Contenders:		
1. Bitcoin (39.6%) 2. Litecoin (0.68%)	1. Ethereum (19.26%) 2. Cardano (1.27%) 3. Solana (0.67%)	1. Tether (7.53%) 2. USD Coin (5.00%) 3. Binance USD (1.85%)	1. BNB (5.12%) 2. XRP (2.11%)	1. Dogecoin (1.17%) 2. Shiba Inu (0.57%)		

* Market Share indicates the relative share of the market capitalization of the cryptocurrency universe, including both coins and tokens.

† Within cryptocurrencies, "stores of values" are typically supply-limited coins such as Bitcoin. However, we question the notion that a cryptocurrency is a reliable store of value given their volatility.

Sources: Invesco and CoinMarketCap via Macrobond, as of 12 January 2023. Cryptocurrency count is sourced from CoinMarketCap and CoinGecko.

Valuing cryptocurrencies remains an open question

Valuing cryptocurrencies is challenging, not least because of their variety. While typical financial valuation models rely on assumptions about expected cash flows and discount rates, investors in supply-limited cryptocurrencies tend to look to supply and demand dynamics, not unlike commodity valuation. In some cases, cryptocurrencies may also offer a kind of cash flow denominated in cryptocurrency terms.

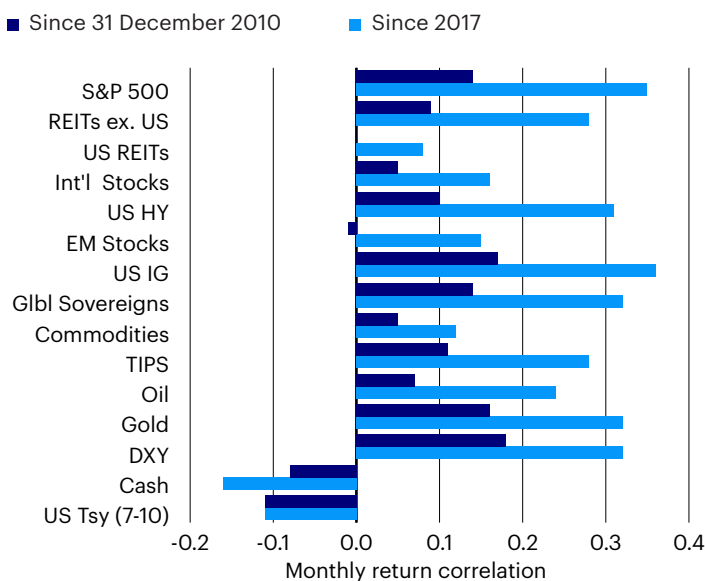
So far, most valuation approaches have disappointed. As cryptocurrencies are essentially networks of users, models of network value have been applied to cryptocurrency values, such as Metcalfe's Law, which argues that value originates in network effects. Another approach, the Hayes model, argues that the value of a supply-limited, proof-of-work cryptocurrency (Bitcoin) has a price floor of at least its cost of production—that is, the marginal cost of mining each bitcoin should serve as a floor for crypto values. Neither approach has offered solid theoretical or empirical results, in our assessment.²

While Bitcoin and similar, commodity-like cryptocurrencies are not well-suited to such valuation exercises, the case may be different for other cryptocurrencies. In many cryptocurrencies, owners may lock up their crypto for a period of time, usually to provide some useful function for the platform like providing liquidity, thereby potentially entitling them to capture a portion of transaction fees collected on the network. Theoretically, investors may be able to use a discount model that combines these expected cash flows with an assumed discount rate that reflects the uncertainty of cash flows, the rate of inflation of the token itself, and the change of the token value (since cash flows are denominated in a cryptocurrency). However, no such model has publicly been made available at this time.

Despite the challenges involved in valuation, we have seen cryptocurrencies touted as diversifiers. Yet as they have grown in popularity, their behavior has evolved to be more cyclical in nature, trading more in line with other risky asset classes rather than uncorrelated diversifiers (see Figure 5). Instead, cryptocurrencies appear to be driven primarily by excess liquidity. For example, weakness in cryptocurrencies has coincided with the tightening of monetary policy by the Fed and other central banks (see Figure 6). For the investable assets narrative, we suspect crypto weakness to last until global financial conditions reach peak tightness and begin to ease.

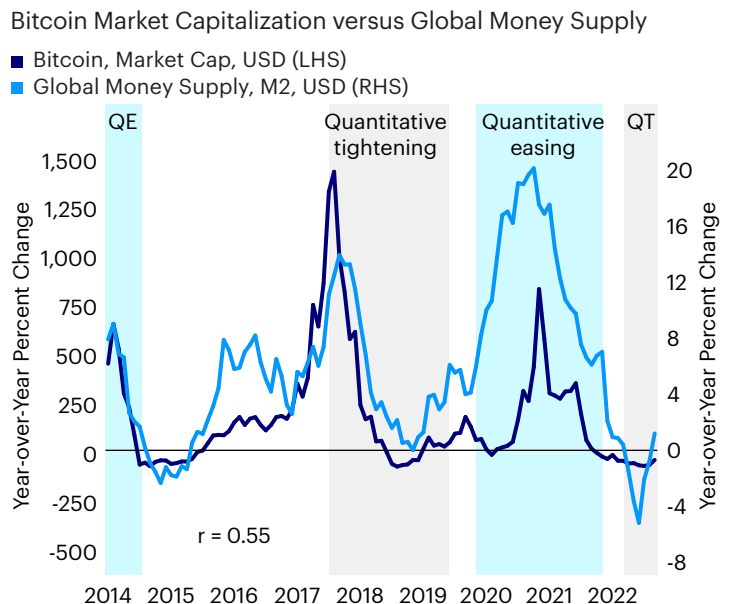
2. For more details, please see our Exploring Cryptocurrencies piece.

Figure 5: Bitcoin Correlations Since 2017 and 2020



Bloomberg and Invesco, as of 31 December 2022. Past performance does not guarantee future results. For definitions see 'Index Definitions' on Page 11

Figure 6: Cryptocurrencies Appear Tied to Excess Liquidity



Sources: Macrobond, Bloomberg, and various central banks as of 28 February 2023. Quantitative easing and quantitative tightening callouts are for the Federal Reserve only.

Taking the currency out of crypto

While cryptocurrencies have dominated the digital assets narrative, distributed ledger technology (of which blockchain is an example) is the object of increasing interest outside the context of cryptocurrencies. Such efforts have less to do with investable assets and instead focus on how blockchain may be able to be deployed for infrastructure efficiencies.

Blockchain may have a number of advantages over traditional database architectures. In contrast with conventional database architecture, updates to a blockchain database are validated by a variety of stakeholders rather than by a centralized bookkeeper, which theoretically improves the resilience of a system as it has fewer critical fault points. Blockchains are also distributed systems, meaning that multiple actors can contribute to the same database, rather than the siloed approach that is commonplace in many of today's data management solutions. Like conventional databases, blockchains are capable of storing data in perpetuity and showing how that data shifts over time. Through hashing³, blockchains can also maintain digital paper trails that mask the identity of involved parties and information exchanged between them. Unlike conventional databases, blockchains can be accessed and modified either by anyone (permissionless) or by a limited set of parties (permissioned).

Through so-called "smart contracts," blockchains can also function as more than just databases. Beginning around 2014, smart contracts began to be created and implemented on blockchains. These are small snippets of code which allow tasks to be preprogrammed and executed in a distributed ledger given a set of conditions. For example, a smart contract could be structured like a vending machine, where a user sends a required amount of currency and the contract automatically sends the paid-for item to the digital address of the user. Thus, smart contracts enable the programmability of value on blockchains.

Smart contracts often exist together with a broader system of smart contracts that, together, form what amounts to components of an application. In other words, applications can be built, hosted, and maintained in a decentralized manner. Such applications expand the functionality of blockchains and power recent developments including "decentralized finance," tokenized assets, blockchain-based video games, and more.

Within this distributed ledger technology (DLT) framework, blockchains are the ledger that records data, smart contracts are the code snippets that enable the programmability of value, and collections of smart contracts create applications that are built, run, and maintained in this decentralized manner.

As blockchain is essentially an information transfer and storage protocol, we believe that blockchain may have value wherever there is a shared database solution across multiple stakeholders. Moreover, such solutions can be built without the use of an attached cryptocurrency and can be structured for either limited access or public use.

3. Hashing is the act of turning data of an arbitrary size into a fixed size set of values. Hashing can be used as part of encryption and it can be used as a means to reduce data sets to smaller, more uniform sizes. Most importantly, hashing helps to ensure the integrity of data. A tiny change to input data can generate a radically different hash. Blockchains use old outputs as new inputs, chaining hashes together such that if any link in the chain changes, the whole chain should break.

Distributed ledger technology in the context of financial services

The financial services industry offers a helpful example of how blockchain may have potential. Since the inception of stocks in the 1600s, advances in technology have progressively enabled the movement from paper shares to electronic trading to T+2 settlement. The 2000s saw an acceleration that reshaped the industry from trading floors to electronic trading portals, increased data frequency and availability, and high-frequency execution speeds. Today, blockchain offers the ability to record the ownership of assets in a publicly accessible, decentralized record. This "tokenization" allows for the recording of ownership of any asset.

In conventional financial markets, participants rely on institutions and intermediaries for the issuance, trading, banking, and settlement of investments. Blockchain may introduce a shift in the trust mechanism to blockchain technology which introduces public verification of transactions, leading to greater transparency, efficiency, and speed. Research from major central banks has highlighted the potential for blockchain-based transactions to accelerate payments and security settlement. Another anticipated upside of decentralization is increased matching of buyers and sellers and greater depth and access to capital markets as new liquidity sources are opened in equally secure and trusted manners.

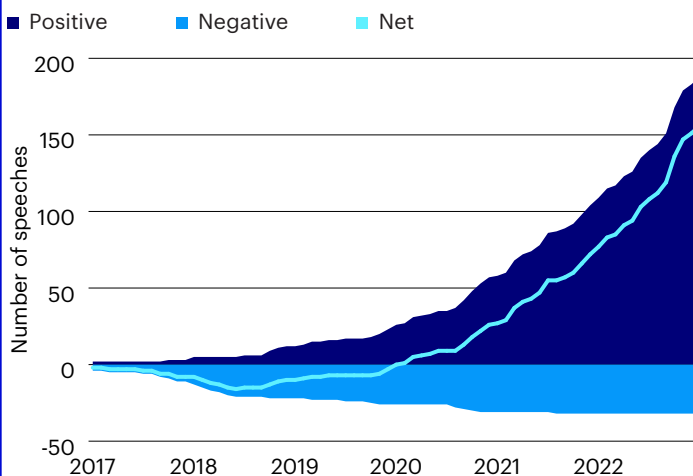
Central Bank Digital Currencies (CBDCs)

Many of the world's central banks are building out research and pilot projects that seek to make fiat currencies digitally native. Formats and definitions vary widely, but the defining trait of a CBDC is that it's a direct liability of a central bank, as distinguished from physical banknotes and reserve balances. Drivers are manifold, including social goals and a response to greater digitalization. Most importantly for the digital assets outlook, the emergence of CBDCs seems to be a direct response to the emergence of fintech and cryptocurrencies.

CBDCs may or may not use blockchain. Where they do, blockchain is viewed as a settlement layer whereby transactions can be verified by a collection of trusted entities, and a record of these is easily maintained within the financial system. This can help make the system faster and cheaper, but it also raises privacy concerns as fiat currency transaction details become digitalized and theoretically available to the central bank.

Figure 7: Sentiment Toward CBDCs in a Positive Upswing

Total Sum of Positive and Negative Speeches Since 2016

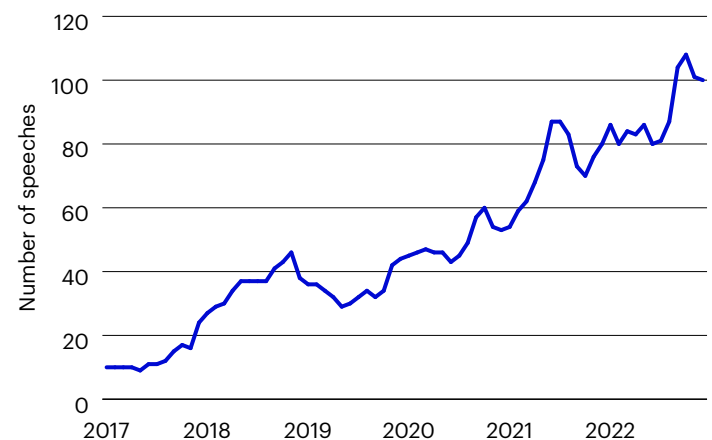


Sentiment indicates an assessment of sentiment towards CBDCs as assessed by the source authors (see below). 1 = positive; -1 = negative. Neutral sentiment speeches were excluded.

Source: Bank for International Settlements, reproduced from Auer, R, G Cornelli and J Frost (2020), "Rise of the central bank digital currencies: drivers, approaches and technologies", BIS working paper, No 880, August. Data latest available as of 31 January 2023.

Figure 8: Central Bankers Look to Be Increasingly Engaging with CBDCs

Rolling 12-month Sum of Central Banker Speeches Related to CBDCs



Source: Bank for International Settlements, reproduced from Auer, R, G Cornelli and J Frost (2020), "Rise of the central bank digital currencies: drivers, approaches and technologies", BIS working paper, No 880, August. Data latest available as of 31 January 2023.

Current DLT implementations

DLT is already being used in the real world, as evidenced by a growing number of businesses that are building products that use distributed ledger technology, including IBM Blockchain, Microsoft Azure Blockchain, Oracle Blockchain Cloud Service, and JP Morgan's Quorum. Logistics is a popular example for the potential usefulness of blockchain, where supply chain tracking may become simplified and less expensive. In government use cases, blockchain may make recordkeeping cleaner and faster. In investment management, blockchain may improve the transfer of assets, with a variety of pilot projects already exploring this topic across central banks, governments, and private industry.

In financial services, large firms have experimented with and released products that make use of blockchain. Franklin Templeton, for example, launched a US government money market fund in April 2021 that uses blockchain to process transactions and record share ownership, which may one day enable shareholders to trade 24/7, 365 days a year, while enjoying a "highly significant decrease in fees."⁴

Some firms are making institutional and ultra-high-net-worth investment products available to individual investors by using digital tokens on the blockchain to represent shares. Some firms have already launched private credit investment offerings through tokenized funds, with some offering as a result lowered minimums and greater liquidity. Central banks are also exploring how smart contracts may be used to improve the settlement of foreign exchange transactions.

Regulatory headwinds remain

No digital assets discussion is complete without mention of regulation. While there are generally fewer compliance and regulatory costs involved in digital assets, there are also fewer safeguards preventing market manipulation, overleverage, and insolvency. Regulator-imposed capital buffers are practically non-existent for decentralized protocols involved in lending, and custody of assets is highly varied with each blockchain and protocol. Moreover, decentralized systems are difficult to regulate. Many DeFi projects are self-governed by a developer community; norms can vary from project to project, protocol to protocol, and platform to platform. Finally, cryptos are largely traded and minted on digital platforms, separate from traditional brokerages. Due diligence therefore remains essential, in our view.

Moving forward, it remains to be seen whether regulators ultimately try to cordon off digital assets from the rest of the financial system, attempting to limit contagion risks.

While few official positions have been declared, current SEC crackdowns may feel to some like Operation Chokepoint 2.0. We disagree – illicit activity is a smaller part of much bigger picture and regulators are likely to see it that way, too. Governance is the fundamental issue that has plagued businesses in the digital assets space, in our view. Some have demonstrated an appetite for excessive risk-taking or an amateur approach to operations. Such issues, when combined with volatility - the booms and busts of the digital asset space - make those businesses especially fragile, leading to meltdowns that burn customers too. The recent announcements of wind-downs of Silvergate Bank, Silicon Valley Bank, and Signature Bank, which all accepted deposits from crypto-exposed firms, has exacerbated fears. Until investor trust is well-established in investable digital assets, they are likely to remain subject to extreme volatility and headline risk. These problems are considerably more pernicious and fundamental than a single-minded focus illicit activity. In contrast, we believe applications of blockchain technology are not subject to the same risks and will likely continue to develop independently of cryptocurrencies.

4. Source: Financial Times, "Blockchain-powered breakthrough on mutual fund"

Conclusion

Looking ahead into the remainder of 2023, we expect cryptocurrencies to largely trade in-line with broader cyclical risky assets, with divergences defined by changes of confidence in cryptocurrency-focused operations. In the near-term, cryptos are likely to benefit (or suffer) from broader market risk sentiment. Loose financial conditions and excess liquidity have historically been a boon to cryptocurrencies, so tight conditions are likely to paint a difficult backdrop throughout 2023. As central banks pivot, we believe there is room for a sea-change in crypto prices. Longer-term, we expect cryptocurrencies to continue to be driven by speculation until real economic value is meaningfully identified. Project-specific idiosyncrasies likely will remain in the backseat until true use cases are identified and developed.

However, we continue to expect an increasing number of pilot projects that make use of blockchain-based solutions. A variety of projects are already underway, from CBDCs, to payments and investment management, to use cases beyond finance. We expect this list of examples to grow, especially as regulatory frameworks continue to be developed and tokenization takes hold as a viable approach to the transfer and settlement of assets. For existing investable assets, and as regulators play catch-up, we expect greater scrutiny of centralized crypto projects and more guardrails for decentralized investments that will likely define the remainder of this year's crypto market headlines.

Index Definitions

- Cash is represented by the Bloomberg 1-3 Month U.S. T Bill Index, which is designed to track the market for US Treasury bills with 1 to 3 months to maturity.
- DXY is an index designed to capture the general international value of the US dollar by averaging exchange rates between the USD and major world currencies.
- The S&P 500 Index is a market capitalization weighted index of the 500 largest domestic U.S. stocks.
- Int'l (International) Stocks is represented by the MSCI World exluding US Index, which is designed to measure large and mid market capitalization stocks in developed markets, excluding the United States.
- EM (Emerging Market) Stocks is represented by the MSCI Emerging Markets Index, which is designed to measure large and mid market capitalization stocks in emerging markets.
- Global Gov Bonds is represented by the FTSE World Government Bond Index (ex-USD) index, which is designed to measure the performance of international developed bonds excluding US dollar denominated bonds.
- Tsy (Treasury) Bonds (7-10) is represented by the Bloomberg US Treasury: 7-10 Year Index, which is designed to measure the US dollar-denominated, fixed-rate, nominal debt issued by the US Treasury with 7-10 years to maturity.
- US IG (Investment Grade) is represented by the Bloomberg US Aggregate Bond Index, which is designed to measure the performance of investment grade bonds in the United States.
- US HY (High Yield) is represented by the Bloomberg US High Yield Bond Index, which is designed to measure the performance of US corporate high yield bonds.
- Gold is measured by the gold spot price quoted as US Dollars per Troy Ounce.
- TIPS is represented by the Bloomberg US Treasury Inflation Notes Index, which is designed to measure the performance of the US Treasury Inflation Protected Securities (TIPS) market, excluding Federal Reserve holdings.
- Commodities are represented by the Bloomberg Commodity Index, which uses futures contracts to reflect the returns on a basket of diversified commodities investments.
- Oil is represented by the West Texas Intermediate spot price in US dollar terms.
- US REITs (Real Estate Investment Trusts) are represented by the FTSE NAREIT All Equity REITS Total Return Index, which seeks to measure all tax qualified REITs listed in the NYSE, AMEX, and NASDAQ National Market.
- REITs ex. US are measured by the FTSE EPRA/NAREIT Developed ex US Index, which is a market capitalization weighted index designed to measure the performance of real estate investment trusts in developed markets, excluding the United States.
- Indices are unmanaged and cannot be purchased directly by investors. Index performance is shown for illustrative purposes only and does not predict or depict the performance of any investment. **Past performance does not guarantee future results.**

Investment risks

The value of investments and any income will fluctuate (this may partly be the result of exchange rate fluctuations) and investors may not get back the full amount invested.

Companies engaged in the development, enablement, and acquisition of blockchain technologies are subject to several risks. Blockchain technology is new and many of its uses may be untested. There is no assurance that widespread adoption will occur. The extent to which companies utilize blockchain technology may vary. As blockchain technology is new, there is a risk that companies developing applications of this technology may be subject to additional risks including, but not limited to, intellectual property claims and legal action. Furthermore, blockchain technology may be subject to future law and regulation that may adversely impact adoption. Companies transacting on the blockchain are required to manage a user's account (or "wallet") which is accessed via cryptographic keys. Mismanagement, theft, or loss of the keys can adversely affect the company's operations on the blockchain. Blockchain technology relies on the internet, the disruption of which may adversely affect companies involved with the technology or even the blockchain itself.

Cryptocurrencies are subject to fluctuations in the value of the cryptocurrency, which have been and may in the future be highly volatile. The price of a digital currency could drop precipitously (including to zero) for a variety of reasons, including, but not limited to, regulatory changes, a crisis of confidence, flaw or operational issue in a digital currency network or a change in user preference to competing cryptocurrencies. Cryptocurrencies trade on exchanges, which are largely unregulated and, therefore, are more exposed to fraud and failure than established, regulated exchanges for securities, derivatives, and other currencies. Currently, there is relatively limited use of cryptocurrency in the retail and commercial marketplace, which contributes to price volatility.

Currencies generally are volatile and are not suitable for all investors.

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