THE BITCOIN ECOSYSTEM

2024 Annual Report

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Epoch

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Letter from the Founder

We live in a remarkable time. I started working in bitcoin because the technology is a solution to the most significant issues in the world and it emerged precisely when it was needed. Often, I'm overwhelmed with the feeling that the bitcoin ecosystem was made for me as it aligns so precisely with my personal curiosities and values. The reality is that bitcoin is just technology, and many have a similar intuition to me for completely different reasons.

I founded Epoch because I believe the success of Bitcoin as a neutral global monetary system will be the most important innovation in our lifetimes. The emergence of a new monetary good has not occurred in millennia, and money is the largest market in the world. The ecosystem around this emerging monetary good requires capital. Capital is accumulated not by chance but by the concerted efforts of all individuals involved. Epoch is a capital provider dedicated to building the infrastructure, applications, and adjacent technologies at the advent of this system.

My team wrote this report to illuminate everything happening with bitcoin, educate as best we can, and encourage readers to participate in the bitcoin ecosystem. Working in this industry is a privilege. Influencing the ideas and beliefs at the vanguard of this emerging ecosystem is a responsibility we do not take lightly.

This is the first annual bitcoin ecosystem report from Epoch, and we will do this every year until distinguishing the bitcoin ecosystem from any other ecosystem becomes pointless. We were pressed for time and spent many late nights producing this report. There are many things we didn't cover and many improvements we plan to make in our report next year. Please reach out with any thoughts or feedback.

I want to thank my team for all of the hard work:

- VJ Vesnaver, Operating Partner; @victoreejones
- Adam Stryer, Analyst; @sultanofchart
- Clark Moody, Venture Partner; @clarkmoody
- Danny Knowles, Venture Partner; @_DannyKnowles

With that, enjoy.

Eric Yakes, Managing Partner

But little they know that it's so hard to find one rich man in ten with a satisfied mind

— Jonny Cash

The State of Bitcoin Adoption

Introduction

There's so much more to Bitcoin adoption than just the number of Bitcoin owners.

To fully understand its current state, we examine adoption among individuals, businesses, and nation states. The report analyzes price dynamics, volatility, onchain usage, and media coverage.

This section will analyze the following:

Market Performance

- Bitcoin's price, volatility patterns, and correlations against other asset classes.
- Bitcoin dominance or relative performance versus major cryptocurrencies.

Individual Adoption

- Bitcoin adoption among individuals:
    - Unique methodology for estimating U.S. and global ownership.
    - Detailed U.S. Bitcoin ownership demographics and the key factors deterring non-owners.

Business Adoption

- Overview of corporate Bitcoin adoption trends.
- Deep dive into business adoption, and Microstrategy (MSTR): see our Bitcoin Corporate Finance section.

Institutional and Government Adoption

- Nation-state adoption trends.
- Potential for governments to implement strategic bitcoin reserves.
- Emergence of Bitcoin spot ETFs and a breakdown of their ownership.

Network Activity

- Onchain metrics: Total value locked (TVL), Decentralized exchange (DEX) volume, and Fee revenue.
- Bitcoin's growth potential compared to other blockchains,
- Adoption trends in non-native BTC (WBTC and cbBTC), and existing Bitcoin L2s.

Media Coverage

- Coverage analysis across traditional media (NYT, CNBC, CNN).
- Social media trends.

Price Analysis

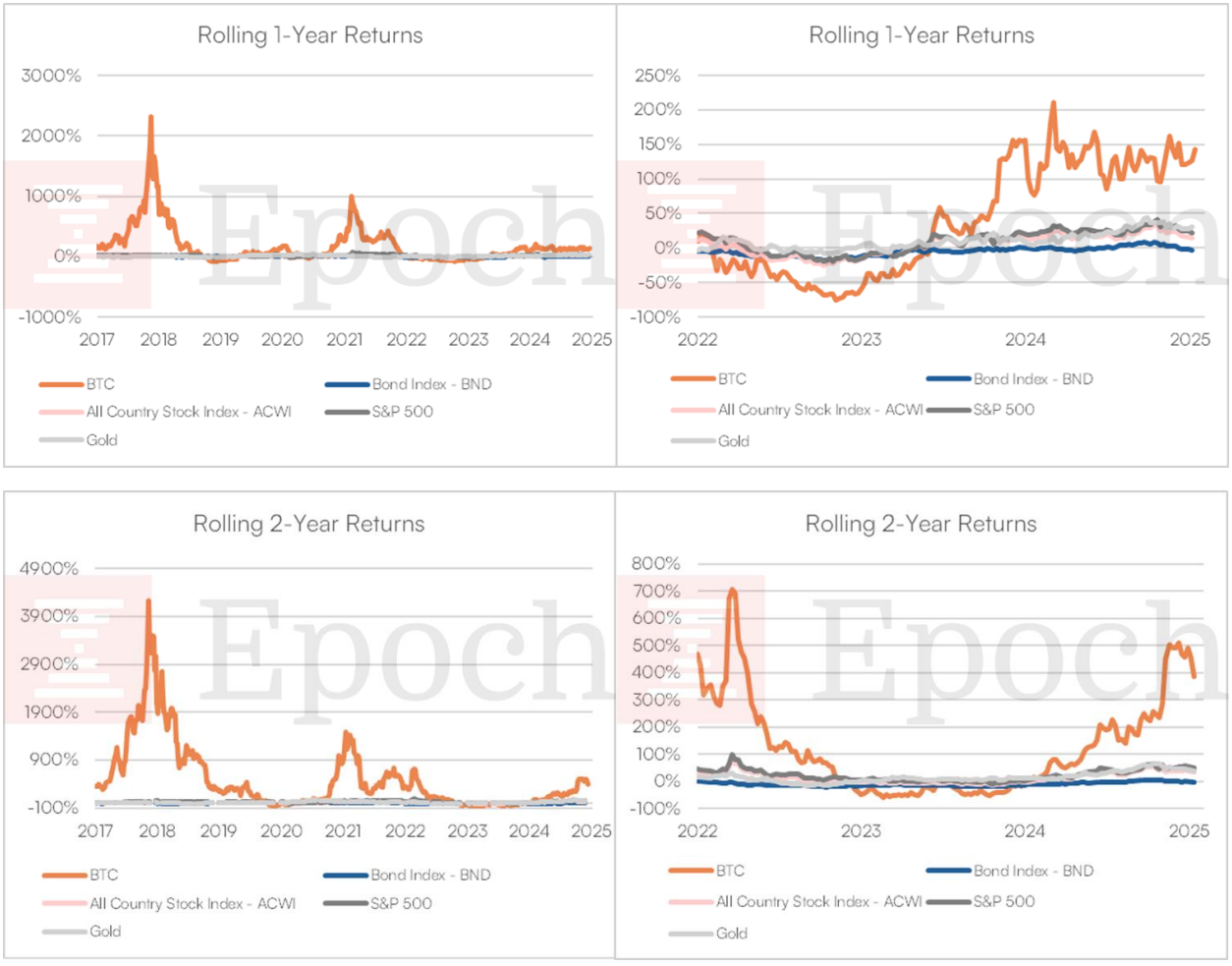
For the past decade, Bitcoin has defined portfolios, and we expect that to continue.

As of this writing, the price of one bitcoin is roughly $96,000, representing a ~100% increase over the past year, and ~110% over the past four years. It remains the best performer among major asset classes over the past four years, both in absolute terms and on a risk-adjusted basis.

While bitcoin's rolling returns showcase its historical volatility and propensity for boom-and-bust cycles, a broader perspective reveals an undeniable fact: Bitcoin's performance is unmatched — despite interim periods of volatility.

On one to two year timeframes, Bitcoin's performance has fluctuated between significant outperformance and underperformance versus traditional assets such as stocks, bonds and gold. Since 2017, its maximum drawdown was -83% over one year and -71% over two years.

However, Bitcoin consistently rebounded, erasing any unrealized losses. In 2023, its rolling one and two-year returns outperformed crypto-peers, and despite the ongoing bull market in stocks, Bitcoin continues to outperform.



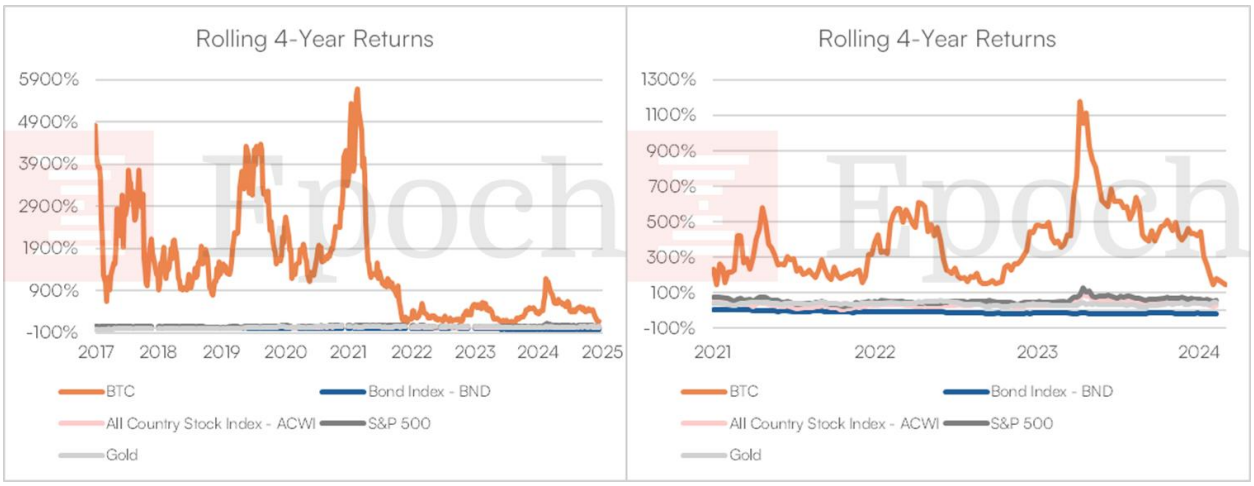
Source: TradingView[1]

[1] Chart data: https://www.tradingview.com/

Zooming out with Bitcoin's four-year halving schedule in mind, its performance overshadows all other asset classes. In spite of its significant volatility, bitcoin's four-year returns were over +100% at every point as of January 2025.

Since 2017,[2] Bitcoin has rewarded investors willing to hold through an epoch (four year timespan), with a median return of ~1,200%, and an average of ~1,500%.

However, comparisons with the 2017 and 2021 cycles points to an ongoing trend of diminishing returns.



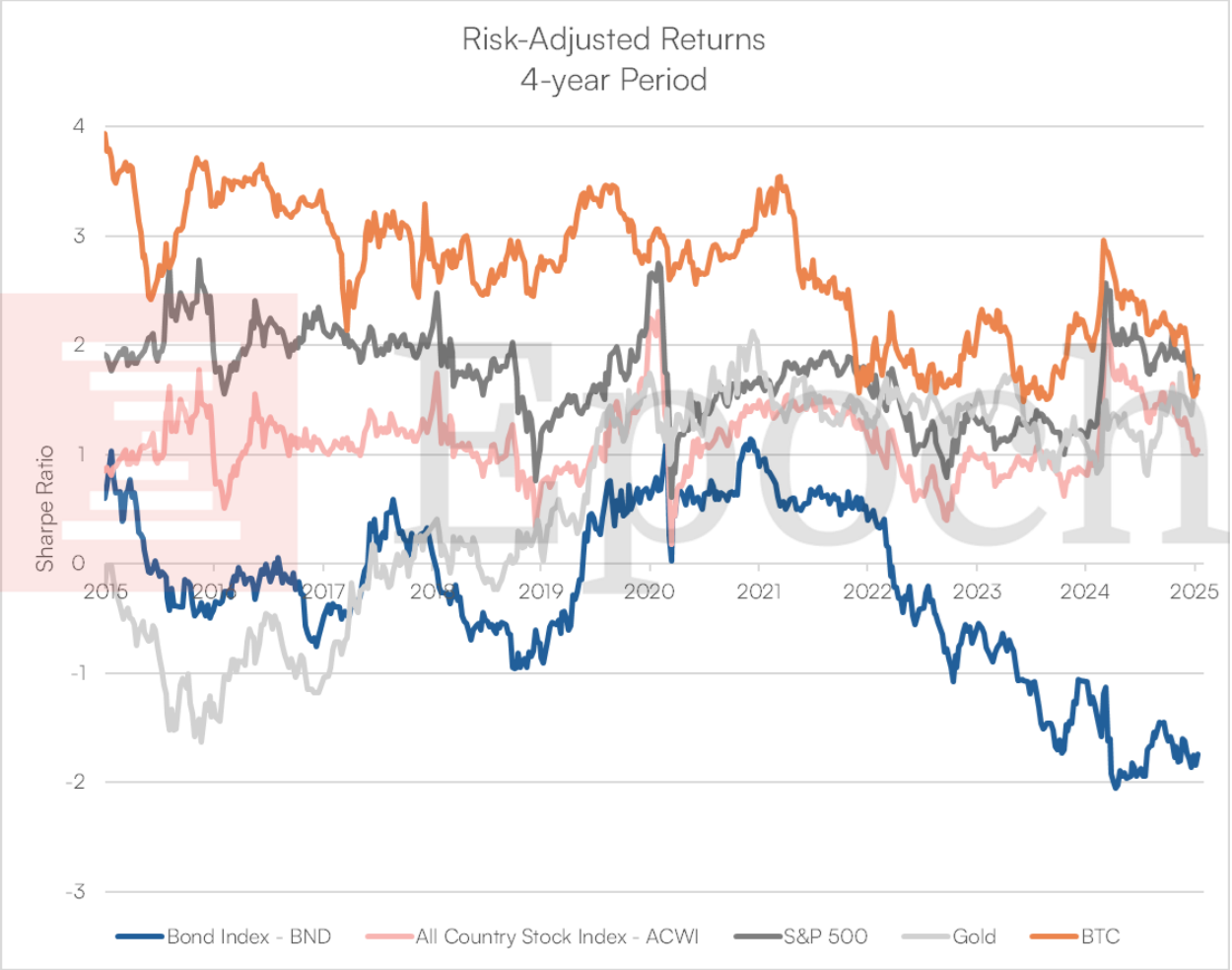
Source: TradingView[3]

When using the Sharpe ratio to factor in volatility, Bitcoin continues to outshine other assets in risk-adjusted returns over a four-year period.

The Sharpe ratio accounts for risk using the standard deviation of an asset's excess return.

Although its four-year returns have dwindled from the explosive growth seen in its formative years, volatility has also dropped. Bitcoin's Sharpe ratio recently fell below that of the S&P 500 due to a rapid price rise exactly four years prior. The resilience of Bitcoin's Sharpe ratio throughout significant drawdowns have made it an ideal investment for long-term holders.

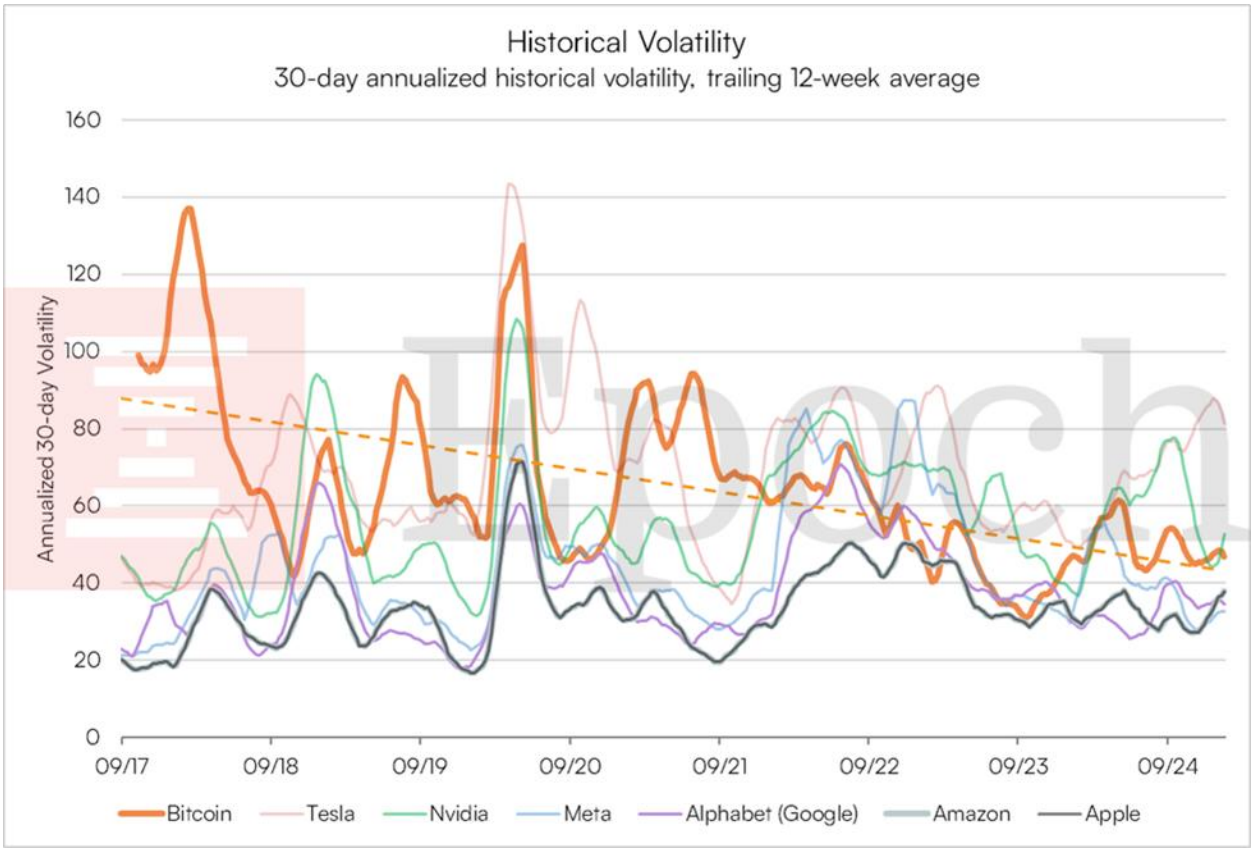
[2] Figures referenced are since 1/1/2017. Including all 4-year timeframes since 2013 results in a median 4-year gain of ~1,700% and an average of 2,516,897%.
[3] Chart data: https://www.tradingview.com/



Source: TradingView[4]

Even though the perception is that Bitcoin is a speculative and volatile asset, its realized volatility matches that of mega-cap stocks and runs below that of TSLA and NVDA. Most S&P 500 investors are significantly exposed to these companies, undermining the notion that a Bitcoin allocation is riskier. This misperception of Bitcoin's volatility shows up in the options market for BlackRock's Bitcoin ETF, IBIT. IBIT's current implied volatility is 61%, but its historical volatility over the past year was 52%.[5] As the spot Bitcoin ETFs mature, we expect this mispricing (along with broader misconceptions surrounding Bitcoin's volatility) to correct.

[4] Chart data: https://www.tradingview.com/
[5] See volatility data here: https://marketchameleon.com/Overview/IBIT/IV/



Source: TradingView[6]

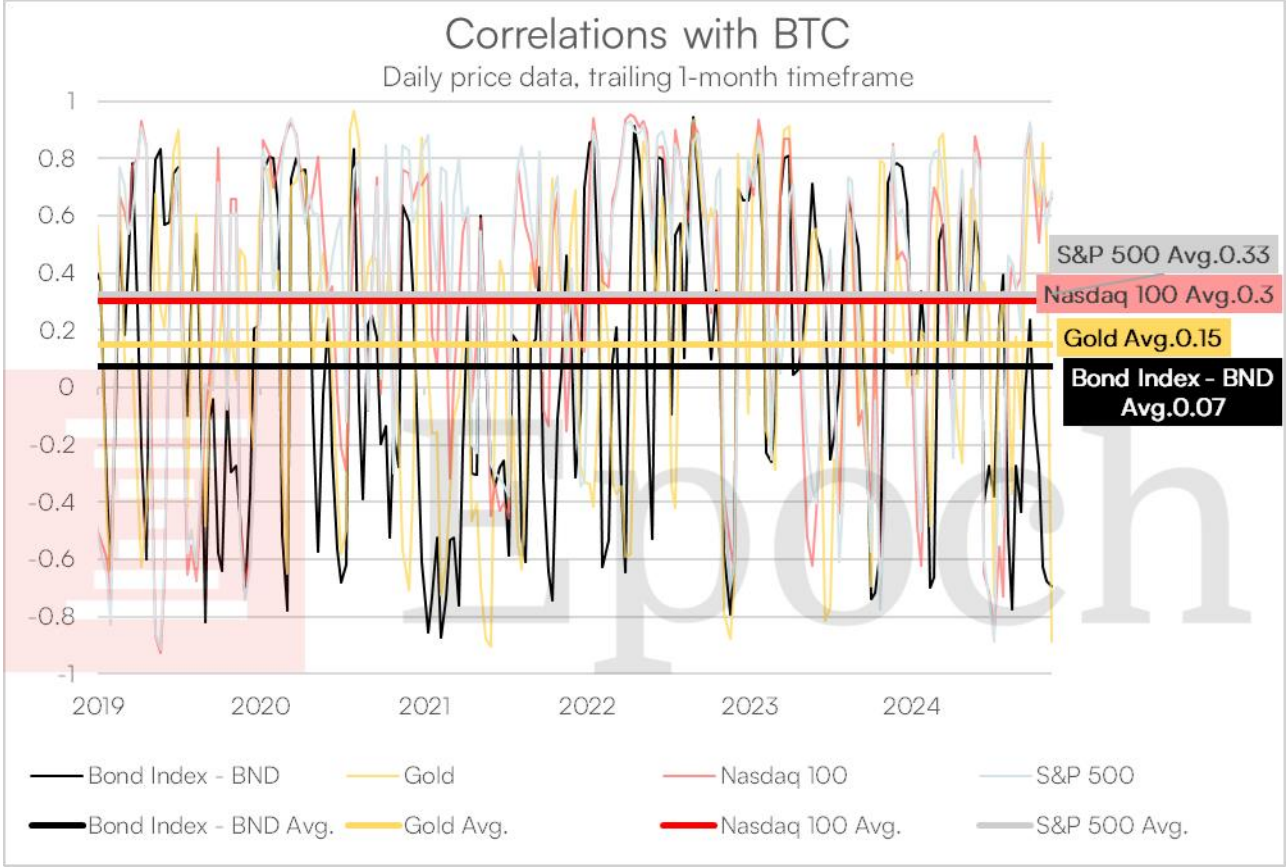
Correlations

Over the past decade, Bitcoin has been highly correlated with global equities.

BTC Daily Correlations since 1/1/2015					
	Bond Index BND	All Country Stock Index ACWI	Gold	Nasdaq 100	S&P 500
BTC Correlation	-0.42	0.93	0.88	0.93	0.93

On shorter timeframes, Bitcoin's correlations have oscillated significantly.

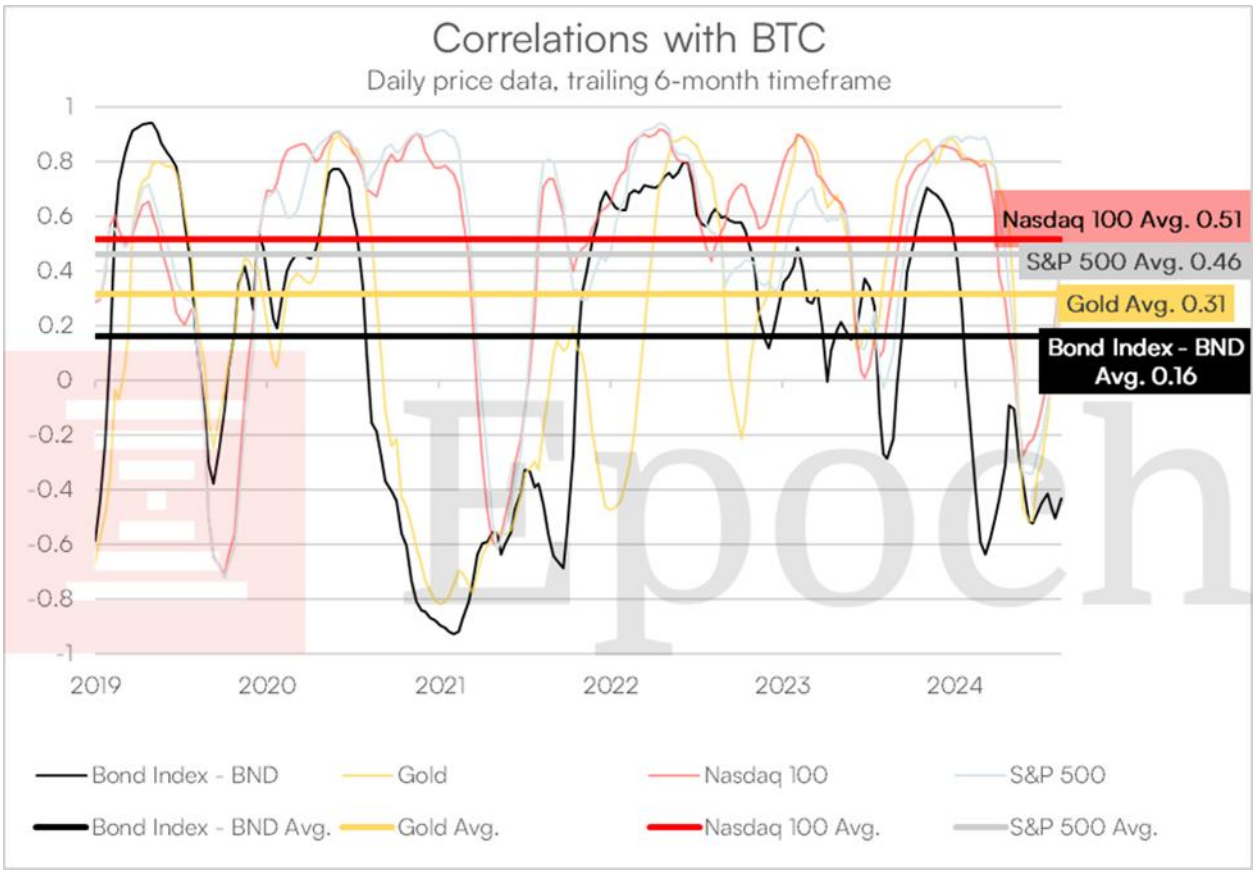
[6] Chart data: https://www.tradingview.com/



Source: TradingView[7]

Bitcoin and equities are highly correlated with global liquidity which central banks have structurally expanded since 2009. That said, additional fundamental adoption drivers discussed throughout this section fuel Bitcoin's superior returns against broader asset classes.

[7] Chart data: https://www.tradingview.com/



Source: TradingView[8]

As Bitcoin matures, we hypothesize that its narrative will shift from a speculative asset that benefits from expanding monetary policy, and geopolitical tensions, towards a safe-haven asset like gold.

We identify several fundamental drivers to support this shift:

1. **Declining Volatility:** If volatility continues to decline, investors with shorter time horizons will feel more comfortable allocating capital to Bitcoin.
2. **Credit Market Maturity:** Bitcoin's credit markets coming of age, discussed in the business model section of this report, will lead to further stability. Instead of market exuberance, expansionary cycles will be driven by proven leverage models, and we anticipate materially smaller drawdowns in bitcoin's price.
3. **Passive Index Flows:** Including bitcoin as an asset category for passive institutional investment flows will reduce its susceptibility to extreme market reactions.
4. **Evolving Investment Narratives:** These three drivers combine to fundamentally transform Bitcoin's narrative to become a valid part of an investment portfolio. We believe that bitcoin is experiencing its "gradually then suddenly" moment. This is when investor knowledge quickly expands, and nation-state and institutional adoption provides the social proof necessary for other investors to reevaluate their investment strategies. We expect this shift to be from "speculative asset with no cash flow" to "the world's scarcest

[8] Chart data: https://www.tradingview.com/

asset with unique properties that can demonetize gold." At Epoch, we believe bitcoin is the substrate of the world's first neutral monetary system but are happy with investors first simply understanding that it is a better monetary asset than gold.

These four factors will lead Bitcoin's correlation away from economically sensitive assets like stocks towards "safer" assets like gold — a move that could happen faster than many are anticipating. As the volatility of bitcoin continues to decline, we anticipate its safe haven status will rise, and it's correlation with other asset classes will decline. As money managers begin to see Bitcoin as a diversification tool, they may boost their Bitcoin allocations by an order of magnitude.

Dominance

In spite of the emergence of new chains, money flows to Bitcoin, expanding its dominance.

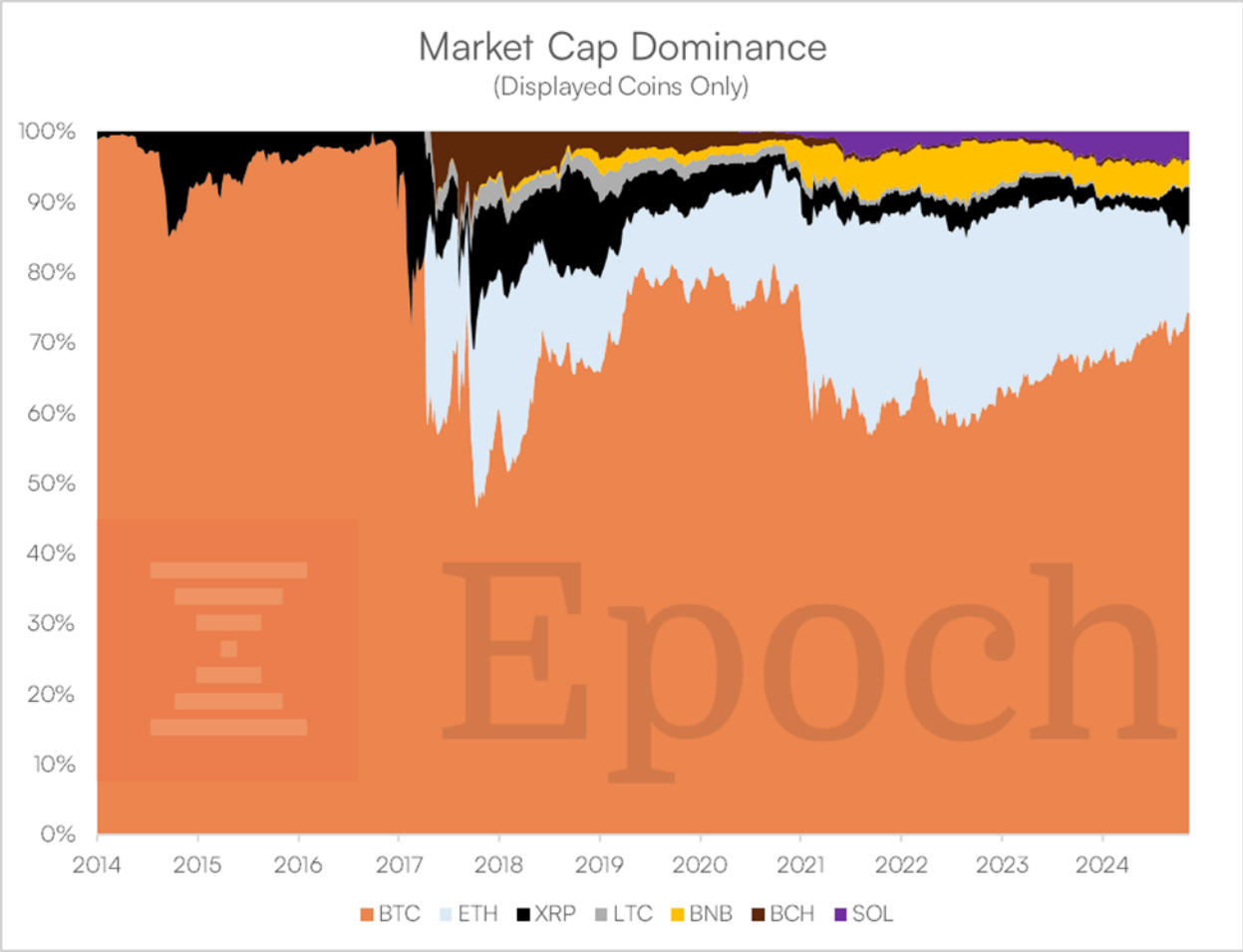
At Epoch, our position on this remains unwavering.

Since Bitcoin's emergence, many cryptocurrencies have risen and fallen, tying their brief existence to unsustainable inflationary token economics, and creative marketing tactics. Much like how the market can remain irrational longer than one can stay solvent, often these narratives can persist for longer than expected.

Bitcoin's "competitors" have learned two lessons: first, don't compete with bitcoin as money because you will lose. Second, allowing a network to process more transactions, or adding more programmability requires network centralization. We anticipate that many projects (no matter their degree of decentralization) will continue to realize that interacting with Bitcoin is the best way to enhance its monetary capabilities.

Monetary demand is the lynchpin holding all other forms of utility together. At Epoch, we view monetary demand as gravity pulling all other forms of utility into its orbit over the long term.

As the broader cryptocurrency ecosystem comes to terms with this reality, Bitcoin's gravitational pull will deepen, demand for alternative cryptocurrencies will fall, and Bitcoin dominance will expand.



Source: TradingView[9]

BTC's steady expansion against the largest altcoins by market capitalization reflects the market's growing desire for one dominant chain. Bitcoin adoption is increasing but its value lags total cryptocurrency due to thousands of new coins launching with immaterial markets.

There is a divergence between money flows and adoption metrics because many new cryptocurrency investors chase narratives rather than taking a long term approach towards this industry. Large institutions participate as Bitcoin market makers, adding more liquidity and institutional capital to bitcoin.

In contrast, individuals are drawn to new coins that act like a lottery ticket.

Developers create thousands of new coins daily on Ethereum, Solana, and other chains, the absolute majority with near-zero market caps and no utility. The price discovery mechanism for these new coins is driven by liquidity pools. These create exponential price growth without significant inflows, offering fertile ground for speculators to gamble on these markets, most of whom will lose money over time. Data from pump.fun, a popular "memecoin" launch site, indicates that 60% of traders lost money in 2024. Meanwhile, a meager 3% made more than $1,000, and only 0.5% made more than $10,000.[10]

[9] Chart data: https://www.tradingview.com/
[10] Source: https://x.com/crypto__kermit/status/1858852191638892664

Newcomers in the cryptocurrency industry may chase new shiny objects disguised as altcoins, but Bitcoin's growing dominance proves that marginal money is consistently flowing to BTC. We believe that there will come an inflection point in the industry whereby the universe of alternative cryptocurrencies will become immaterial, and the only remaining chains will survive by adopting Bitcoin's monetary value.

Individual Adoption

Strong price performance, risk-adjusted returns, and the potential use for portfolio diversification has helped drive Bitcoin adoption to more than ~300 million owners worldwide.

The launch of spot Bitcoin ETFs in the U.S. — with their whopping success — growing institutional, and nation state adoption bodes well for new bitcoin ownership moving forward. In fact, institutional support provides a form of social proof that can drive long-term adoption among many individuals.

Global bitcoin ownership has grown at a compound annual growth rate (CAGR) of approximately 36% since the first half of 2021. Crypto.com, a cryptocurrency exchange based in Singapore, estimates that by December 2024 there were roughly 337 million bitcoin owners, and around 659 million cryptocurrency owners. However, these estimates do not account for a key group that we call *owners by association*.[11] Our analysis estimates the true figure to be between 25% and 35% higher than Crypto.com's, with 422 to 455 million total bitcoin owners and 824 to 890 million cryptocurrency owners as of December 2024.

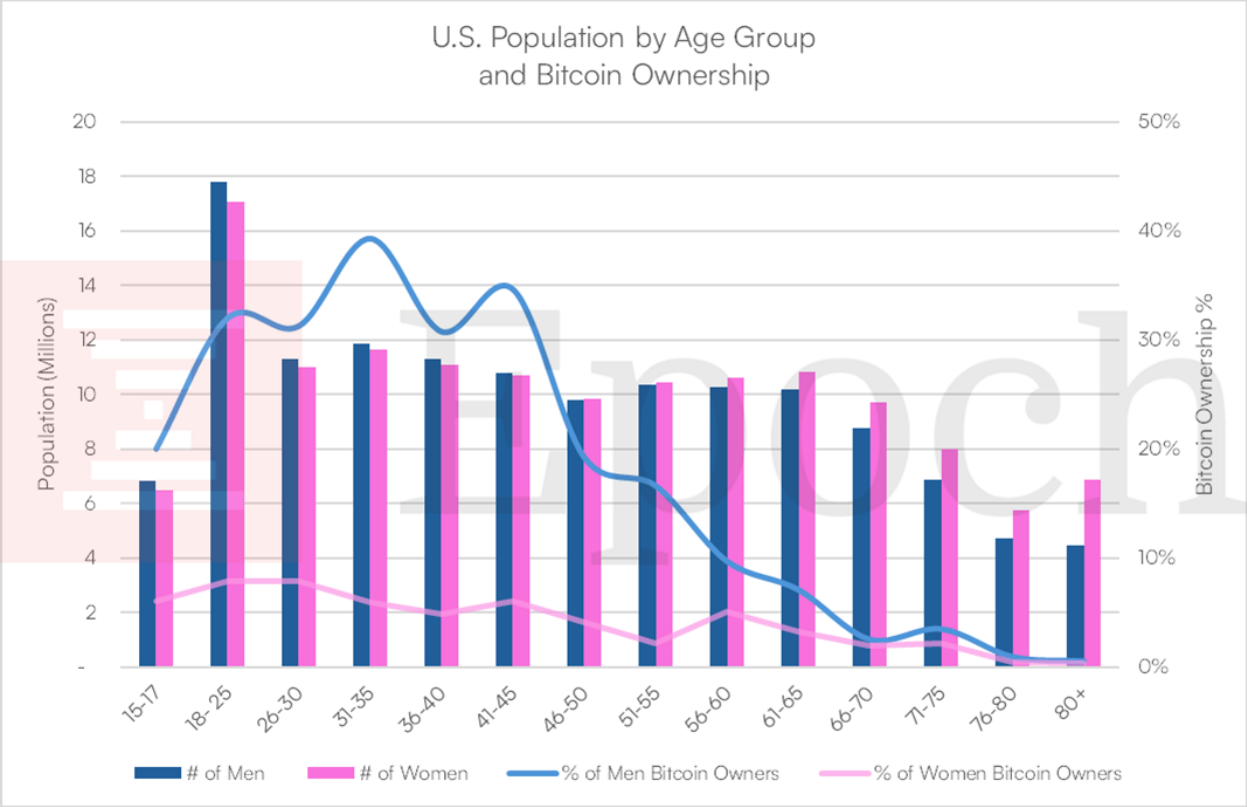
Crypto.com and other industry estimates track onchain and exchange data to calculate ownership estimates, but it ignores "owners by association." This group consists of people whose wealth is linked to bitcoin or cryptocurrency, but who do not own the assets directly. The most common example of an owner by association is among married couples with combined finances. Typically, one spouse will singlehandedly manage their cryptocurrency holdings due to technical knowledge of wallet custody and mechanics. The other spouse is excluded from industry estimates.

We count spouses who do not control or operate their cryptocurrency accounts and wallets as "owners by association," and we include them in our estimates. Given our assumptions, *owners by association* comprise a significant group of cryptocurrency owners that are not included in common industry estimates.

Modeling for *Owners by Association*

Referencing survey data from the Nakamoto Project and incorporating our adjustments, we estimate **direct** Bitcoin ownership in the U.S. as follows:

[11] Crypto.com estimates: https://crypto.com/research/crypto-market-sizing-report-h1-2024



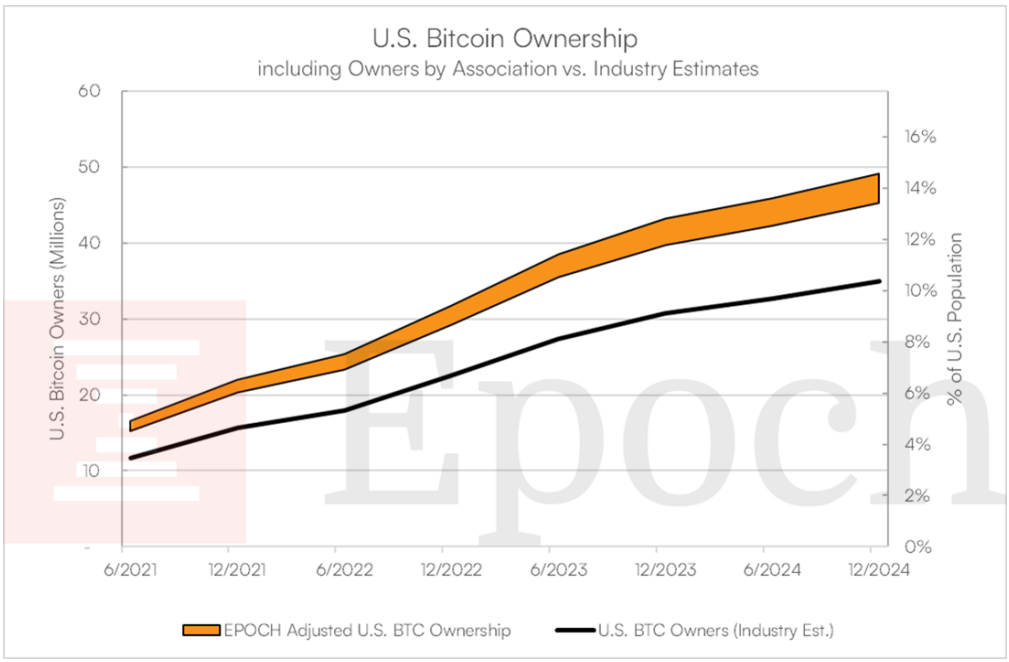
Source: Epoch estimates, The Nakamoto Project[12]

Using this data and marriage statistics, we estimate bitcoin ownership in the U.S. and similarly for the rest of the world.[13]

U.S. Bitcoin ownership

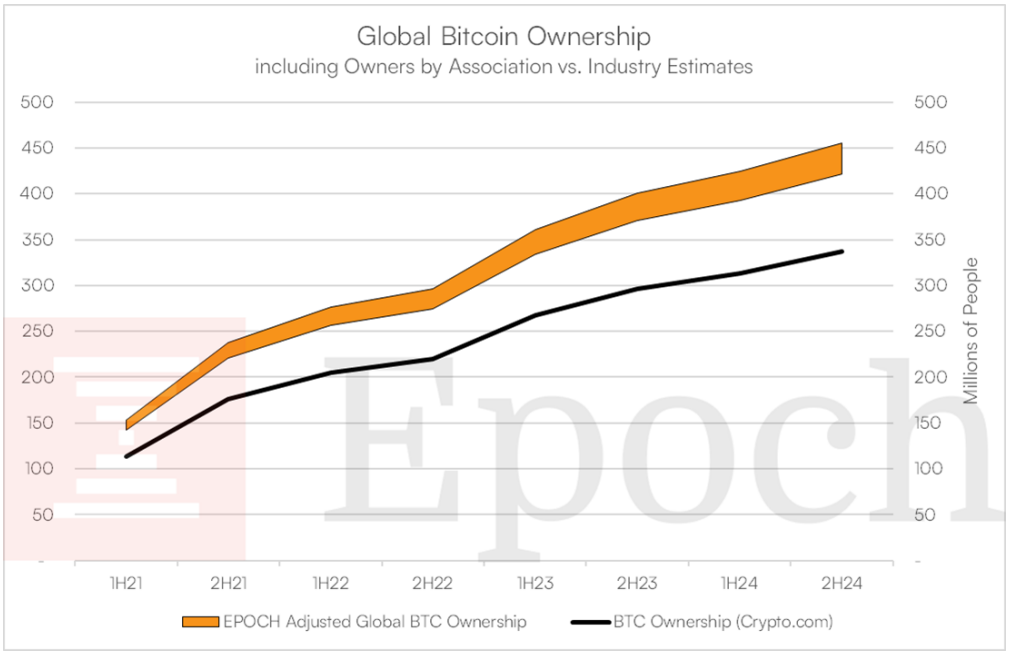
- Direct ownership: 34.9 million Americans (10% of the total population) own bitcoin before accounting for ownership by association.
- Marriage factor: 65 to 90% of American couples assign one partner to manage cryptocurrency accounts.
- Total ownership including spouses: Between 45 million and 49 million Americans (ranging between 13% to 15% of the total population).

[12] The Nakamoto Project, https://www.thenakamotoproject.org/report
[13] Statista, CDC.gov, Census.gov, ourworldindata.org



Global ownership data including ownership by association

- Non-U.S. bitcoin ownership: 376 to 406 million.
- Global bitcoin ownership: 422 to 455 million bitcoin owners and 824 to 890 million cryptocurrency owners (25% to 35% higher than Crypto.com's estimates of 337 million for bitcoin and 659 for crypto)



Our inclusion of *owners by association* suggests that Crypto.com's and other industry figures may underestimate total Bitcoin ownership.

We hypothesize that the gap in ownership between Bitcoin and total cryptocurrency will narrow as Bitcoin's dominance expands.

Who owns Bitcoin in the U.S.?

In a mere 15 years, Bitcoin has touched the minds of 90-95% of Americans.

Roughly one in every seven Americans owns Bitcoin directly and the figure could climb as high as 65% when accounting for indirect ownership.[14] According to Gallup, 62% of Americans own stocks. Most of those investors likely own index funds which include Bitcoin-holding companies like Tesla. However, our focus is direct ownership, because it reflects a conscious decision to support the Bitcoin ecosystem, risking hard-earned-money in favor of Bitcoin over other asset classes.

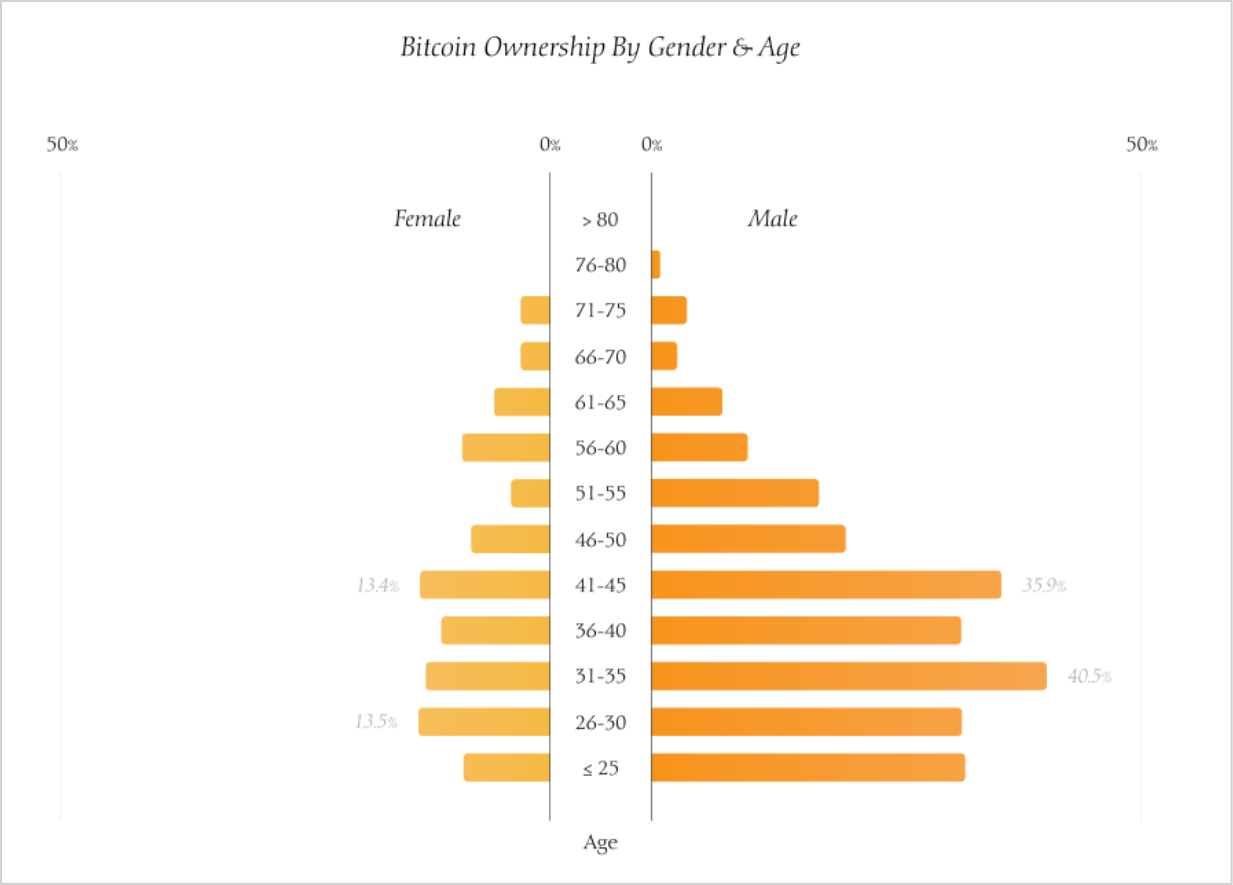
Demographics

Bitcoin ownership in the U.S. is dominated by young men, although the distribution is wider than expected when adding variables of gender, age and political preference. Men typically have a higher risk tolerance than women and opt for more technical fields of study, both of which are potential causes of greater Bitcoin adoption among men. However, the regulatory environment and a drop in perceived volatility bodes well for increased adoption among women and other risk-averse groups in the near future.

Young women may be on the precipice of a new wave of bitcoin adoption as the perceived risk and complexity to owning Bitcoin declines, due in part to institutional participation. Roughly 13% of women ages 26 to 45 claim to own Bitcoin, but direct ownership is lower as this figure includes *ownership by association*. As bitcoin adoption spreads towards a scale of cultural acceptance and institutional adoption, risk-averse demographics will flow into the market. Recent participation from trusted names like Blackrock and Fidelity yields a sense of security to hesitant Bitcoin adopters. In conjunction, Bitcoin's volatility has subsided greatly in recent years and this trend is likely to continue as institutional adoption increases. Trusted institutions' adoption eases access to Bitcoin and shifts risk perception, paving a path towards new ownership from Millennial and Gen-Z women and other risk-averse people.

For non-owners, the "trust" associated with financial institutions will initially lead many to the ETFs and while we prefer self-custody, the ETFs promote Bitcoin awareness and understanding. New participation in Bitcoin, regardless of the method of ownership, should lead to greater self-custodial ownership over time as Bitcoin strides towards common knowledge.

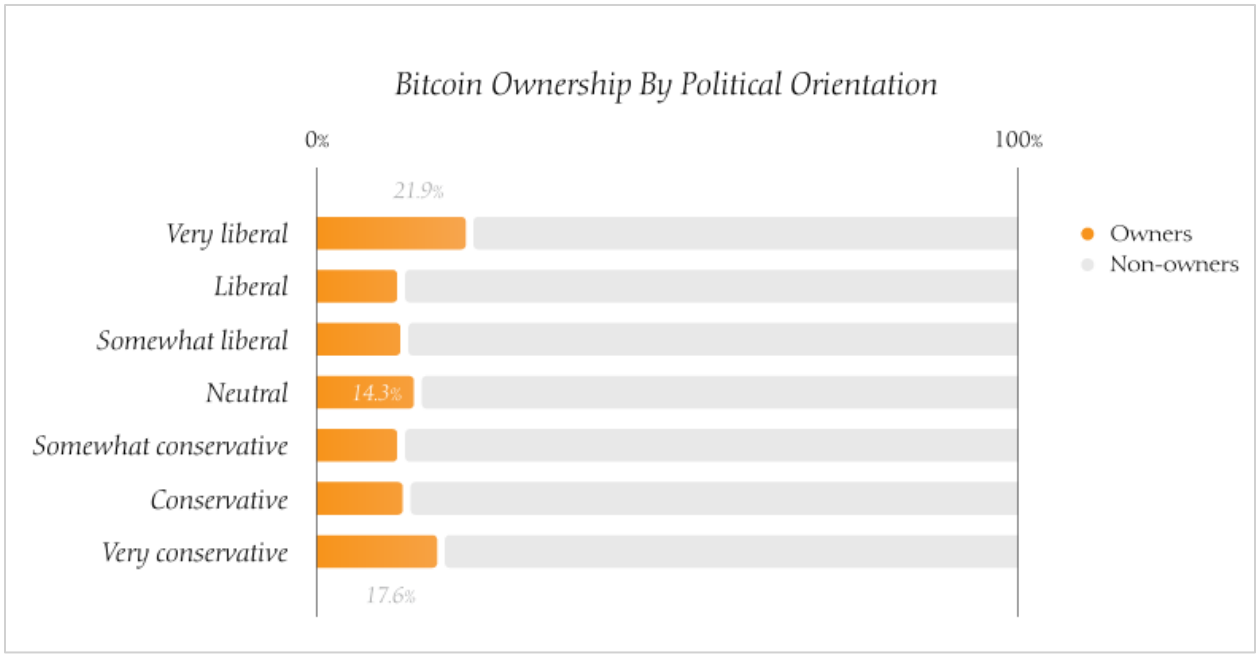
[14] The Nakamoto Project, https://www.thenakamotoproject.org/report



Source: The Nakamoto Project[15]

Bitcoin ownership across the political spectrum is roughly a uniform distribution, debunking the narrative that Bitcoin and cryptocurrency more broadly is a conservative or libertarian phenomenon. In the Nakamoto Project survey, respondents self-identified between "very liberal" to "very conservative." The results show that Bitcoin ownership is largely uncorrelated with political leanings and interestingly, the "very liberal" group had the highest Bitcoin ownership at 21.9% of respondents.[16] The only relationship the study found was a modest correlation between libertarians and Bitcoin ownership.

[15] The Nakamoto Project, https://www.thenakamotoproject.org/report
[16] The Nakamoto Project, https://www.thenakamotoproject.org/report



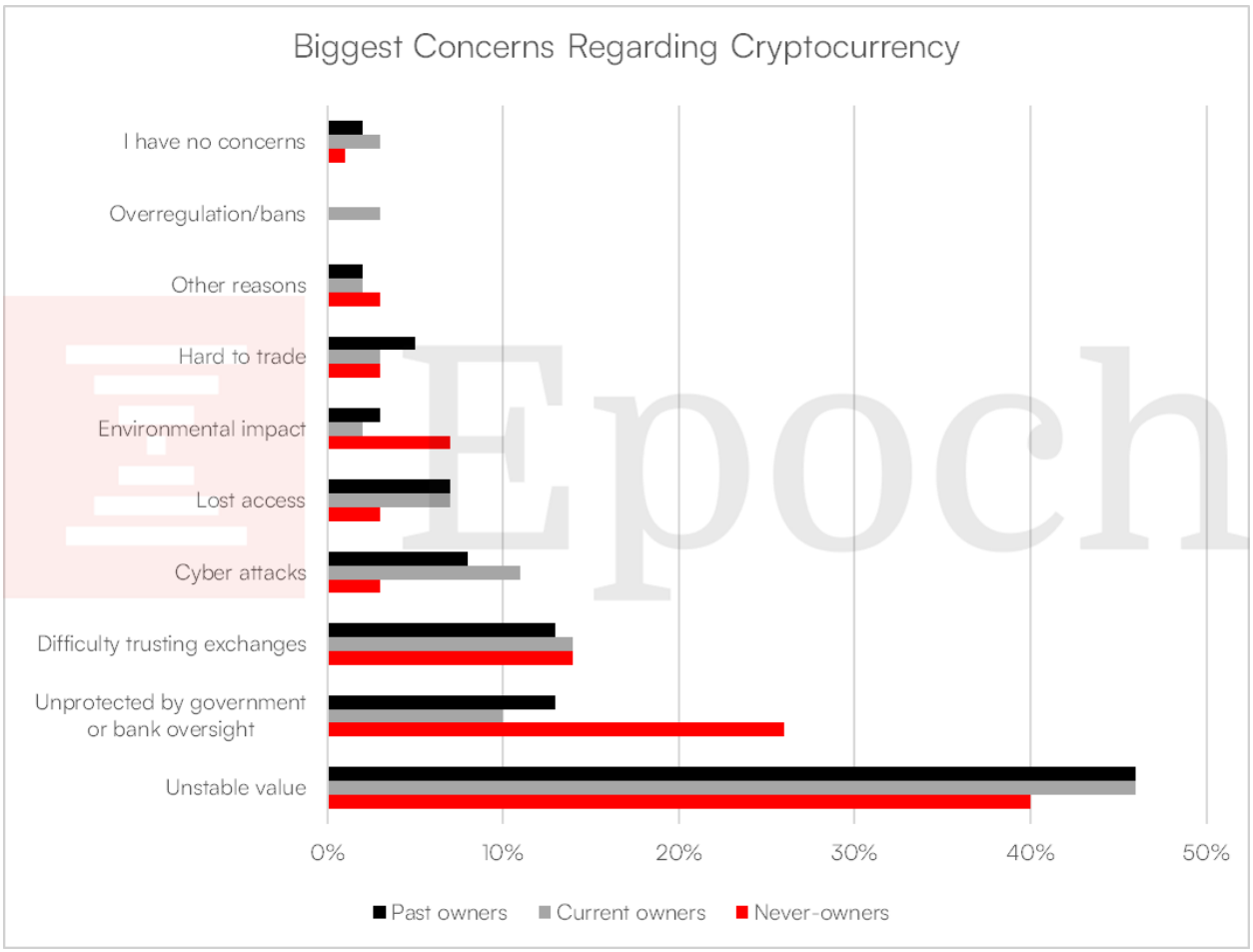
Source: The Nakamoto Project[17]

Cryptocurrency was a hot topic during the 2024 Presidential campaigns, which may have generated a short-term uptick in ownership from conservative groups. Long-term, however, Bitcoin is a non-partisan issue that can continue to grow across the political spectrum.

Holdouts to Bitcoin Ownership

Over 40% of people fear cryptocurrency's "unstable value;" the next frontier in Bitcoin adoption may revolve around money managers' alleviating these concerns through support of the Bitcoin ETFs. Money managers, along with institutions, control the perception of risk and with their stamp of approval, their clients and the 40%+ of people that fear instability will gain comfort investing in Bitcoin.

[17] The Nakamoto Project, https://www.thenakamotoproject.org/report



Source: Security.org[18]

The launch of the ETFs creates a perfect storm for money managers' support because they are only incentivized to move client funds within their ecosystem — i.e. where they can collect fees on AUM. Allocating to Bitcoin ETFs allows them to continue charging AUM fees while achieving greater diversification with the best-performing asset on a risk-adjusted basis in recent history: Bitcoin. This shift may be imminent; money managers will persuade their clients and global sentiment around Bitcoin ownership risk will rapidly improve.

A crucial segment for adoption from a capital and reputational standpoint is people who use money managers, 2/3 of whom are uncomfortable investing in cryptocurrency.[19] According to the Thinking Ahead Institute, the top 500 asset managers reached $128trn at EOY 2023, of which $78trn resided in the U.S. and these figures are likely 15%+ higher today due to the bull market in equities. Financial institutions are beginning to support Bitcoin's inclusion in portfolio construction. Less than a 1% portfolio allocation to Bitcoin from asset managers would generate over $1 trillion in inflows in the short-term, and passive flows from investing new deposits and portfolio rebalancing. This shift could be imminent.

[18] Security.org, https://www.security.org/digital-security/cryptocurrency-annual-consumer-report/
[19] Security.org, https://www.security.org/digital-security/cryptocurrency-annual-consumer-report/

The second leading concern around cryptocurrency is a lack of banking and government oversight, which reached an inflection point in 2024 as the spot ETFs launched and a pro-crypto administration won the Presidential election. These dynamics are discussed at length in the regulatory and policy section of the report. Along with the ETFs, modest regulation should also permit more banking access for the Bitcoin and cryptocurrency industry.

Amid the tailwinds, Bitcoin and broader cryptocurrency adoption faces headwinds from bankruptcies and criminal activity including FTX, Voyager, Terra (LUNA), and many more. The fear of anything related to cryptocurrency will persist in non-crypto owners for some time.

Yet, Bitcoin's history has proven that hope often outweighs fear. Bullish price action draws attention from non-participants and leads people to buy despite their concerns. Countless factors influence individuals' adoption of Bitcoin; this cycle may be most impacted by institutional adoption and widespread acceptance of Bitcoin which is discussed in the following sections.

Business Adoption

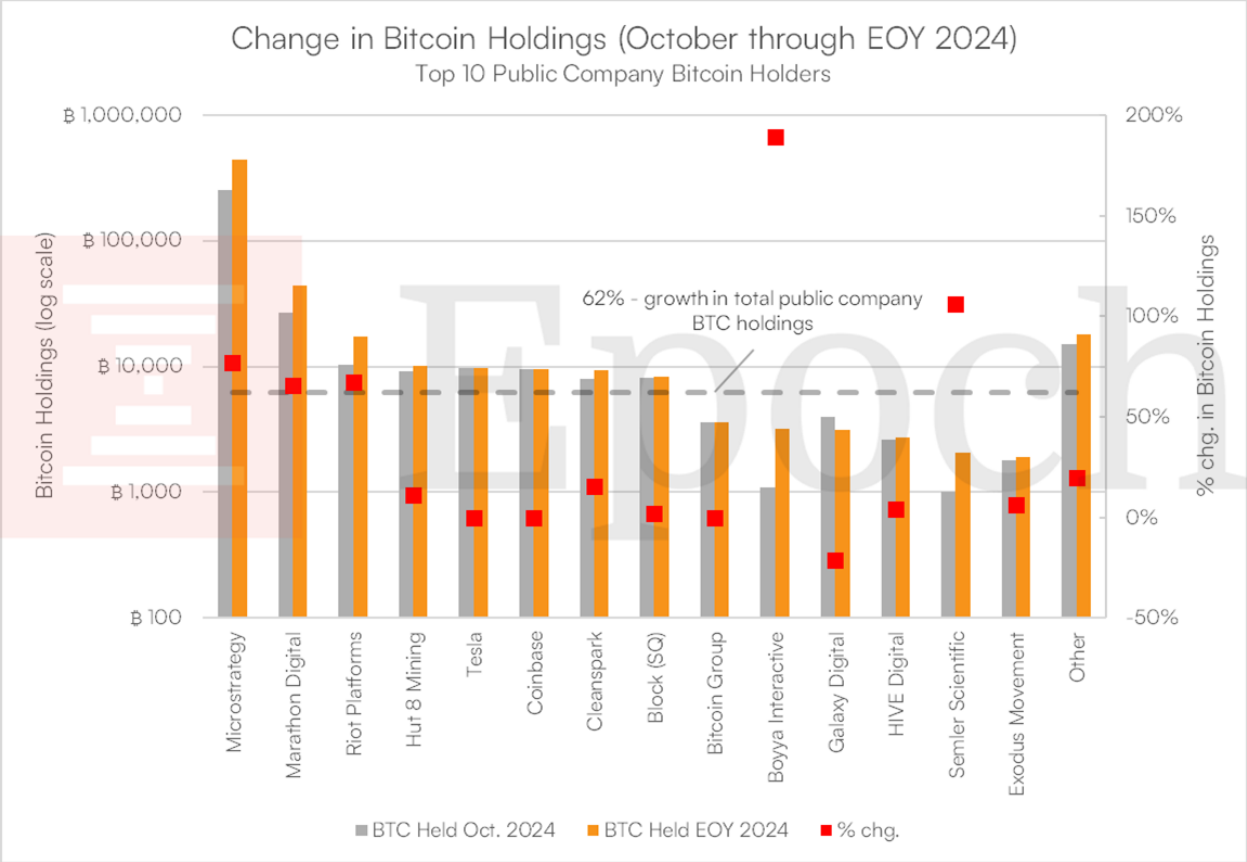
Business adoption of Bitcoin is accelerating as Wall Street begins to understand the value proposition of Bitcoin. Spot ETFs, liquidity, price action, and MicroStrategy (MSTR) have dominated the headlines of mainstream financial media. In particular, businesses allocating treasury reserves as a means towards increasing shareholder value is a growing corporate finance strategy. In January 2020, 13 public companies held 34,359 BTC compared to 69 public companies holding ~590k BTC at EOY 2024.[20]

[20] Bitcoin treasuries: https://bitcointreasuries.net/

Source: Bitcoin Treasuries[21]

Public company adoption may have reached an inflection point in late 2024. In just 2-3 months between October 2024 and EOY 2024, total public company bitcoin holdings grew 62%.

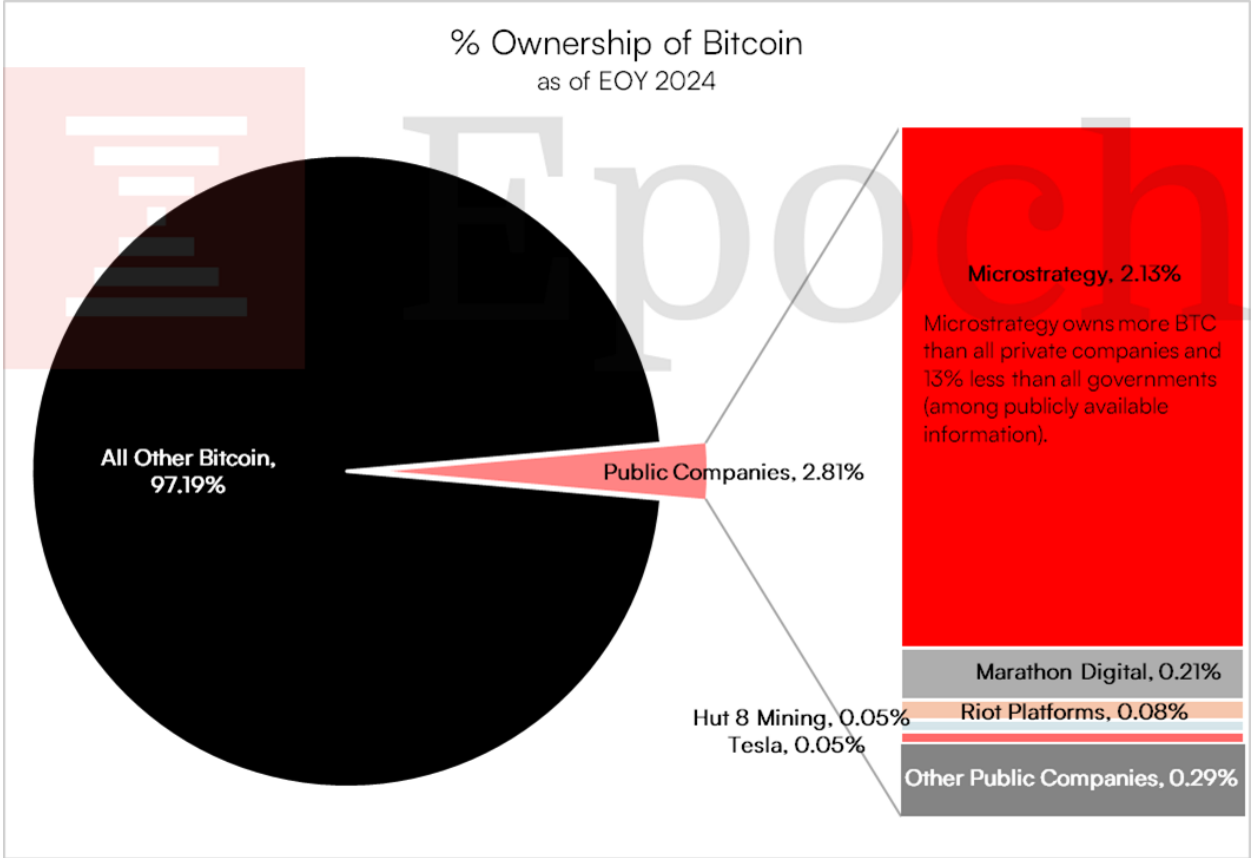
[21] Bitcoin treasuries: https://bitcointreasuries.net/



Source: Bitcoin Treasuries[22]

Public companies held ~2.8% of total future bitcoin supply as of EOY 2024. MicroStrategy overshadows all other public companies with ~2.1% of supply.

[22] Bitcoin treasuries: https://bitcointreasuries.net/



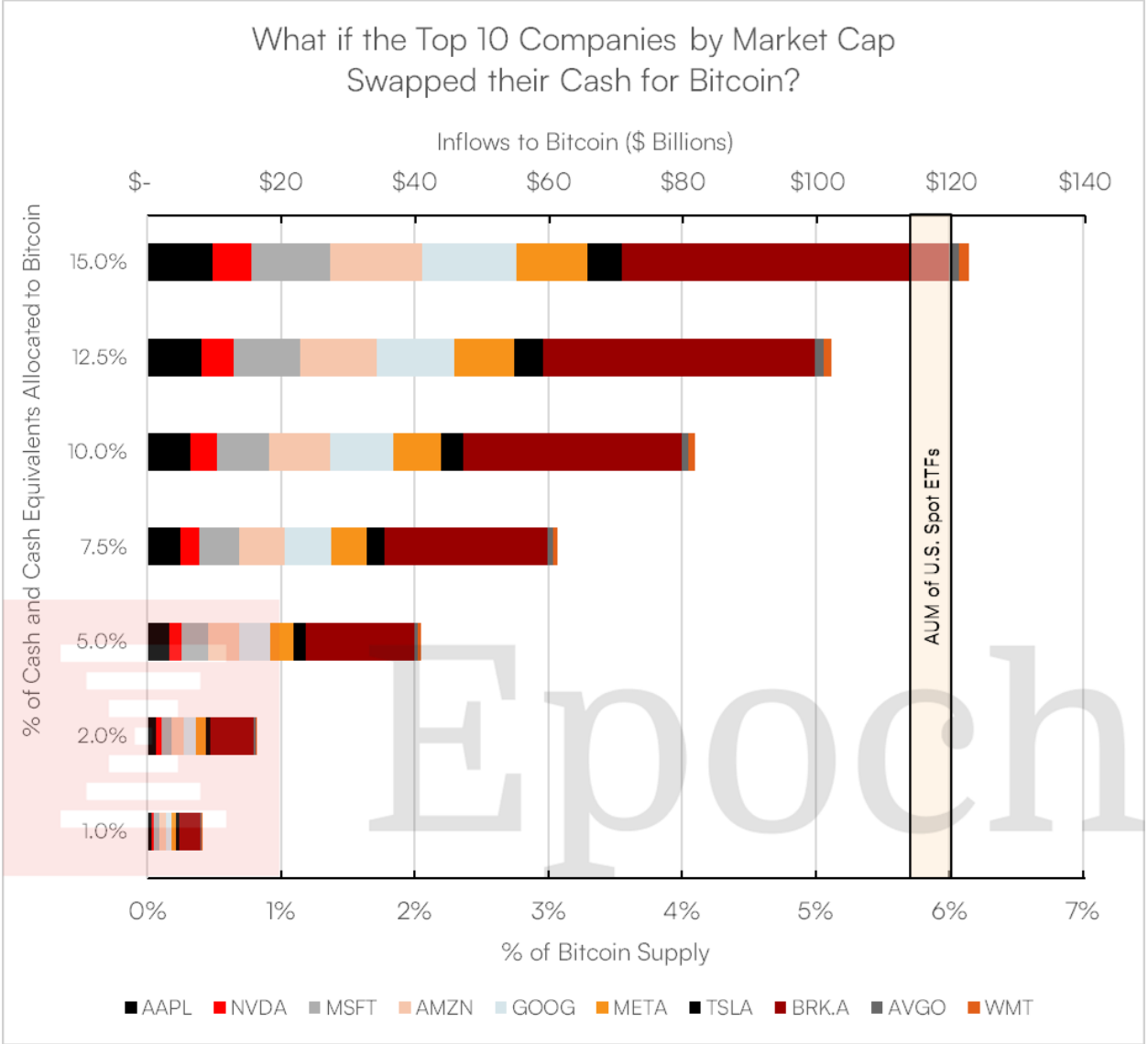
Source: Bitcoin Treasuries[23]

Adoption has come primarily from TSLA, SQ, bitcoin miners, and cryptocurrency companies, but change is materializing within larger companies. Recently, Microsoft (MSFT) shareholders voted on a proposal titled "Assessment of Investing in Bitcoin," which could have produced a BTC allocation among MSFT's ~$75bn in cash and equivalents.[24] Shareholders rejected the proposal, but it signals a drastic shift in sentiment and Amazon shareholders have followed with a proposal for 5% of its ~$585bn in assets to be allocated to Bitcoin.[25] Precedent is now established for mega-cap company shareholders to propose Bitcoin allocations and institutional shareholders may eventually concede with enough pressure.

The top ten public U.S. companies by market cap had over $817bn in cash and cash equivalents earning little to no returns in their recent quarter.[26] Microsoft's shareholder vote was the first and if momentum continues, mega-cap companies may eventually allocate to Bitcoin. At current levels, a 5% Bitcoin allocation from the ten largest U.S. companies' cash reserves would generate ~$40bn in inflows, representing nearly 2% of Bitcoin's total future supply. A 15%

[23] Bitcoin treasuries: https://bitcointreasuries.net/
[24] Yahoo Finance, https://finance.yahoo.com/news/microsoft-shareholders-vote-against-bitcoin-172000696.html
[25] TradingView News, https://www.tradingview.com/news/newsbtc:21799d371094b:0-bitcoin-bet-for-amazon-5-stake-proposal-raises-eyebrows/
[26] TradingView Data: https://www.tradingview.com/

allocation would produce over $120bn in inflows, equivalent to the size of U.S. spot Bitcoin ETFs (~$118bn AUM).

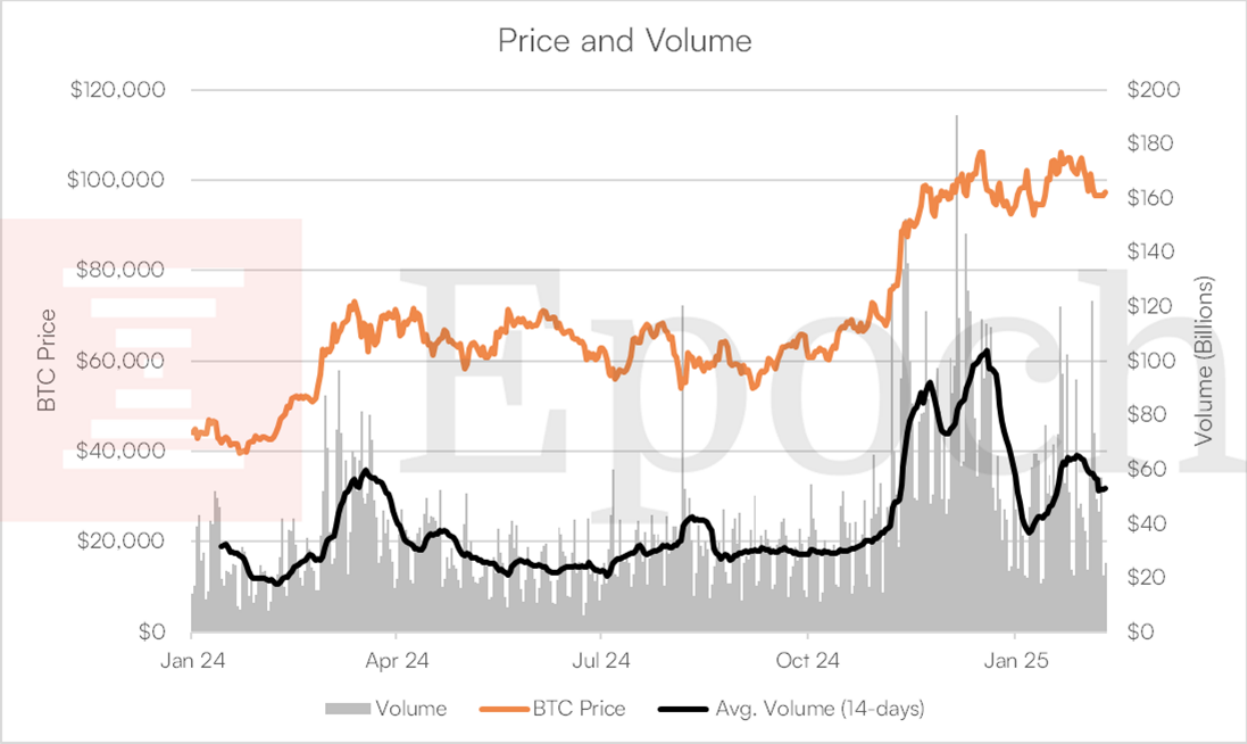


Bitcoin allocations from the largest companies are unlikely in the near-term, but spot ETFs' impact on Bitcoin's acceptability potentially opens the door for increased company adoption. Bitcoin spot ETFs lead financial institutions to take a more positive view of Bitcoin because of their recent exposure to Bitcoin through ETF issuance or ETF holdings.

Bitcoin's extensive liquidity and 24/7 settlement qualifies it for businesses of any size. In 2024, average daily trading volume was $38.7bn.[27] Even on weekends, when volume and volatility contracts, there is ample liquidity for large corporations to trade 24/7/365. According to Kaiko,

[27] Coingecko, https://www.coingecko.com/en/coins/bitcoin/historical_data

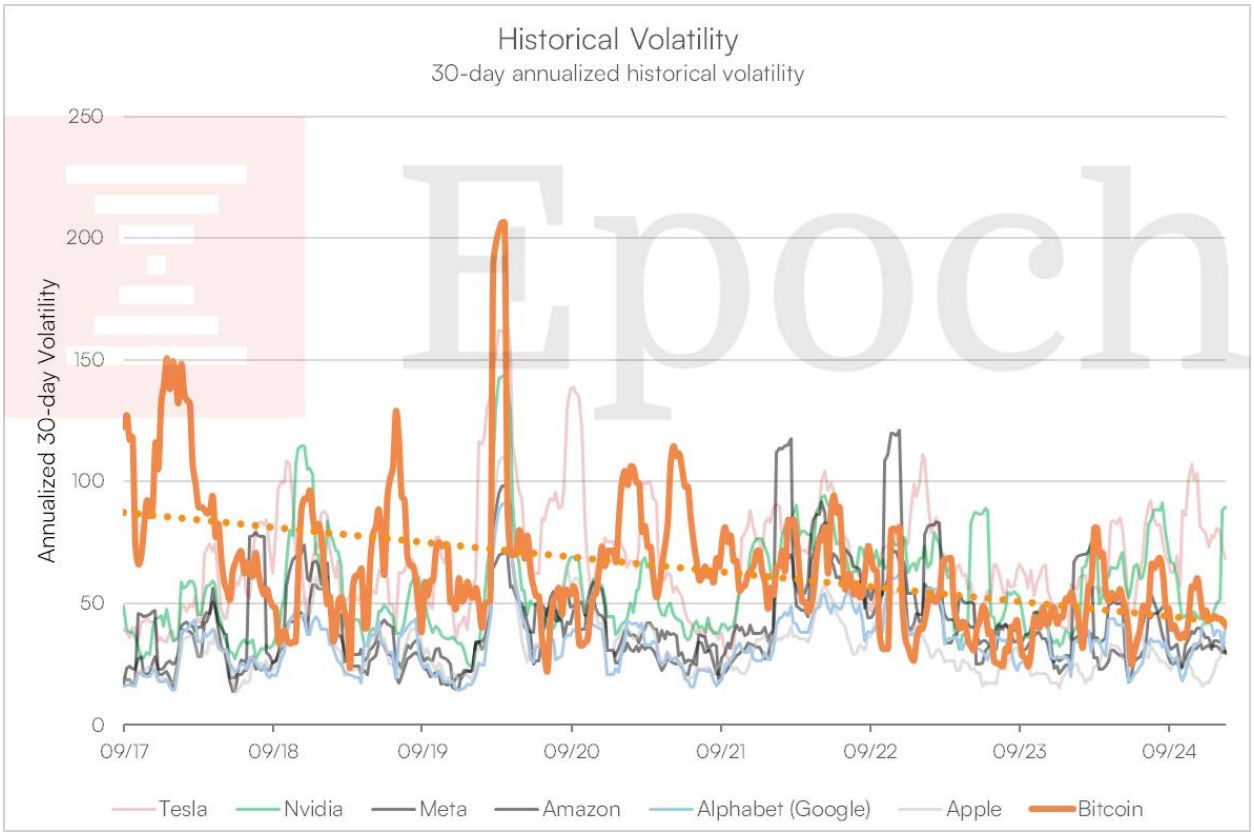
the dollar amount required to move Bitcoin's price by 2% remained above $250m throughout 2024.[28]



Source: Coingecko[29]

Increased liquidity reduces volatility which should mitigate leading concerns around Bitcoin adoption: volatility and risk. Bitcoin's volatility has trended downward since its inception and since 2022, its 30-day realized volatility is in-line with many mega cap stocks. Declining volatility and strong liquidity increase the feasibility of bitcoin as a treasury asset. We expect both trends to continue as bitcoin grows in size and expands its footprint with institutions who will take on a more prominent role as market makers.

[28] Kaiko, https://www.kaiko.com/
[29] Coingecko historical Bitcoin data: https://www.coingecko.com/en/coins/bitcoin/historical_data



Source: TradingView[30]

For a deep dive on MicroStrategy and Bitcoin Treasury allocations, see our Bitcoin Corporate Finance section.

As a final point on business adoption, we view the emergence of leveraged bitcoin corporate finance practices as a potential vector for concentrated risk in the industry in the near term. Prior bitcoin cycles have always had a subsequent crash, and this is exacerbated by structural declines in credit markets. In the Bitcoin Corporate Finance section of this report, we dive into the leveraged practices of MSTR. As this model is replicated, it could result in a concentration of credit risk that drives up price and results in a material crash as the market finds equilibrium.

[30] Chart data: https://www.tradingview.com/

Nation State Adoption

2024 will be remembered as a seminal year in nation state adoption of bitcoin. Multiple presidential candidates, and the ultimate winner announced commitments to a strategic bitcoin reserve. Bills have been proposed and the likelihood of its adoption is increasing. Further, states such as Texas, Pennsylvania, and Wyoming are all proposing legislation for bitcoin reserve adoption. We expect this trend to continue.

This announcement has driven anticipatory demand for the asset with the market now considering just how far nation state adoption could spread. China, Japan, Russia, and even the EU have staked claims and called for bitcoin reserves.[31] Bitcoin has now entered the maelstrom of fiscal and monetary geopolitics.

From the viewpoint of a sovereign nation, bitcoin possesses several attractive characteristics:

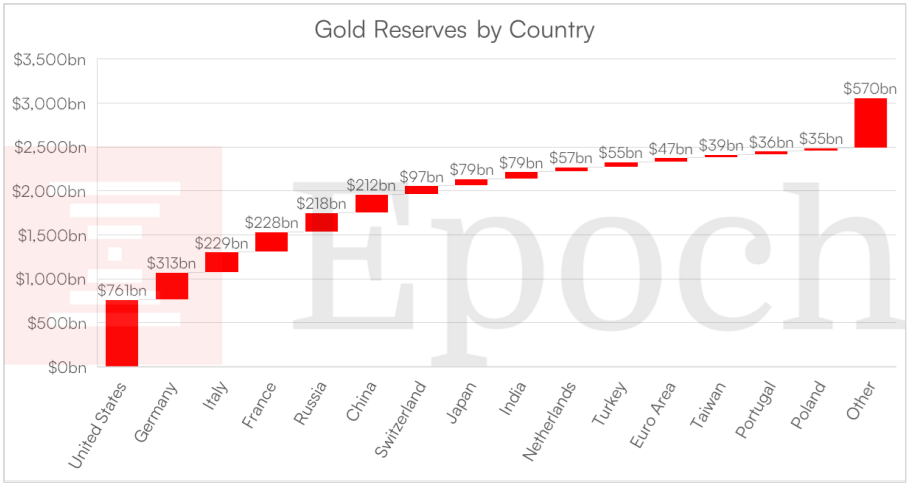
- 24/7/365 real time settlement
- Independent sovereign custody
- Liquidity of capital markets
- Certainty of scarcity
- Efficiency of verification and portability

For these reasons we view bitcoin as a superior sovereign reserve asset to gold and expect it to consume that market in the medium term. Today, gold's primary advantage over bitcoin is the depth of its capital markets. However, we expect this advantage to transition to bitcoin in the coming decade because bitcoin is superior in nearly every other category.

Nation State Bitcoin Reserves Market Potential

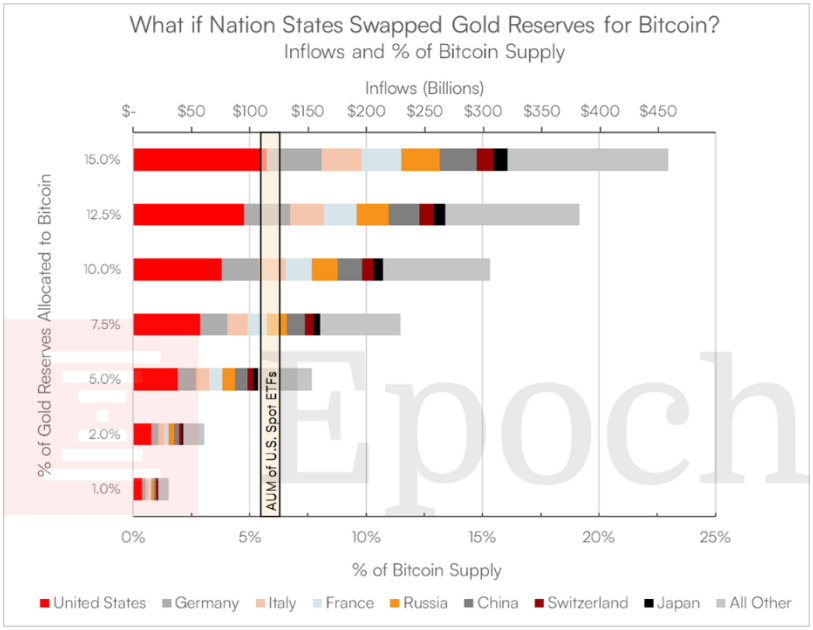
At Epoch, we believe bitcoin will eventually become the world's first global neutral monetary system. In the near to medium term, however, it must first consume the market of gold and we view this market as the most addressable. The U.S. holds ~$761bn in gold and globally, total nation state gold reserves are over $3trn.

[31] Source: https://www.forbes.com/sites/tomerniv/2024/12/16/the-cold-war-of-national-bitcoin-reserve-global-race-for-digital-gold/



Source: Trading Economics[32]

If countries sought just a 5% allocation to Bitcoin vs. their gold reserves, Bitcoin would see ~$153bn in inflows. At the current price, this would be ~7.7% of Bitcoin's total supply and ~$35bn greater than the AUM of U.S. spot bitcoin ETFs. A 10% allocation would represent ~$305bn in inflows and 15% of Bitcoin supply. In reality, inflows of this magnitude would boost BTC's price and the percentage of supply they could accumulate would be far lower. Nation state SBRs are no longer wishful thinking, but a plausible scenario over the long run. The only question is, how much will countries buy? Or rather, how much can they afford?



Nation state adoption is reaching an inflection point and the potential to drive demand for bitcoin as an asset is massive. Below is a summary of the current state of adoption amongst relevant countries.

[32] Trading Economics, https://tradingeconomics.com/country-list/gold-reserves

Nation State Summary

Country	Government Stance	BTC Holdings	Source of BTC	Key Information on BTC and Crypto
United States of America	Permitted	฿ 198,109	Seizure	• **Approved Spot BTC ETFs in Jan. 2024.** • Trump signed an Executive Order promoting digital assets in Jan. 2025 and appointed venture capitalist David Sacks as "AI and Crypto Czar." • The SEC repealed SAB 121, laxing requirements for digital asset custodians. • 16 U.S. states have introduced legislation to establish a Bitcoin reserve as of Feb. 7, 2025. Vaneck suggests this could result in purchases of 243k+ BTC. • With Trump's pro-crypto stance, momentum is building for a federal strategic Bitcoin reserve, an initiative supported by well-funded lobbyist groups.
China	Partial Prohibition	฿ 190,000	Seizure	• Financial sector prohibited from trading crypto or facilitating crypto transactions. • Bitcoin mining is banned.
Hong Kong	Permitted; friendly	-	-	• **No capital gains tax on crypto for indviduals, barring exceptions.** • Unregulated: no specific legislation.
Japan	Permitted	-	-	• Regulated and friendly; treated as property. • Reviewing its rules for Crypto industry - examining whether there is enough protection for investors and may lower taxes on digital assets (Bloomberg). • Proposal for a national Bitcoin reserve was rejected in Dec. 2024 (Binance).
Europe	Permitted but banned Tether			• **Europe banned Tether (USDT) for failing to comply with regulatory requirements. Europe comprised 64% of USDT volume. (@JacobKinge)** • Czech Republic removed capital gains taxes on crypto held for 3+ years and proposed an investment in BTC by the Czech National Bank (CoinDesk).
Germany	Permitted	-	-	• No capital gains tax on crypto held over a year. • Banks permitted to sell and custody cryptocurrencies.
India	Permitted	-	-	• Cryptocurrencies are unregulated. • Bitcoin used for remittance payments through companies like Crobo.
United Kingdom	Permitted	฿ 61,245	Seizure	• Regulated and subject to capital gains taxes. • Bill introduced in Sept 2024 to classify crypto as personal property. • Bitcoin ATMs were ordered to shut down in 2022 after failure to register or get licensed by the government.
France	Permitted	-	-	• Capital gains tax on crypto: 30% for individuals and 45% for professionals regardless of holding period.
Russia	Permitted but unfriendly and unclear	-	-	• Officially recognized cryptocurrency as property in international trade and eased tax laws for holders and miners in Nov. 2024. • In trials for a digital ruble (CBDC) since 2023 and a Russian lawmaker proposed a national Bitcoin reserve (Forbes). • **Imposed a 6-yr mining ban, supposedly due to energy shortages (Yahoo).**
Canada	Permitted	-	-	• **First-ever Bitcoin ETF launched in Canada in 2021.** • Regulated and treated similarly to commodities for taxes.
Italy	Permitted	-	-	• Reportedly walking back plans to raise taxes on crypto capital gains from 26% to 46%; instead planning to raise to 28% (Bloomberg).
El Salvador	Legal Tender	฿ 6,073	Purchased	• **First country to adopt Bitcoin as legal tender.** • Investing in BTC and holding it in its treasury.
Bhutan	Permitted	฿ 10,771	Actively Mining	• **First country to actively accumulate BTC and reach $1bn in holdings.** • Began Bitcoin mining in 2019 and have expanded operations since, fueled by immense hydroelectric power resources • Largest nation state Bitcoin holder as % of GDP: ~39% of GDP.
Argentina	Permitted • Common use among citizens	-	-	• **~1/3 of Argentinians use crypto daily, primarily as an inflation hedge** (*Crypto Council for Innovation*). • **Highest cryptocurrency adoption rate in the Western Hemisphere** (*Forbes*, *SimilarWeb*). • Endorsed Bitcoin's use in legally binding contracts. • **We believe it may soon adopt Bitcoin as legal tender and begin accumulating a strategic reserve.**
Switzerland	Permitted; friendly	-	-	• Regulated and friendly crypto environment. • BTC and crypto held over 6 mos. not subject to capital gains tax, barring exceptions.
Singapore	Permitted; friendly	-	-	• Allowed businesses the freedom to transact in BTC or other as early as 2013. • Hub for cryptocurrency startups.
United Arab Emirates	Permitted; friendly	-	-	• Regulated and friendly; no capital gains taxes. • Dubai is becoming a global crypto hub for business and investors.
Brazil	Permitted	-	-	• Popular among Brazilians as an inflation hedge and for remittances.

VanEck also released an interesting update on US bitcoin adoption by state:

U.S. State Bitcoin & Digital Asset Reserves									
.	Title	Introduced	Type	Status	Funding Source(s)	Est. Funding Source Size	Potential Investment (%)	Est. Potential Investment ($)	Est. # Bitcoin
Oklahoma	House Bill 1203 (HB 1203)	15-Jan-25	Both Reserve & Pension	Committee 1	State General Fund, Revenue Stabilization Fund, Constitutional Reserve (Rainy Day) Fund	$14,664,000,000	10%	$1,466,400,000	15,125
Massachusetts	Senate Docket, No. 422	Jan-25	Reserve	Introduced	Commonwealth Stabilization ("Rainy Day") Fund	$8,831,000,000	10%	$883,100,000	9,109
Wyoming	House Bill 201 (HB 201)	17-Jan-25	Reserve	Failed/Dead	General Fund and Permanent Wyoming Mineral Trust Fund	$27,100,000,000	3%	$813,000,000	8,386
Ohio	House Bill No. 18	23-Jan-25	Reserve	Committee 1	General Revenue Fund Interim Funds, Budget Stabilization Fund, Deferred Prizes Trust Fund	$4,590,000,000	10%	$459,000,000	4,734
Ohio	Senate Bill No. 57	29-Jan-25	Reserve	Committee 1	State entities' Bitcoin payments, donations, criminal forfeitures, interim funds	n/a	n/a	n/a	n/a
New Hampshire	HB 302	10-Jan-25	Reserve	Committee 1	General Fund, Revenue Stabilization Funds, others as authorized by legislature	$2,116,317,421	10%	$211,631,742	2,183
Utah	House Bill 230	15-Jan-25	Reserve	Committee 2	State Disaster Recovery Restricted Account, General Fund Budget Reserve Account, Income Tax Fund Budget Reserve Account, Medicaid Growth Reduction and Budget Stabilization Account	$1,401,800,000	10%	$140,180,000	1,446
Texas	Senate Bill 778 (SB 778)	16-Jan-25	Reserve	Committee 1	Unencumbered and unobligated GRF blance per biennium	$18,290,000,000	1%	$182,900,000	1,887
North Dakota	House Concurrent Resolution No. 3001	14-Jan-25	Reserve	Introduced	State General Fund, Budget Stabilization Fund, Legacy Fund	$18,557,625,832	unspecified	-	-
North Dakota	HB1184	7-Jan-25	Reserve	Failed/Dead	Certain State Funds	n/a	n/a	n/a	n/a
Iowa	Inflation Protection Act	6-Feb-25	Reserve	Introduced	General Fund, Cash Reserve Fund, Economic Emergency Fund	$5,472,000,000	5%	$273,600,000	2,822
Illinois	Strategic Bitcoin Reserve Act	29-Jan-25	Reserve	Committee 1	Gifts, Grants, Donations	n/a	n/a	n/a	n/a
Kentucky	HB 376	6-Feb-25	Reserve	Committee 1	Excess State Treasury Cash	unclear	10%	-	-
Missouri	HB 1217 Bitcoin Strategic Reserve Fund	6-Feb-25	Reserve	Introduced	Gifts, Grants, Donations	n/a	n/a	n/a	n/a
Missouri	SB614 - Treasurer Investment Provisions	23-Jan-25	Reserve	Introduced	State Treasurer	$17,082,467,808	10%	$1,708,246,781	17,620
Maryland	HB1389 - Strategic Bitcoin Reserve Act of Maryland	21-Jan-25	Reserve	Committee 1	Seized gambling-related money, state budget fund appropriations, donations, grants	n/a	n/a	n/a	n/a
New Mexico	Strategic Bitcoin Reserve Act (SB 275)	4-Feb-25	Reserve	Committee 1	Land Grant Permanent Fund, Severance Tax Permanent Fund, Tobacoo Settlement Permanent Fund, other state funds deemed appropriate by investment council	$42,098,000,000	5%	$2,104,900,000	21,711
South Dakota	House Bill 1202	30-Jan-25	Both Reserve & Pension	Committee 1	State public funds approved by the State Investment Council	$16,678,800,000	10%	$1,667,880,000	17,203
Montana	House Bill No. 429 - "Inflation Protection Act of 2025"	8-Feb-25	Reserve	Committee 1	Montana General Fund - up to $50 million initially,	$4,176,970,000	n/a	$50,000,000	516
North Carolina	HB 92 - NC Digital Assets Investments Act	10-Feb-25	Both Reserve & Pension	Introduced	General Fund, Highway Fund, Teachers' and Sate Employees' Retirement System, other special state funds	$26,291,046,000	10%	$2,629,104,600	27,118
							Total:	$23,538,440,545	242,787

Source: VanEck Digital Assets Research[33]

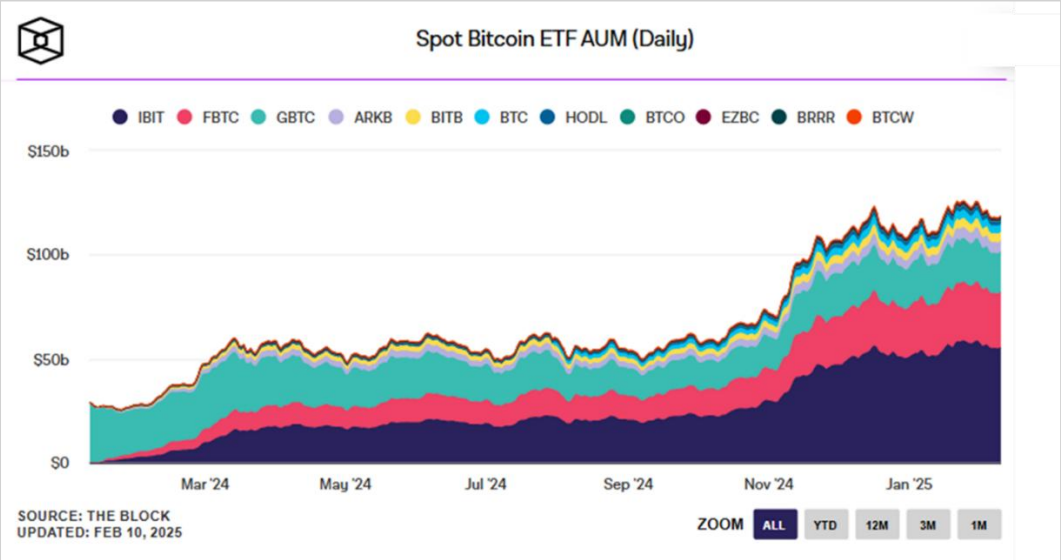
Bitcoin ETF Adoption

In the private sector, ETF approval has been another key contributor to improving risk perception and advancing adoption of Bitcoin. The ETFs serve as a proof point for longstanding holdouts that Bitcoin can be trusted now that the largest and most heavily scrutinized financial institutions support the asset. The ETFs' ease of access through traditional financial markets has generated a historic response from the market, primarily from retail investors who account for the bulk of ETF inflows.

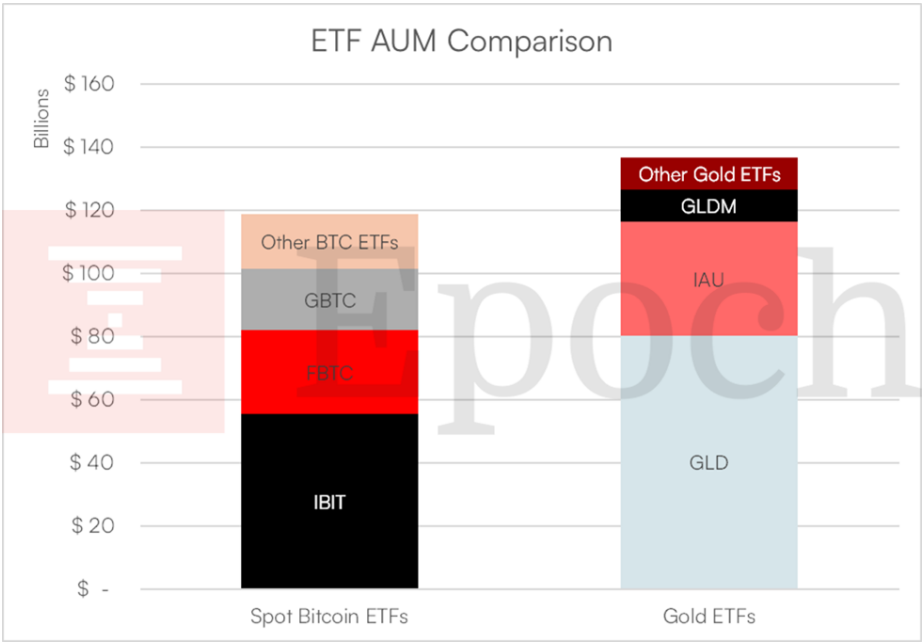
Spot Bitcoin ETFs, launched in January 2024, had the most successful launch in ETF history. IBIT and FBTC were the largest-ever ETF launches on first-month assets under management (AUM)[34]

[33] @matthew_sigel on X, https://x.com/matthew_sigel/status/1889666062892888338/photo/1
[34] @EricBalchunas on X, https://x.com/EricBalchunas/status/1755702963778023718

and spot Bitcoin ETFs in total breached $100bn in AUM on 11/20/2024.[35] AUM as of 2/10/2025 stands at ~$119bn.



To put this $119bn AUM figure into perspective, the top 15 Gold ETFs comprise $137bn in AUM.[36] Gold ETFs launched in 2004, compared to less than a year for Bitcoin ETFs.



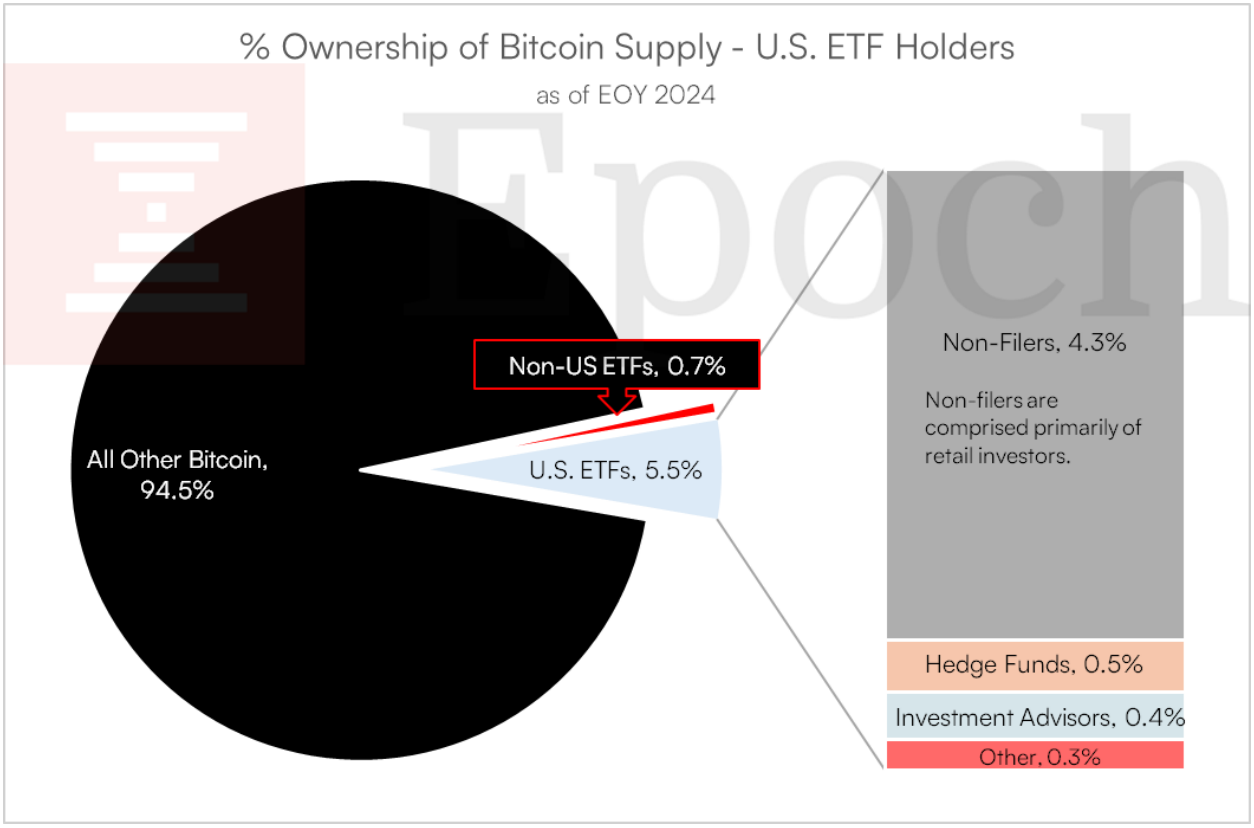
Sources: The Block[37] and etfdb.com[38]

[35] ETF data from The Block: https://www.theblock.co/data/crypto-markets/bitcoin-etf/spot-bitcoin-etf-onchain-holdings-usd
[36] Gold ETF data: https://etfdb.com/etfs/commodity/gold/
[37] ETF data from The Block: https://www.theblock.co/data/crypto-markets/bitcoin-etf/spot-bitcoin-etf-onchain-holdings-usd
[38] Gold ETF data: https://etfdb.com/etfs/commodity/gold/

Bitcoin ETFs quickly surpassed Gold ETFs as a percentage of total value and even matched them on AUM briefly in December 2024 when bitcoin touched $108k. Gold ETFs hold less than 1% of Gold's total value whereas U.S. Bitcoin ETFs account for ~5.8% of Bitcoin's total market cap (~6.4% including non-U.S. funds).[39] Both assets have barriers to ownership — Gold is a physical asset that necessitates secure storage while Bitcoin requires its own distinct custodial arrangements.

Who is buying the ETFs?

Retail investors are the largest holders of spot Bitcoin ETFs. Institutions who file 13F forms with the SEC comprised 21.5% of holdings at the end of Q3 2024, while non-filers held 78.5%. "Non-filers" are impossible to parse, but the strong majority are retail investors who now own over 4% of the 21 million Bitcoin supply via the ETF.

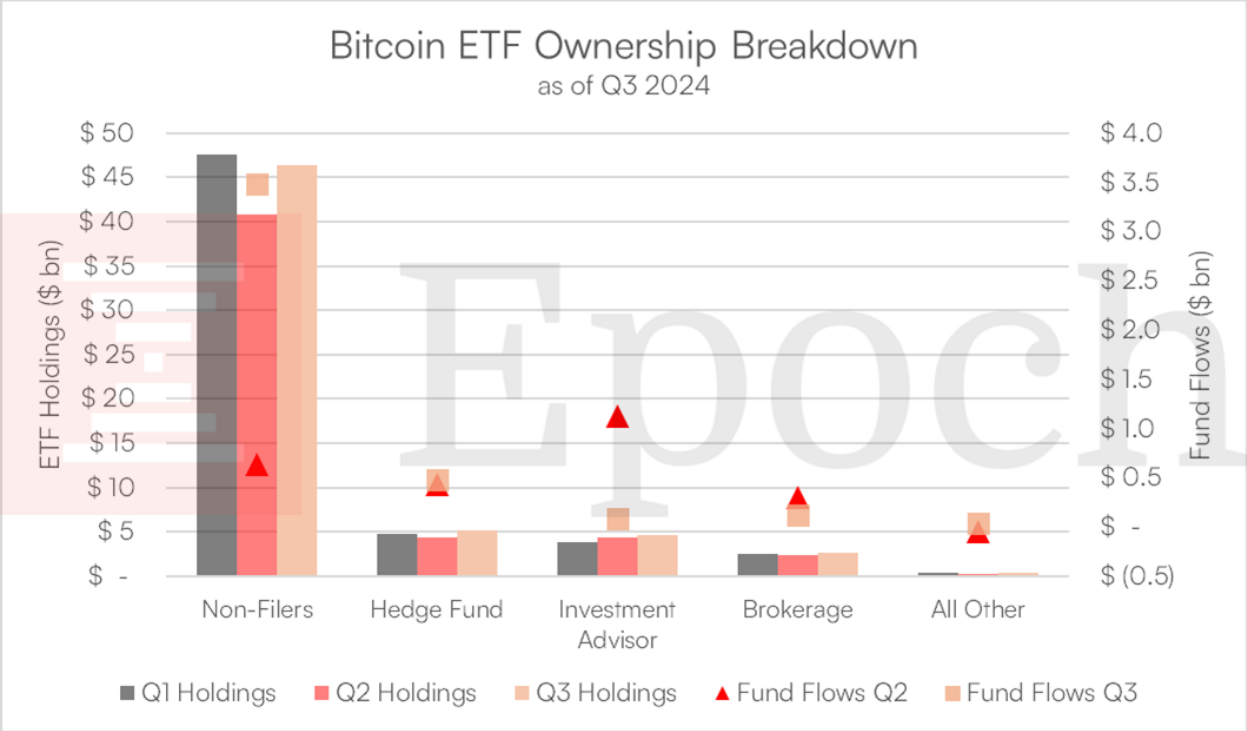


Source: Bitcoin Treasuries[40]

Retail investors have continued to buy since the ETFs launched in January 2024. Despite a decline in Bitcoin's price from Q1 to Q2, retail investors (non-filers) drew $637.5m in inflows. Retail inflows then soared to ~$3.5bn in Q3, bringing total holdings over $45bn. Today, retail investors likely hold close to $95bn due to bitcoin's rise. The biggest Q2 inflows came from

[39] Source: https://8marketcap.com/
[40] Bitcoin treasuries: https://bitcointreasuries.net/

investment advisors at $1.1bn or 26% of their Q2 holdings, but their buying fell sharply in Q3. Hedge fund inflows were consistent between $400-500m in Q2 and Q3.



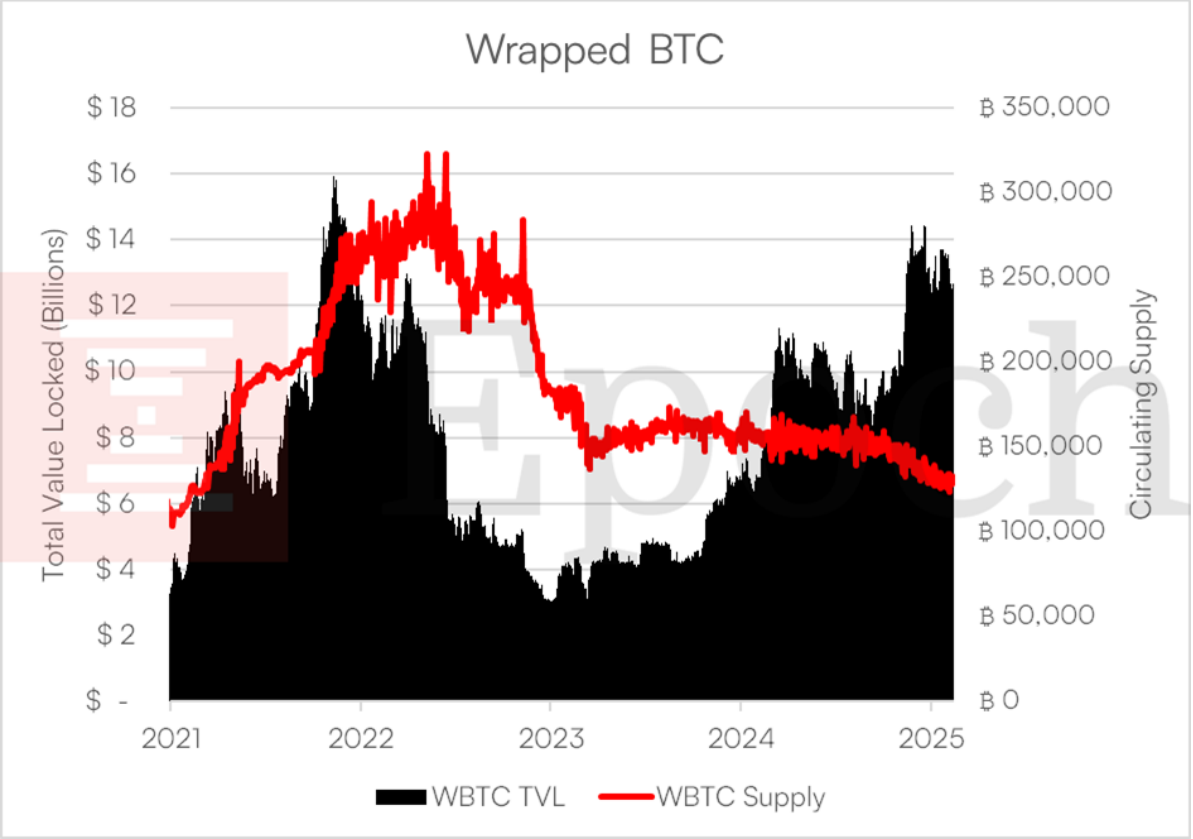
Source: NYDIG[41]

Non-Native BTC

Similar to how the ETFs offer indirect ownership of Bitcoin, non-native BTC is a way to "own" Bitcoin on other blockchains. Tokens like WBTC and cbBTC are ERC20 tokens backed by Bitcoin. While they are not direct ownership of Bitcoin itself, many users of ETH, SOL, and Base have gravitated to these tokens to gain BTC exposure outside the Bitcoin ecosystem.

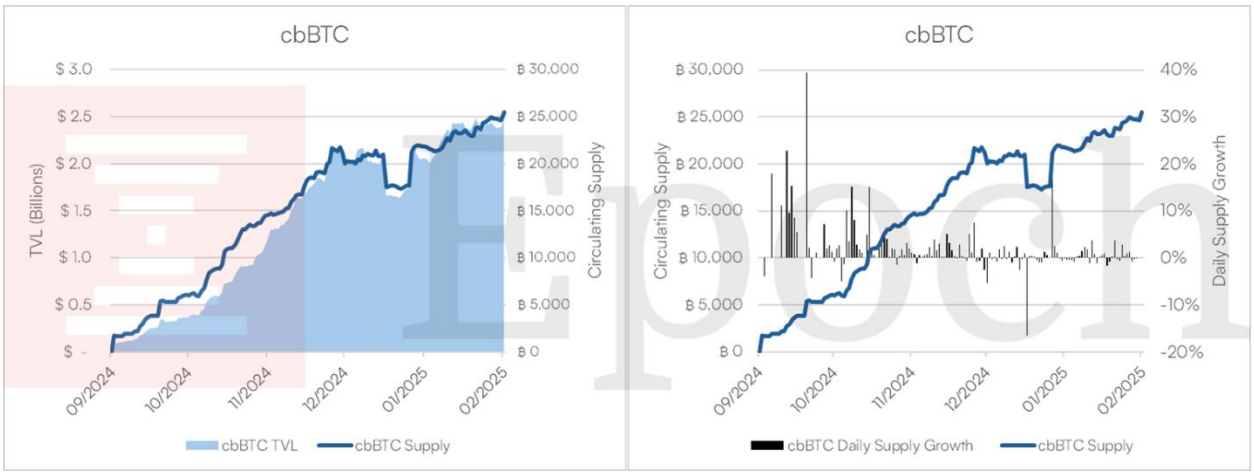
Wrapped BTC (WBTC) experienced rapid growth in 2021-22, reaching over 300k Bitcoin in circulating supply, but has since tapered off. Supply remains near 135k BTC as of February 2025, representing over $12.6bn or 0.6% of total BTC supply. WBTC is a meaningful portion of Bitcoin, but we interpret its supply's flattening as Bitcoiners opting for direct ownership and competing forms of exposure.

[41] NYDIG ETF data on 13-F filings: https://www.nydig.com/research/where-could-bitcoin-go-this-cycle



Sources: Glassnode, Defillama[42]

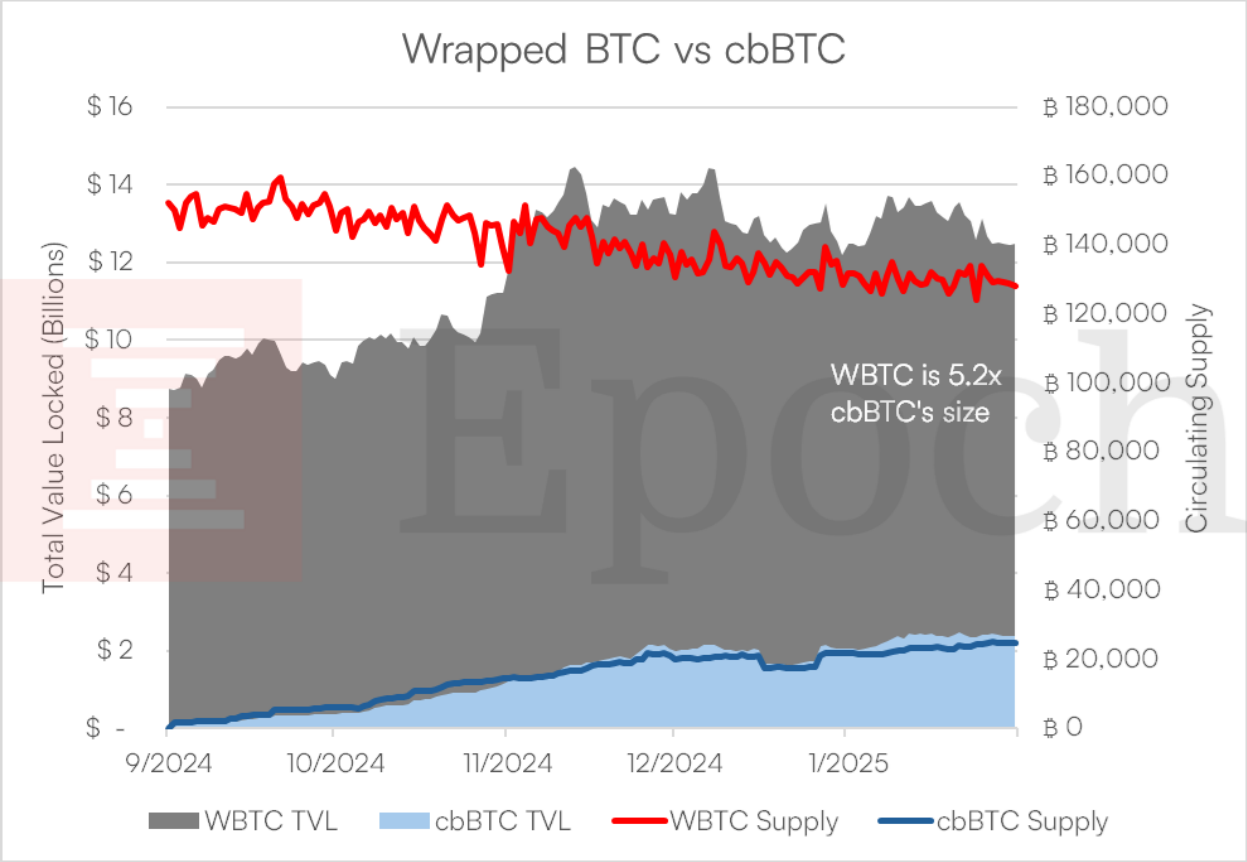
cbBTC, Coinbase's version of wrapped BTC, has grown significantly since launching the token on Sept. 12, 2024. It broke $100m in market cap on its first day and $1bn within 2 months of launch. Supply has expanded over ~14x in less than six months since its first day.



Source: Dune[43]

[42] WBTC data from Defillama: https://defillama.com/protocol/wbtc?denomination=BTC and https://glassnode.com/
[43] cbBTC data: https://dune.com/queries/4063928/6842874

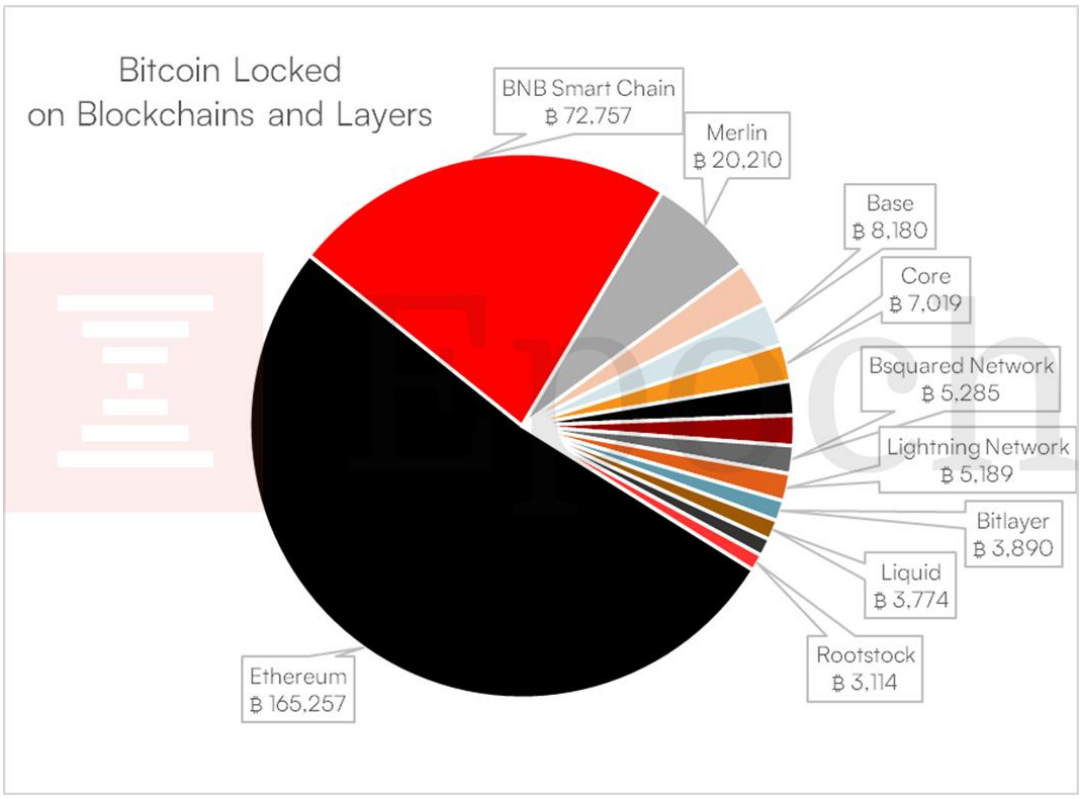
WBTC remains dominant at 5.2x cbBTC's size today, but the gap is narrowing. Coinbase's ability to leverage its extensive existing customer base and its delisting of WBTC makes it likely that this trend will continue.



Use of existing L2s

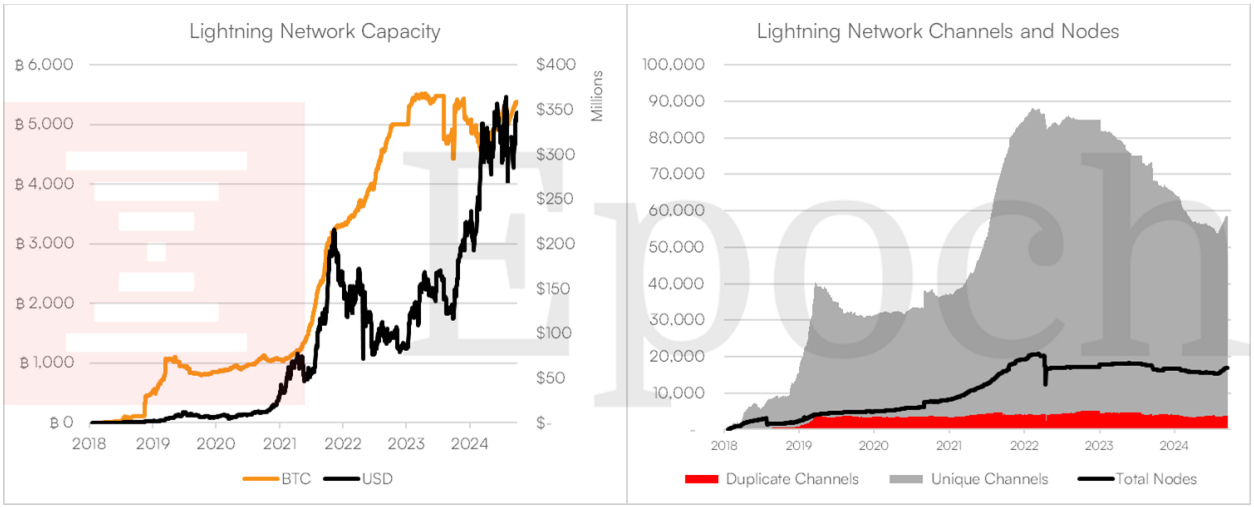
Bitcoin Layer 2 solutions aim to expand the capabilities of Bitcoin's base layer and close the functionality gap between BTC and alternative cryptocurrency blockchains that offer more developed applications. As the Bitcoin L2 ecosystem develops, we expect much of the total value locked and volumes from other blockchains will migrate to Bitcoin for its security properties, monetary value, and disintermediation of infrastructure.

The amount of Bitcoin locked in L2s today is well distributed among the major projects.



Source: Bitcoin Layers[44]

The Lightning Network is the most notable Bitcoin L2 due to its unilateral exit guarantees. Lightning allows users to send/receive Bitcoin and alleviates Bitcoin's scalability limitations by enabling theoretically unlimited throughput. Lightning's capacity has steadily increased since 2018 to >$300m today.



Source: Bitcoin Visuals[45]

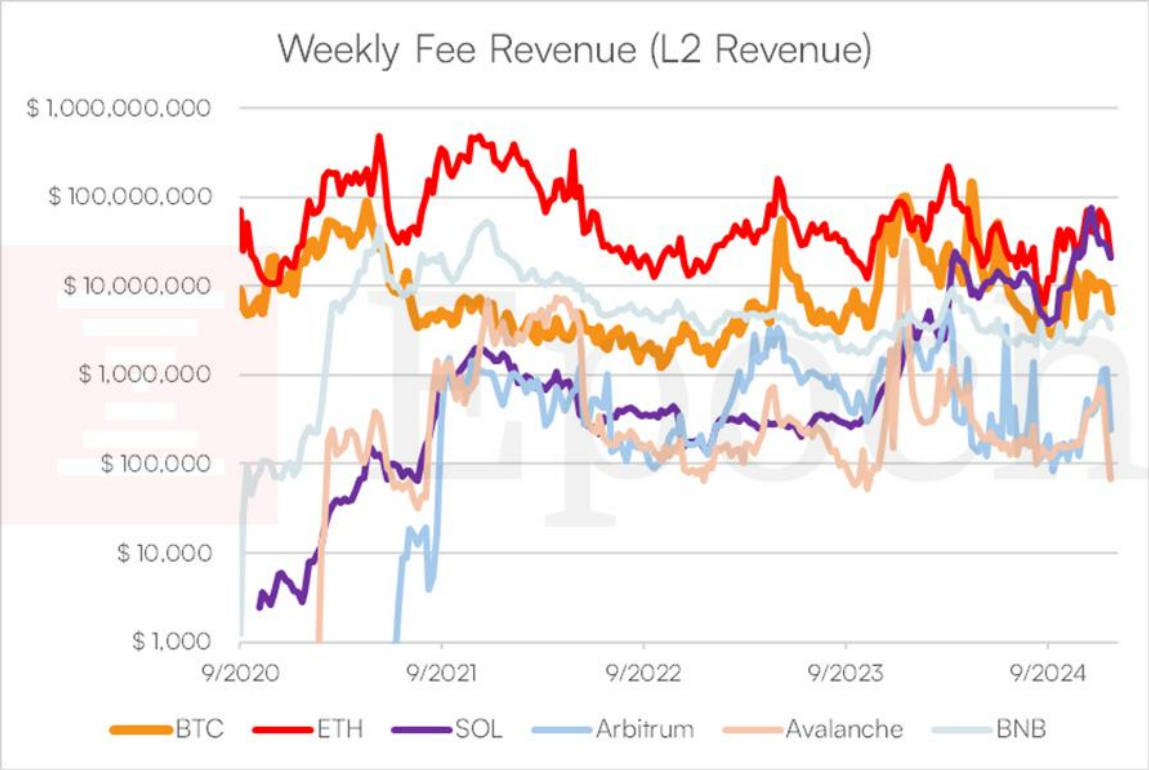
[44] L2 data from Bitcoin Layers: https://www.bitcoinlayers.org/
[45] Lightning network data: https://bitcoinvisuals.com/

BTC vs. Other Chains

Bitcoin L2 applications have developed slower than other cryptocurrencies, producing a divergence between Bitcoin and others among market capitalization vs. venture investment and onchain metrics. Bitcoin has maintained a leadership position among cryptocurrency valuations since inception, but Ethereum, Solana, and others attract greater venture capital investment. ETH and SOL originated with L2 applications as a founding attribute, whereas Bitcoin requires core changes to alter its functionality. Regardless of whether Bitcoin's methodical development is an advantage, these technological differences have drawn billions in venture investment to non-BTC cryptocurrency development and fueled their onchain metrics to overshadow those of Bitcoin.

Onchain Metrics

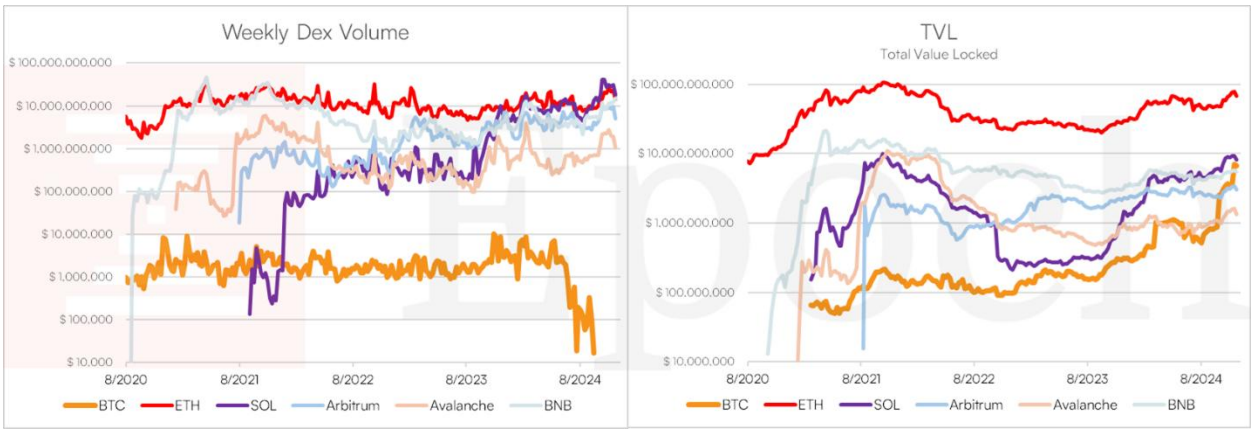
Despite Bitcoin's market capitalization, it lags other cryptocurrencies in terms of onchain metrics. While Bitcoin is nearly sixfold the market capitalization of Ethereum and 20 times that of Solana, it lags both in fee revenue.[46]



Source: Artemis[47]

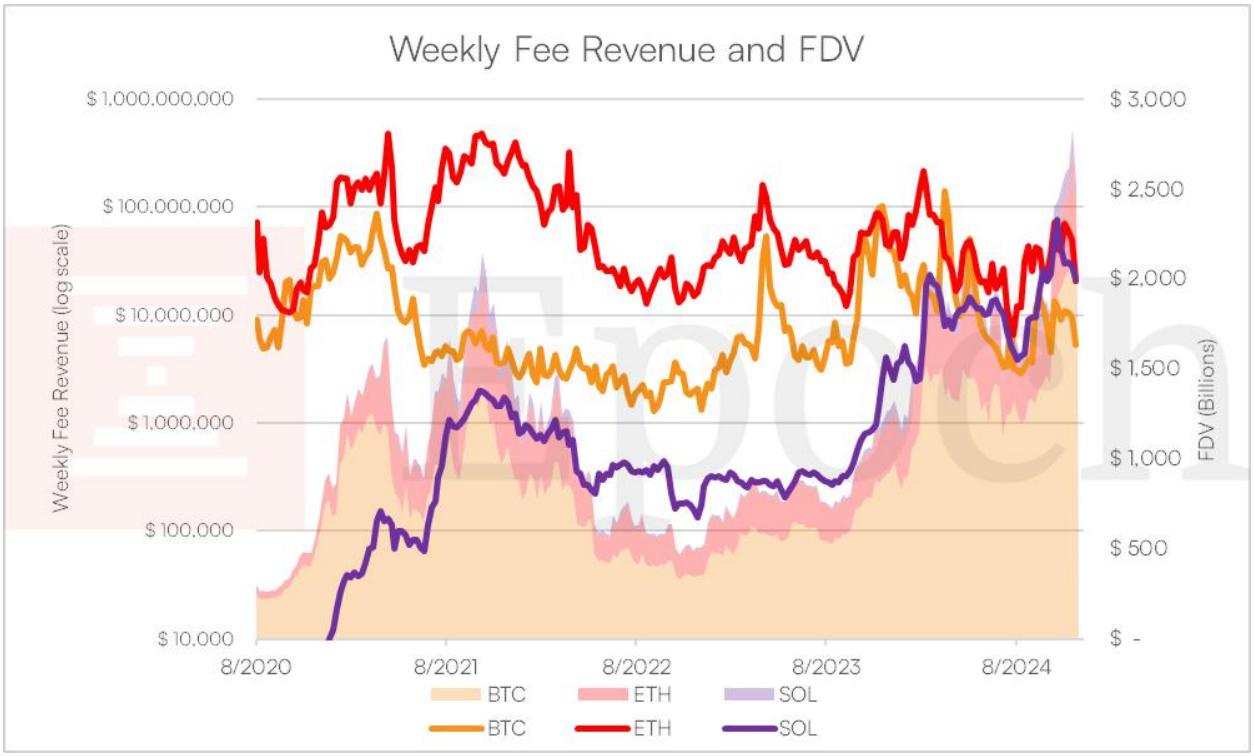
[46] Calculations use the average weekly fee revenue over the preceding 8 weeks.
[47] Onchain data: https://app.artemisanalytics.com/home

The gap in decentralized exchange volume is even more pronounced. While Bitcoin has narrowed the difference in total value locked, ETH's remains ~16 times higher as of the end of 2024.

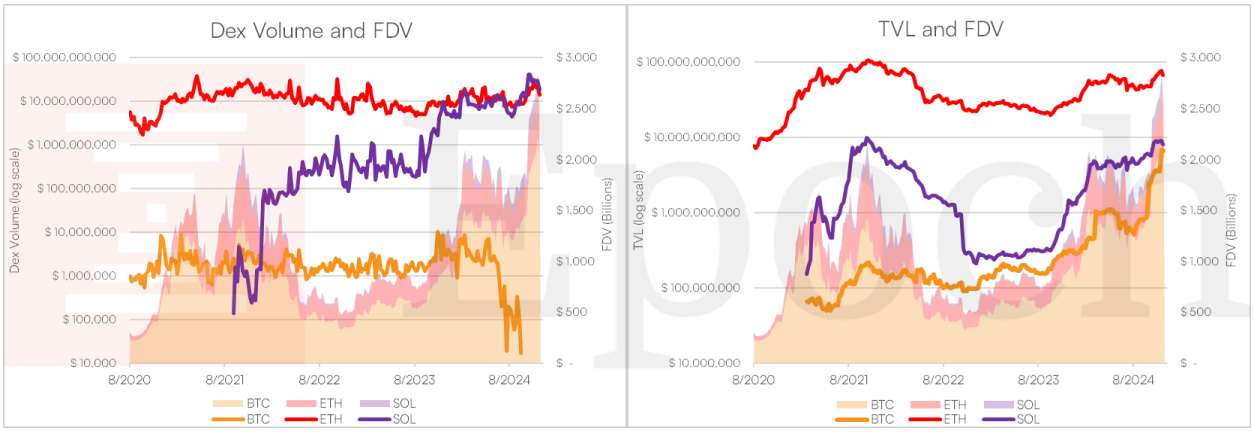


Source: Artemis[48]

Comparing Bitcoin, Ethereum, and Solana's fully diluted valuation reveals a paradox: Bitcoin commands a higher valuation despite trailing in weekly revenue and DEX volume. Though this is logical because Bitcoin's ecosystem has less development, still the magnitude of discrepancies is significant.



[48] Onchain data: https://app.artemisanalytics.com/home

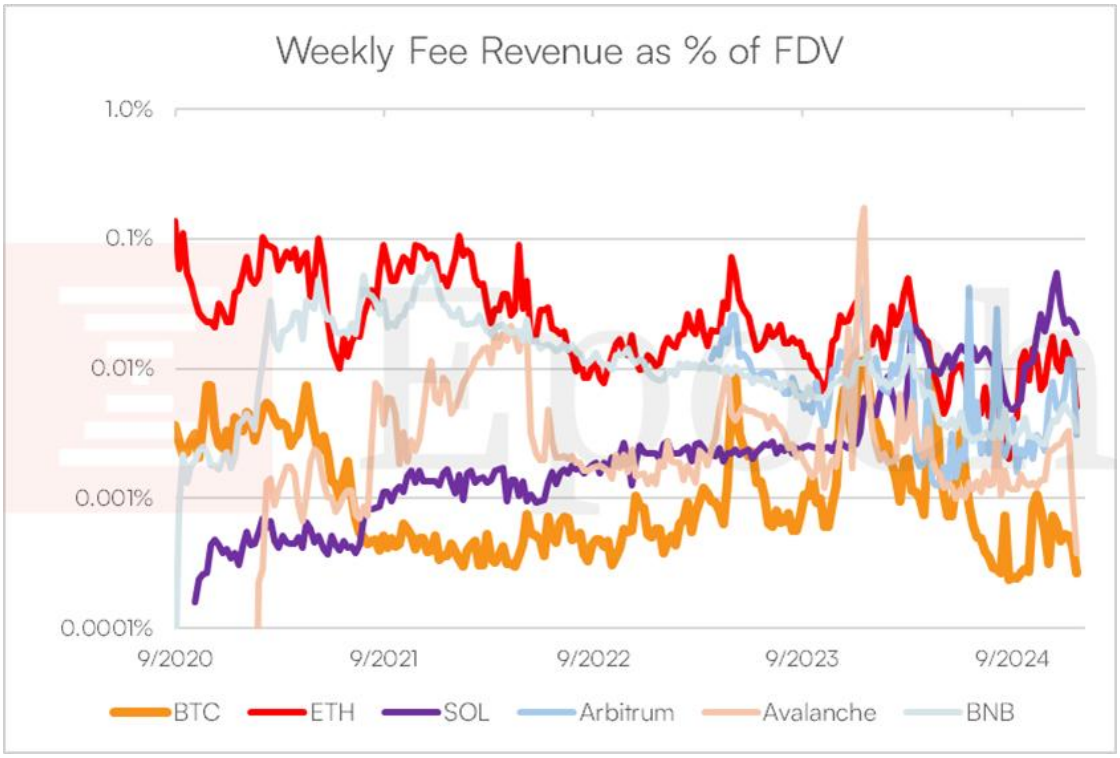


Source: Artemis[49]

Any growth from the Bitcoin native application ecosystem can reduce the gap with competing L1 cryptocurrencies, driving substantial growth on both a relative and absolute basis.

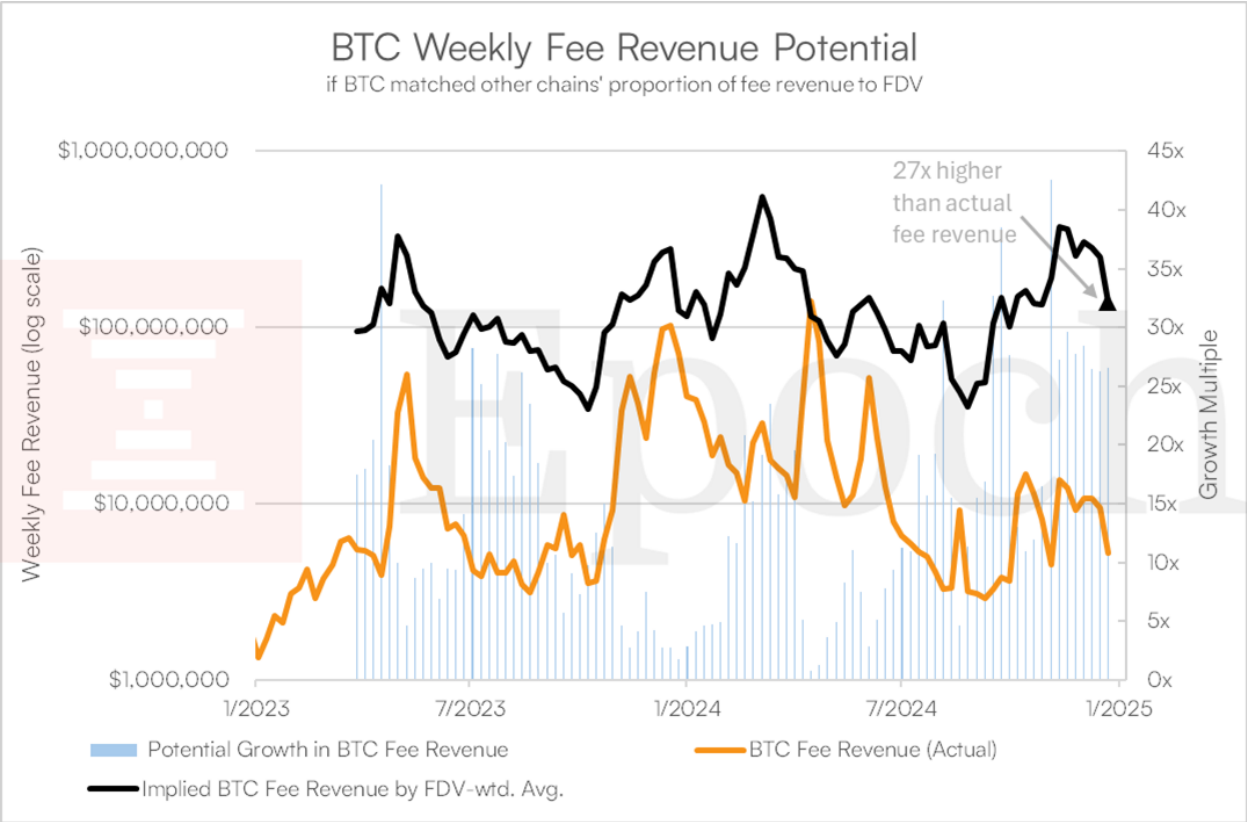
Bitcoin Native Protocols Expectations

Bitcoin market dominance and widespread recognition could draw a migration of capital towards emerging Bitcoin native protocols. By analyzing Bitcoin's outsized market capitalization relative to other chains, we estimate potential growth in protocol revenue, DEX volume and TVL, especially as its native ecosystem matures.



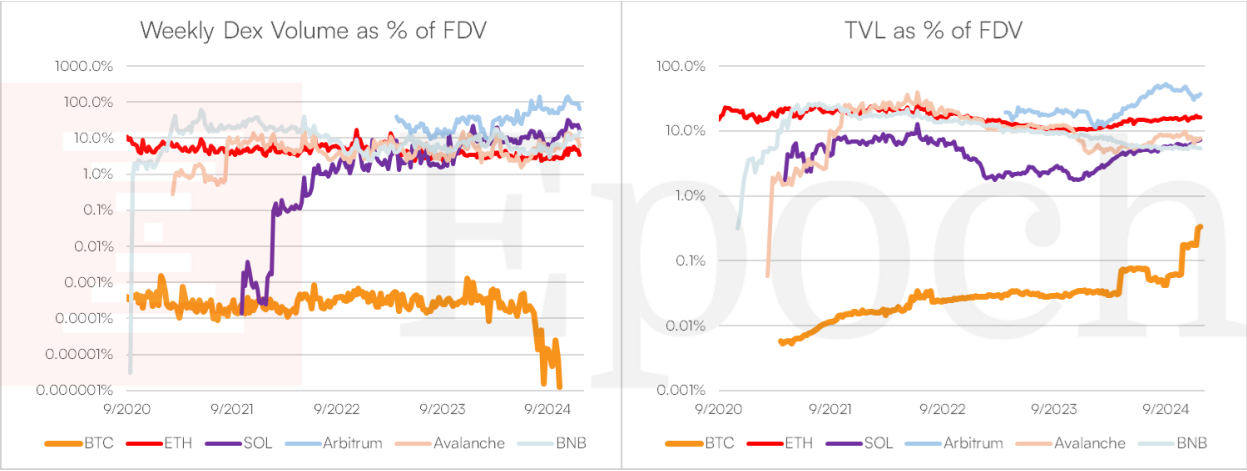
[49] Onchain data: https://app.artemisanalytics.com/home

By applying the revenue/fully diluted valuation (FDV) metric as a weighted average across alternative cryptocurrency chains, Bitcoin's implied fee revenue is 27 times that of its current fee revenue.



Source: Artemis[50]

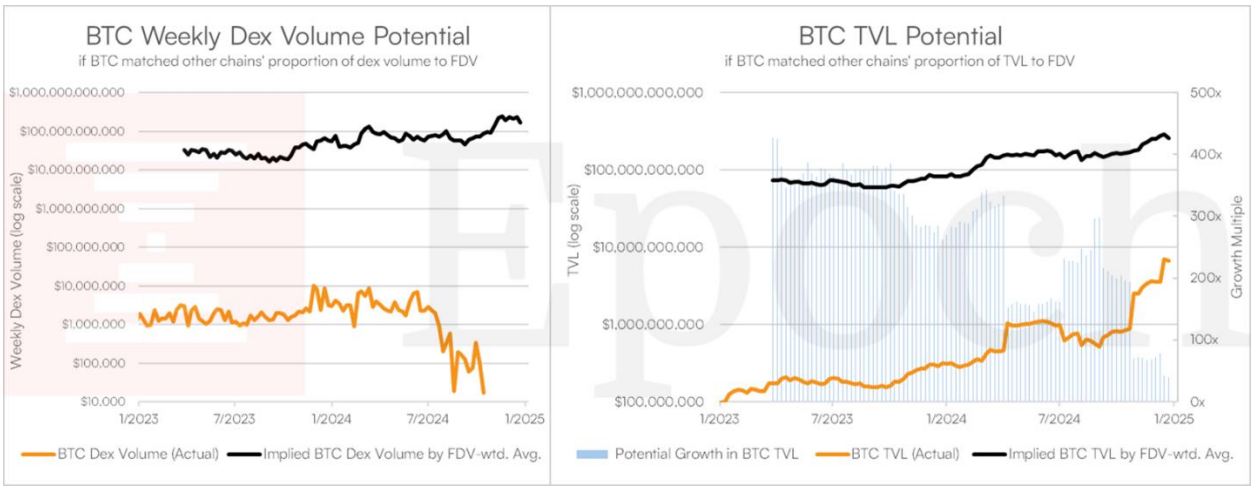
Similarly, DEX volume and TVL sharply underperform other chains as a percentage of FDV.



Source: Artemis[51]

[50] Onchain data: https://app.artemisanalytics.com/home
[51] Onchain data: https://app.artemisanalytics.com/home

DEX volume on BTC is near zero, though it can aspire to ~$166 billion if it mirrors other chains' ratios with FDV. Total value locked on Bitcoin surged over 2,000% in 2024, and yet, its current FDV implies ~$260 billion in potential TVL compared to ~$7 billion today.



Source: Artemis[52]

We anticipate Bitcoin-native protocol growth to accelerate through its current and upcoming cycles. If Bitcoin's ecosystem expanded to match the proportions of alternative cryptocurrency ecosystems, it could drive approximately 27 times more fee revenue, generate some DEX volume, and increase TVL by roughly 39-fold.[53]

However, we expect Bitcoin's native ecosystem to trail the broader cryptocurrency ecosystem. We believe that many crypto use-cases currently rely on unsustainable token incentive models — a practice that will exist in Bitcoin-native protocols but to a lesser degree. As the Bitcoin-native protocol ecosystem grows, many protocols will adopt bitcoin as their incentive token, potentially dampening short-term demand. As sustainable use-cases continue to appear, the ultimate market size remains uncertain.

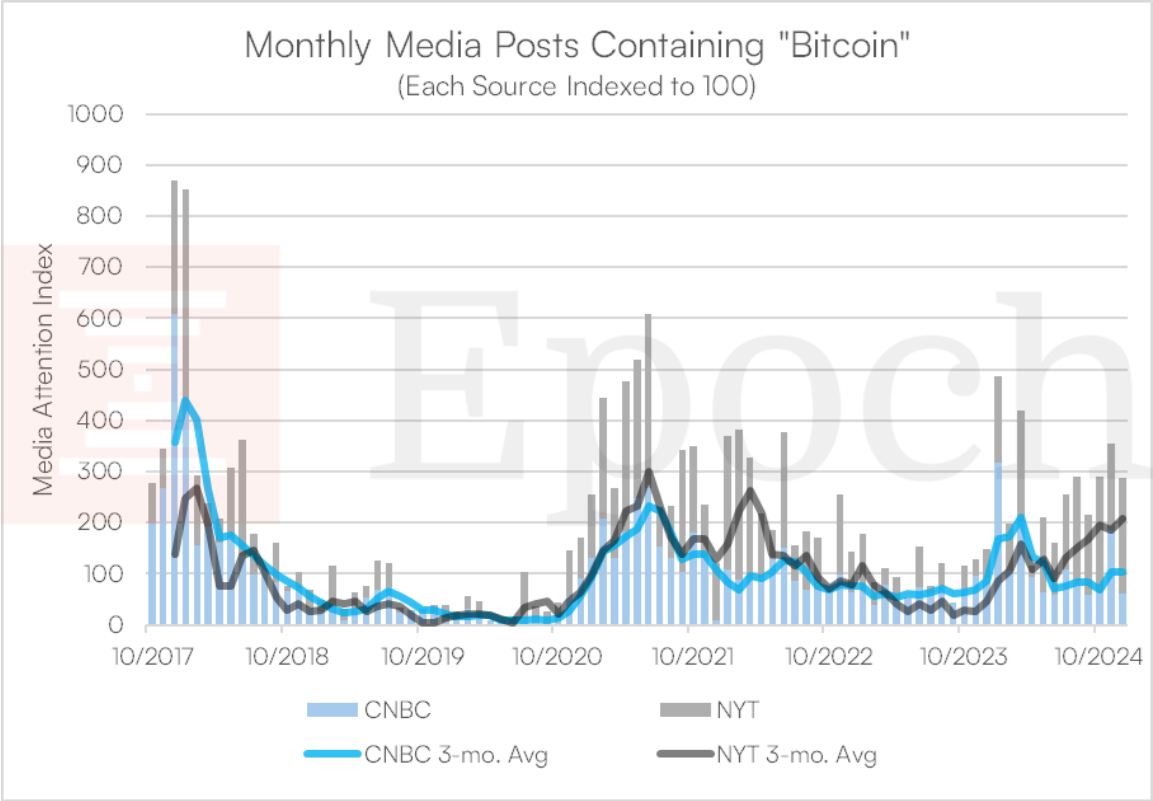
Bitcoin in the Media

Bitcoin's adoption and onchain usage influence its market capitalization, which in turn drives attention from traditional media, social media, and internet searches. Media coverage exhibits clear cyclical patterns that align with Bitcoin's price movements. Trough levels during bear markets have increased compared to previous cycles, suggesting Bitcoin's growing societal entrenchment.

Articles mentioning "bitcoin" in CNBC and New York Times coverage peaked in 2017, reached a low in 2019, and have since maintained more consistent coverage while following general price action.[54] CNBC's Bitcoin coverage reached an all-time high in late 2017, nearly doubling the

[52] Onchain data: https://app.artemisanalytics.com/home
[53] Figures are weighted to FDV. If BTC price doubles, fee revenue would grow 40x instead of 20x.
[54] Our data is indexed relative to the number of articles each website posted.

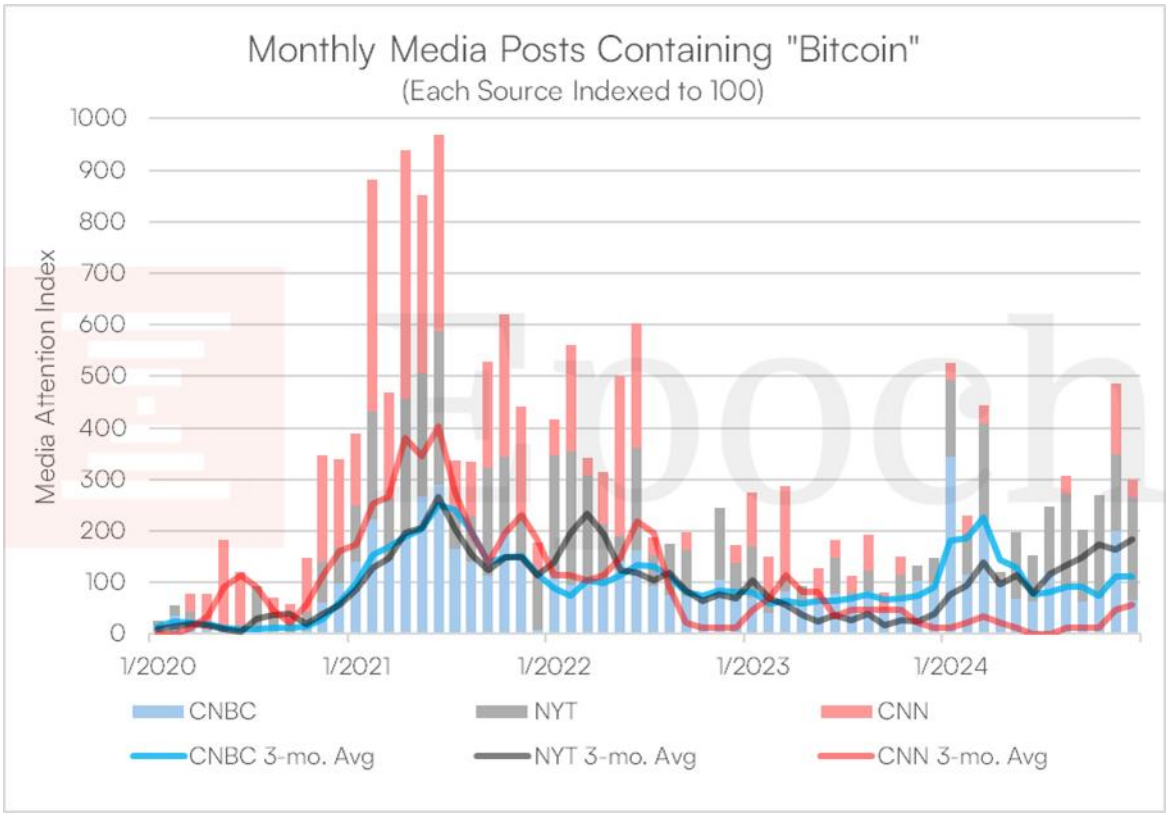
second highest month — January 2024's spot bitcoin ETFs coverage. Since 2021, CNBC continued covering Bitcoin through the recent bear market, likely reflecting Bitcoin's deeper integration with retail investors and institutional finance. The New York Times reached peak coverage in 2021, and bolstered its Bitcoin attention throughout 2024. Still, current media coverage from CNBC and the New York Times remains below prior cycle peaks.



Source: CNBC, The New York Times[55]

Recent data including CNN shows a stark contrast between 2021 and present coverage. CNN's Bitcoin-related articles have declined significantly. Despite a brief uptick in November 2024, its coverage of Bitcoin over the past 18 months remains subdued relative to prior years. The disparity between the New York Times and CNN in 2024 — both non-financial publications — is noteworthy.[56]

[55] Sources: https://www.cnbc.com/ and https://www.nytimes.com/
[56] CNN has fewer datapoints than NYT and CNBC which may contribute to its greater volatility.

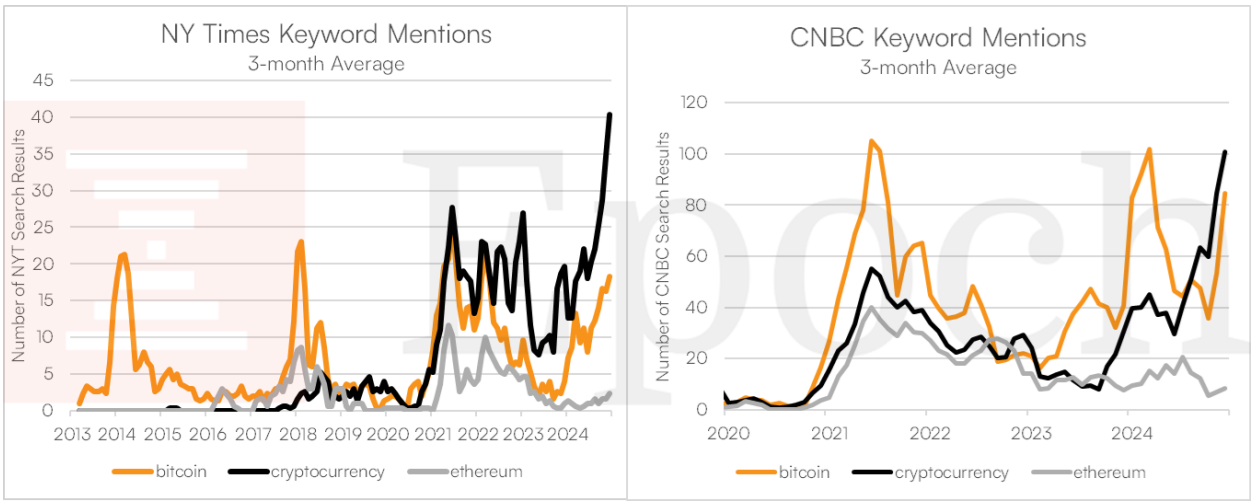


Source: CNBC, The New York Times, and CNN[57]

Comparing "bitcoin" with related search terms from the New York Times and CNBC reveals distinct patterns. The New York Times' coverage closely tracks bitcoin's price cycles, with a notable divergence since 2021 between the terms Bitcoin, cryptocurrency and Ethereum. While all three keywords spiked in early 2021 as bitcoin surpassed $50,000, "cryptocurrency" maintained prominence during the bear market, partly due to the collapse of FTX and other platforms.

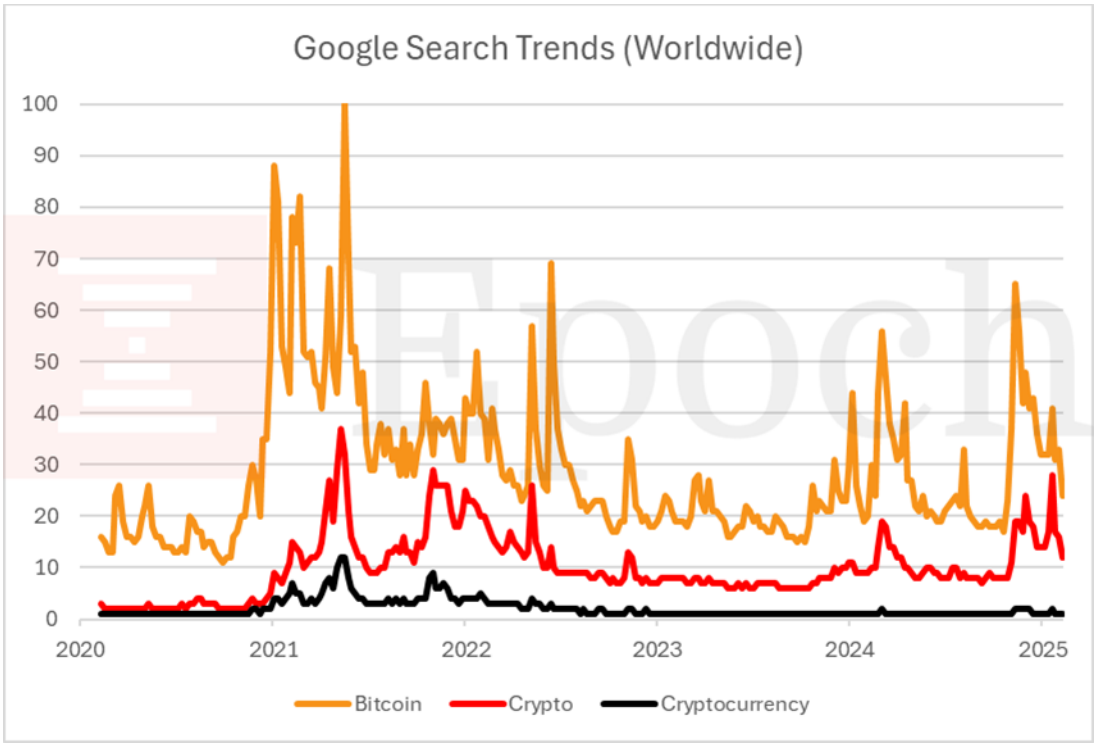
From 2020 through today, CNBC data largely parallels the New York Times, except for heightened Bitcoin coverage in 2021 and early 2024 during the launch of the spot Bitcoin ETFs. The 2024 surge in "bitcoin" and "cryptocurrency" coverage from both outlets, contrasted with minimal growth in "Ethereum" coverage echoes Bitcoin's expanding dominance and reinforces the narrative of "Bitcoin vs. everything else." [58]

[57] Sources: https://www.cnbc.com/ and https://www.nytimes.com/ and https://www.cnn.com/
[58] Media in our data may be included for more than one keyword. Data for "cryptocurrency" may be lifted by articles about bitcoin that also mention cryptocurrency whereas articles about cryptocurrency broadly may not mention bitcoin.



Traditional media coverage reflects news organizations' perception of public interest, while social media trends should serve as both leading indicators for traditional media and a more direct measure of public sentiment.

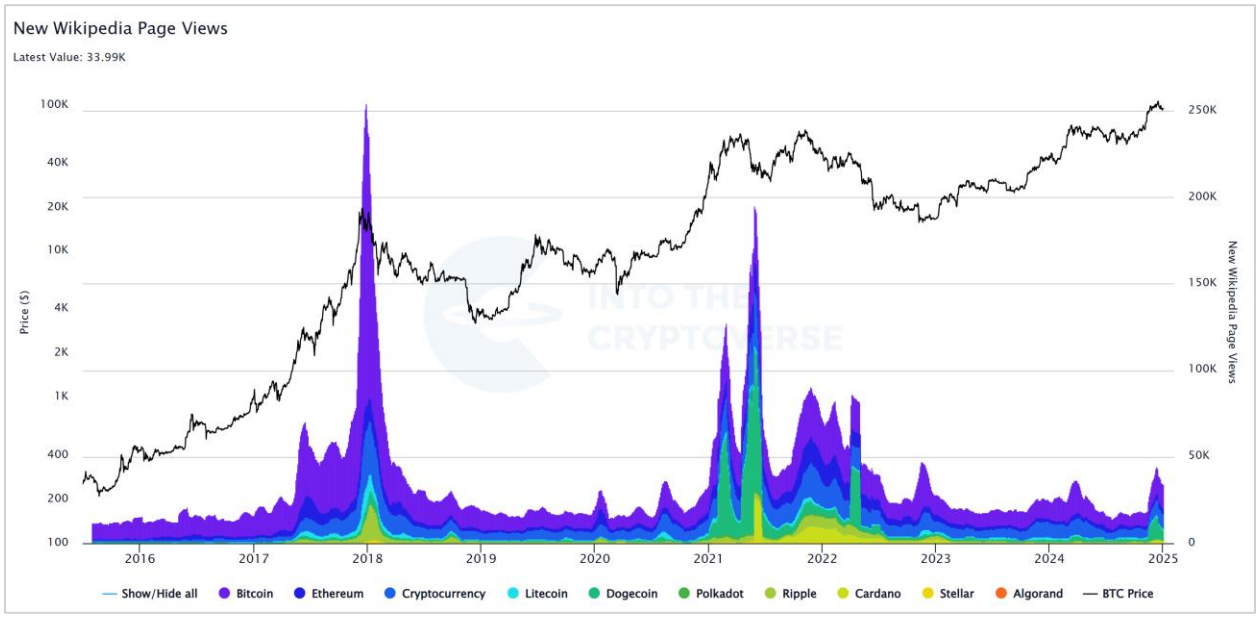
Google Search trends and Wikipedia page views, which capture one-off searches for information, naturally correlate with Bitcoin's price. Over the past five years, Google trends peaked in 2021 with late 2024 activity reaching approximately 65% of that level as Bitcoin topped $100,000.



Source: Google Trends[59]

[59] Google Trends: https://trends.google.com/trends/

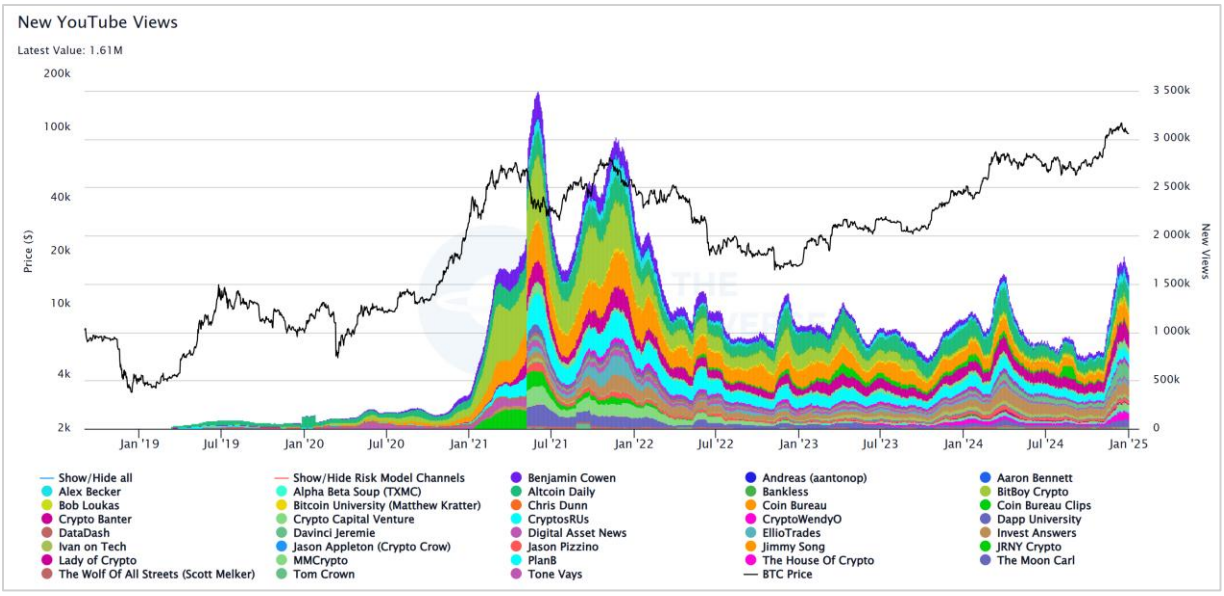
Wikipedia page views spiked in late 2024, though the uptick is trivial relative to Google trends. This disparity suggests public interest focused primarily on price movements rather than deeper understanding of Bitcoin's fundamentals. However, this price-driven attention could eventually catalyze broader curiosity about Bitcoin's underlying nature, potentially leading to increased Wikipedia engagement over time.



New Wikipedia Page Views, Daily, 30-day Moving Average; Source: Into the Cryptoverse[60]

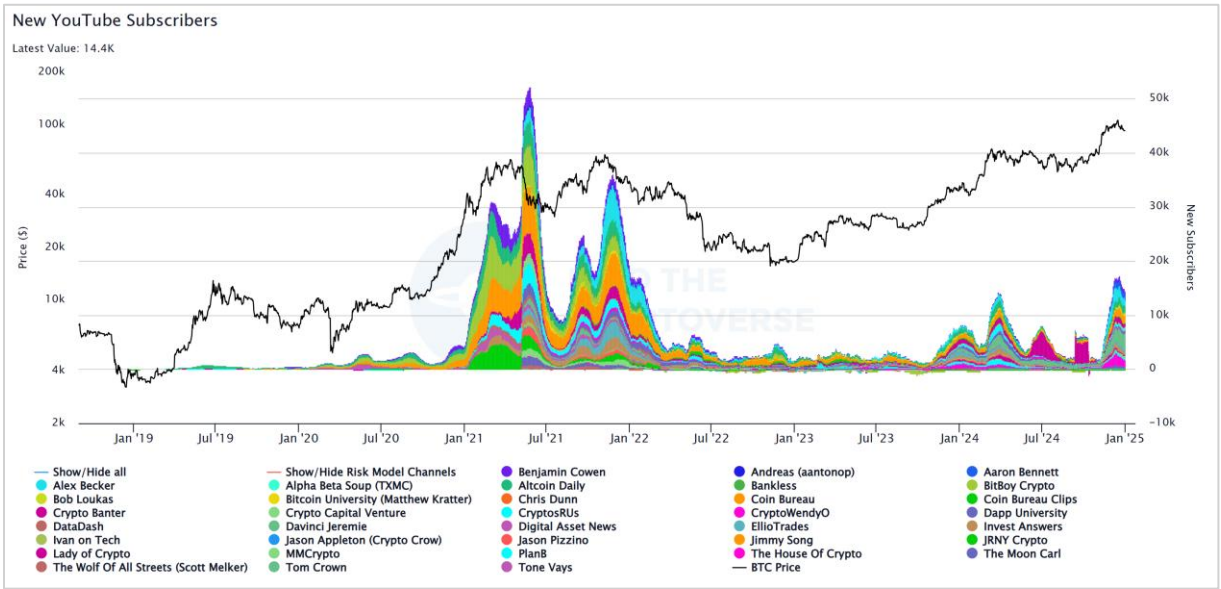
Analysis of YouTube engagement — both views and new subscribers to Bitcoin-related channels — mirror broader attention trends but with notably lower volatility. The drawdown in YouTube views from peak to trough appears more modest compared to Google Search and Wikipedia view patterns. YouTube content creators typically increase video production during bull markets, which should amplify volatility in both views and subscriber growth. This makes the sustained engagement on YouTube during bear market conditions particularly meaningful.

[60] Source: https://intothecryptoverse.com/



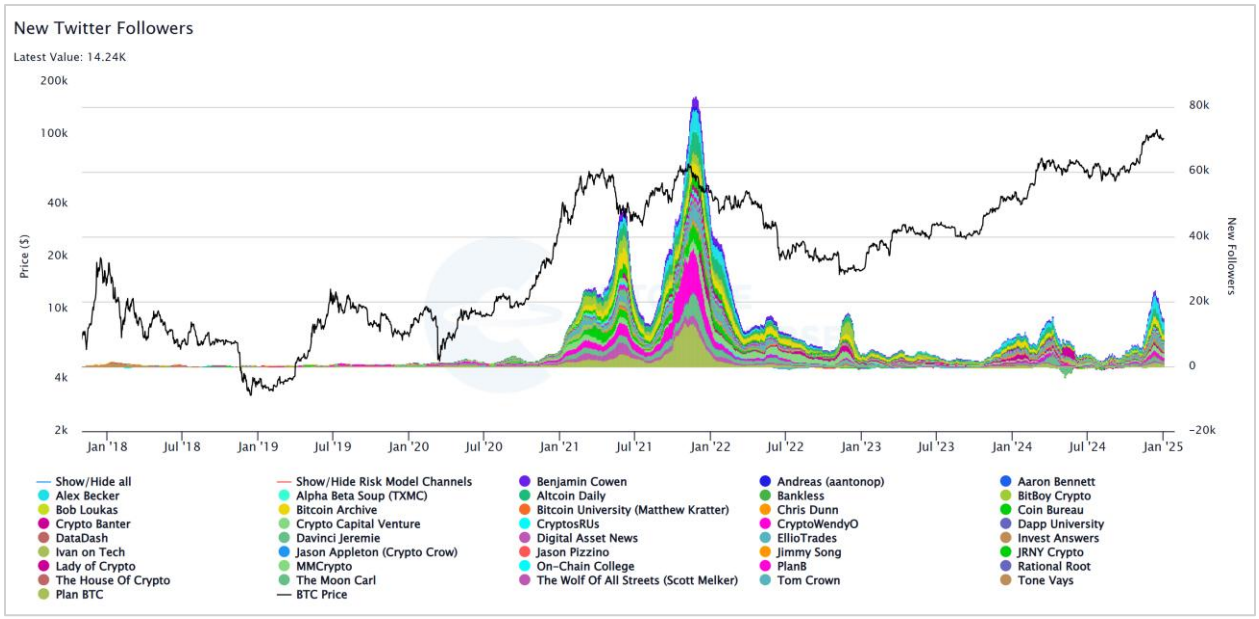
New Youtube Views, Daily, 30-day Moving Average; Source: Into the Cryptoverse[61]

Views and searches represent one-time events— people seeking immediate information — whereas subscribers and followers indicate an expectation of ongoing interest. After more than a year of minimal growth, both YouTube subscribers and Twitter followers of analyst accounts are rising in 2024. Though bear markets typically lead some new subscribers to disengage or ignore content, YouTube data suggests many will continue their Bitcoin education regardless of market conditions.



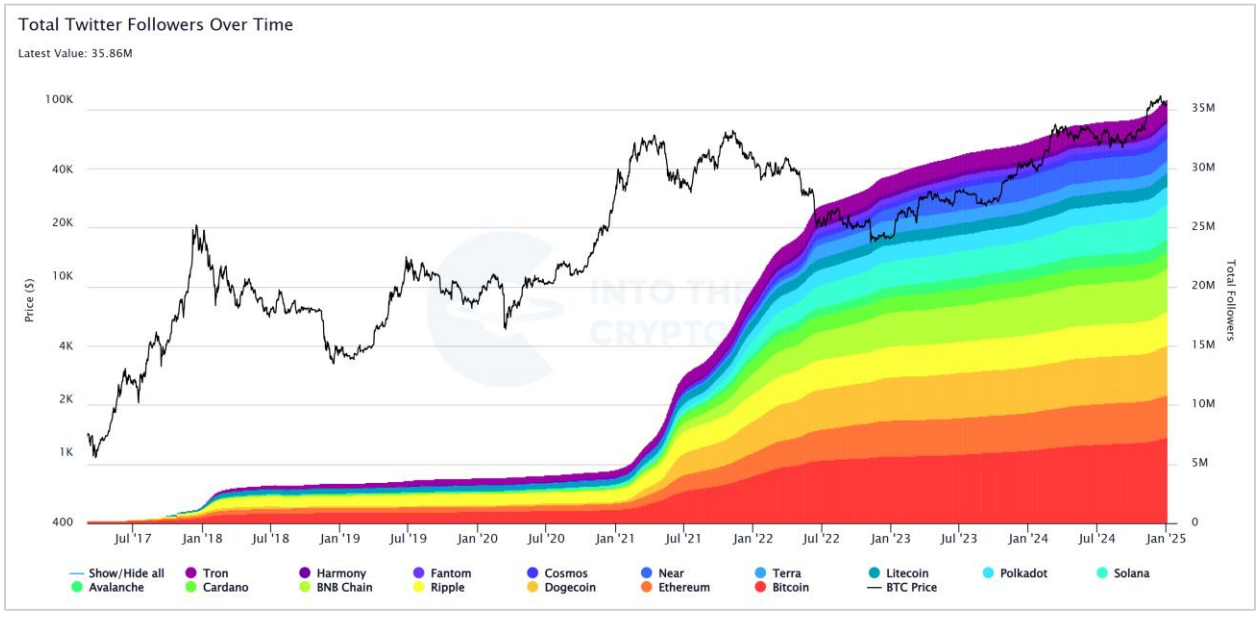
New Youtube Subscribers, Daily, 30-day Moving Average; Source: Into the Cryptoverse[62]

[61] Source: https://intothecryptoverse.com/
[62] Source: https://intothecryptoverse.com/



New Twitter Followers to Analysts, Daily, 30-day Moving Average; Source: Into the Cryptoverse[63]

Twitter followers for @Bitcoin and other cryptocurrencies' accounts experienced explosive growth in 2021. Growth since 2022 has maintained a slow but steady place, with signs of reacceleration emerging one in the past one to two months. This recent uptick may herald an impending boom in Bitcoin and crypto interest.

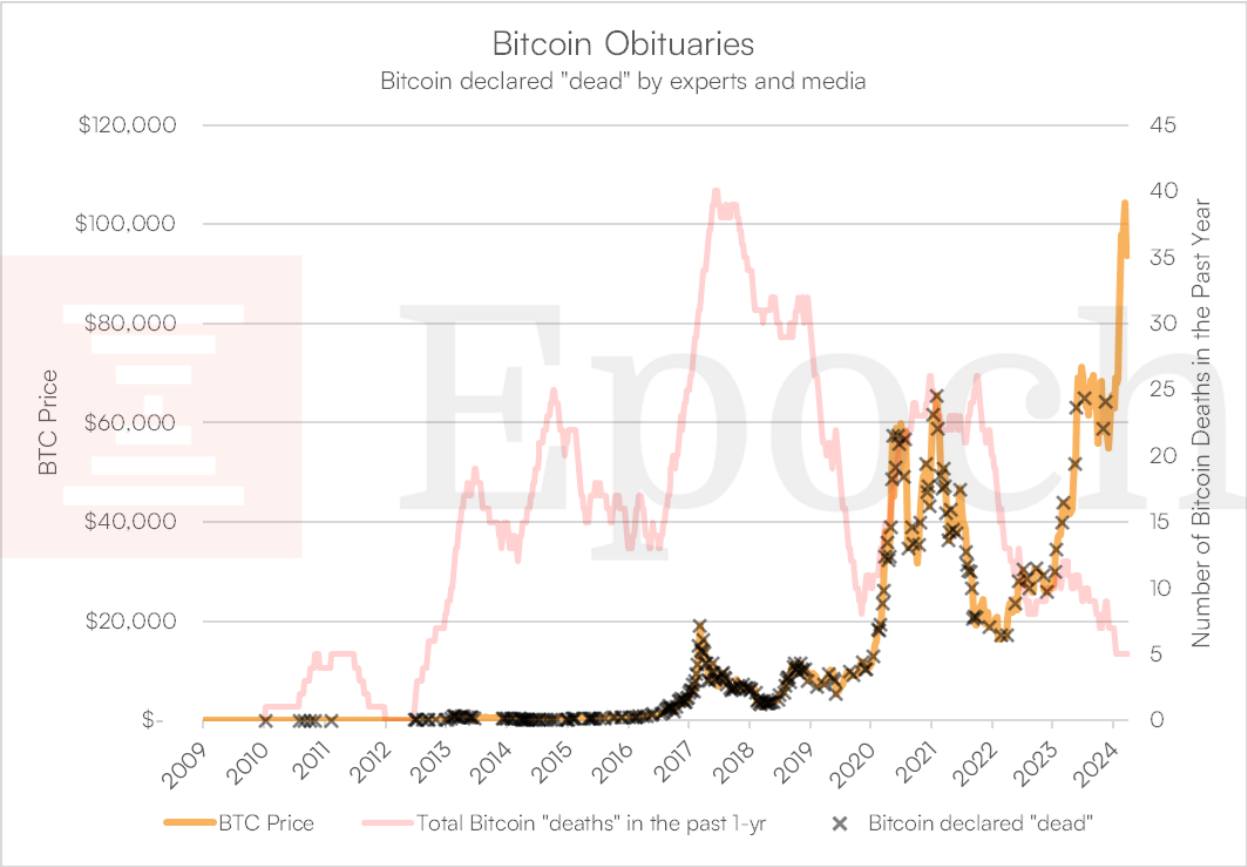


Total Twitter Followers to Layer 1 Accounts, Daily, 30-day Moving Average; Source: Into the Cryptoverse[64]

Bitcoin obituaries — tracking instances where "experts" and media declare Bitcoin dead — illustrate the historically defamatory coverage from media and traditional finance. However,

[63] Source: https://intothecryptoverse.com/
[64] Source: https://intothecryptoverse.com/

reported Bitcoin "deaths" have declined sharply from their 2017 peak when viewed over a one-year period. The persistent narrative that Bitcoin is a scam or Ponzi scheme appears to be fading as even some of Bitcoin's harshest critics begin to acknowledge its utility.



Source: Bitcoin is Dead[65]

Current legacy media coverage and individual interest, as reflected in social media data, suggest that the bull market has plenty of upside and time remaining. While media metrics show upward momentum, they remain below 2021 levels, and significantly under late 2017's exuberance. Traditional media attention towards Bitcoin is increasing, driven partly by the ETFs and the $100,000 price level, though some outlets like CNN show only marginal increases from bear market levels. Social media and Google Search trends spiked as price broke through $70,000 in late 2024. Though attention correlates with price in the short term, we expect baseline interest levels to rise — irrespective of price action — gradually over time.

[65] Source: https://bitcoindeaths.com/

Conclusion

Bitcoin has experienced unprecedented adoption growth since its 2009 inception, driving its unparalleled price performance across major asset classes.

- **Price Performance:** Bitcoin has defined investment portfolio performance over the past decade, delivering unmatched returns despite its volatility.
    - **Volatility:** Contrary to popular belief, Bitcoin's volatility is comparable to some mega-cap stocks. Accounting for its volatility, Bitcoin has consistently outperformed other asset classes over four-year timeframes on a risk-adjusted basis.
    - **Correlations:** Bitcoin shows modest correlation with traditional assets, serving as a portfolio diversifier. It may continue to do so as Bitcoin's narrative shifts from a speculative asset to a safe-haven asset like gold, driven by its declining volatility, maturing credit markets, and increased institutional adoption.
    - **Bitcoin Dominance:** Bitcoin's market cap relative to other cryptocurrencies continues to expand as capital migrates from other chains. We expect this to continue over the long run.
- **Bitcoin Adoption:** Global Bitcoin ownership exceeds 400 million people (5% of global population), including approximately 48 million U.S. owners.[66]
    - **Demographics:** Ownership is concentrated to young men, though gender gaps may narrow as risk perceptions ease.
    - **Bitcoin Holdouts:** The greatest adoption barriers including "unstable value" and "lack of government or banking oversight," are diminishing following the launch of spot ETFs and evolving regulatory landscape.

Institutional adoption is approaching an inflection point across multiple sectors:

- **Business Adoption:** Accelerating corporate Bitcoin holdings, and emerging shareholder proposals at mega-cap companies like Microsoft and Amazon signal growing mainstream acceptance. A 15% cash allocation from the top 10 largest companies by market cap would generate over $120 billion in inflows, surpassing current U.S. spot Bitcoin ETFs (roughly $119 billion in AUM).
- **Nation State Adoption:** In 2024, Bitcoin had a breakthrough year with U.S. presidential candidates proposing strategic bitcoin reserves, prompting other countries to explore similar policies. Bitcoin's advantages in real-time settlement, independent custody, liquidity, scarcity, and verification efficiency position it as a superior reserve asset to gold. If countries sought a modest 5% allocation to bitcoin vs. their gold reserves, bitcoin would see approximately $153 billion in inflows.
- **Bitcoin ETF Adoption:** Launched in January 2024, U.S. spot bitcoin ETFs, experienced unprecedented demand and briefly surpassed Gold ETFs in AUM within

[66] Epoch estimates that include *ownership by association*.

their first year. Retail investors account for the majority of inflows, holding 78.5% of the ETFs' AUM as of Q3 2024.

Bitcoin adoption extends beyond ownership to include non-native Bitcoin use, onchain metrics across different networks, and Bitcoin-specific media coverage.

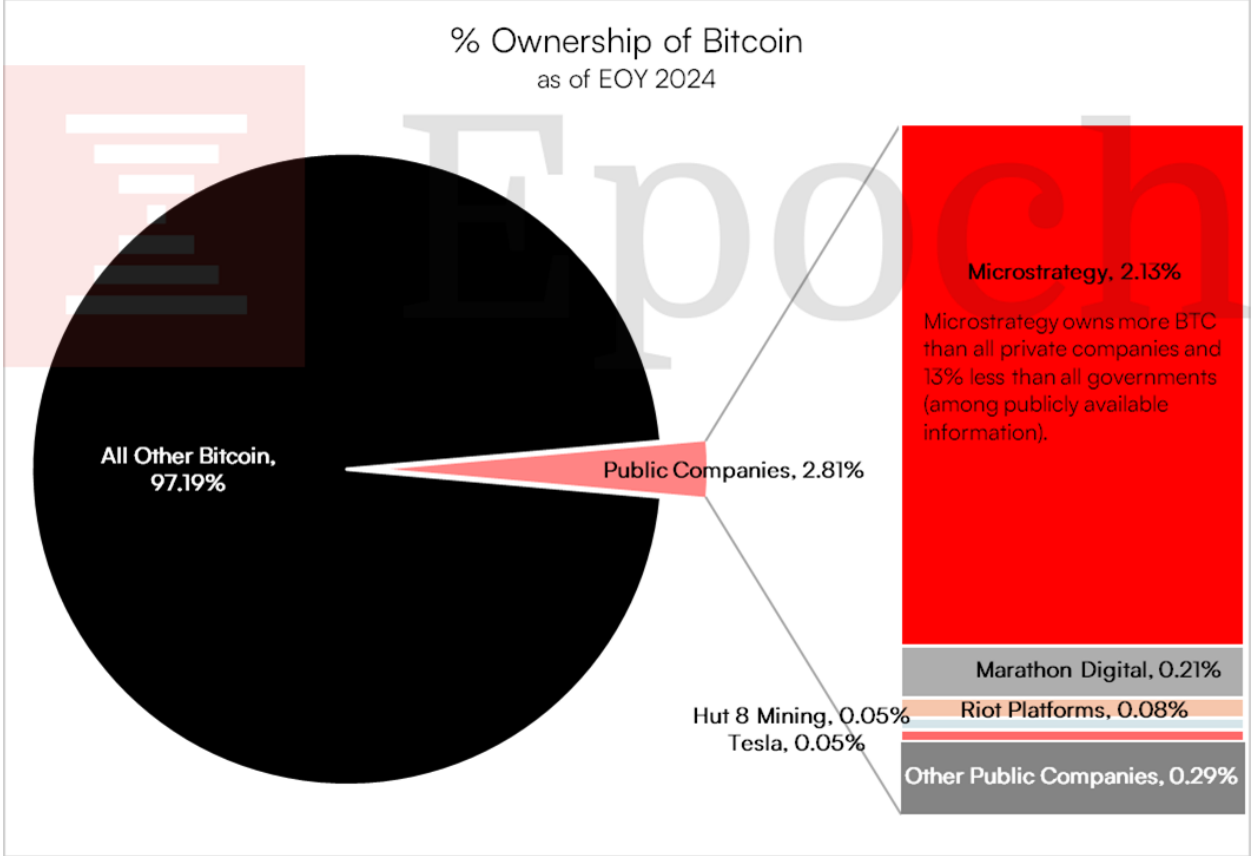
- **Non-native BTC:** Wrapped Bitcoin tokens (WBTC, cbCBTC) provide exposure to Bitcoin on alternative blockchains. They account for less than 1% of the total supply, but reveal demand for Bitcoin from native users of other blockchains.
- **Comparing Onchain Metrics:** Despite Bitcoin's market cap dominance, its limited L2 functionality results in lower TVL, DEX volume, and fee revenue compared to alternative cryptocurrency networks. If the Bitcoin-native application ecosystem catches up to competing L1 cryptocurrencies, Bitcoin's onchain metrics could exponentially grow.
- **Bitcoin Media Attention:** Traditional media (NYT, CNBC, CNN) coverage, and social media data correlates with Bitcoin's price, and despite more interest, levels remain lower than prior peaks. Notably, baseline attention levels during the most recent bear market increased when compared to prior cycles. Combining higher baseline attention with diminishing "Bitcoin obituaries" indicate growing mainstream acceptance.

Looking ahead, Bitcoin adoption is expanding and we believe it is on the precipice of rapid growth, particularly among businesses and nation states. In later sections of this report, we explore Bitcoin business models and the mechanics of Bitcoin on balance sheets.

Bitcoin Corporate Finance

Introduction

Our adoption section highlighted substantial growth in Bitcoin as a balance sheet asset, warranting its own section with dedicated analysis.



Source: Bitcoin Treasuries[67]

This section of the report will explore:

- The fundamentals of a Bitcoin Treasury allocation, focusing on early-stage Bitcoin companies
- Bitcoin corporate finance strategies
- A deep dive on the MicroStrategy playbook
- Our expectations for credit expansion as more companies adopt a leveraged Bitcoin treasury strategy

[67] Bitcoin treasuries: https://bitcointreasuries.net/

The Fundamentals of Bitcoin Treasury Allocation

We've identified four primary considerations when implementing a bitcoin treasury strategy.

These are financial and strategic in nature:

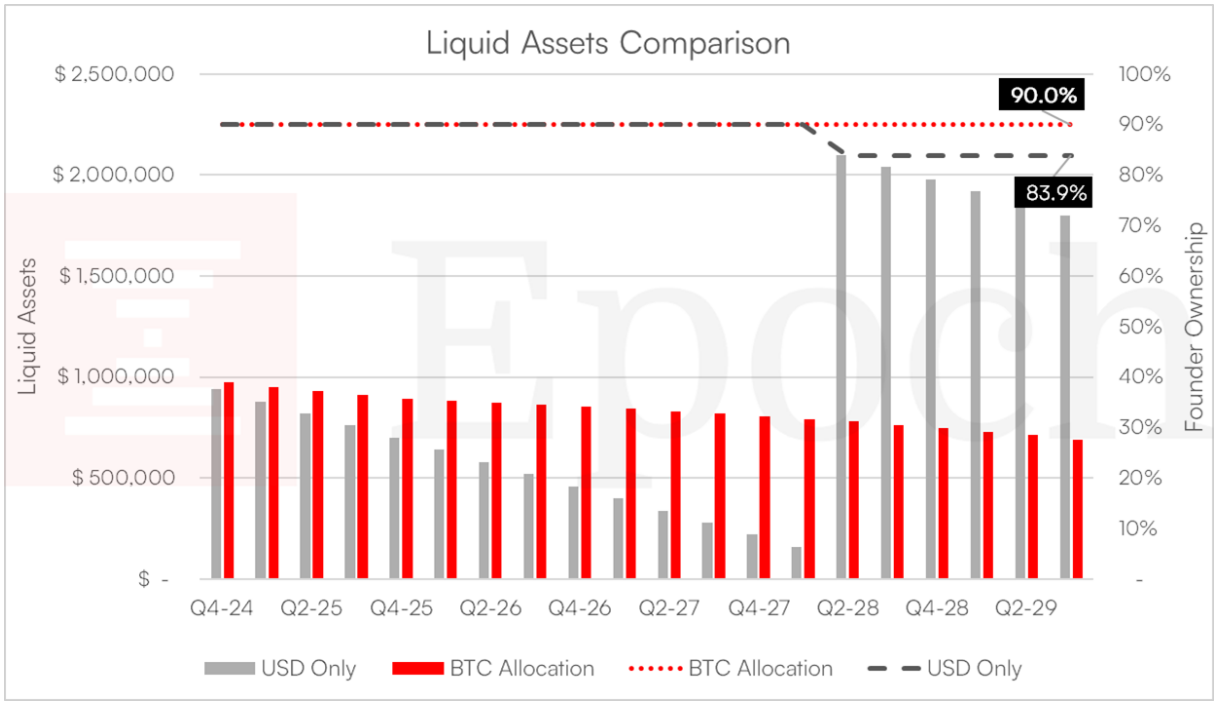
1. **Inflation protection:** Long-term allocation to a scarce asset as a store of value against monetary inflation. Companies should balance the tradeoff between short-term volatility and solvency risks when determining a holistic treasury allocation.
2. **Dilution protection:** High performant treasury assets can extend capital efficiency, and reduce the need for future fundraising. This is most advantageous to early-stage companies by preserving founder equity, and its subsequent incentives.
3. **Strategic financing capabilities:** Mature companies can tap into their broader capital market access for more Bitcoin-collateralized borrowing and liquidity management.
4. **Strategic marketing initiatives:** Bitcoin stakeholders are unique because they benefit from supporting businesses that further Bitcoin adoption. Businesses that accept bitcoin and hold it on their balance sheet can leverage this for Bitcoin-specific marketing campaigns providing access to a large global market of adopters.

Bitcoin as Dilution Protection for Starts Ups

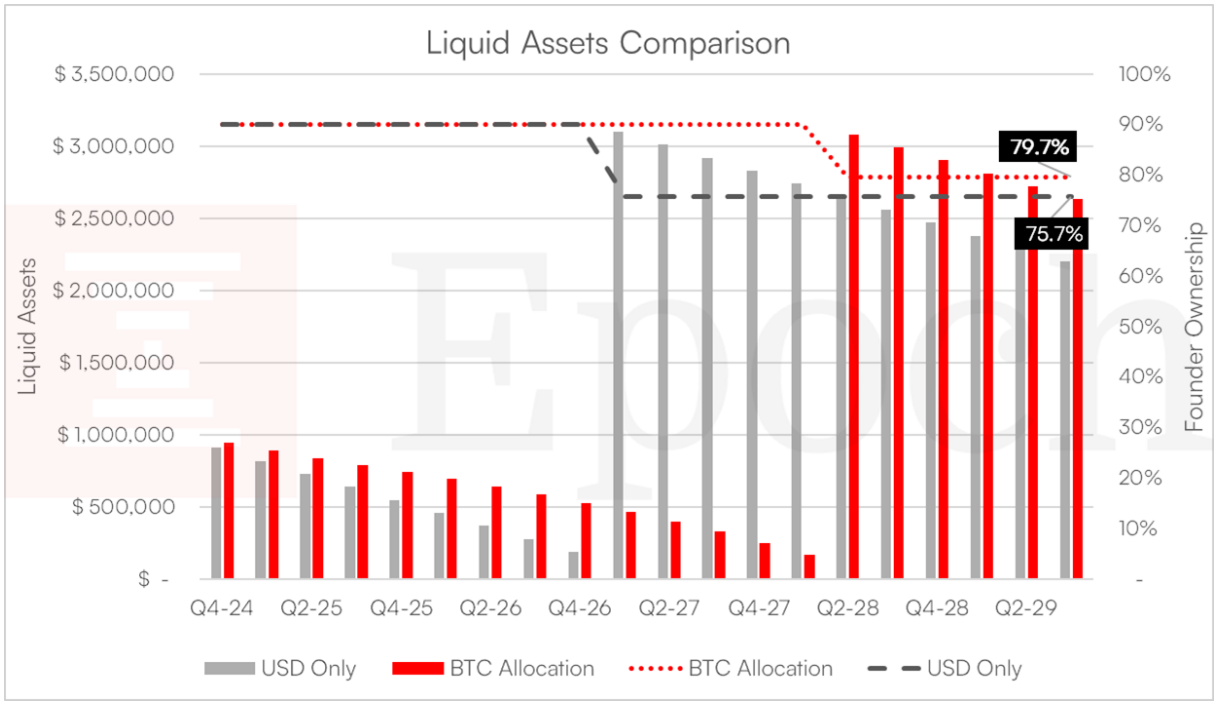
At Epoch, we've seen a considerable uptick in start-ups using bitcoin as a balance sheet asset. Epoch's model helps our portfolio companies determine economic considerations when exploring bitcoin treasury allocations. The following analysis compares how a startup can be affected by holding Bitcoin on its balance sheet compared to a USD treasury allocation.

(1) Consider a startup that raised $1 million for 10% equity, and is burning $20,000 per month. If this startup allocated 50% of its cash to Bitcoin and bitcoin's price increased annually by 30%,[68] the company would eliminate fundraising needs over the next five-year period. This strategy reduces the hassles of fundraising, while allowing shareholders to keep more of their equity, which would extend runway toward profitability and self-sustainability.

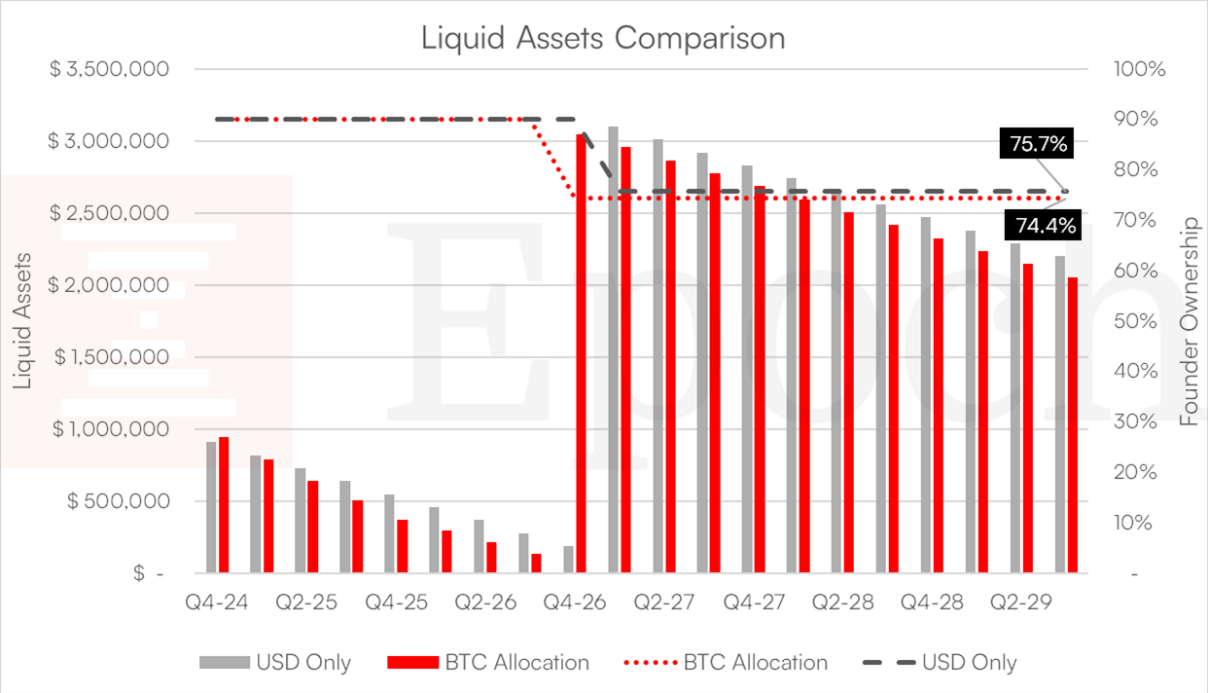
[68] The historical CAGR of bitcoin is much higher than this: https://casebitcoin.com/charts#sharpe_chart



(2) Consider the same company, but with a higher burn rate: $30,000. With bitcoin on its balance sheet, the startup would still need to fundraise, but it could delay the round by at least one year — when comparing with a dollar-only scenario. This extended runway could boost its valuation and limit equity dilution.



(3) Even with Bitcoin's well-documented price cyclicality, downside risk remains manageable. With a 40% price decline in 2025, the company would need a fundraiser three months earlier and effectively dilute itself only 1.3% more.



Applying historical bitcoin price performance to each of these scenarios, a Bitcoin allocation strategy would materially benefit the company's financial position. Even with conservative growth assumptions, a bitcoin allocation can meaningfully impact short term financial marginal considerations.

While price volatility requires active solvency management, under extreme scenarios Bitcoin serves as collateral for short-term liquidity through borrowing. Given multiple volatility management options, along with Bitcoin's asymmetric return profile, start-up founders should consider allocating a proportion of idle funds to Bitcoin.

Bitcoin Allocations for Strategic Marketing

One of the most interesting aspects of adopting a corporate Bitcoin strategy is its potential marketing benefits.

In the adoption section of this report, Epoch estimated global bitcoin adoption to be around 400 million people. As the first decentralized protocol where all stakeholders benefit from adoption there are strong incentives within the Bitcoin owning population to support other businesses that are furthering its adoption.

River Financial released a report last year detailing various case studies,[69] and found two compelling examples of benefits for businesses operating a Bitcoin treasury strategy.

- Tahini's: Canadian-based fast-food restaurant hit heavily by the pandemic lockdowns that decided to make bitcoin it's primary treasury reserve asset — investing 100% of its profits into bitcoin. Before this decision it had three franchise locations, as of 2023 the company has expanded to 44 locations. Along with the financial benefits of their Bitcoin strategy (having survived a 74% drawdown), Tahini's enjoyed an uptick in benefits from their marketing efforts. Tahini achieved viral marketing success through their Bitcoin strategy — building a three million YouTube subscriber following. This marketing strategy along with its benefits were unprecedented.
- Real Bedford FC: Peter McCormack, the Bitcoin podcasting sensation, bought his home town soccer team in 2021, and under his ownership, the team adopted bitcoin as its primary reserve asset — accepting BTC as a form of payment. It has built a global fanbase as "the Bitcoin soccer team" driving record-breaking support, attendance, and merchandise sales for the club. This has offered Real Bedford a competitive advantage above other local football clubs with no channels to building a global fanbase — a necessity to upskill towards more competitive leagues. Furthermore, the team has secured major Bitcoin industry sponsorships.

These two examples of Bitcoin adoption show how Bitcoin alignment can drive the success of a company through marketing, sales, sponsorships, and financial benefits. Consumer brands can differentiate themselves from competitors simply by supporting Bitcoin and tapping into the benefits afforded by this growing market. At Epoch, we invest in companies aligned with Bitcoin adoption and are always exploring investments in companies finding a strategic angle for Bitcoin adoption across unique verticals.

Establishing a Bitcoin Governance Policy

When adopting bitcoin as a treasury asset, it's paramount to establish a governance policy for allocation decisions.

River Financial documented four primary strategies that businesses implement today[70]:

1. **Percentage based allocation:**
    - Short-term approach.
    - Maintains fixed percentage of treasury assets.
    - Requires a rebalancing policy.
    - Provides precise volatility exposure.
    - Demands frequent monitoring.

[69] River Financial report on business adoption of bitcoin: https://river.com/learn/files/business-bitcoin-report-2024.pdf
[70] See River Financial's report: https://river.com/learn/files/business-bitcoin-report-2024.pdf

2. Cash Flow based allocation:
    - Allocates predefined profit percentage.
    - Long-term position building.
    - Deployed by large companies such as Block, Coinbase, and Tether.
3. Excess Reserve allocation:
    - Well-suited for multi-year time horizons.
    - Applicable primarily to startups which can raise for three years of runway.
    - Startups maintain one year cash runway.
    - Can justify raising excess capital if Bitcoin allocation outperforms future dilution.
4. Primary reserve asset:
    - Geared for companies with very strong long-term conviction.
    - Requires minimal cash for immediate expenses.
    - Bitcoin is the dominant reserve asset.
    - Example: The Space (community-based organization located in Denver)[71]

For startups, governance policy should prioritize dilution risk management. Many of these considerations are based on access to capital which can be influenced significantly by the market. Importantly, when considering leveraging their loan collateral in Bitcoin, founders should take into account total liquidity: cash runway along with borrowing capacity during drawdowns). Companies that offer to collateralized bitcoin loans include Ledn, Debifi, and Unchained Capital. Banks are soon to come.

Bitcoin Allocations with Strategic Financing Capabilities

Once a firm reaches a specific scale, it can employ more complex financing capabilities.

MicroStrategy (MSTR) exemplifies sophisticated Bitcoin financing at scale. Given its access to capital markets, the firm can publicly market debt and equity offerings to qualified purchasers. This has enabled MSTR to build the largest public company with a bitcoin balance sheet allocation. MicroStrategy uses leverage, and the value of its business is predicated on the value of bitcoin. While MicroStrategy's value correlates to Bitcoin, it also depends on access to capital markets. Any drop in market appetite could threaten the sustainability of its financing model.

[71] The Space website: https://denver.space/

MicroStrategy Inc. Capital Structure (EOY 2024)			
(USD in Millions)	Amount ($m)	Maturity	Rate
0% Senior Unsecured Convertible Notes due 2027	1,050.0	2/2027	0.000%
0.625% Senior Unsecured Convertible Notes due 2028	1,010.0	9/2028	0.625%
0% Senior Unsecured Convertible Notes due 2029	3,000.0	12/2029	0.000%
0.625% Senior Unsecured Convertible Notes due 2030	800.0	3/2030	0.625%
0.875% Convertible Senior Notes due 2031	604.0	3/2031	0.875%
2.25% Convertible Senior Notes due 2032	800.0	6/2032	2.250%
Total Unsecured Debt	**7,264.0**		
Less: Cash and Equivalents	(46.3)		
Plus: Restricted Cash	1.9		
Net Debt (as of Q3 2024)	**7,219.6**		
Plus: Market Capitalization	70,910.0		
Enterprise Value	**78,129.6**		

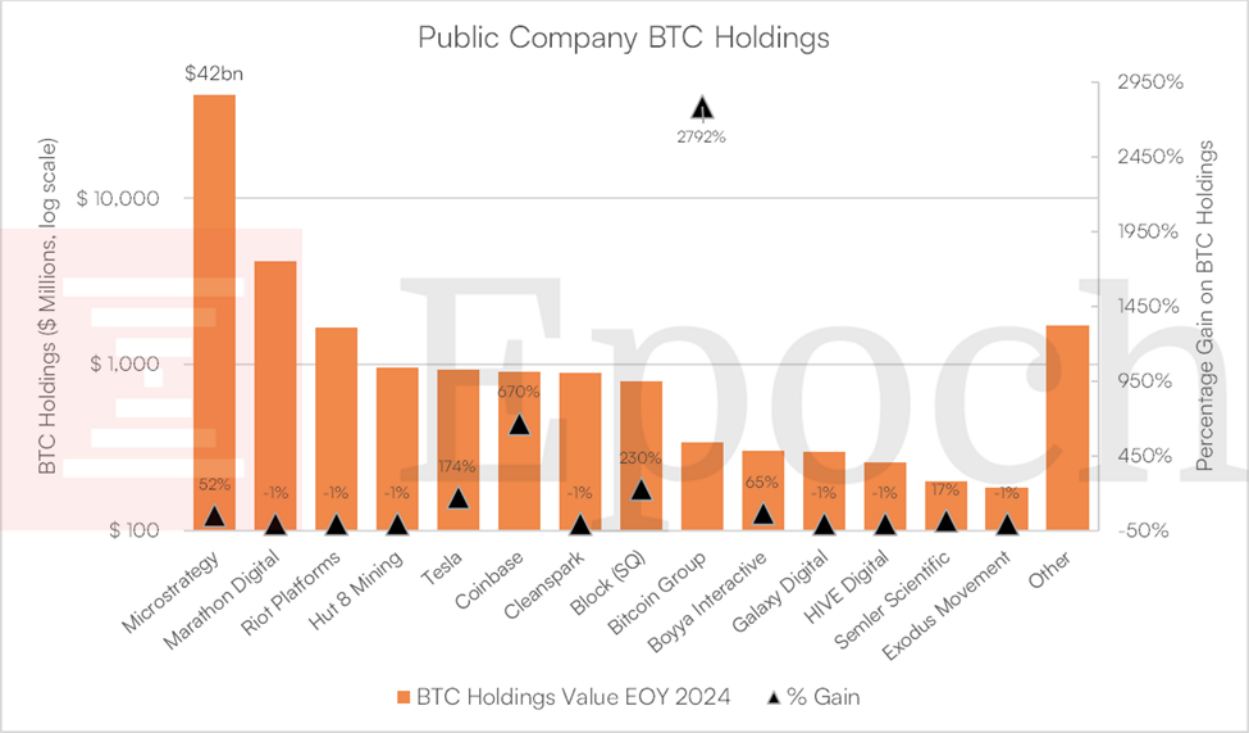
Source: Microstrategy Company Filings[72]

While MicroStrategy's model isn't possible for early-stage companies, firms with capital market access can execute a similar strategy at market terms. We anticipate this model to continue as MicroStrategy's stock price rises from its bitcoin exposure, and additional flows from institutional appetite enter the market.

Sustainable success will depend on carefully managing leverage during Bitcoin's cyclical downturns. However, MicroStrategy's unique model, which has led it to outperform S&P 500 equities in 2024, has inspired companies around the world to do the same.

Here are public companies that recently began mirroring this strategy:

[72] MicroStrategy investor relations: https://www.microstrategy.com/investor-relations



Source: Bitcoin Treasuries[73]

As more companies adopt leveraged Bitcoin strategies, industry lending will expand significantly. Lenders will enjoy more favorable terms than borrowers, but all else should remain equal. While it is hard to predict how significant this adoption could be, we expect the market for bitcoin lending to become more attractive, drawing multiple degrees of expansion in the near-to-medium term.

The proliferation of leveraged Bitcoin corporate finance strategies is a key risk towards Bitcoin's price volatility. We've conducted a deep dive on the MicroStrategy playbook. Our analysis will help grasp how companies executing similar strategies at less favorable credit terms could lead to concentration of credit risk.

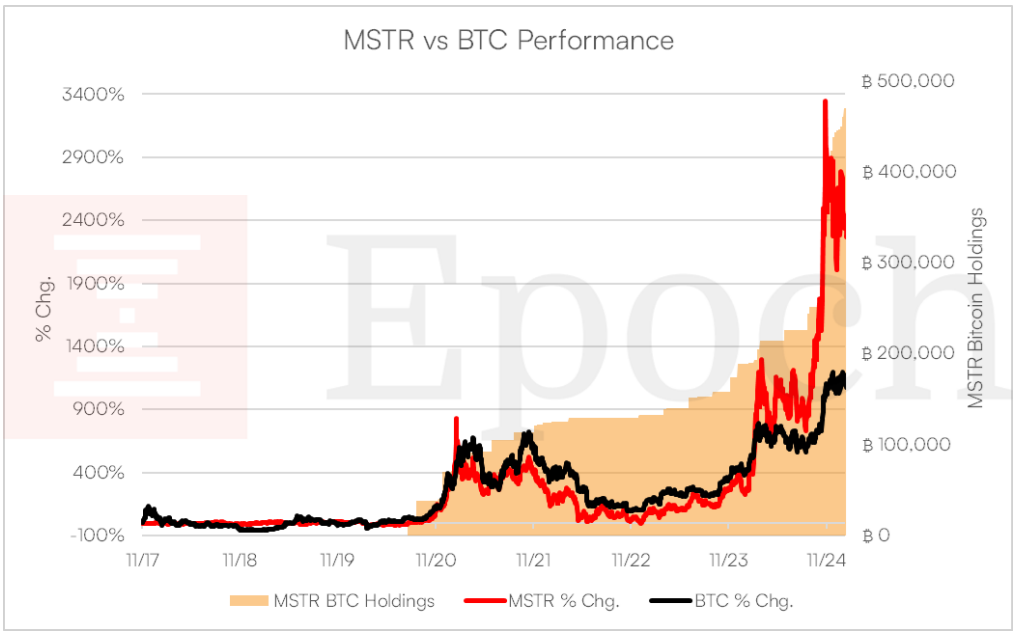
MicroStrategy (MSTR)

MicroStrategy (MSTR)[74] is the top public company promoting bitcoin balance sheets via their leveraged finance strategy. The firm's returns outperforming Bitcoin has captured both the attention of Bitcoin advocates and Wall Street. Since MicroStrategy began accumulating Bitcoin in 2020, the stock has appreciated roughly 2,380% compared to Bitcoin's ~756% as of February 10, 2024.

MicroStrategy's access to capital markets enables it to raise debt and equity capital to buy Bitcoin — drastically outperforming its cost of capital. Since it began its Bitcoin initiative in 2020,

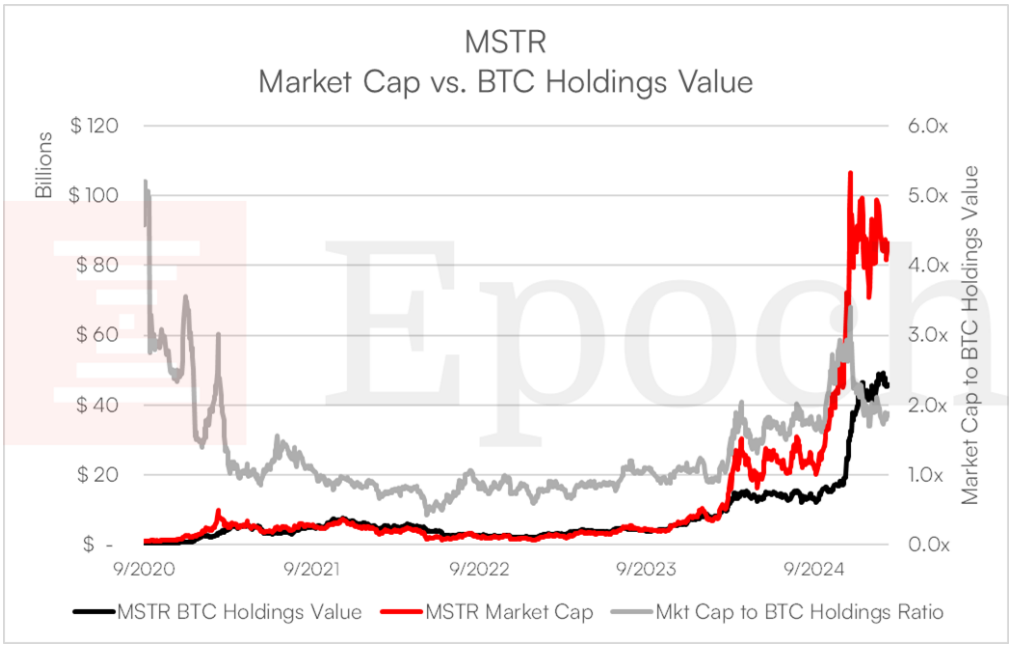
[73] Bitcoin treasuries: https://bitcointreasuries.net/
[74] MicroStrategy changed its name to "Strategy" on February 5, 2025. We will refer to it as MicroStrategy or MSTR.

MicroStrategy has accumulated 471,107 bitcoin (worth approximately $46 billion as of February 2025), and is currently executing on $42 billion in planned fundraising from 2025-2027 to finance more BTC purchases.



Source: TradingView[75]

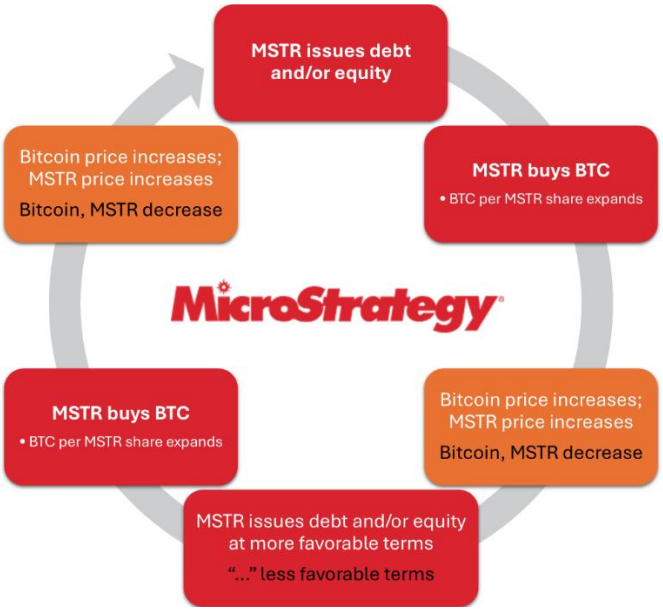
MSTR stock trades at roughly 1.9x the value of its Bitcoin holdings, and 2.3x its book value. In theory it should trade near book value, but this perspective is based on an incomplete understanding of the business strategy.



[75] Chart data: https://www.tradingview.com/

Why is MSTR outperforming Bitcoin?

(1) Perpetual leveraged financing expectations



MicroStrategy's strategy relies on Bitcoin's perpetual price appreciation. This belief drives unlimited debt appetite — as Bitcoin rises, MicroStrategy can theoretically continue to raise capital at favorable terms (all else equal) due to its improving balance sheet position. If MicroStrategy continues to execute its strategy, the stock will continue to rise (all else equal), potentially outperforming Bitcoin. We attribute some of the stock's premium over Bitcoin to the market's belief that BTC is undervalued and that MicroStrategy will not waver on its capital plans.

(2) MSTR: a growing source of Bitcoin

MicroStrategy's model attracts investors who prefer it to spot bitcoin, driven by a KPI dubbed "BTC Yield" that "represents the percentage change period-to-period of the ratio between the company's bitcoin holdings and its Assumed Diluted Shares Outstanding."[76] Put simply, it measures the change in Bitcoin per share of MSTR over time. In 2024, MSTR's BTC Yield was 73.4%.

MicroStategy's structure grows Bitcoin per share through two mechanisms:

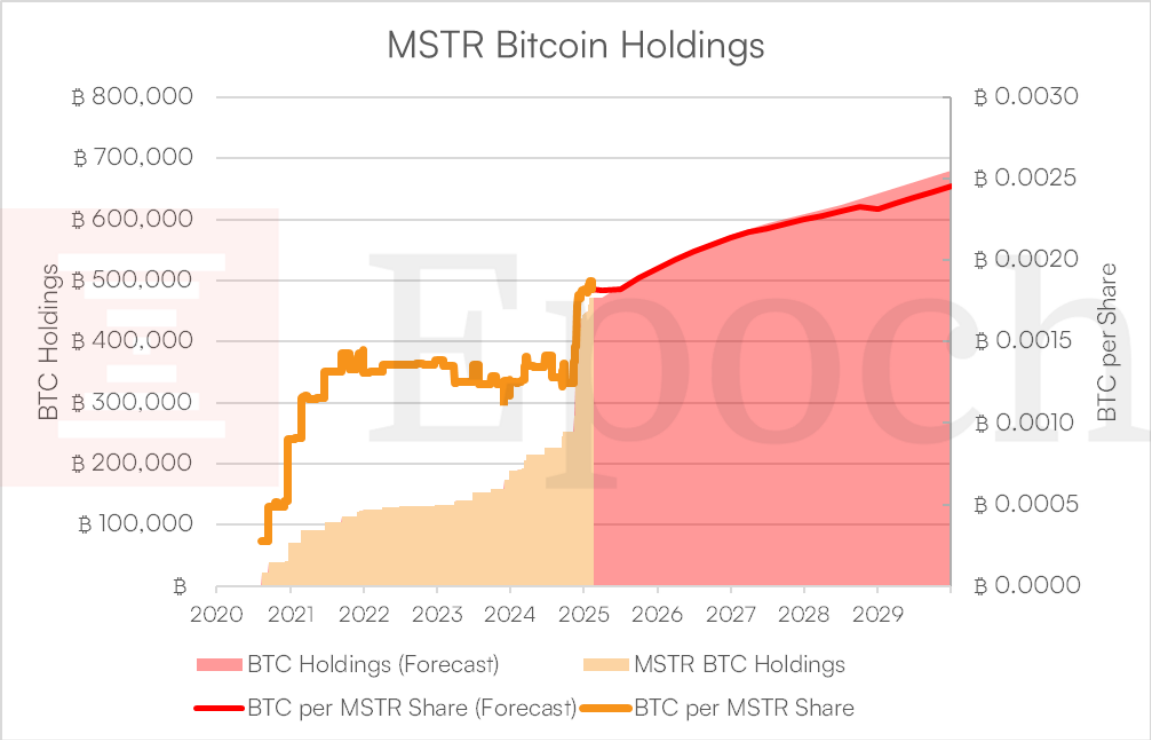
- Debt capital: By raising debt capital, MicroStrategy can purchase Bitcoin without diluting shareholders in the immediate term. Although its debt is convertible, it delays dilution, requiring a higher share price to offset potential future dilution.

[76] MicroStrategy investor relations: https://www.microstrategy.com/investor-relations

- Equity capital: Under current conditions, raising equity capital by selling shares also produces more BTC per share. As long as MSTR shares are trading above book value, selling equity to buy BTC generates an increase in its BTC holdings that exceeds the dilution to shareholders.

MSTR Price/Book Value	Effect of Selling Equity to Buy BTC	Impact on BTC per Share
>1	% change to BTC holdings > % dilution to shareholders	Up
=1	% change to BTC holdings = % dilution to shareholders	Flat
<1	% change to BTC holdings < % dilution to shareholders	Down

Based on MicroStrategy's stated capital plans and our analysis, we project Bitcoin per share of MSTR to grow ~40% through 2029, with more growth thereafter.



(3) A Differentiated Investment Vehicle

Financial theory suggests that MSTR should trade near its book value — the value of its assets minus liabilities — because it holds a liquid asset with a known price.[77] However, MSTR trades above twofold its book value when factoring in the market value of its Bitcoin holdings. This is partially explained by financial markets.

[77] MSTR's underlying business is small compared to its Bitcoin holdings and we ignore it for simplicity.

There are limited options to trade or speculate on Bitcoin, particularly for institutions or individuals' accounts that are limited to highly regulated stock exchanges.

While spot Bitcoin ETFs now exist, MSTR offers unique advantages:

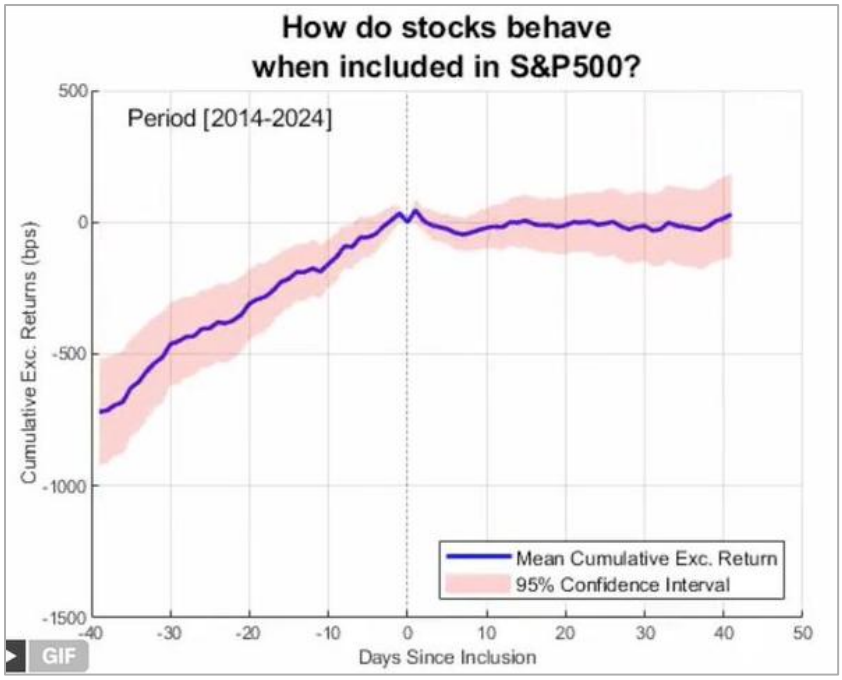
1. **Leveraged returns:** MicroStrategy uses debt to increase speculative capacity. Selling debt to buy Bitcoin makes MSTR trade like a leveraged position on Bitcoin. As Bitcoin's price increases, MSTR should theoretically outperform BTC.[78]
2. **Speculation:** Bitcoin ETFs did not offer options trading until Nov. 19, 2024. However, options trading had always been possible with MSTR. Traders use MSTR options to leverage their bets on the Bitcoin price. The stock itself is a leveraged bet on BTC that should produce outsized returns for traders if BTC rises, so options trading amplifies leverage. We believe this embedded premium in MSTR's valuation will wane over time as ETF options and proxy markets mature.
3. **Volatility:** MSTR options trading allows the company to achieve attractively low rates on its convertible bonds. Institutional traders capture MSTR's high implied volatility by buying convertible bonds and selling MSTR calls, creating significant demand for billions of dollars of MSTR convertibles notes at near 0% coupon.[79] Despite the 0% coupon, these notes have recently been a top performing fixed income security.[80]
4. **Fees:** Bitcoin ETFs charge an annual management fee. Though fees are low, long-term holders may prefer truly zero-fee Bitcoin exposure. MSTR serves as a medium for Bitcoin ownership with no management fees and no trading fees.
5. **Frontrunning MSTR's likely inclusion to the S&P 500 & Nasdaq 100 Indices:** MSTR will adopt new accounting standards on Jan. 1, 2025, when it becomes eligible for the S&P 500. This would force over $10 billion in inflows from index funds and ETFs to rebalance portfolios.[81] Similarly, MSTR was added to the Nasdaq 100 index on December 13, 2024. Some of MSTR's recent outperformance over BTC may be attributed to frontrunning its inclusion to the S&P 500.

[78] MSTR trades like a long-term, in-the-money call option on Bitcoin. Most retail investors understand that when Bitcoin is up, MSTR typically outperforms and vice versa. Retail investors do not fully understand that when Bitcoin is flat, MSTR is likely to trend down like a call option losing its time value.

[79] Link to article regarding demand for MSTR bonds: https://www.barrons.com/articles/microstrategy-option-volatility-convertible-f4f0544d

[80] MSTR's unusual relationship with volatility also means that the stock price is loosely tied to volatility. Higher volatility permits beneficial financing terms and leads to greater BTC yield. Many MSTR shareholders are unaware that the stock, like a call option, is exposed to downside risk from lower volatility; if Bitcoin is flat, MSTR should underperform.

[81] @woonomic on X.com



Source: @woonomic on X.com[82]

(4) MicroStrategy Company Dynamics

- **Favorable terms on bond issuance:** MSTR's debt repayment track record, successful Bitcoin strategy, and high implied volatility enables favorable terms when raising capital. As discussed in (3)3 above, traders profit from selling MSTR calls against convertible bonds, letting lenders accept 0% coupon convertible bonds with conversion prices 50%+ above current price.
- **The Michael Saylor Effect (and Trust in Management):** MSTR's price includes a premium from the adoration for Michael Saylor among the Bitcoin community, and the belief in management to continue the Bitcoin strategy flywheel.

[82] @woonomic on X.com: https://x.com/woonomic/status/1855769772358819869

MSTR Balance Sheet Forecast and Analysis

MSTR's outperformance stems from leveraged Bitcoin exposure, and the market's expectation that MSTR's Bitcoin per share will expand while Bitcoin's price rises. Analyzing MSTR's capital structure and stated plans reveals an "implied BTC price" in today's market valuation. By forecasting MicroStrategy's balance sheet and a range of price/book ratios, we can propose a MSTR-implied Bitcoin price and use Bitcoin price forecasts to project how MSTR's stock price will perform over time.

Examining MicroStrategy's current ~$335 stock price across potential Price/Book ratios shows that the market implies a Bitcoin price between $122,000 to $171,000 at ratios of 1.25x to 1.75x.[83]

BTC's implied current price — derived from MSTR's current price and future Price/Book Value

Current BTC Price Implied by MSTR		MSTR Future Price/Book Value					
		0.75x	1.00x	1.25x	1.75x	2.25x	2.75x
MSTR Current Price	$259	$220k	$165k	$132k	$94k	$73k	$60k
	$273	$232k	$174k	$139k	$99k	$77k	$63k
	$287	$244k	$183k	$146k	$105k	$81k	$67k
	$302	$257k	$193k	$154k	$110k	$86k	$70k
	$318	$270k	$203k	$162k	$116k	$90k	$74k
	$335	$285k	$214k	**$171k**	**$122k**	$95k	$78k
	$352	$299k	$224k	$179k	$128k	$100k	$82k
	$369	$314k	$235k	$188k	$135k	$105k	$86k
	$388	$330k	$247k	$198k	$141k	$110k	$90k
	$407	$346k	$260k	$208k	$148k	$115k	$94k
	$428	$363k	$272k	$218k	$156k	$121k	$99k

Given MSTR's bitcoin exposure, Bitcoin's price trajectory through 2030 will drive MSTR's price. If BTC rises to $572,000 by end-of-year 2030, and we apply a 1.25x-1.75x Price/Book, MSTR could reach $1,555 to $2,178 or 365% to 551% higher than today compared to 512% for Bitcoin. While we foresee MSTR's P/B multiple declining, if MSTR can maintain its Price/Book ratio, its growing BTC per share suggests that it would outperform bitcoin. At MSTR's current 2.3x Price/Book, bitcoin's growth to $572,000 could propel it to an implied price of $2,856, with a gain of 753% and strong outperformance over bitcoin.

[83] Note: the assumed Price/Book ratios are critical to these analyses. Due to shareholder dilution, we expect MSTR's Price/Book value to trend downward, further deaccelerating growth in BTC per share growth, and gradually weakening demand for MSTR convertible bonds.

MSTR's 2030 Price — derived from MSTR's future Price/Book Value and BTC Price Performance

Implied MSTR Price in Q4 2030		Change in Bitcoin Price Quarterly (through Q4 2030)								
		-5.0%	-2.5%	0.0%	2.5%	5.0%	7.5%	10.0%	12.5%	15.0%
MSTR Price/Book in Q2 2030	0.50x	$0	$24	$76	$165	$316	$566	$977	$1,648	$2,731
	0.75x	$0	$36	$114	$248	$473	$848	$1,466	$2,473	$4,097
	1.00x	$0	$48	$152	$331	$631	$1,131	$1,955	$3,297	$5,462
	1.25x	$0	$60	$190	$413	$789	$1,414	$2,443	$4,121	$6,828
	1.50x	$0	$72	$228	$496	$947	$1,697	$2,932	$4,945	$8,194
	1.75x	$0	$83	$267	$579	$1,105	$1,980	$3,421	$5,769	$9,559
	2.00x	$0	$95	$305	$661	$1,262	$2,263	$3,909	$6,593	$10,925
	2.25x	$0	$107	$343	$744	$1,420	$2,545	$4,398	$7,418	$12,290
	2.50x	$0	$119	$381	$827	$1,578	$2,828	$4,887	$8,242	$13,656
	2.75x	$0	$131	$419	$910	$1,736	$3,111	$5,375	$9,066	$15,021
	3.00x	$0	$143	$457	$992	$1,894	$3,394	$5,864	$9,890	$16,387
	3.25x	$0	$155	$495	$1,075	$2,051	$3,677	$6,353	$10,714	$17,753
Implied BTC Price in Q4 2030		$28k	$53k	$97k	$176k	$314k	$553k	$960k	$1,646k	$2,790k

For investors, MSTR represents indirect exposure to BTC that theoretically offers outsized returns during bull markets — if it can continue growing BTC/share. However, leveraged exposure means increased downside risk during bear markets, which could be higher than declines in the price of Bitcoin.

Potential Risk of MSTR

Significant drawdowns in Bitcoin's price or company-related changes could threaten MSTR, as its market value is driven by the value of its Bitcoin holdings and its financing ability to buy more Bitcoin.

Current convertible debt stands at roughly ~$7 billion, which could balloon to $25 billion by 2027 based on MicroStrategy's plan to raise an additional $42 billion, split 50/50 between debt and equity. If MSTR is successful, the firm's stock price and solvency could become increasingly levered to Bitcoin's price.

A severe, prolonged bear market represents the worst-case scenario for MSTR. Sharp Bitcoin declines could jeopardize MSTR's balance sheet, triggering creditor demand for bond repayment. With annual convertible notes starting 2027, MSTR could face insolvency if unable to refinance or sell equity during sustained low Bitcoin prices.

However, insolvency remains unlikely. During the 2022 bear market, MSTR found itself in a dangerous financial position as its $2.4 billion debt exceeded its Bitcoin holdings. The bear market, however, proved short-lived, so its debt was never called into redemption. At the time, MSTR's debt was also unsecured, so bondholders were not entitled to MSTR's Bitcoin, and the company could use any method to repay debt. While this remains the case today, MSTR's growing debt-load in a future bear market could become riskier than the 2022 case, although it depends on its degree of leverage.

MSTR could face two perilous situations: (1) early bond redemption from bondholders; or (2) stockholders call for liquidations. Large-scale liquidations of MSTR's Bitcoin holdings are unlikely, even though the downside risk to MSTR's stock price is plausible.

Below we outline the key terms of MSTR's agreements, along with the possible events that could threaten MSTR's stock price performance:

Key Terms to MSTR's Convertible Notes:

MSTR's existing convertible bonds have relatively attractive terms, but if the company undergoes a "fundamental change, investors can call their convertible bonds early by 12 to 18 months." For example, the $3 billion convertible notes issued in November 2024 and maturing on December 1, 2029, state:

> *"Holders have the right to require the Company to repurchase for cash all or any portion of their notes on June 1, 2028 at a repurchase price equal to 100% of the principal amount of the notes to be repurchased, plus any accrued and unpaid special interest to, but excluding the repurchase date.*
>
> *If the Company undergoes a "fundamental change," as defined in the Indenture, prior to maturity, subject to certain conditions, holders may require the Company to repurchase… [the notes at a price of principal plus interest]."* [84]

We discovered a single event that constitutes a "fundamental change" with reasonable chances of occurring:

> *"Stockholders of the Company approve any plan or proposal for the liquidation or dissolution of the Company"* [85]

If MSTR's Bitcoin holdings value exceeds the company's market cap, shareholders may be incentivized to vote for liquidation, especially if MSTR's price/book ratio falls below 1x. This shareholder vote would also trigger early convertible note redemption rights, circumventing the 12-to-18-month restriction clause.

Below we outline reasonable scenarios that might cause (1) early redemption from bondholders, and (2) stockholders to vote for liquidation.

(1) Bondholders call the bonds for early redemption

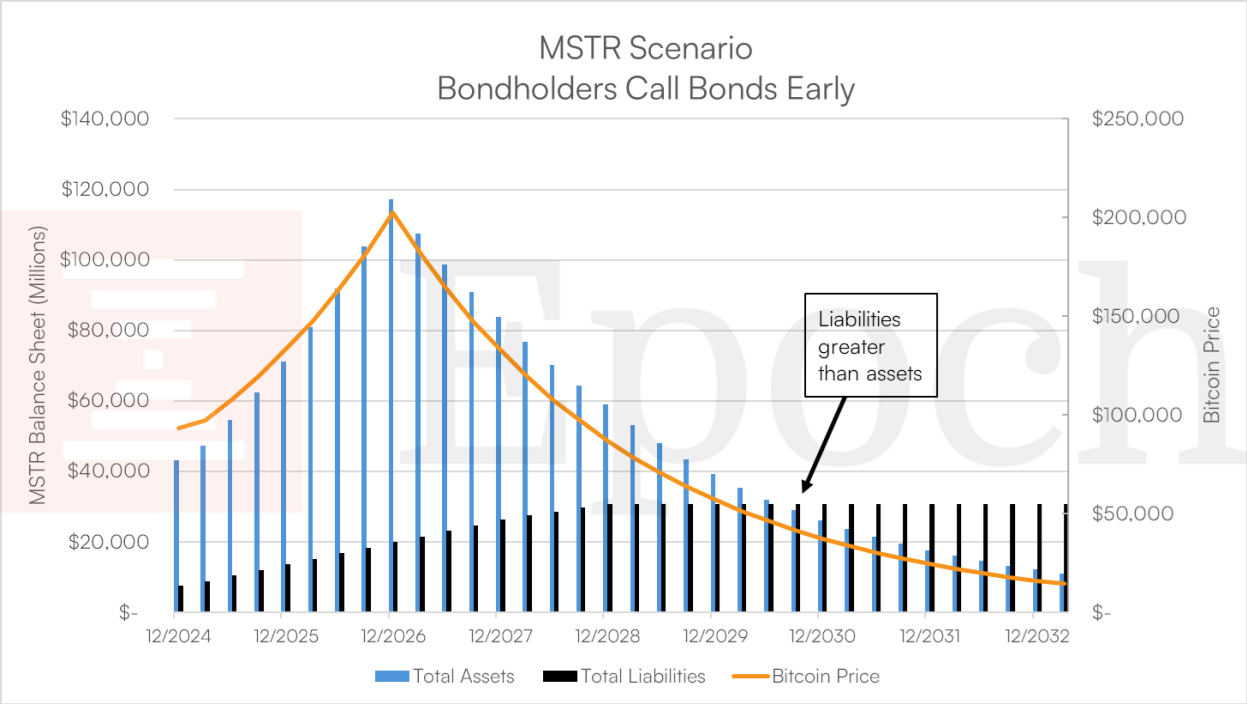
- If the price of Bitcoin drops, MSTR's stock price will theoretically decline, making bond conversion unlikely, and drive noteholders to seek early principal repayment (the case if the price fall is significant).
    - Though MSTR has succeeded in rolling over debt at maturity in years prior, a Bitcoin bear market would reduce institutional credit appetite, and hinder the company's ability to refinance.
    - Without demand for new issuance of MSTR debt, the company would likely sell some of its Bitcoin holdings to repay bondholders.

[84] Link to filing: https://www.sec.gov/ix?doc=/Archives/edgar/data/1050446/000119312524263404/d905221d8k.htm
[85] Link to filing: https://www.sec.gov/Archives/edgar/data/1050446/000119312524263404/d905221dex41.htm

- In a prolonged bear market, widespread early redemptions could deplete MSTR's Bitcoin holdings driving the stock to trade near zero.[86]
  - Selling its Bitcoin would push BTC even lower, and the market would lose faith in MSTR's Bitcoin strategy. MSTR's share price and its price/book ratio would decline, potentially forcing scenario (2): stockholders call for liquidation.

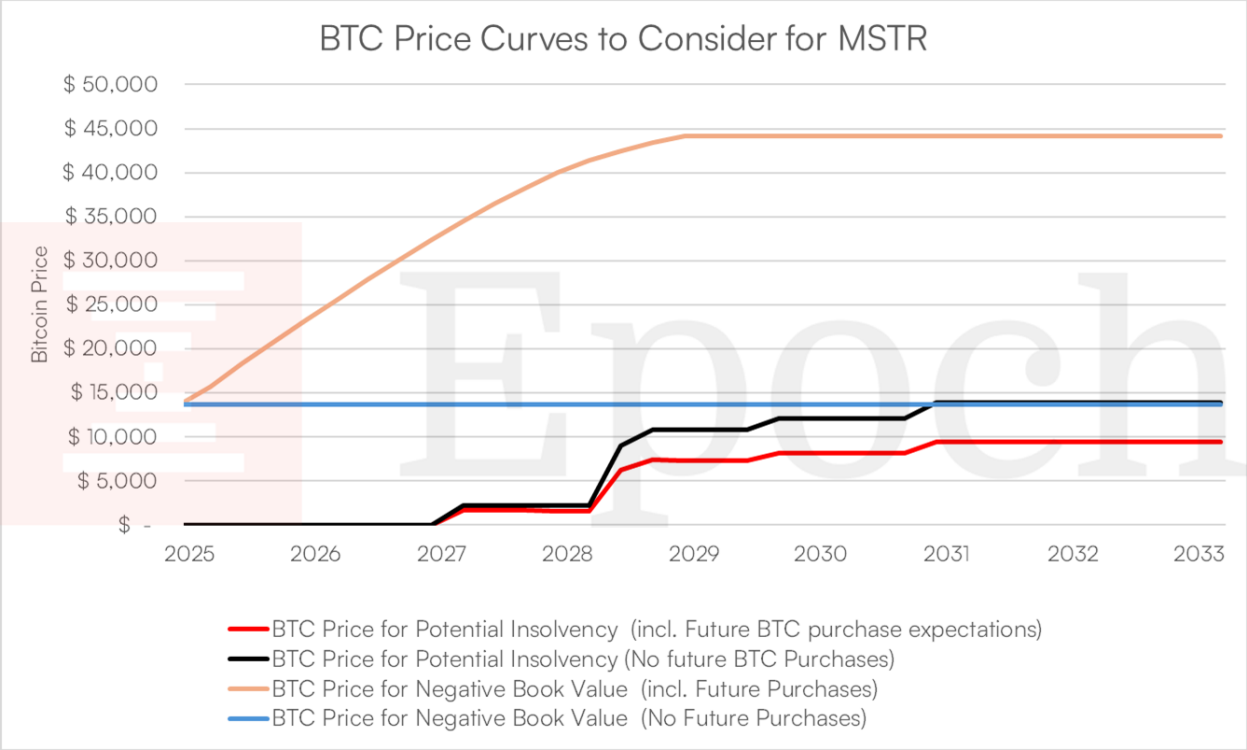
Consider the following scenario:

Bitcoin's price rises to $200,000 through end-of-year 2026 but then falls 10% per quarter thereafter. MSTR continues executing its Bitcoin strategy until MSTR loses its ability to raise capital toward end-of-year 2028. By 2029, the gap between total assets and liabilities would narrow and incentivize early bond redemption. In 2030, liabilities would exceed assets. High credit risk would prevent it from new financing, and it would be forced to sell Bitcoin to repay its debt.



Under this scenario, we can predict Bitcoin's price threshold that could threaten MSTR's insolvency or book value. With $3 billion in debt maturing in 2029 (callable in June 2028), Bitcoin would have to fall below $10,000 to risk debt repayment default. Negative book value presents a more plausible risk; if MSTR halts Bitcoin purchases as of this writing, the Bitcoin price threshold for negative book value is $13,700. However, if MSTR continues its strategy, BTC would need to fall below $44,200 by end-of-year 2028 to produce a negative book value.

[86] Note: this situation would also occur upon maturity without early redemption. Repayment of principal could threaten MSTR's Bitcoin holdings; early redemption accelerates the timeline.



We also see the risk that if MSTR's BTC holdings value approaches or falls below its outstanding debt, concerned bondholders might demand repayment before maturity. Without refinancing options, MicroStrategy would gradually sell some Bitcoin as bonds near maturity. While this scenario would not necessarily put MSTR at immediate risk of bankruptcy it would halt its strategy of growing BTC per share. This would likely be reflected by a lower P/B and stock price. The resulting lower price-to-book ratio could trigger scenario (2).

(2) Stockholders vote for MicroStrategy to liquidate its Bitcoin holdings:

Shareholders may vote to liquidate MSTR's Bitcoin holdings and company dissolution if MSTR's price/book ratio trades below 1x, as liquidation would return more money than the current share price. In this scenario, an activist investor could rapidly accumulate shares and campaign for liquidation to capture this spread. However, the price/book discount would need to persist long enough for shareholders to organize and complete a vote.

MSTR's price/book could remain below 1x for an extended period under the following scenario:

1. Market expects a prolonged Bitcoin bear market.
    - MicroStrategy's stock is not dependent solely on Bitcoin's current price, but also the market's expectations of future price. If the market forecasts a prolonged bear market, it would price that into MSTR's stock price.
    - A severe, prolonged bear market could drive MSTR's book value to go negative. If Bitcoin holdings fall below the value of its debt, MSTR's price/book could fall below 1x.

2. Inability to refinance, leading the market to expect liquidations.
    - Demand for MSTR debt could sour in a bear market. To repay debt it would have to sell Bitcoin, or shares, thus diluting shareholders. Either way, the market would reprice MSTR lower in anticipation, potentially below book value.
    - The market's fear of liquidation could create a self-fulfilling cycle: driving MSTR to trade below book value, triggering a shareholder vote, and forcing the feared liquidation.

In 2022, Bitcoin's bear market and liquidation fears pushed MSTR's stock down 90%to a low of $13.25 in December 2022 from $131.50 in February 2021. While market pessimism drove the stock to trade below its book value, creating theoretical incentives to liquidate, rapid price recovery and available financing protected against shareholders' calls for liquidation.

While 2022's bear market did not force liquidations, it showcased leverage risk: MSTR's drawdown topped 90% compared to Bitcoin's ~77% -- displaying what a quick bear market can do to MSTR. An extended bear market could be far worse, given MicroStrategy continues to add leverage.

In our view, MicroStrategy's risk/reward profile is unfavorable compared to directly buying Bitcoin. As Bitcoin's price rises, MSTR offers outsized growth potential, but it will be diluted by the company selling shares to buy more Bitcoin. There are no guarantees to the upside, while the downside risk to MSTR shares is significant. We do not expect MSTR insolvency or liquidations, although the fear of such event — combined with leveraged exposure to BTC — makes for an outsized MSTR drawdown to be likely during a BTC bear market. Skilled traders may capture MSTR's upside before rotating to BTC for less downside risk, but average investors today will likely underperform Bitcoin. New Bitcoin investors should consider buying the asset directly.

MSTR Summary

- Since adopting its Bitcoin strategy in 2020, MSTR has consistently outperformed for a few key reasons:
    1) **Leveraged bitcoin buys:** If BTC continues to outperform its cost of capital, MSTR should theoretically continue to provide strong returns.
    2) **Bitcoin Yield:** MicroStrategy's Bitcoin per share is growing. If MSTR can continue raising debt and selling equity above its book value, BTC per share can increase.
    3) **Unique Characteristics**
        - **Speculation and Leverage:** MSTR provides leveraged Bitcoin exposure through holdings and options — attracting premium valuations from traders anticipating Bitcoin appreciation.
        - **Volatility in MSTR's options market:** High options market volatility enables attractive terms on its convertible bonds as funds buy bonds and sell calls.
        - **Fees:** MSTR is zero-fee Bitcoin exposure.
        - **Frontrunning MSTR's Index inclusion:** MSTR was added to the Nasdaq 100 on December 13, 2024, and is eligible to enter the S&P 500. Traders

have placed bets on a higher MSTR stock price in advance of these expected events.

- Key Risks:
  - MicroStrategy (MSTR)'s stock performance relies heavily on the value of its Bitcoin holdings, and its ability to secure financing to acquire more Bitcoin.
  - A severe, and prolonged bear market for Bitcoin poses a significant risk to MSTR, potentially jeopardizing its balance sheet and leading to early bond redemption by creditors.
    - MSTR's debt could grow to $25 billion by 2027, and its bonds face early redemption threats. If MSTR cannot refinance, it may be forced to sell its Bitcoin holdings.
    - Market expectations of further Bitcoin price drops could dampen MSTR's stock price and valuation multiples. If MSTR's price/book ratio falls below 1x, shareholders could be incentivized to vote for liquidation.

Leveraged Bitcoin Strategies Will Produce Diminishing Returns

MicroStrategy has become a model for Bitcoin and crypto companies seeking leveraged Bitcoin exposure.

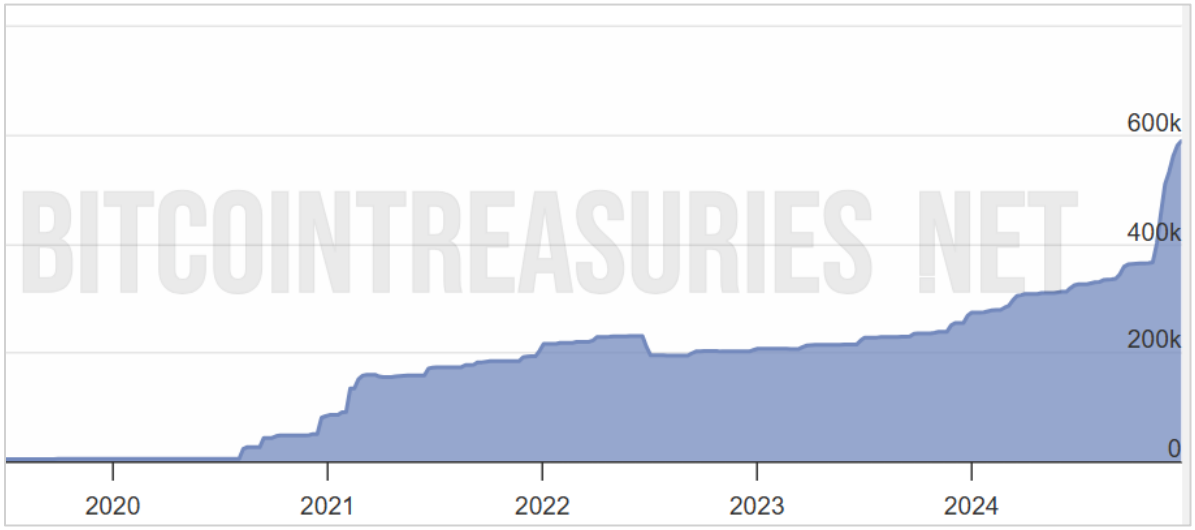
We expect this trend to accelerate over the next year as Wall Street extends more credit to the Bitcoin ecosystem. Non-crypto companies may join, driven by shareholder pressures, and management teams pursuing an easy way to boost share prices. While current terms favor borrowers, market competition will likely reduce these advantages as terms on new debt will become less favorable to debtors. Companies exuberantly rushing to replicate MSTR's success may underestimate the risks associated with the firm's strategy.

Public company Bitcoin holdings surged in 2024 to 600,000 Bitcoin from 270,000 Bitcoin, growing over 60% from November 1 to year-end. Alongside this rapid growth, a prospectus filed with the SEC December 27, 2024, indicates that a "Bitcoin Corporate Treasury Convertible Bond ETF" will soon be offered.[87] The exchange-traded fund (ETF) would invest in convertible bonds issued by companies that hold bitcoin, with companies using the proceeds to buy more bitcoin.

Excitement for the bitcoin treasury strategy has begun and exuberance may follow.

[87] Link to filing: https://www.sec.gov/Archives/edgar/data/1771146/000199937124015836/rex_485apos-122724.htm

BTC Held by Public Companies



Source: Bitcoin Treasuries[88]

Public Bitcoin mining companies Marathon Digital (MARA), and Riot Platforms (RIOT) have accumulated a combined roughly 64,000 BTC worth over $6 billion partially through debt issuance.[89] Mara's December 4, 2024 offering raised $850 million in zero-interest convertible senior notes with a 40% conversion premium.[90] Within two weeks, RIOT issued $594 million of 0.75% interest convertible senior notes with a 32.5% conversion premium.[91] Though both offerings remain unsecured, like MSTR's November 2024 notes, the degrading terms (compared to MSTR's 55% conversion premium — signal early market deterioration despite still early stages of Bitcoin adoption.

Non-U.S. companies such as Metaplanet (TSE:3350) illustrate international adoption of this strategy, though market conditions significantly impact terms. During BTC's ~17% decline from March 2024 to June 2024, Metaplanet's bonds required 0.5% annual interest, personal guarantees from the CEO Simon Gerovich, and were secured by a first-priority mortgage on the Hotel Royal Oak Gotanda." [92] Mr. Gerovich conviction in BTC is admirable given it was during a decline in the market and he personally received significantly less favorable terms.[93]

Terms for new Bitcoin-backed debt remain attractive, but continued market expansion draw non-crypto companies into less favorable arrangements. As debt-fueled purchases drive Bitcoin's price and stock prices higher, companies may chase immediate stock price reactions, despite deteriorating terms and higher Bitcoin entry prices.

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[88] Bitcoin treasuries: https://bitcointreasuries.net/
[89] Bitcoin treasuries: https://bitcointreasuries.net/
[90] MARA press release: https://ir.mara.com/news-events/press-releases/detail/1384/mara-holdings-inc-completes-850-million-offering-of-zero-coupon-convertible-senior-notes-due-2031
[91] RIOT press release: https://www.riotplatforms.com/riot-announces-closing-of-594-4-million-convertible-senior-notes-offering/
[92] Link to filing: https://contents.xj-storage.jp/xcontents/33500/83ccb67f/4ee2/4f76/a2c8/dbeaed64901f/140120241223542705.pdf
[93] Total GigaChad move

Late adopters face greater risks. Unlike MSTR's terms, future debt offerings may include non-zero interest rates, early redemption clauses, and Bitcoin collateral requirements. These companies would face a heightened risk of price declines, liquidation (if debt is secured), or default during bear markets. Particularly unfavorable debt terms could threaten companies' survival during a severe downturn.

The cycle ends when leveraged corporate Bitcoin strategies (and even non-leveraged) no longer appear accretive to shareholders. A subsequent crash in the price of bitcoin will wash out, at a minimum, the long tail of the risk curve comprised of the most exuberant CFOs, before the market finds equilibrium again, and returns to non-leveraged strategy.

Thus, while bitcoin corporate finance strategies will bring a novel wave of adoption, we expect them to become the primary driver of the next boom and bust cycle.

Conclusion

Bitcoin's corporate finance integration presents strategic opportunities and unique challenges. Companies can add Bitcoin to their balance sheet, or use BTC as a means of payment to achieve financial and strategic differentiation from competitors.

Key benefits include:

- **Inflation Protection:** By holding Bitcoin, companies can protect against monetary inflation, though volatility requires active management.
- **Dilution Protection:** Startups can leverage Bitcoin to improve capital efficiency, minimizing future fundraising needs and preserving founder and early investor equity.
- **Strategic Financing Capabilities:** Established companies can leverage Bitcoin's growth to access capital markets, and secure favorable terms for debt-backed Bitcoin purchases.
- **Marketing and Branding:** Accepting Bitcoin attracts a global community of Bitcoin enthusiasts, amplifying marketing exposure and customer engagement.

However, these strategies come with risks:

- **Liquidity and Solvency:** Bitcoin's price volatility requires robust governance policies from companies to manage liquidity, and ensure solvency, especially during bear markets.
- **Credit Expansion and Terms Deterioration:** As more companies adopt leveraged Bitcoin, increasingly less favorable terms of debt heighten financial risks for late adopters during market volatility.

Despite emerging risks, Bitcoin's integration into corporate finance is in its early stages. Successful models like MicroStrategy, Tahini's, and Real Bedford FC prove that strategic

management can transform Bitcoin adoption from survival to advantageous. As adoption grows, we anticipate:

- **Increased Corporate Adoption:** Businesses will increasingly explore Bitcoin, particularly in sectors where the firm's branding and customer engagement can benefit from Bitcoin's unique community support.
- **Evolution of Strategies:** As market dynamics evolve, companies will adapt their Bitcoin strategies, balancing potential benefits of holding Bitcoin against the risks of market volatility and credit constraints.

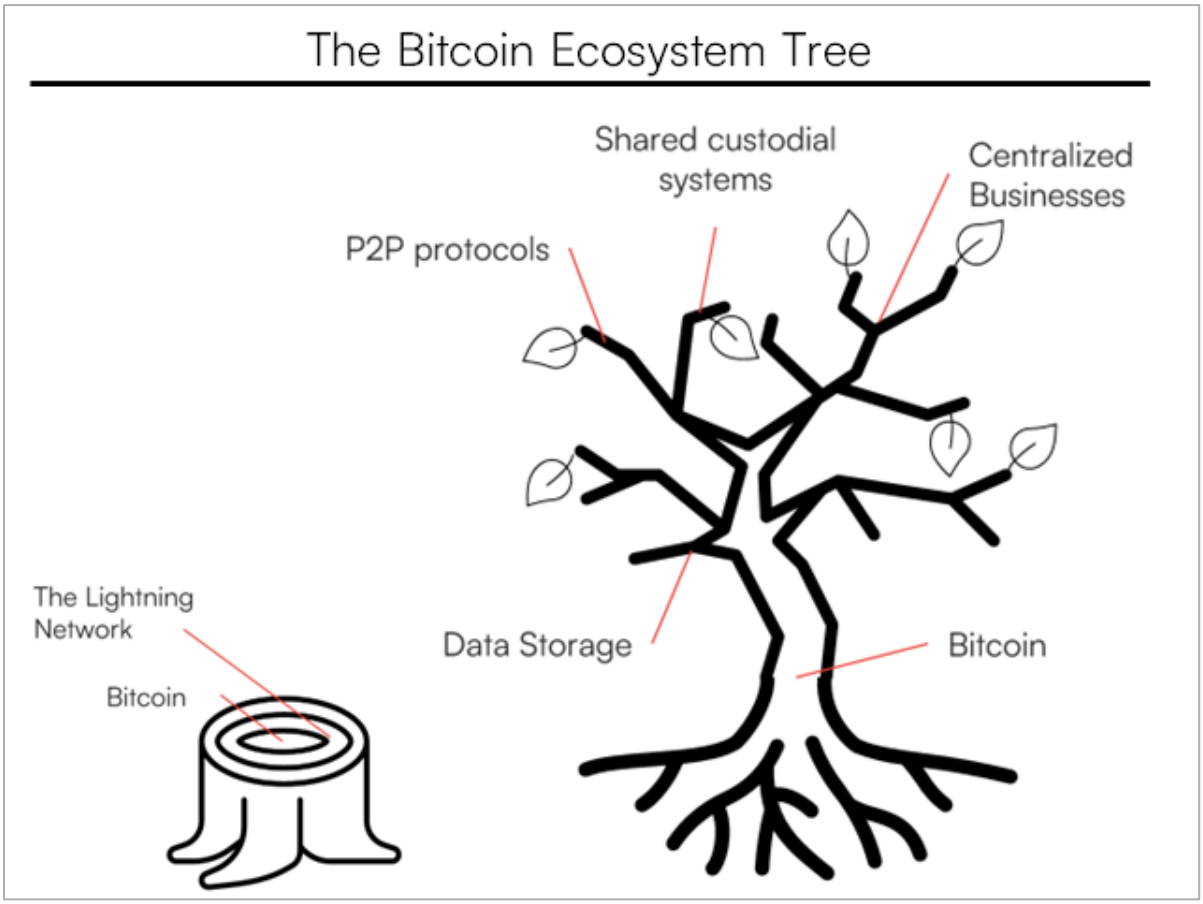
Ultimately, Bitcoin represents a promising but complex corporate finance opportunity, requiring a sophisticated risk management and forward-looking strategy to unlock its full potential without compromising financial stability.

Bitcoin Business Models

Introduction

Bitcoin adoption is driven directly or indirectly by individuals interacting with the network. Direct interaction requires moderate to significant understanding of open-source software. Typically, users with lower levels of technical acumen use products and services made by for-profit businesses.

Large scale bitcoin businesses now include publicly listed companies. There is also an evolving space for early-stage businesses attempting to support new consumer, business, and institutional demands for bitcoin. We view the Bitcoin ecosystem as analogous to a large tree:



Imagine a Bitcoin business or project as a branch with product market fit serving as sunlight. To continue growing, the branch must continuously search for sunlight. When a branch absorbs sunlight, it strengthens the tree trunk, and a trunk that discovers water nourishes all branches — benefiting not just the existing ecosystem, but all potential growth.

Some branches may grow, only to perish as faster-growing branches block their sunlight. Others might grow rapidly but unsustainably, falling off during a storm. Branches with access to adoption today may branch off into a completely different direction tomorrow, but they would

have never gotten there without the initial adoption. Most importantly, without branches the trunk will not grow.

From an investment perspective, our tree analogy reveals ample opportunity to invest in promising "branches" of the Bitcoin ecosystem, while capturing the potential of one of the fastest-growing "trunks" in financial history. Branches grow faster than trunks, and without them, trunks wither and die.

The goals of this section are:

1) Define the bitcoin ecosystem.
2) Identify historical sectors of profitability and scale within Bitcoin.
3) Define the characteristics of attractive bitcoin business models.
4) Identify which emerging technologies can help find profitability and scale.

The Bitcoin Ecosystem Taxonomy

The Bitcoin ecosystem intersects a plethora of industries, making precise categorical considerations for businesses interacting with Bitcoin increasingly complex. Much like most modern companies are now "internet companies" in some form, we expect Bitcoin to follow a similar adoption pattern.

To live is to risk it all, and with that in mind we've attempted to define Bitcoin ecosystem business categories, recognizing that many firms maintain operations in other industries and defy clean categorizations. For each category, we've developed a three-part test to determine business inclusion into that category:

1) **Bitcoin-only companies:** companies exclusively centered around Bitcoin.
2) **Bitcoin-focused companies:** if not (1), companies focused on bitcoin but that also provide broader crypto or non-crypto products and services.
3) **Bitcoin-enabling companies:** if not (2), companies that have Bitcoin support.

The below taxonomy defines Bitcoin businesses by their functional characteristics or primary source of demand. The examples included are illustrative, yet not exhaustive, highlighting key distinctions within the ecosystem.

The Bitcoin Ecosystem		Epoch
Type	Description	Examples
Protocol Nodes		
PoW Miners	Transaction ordering and block creation for the Bitcoin blockchain	Riot, Marathon, Hut 8, CleanSpark, Iren, Gridless, Barefoot
Validators	Validate that transactions follow protocol rules	Babylon, Stacks, Alpen Bridge Operators
Sequencers	Order validated transactions for L1 commitment batches	Citrea, Alpen, Lightspark Operator
Functionaries	Signers of bridge and block transactions for sidechain protocols	Liquid, Rootstock
Mints/Guardians	Signers of bridge and block transactions for federated eCash protocols	Fedimint, Cashu
Protocol Middleware		
Node service providers	Businesses that professionally manage node infrastructure	Lightspark, Breez, Voltage, Ark Labs, Citrea, Bitcoin Layers
Mining Pools	Software for hashrate aggregation and profit distribution	F2Pool, Ocean, Foundry, Antpool, Braiins
Relays	Data storage and relay for adjacent protocols that interact with bitcoin	RSK relays, Mixing Relays
Bridges	Software that locks BTC on bitcoin to back tokens on other protocols	BitVM, Multisig, Nomic MBTC, Bitgo WBTC, Threshold TBTC
Oracles	Software that calls external data and puts it onchain	Lava oracles, Atomic Finance oracles
Developer Tooling	Platforms providing standardized developer tooling across protocols	Joltz, Galoy, Spiral, Breez, Voltage, BDK, LDK
Native Applications and Platforms		
P2P Payments	P2P payment protocol	Bitcoin
P2P Lending	Lending without giving full custody to a centralized intermediary	Debifi, Atomic Finance, Lava Finance, Hodl Hodl, Firefish
P2P Exchange	Exchange without giving full custody to a centralized intermediary	Hodl Hodl, Bisq, Noones Buy Bitcoin, Robosats, Sidepit
P2P Markets	Derivative markets without giving full custody to a centralized intermediary	LN Markets, Rigly, Blockspaces, bitcoinprediction.market, Magma
Real World Assets	Tokenization of tangible or intangible assets	Lava Finance, Ducat
Digital Assets	Non-btc assets that are represented or traded using the bitcoin protocol	Taproot assets, Runes, Ordinals
Staking	Lending BTC to add additional economic security to PoS protocols	Babylon, Botanix
Mixing	Protocols that obscure connections amongst pseudonimous wallets	Coinjoin, Wasabi, Joinstr, Samouri
Explorers	Tracks and organizes protocol activity for applications	Ordiscan, mempool.space
Wallet	UI for sending/receives bitcoin transactions and other financial functions	Bitcoin Core, Phoenix, Blink, Trident Wallet
Consumer Financial Services		
Exchange	Exchanges for fiat currency to bitcoin with centralized custody	Cash App, River Financial, Swan, Coincorner, BullBitcoin, Strike, Relai
Lending	Custodial lending platforms	Ledn, Nexo
Markets	Custodial orderbook for alternative markets (eg, hasrate derivatives)	Luxor
Onramps/Offramps	API infrastructure between banks and applications	Bringin, Swapido
eCommerce Payments	Sending and receive bitcoin payments for businesses	Zaprite, Flash, Opennode
Point of Sale Payments	Sending and receive PoS bitcoin payments for businesses	Square, BTCPay, Musqet, Opago,
Personal Finance Solutions	Cards, rewards, vouchers, and other consumer financial solutions	Fold, Azteco, BitRefill, Oshi
Remittances	Applications and infrastructure for international remittance payments	Strike, Crobo, NeutronPay, Osmo, Saf.money, Sati
Wealth Management	Comprehensive wealth management services for bitcoin	Bespoke, Sound Advisory, Basilic, Bitcoin Financial Advisors Network
Tax	Applications for tax accounting of bitcoin	Coinledger, Koinly, TokenTax, Taxbit
Life Insurance	Bitcoin denominated life insurance fund	Meanwhile
Shared Custody Solutions	Collaborative custodial solutions using multisignature technology	Unchained, Casa
Institutional Financial Services		
Prime Brokerage	Offer an array of financial services investment and risk management strategies	NYDIG, Galaxy Digital
Custody	Digital asset custodial providers to financial institutions	Bitgo, River Financial, Fidelity, Gemini, Anchorage, Fireblocks, BNY Mellon
Lending	Institutional grade lending (exclusive from prime brokerage)	Cantor Fitzgerald, NYDIG, Galaxy, Unchained
Asset Management	Managers of institutional bitcoin financial products	BlackRock, Bitwise, Van Eck, Valkyrie
Banking	Regulated banks with digital asset custody	Custodia, BNY Mellon
Custodial Insurance	Pure bitcoin custodial risk insurance and custody solutions	Anchorwatch
Analytics	Data analytics companies for L1 and L2 focus	Glassnode, Amboss, Hoseki, Bitcoin Layers
Sovereign Services	Technologies and financial services targeted at sovereign nations	Stokr, Jan3
Physical Infrastructure		
Mining Hardware	Manufacturers of PoW mining servers	Bitmain, Bitdeer, Bitfury, Canaan, MicroBT
Mining Infrastructure	Mining operations specialized infrastructure providers	Giga Energy, Upstream Data
Wallet Hardware	Cold storage wallet hardware	Coldcard, Foundation Devices, Trezor, Ledger, Seed Signer, Bitkey
Satellite	Satellite infrastructure for bitcoin network remote access	Blockstream
The Bitcoin Economy		
Media	Media channels, production, platforms, and outlets focused on bitcoin	What Bitcoin Did, Coin Stories, TFTC, Fountain, Bitcoin Magazine
Bitcoin Balance Sheet Companies	Companies with bitcoin treasury exposure as a core function	MSTR, Tahini's, Metaplanet
Gaming/Gambling	Bitcoin games and gambling applications	THNDR, Bitcasino, bustabit
Social	Bitcoin focused social applications	Geyser, Orange Pill App, Primal, Damus

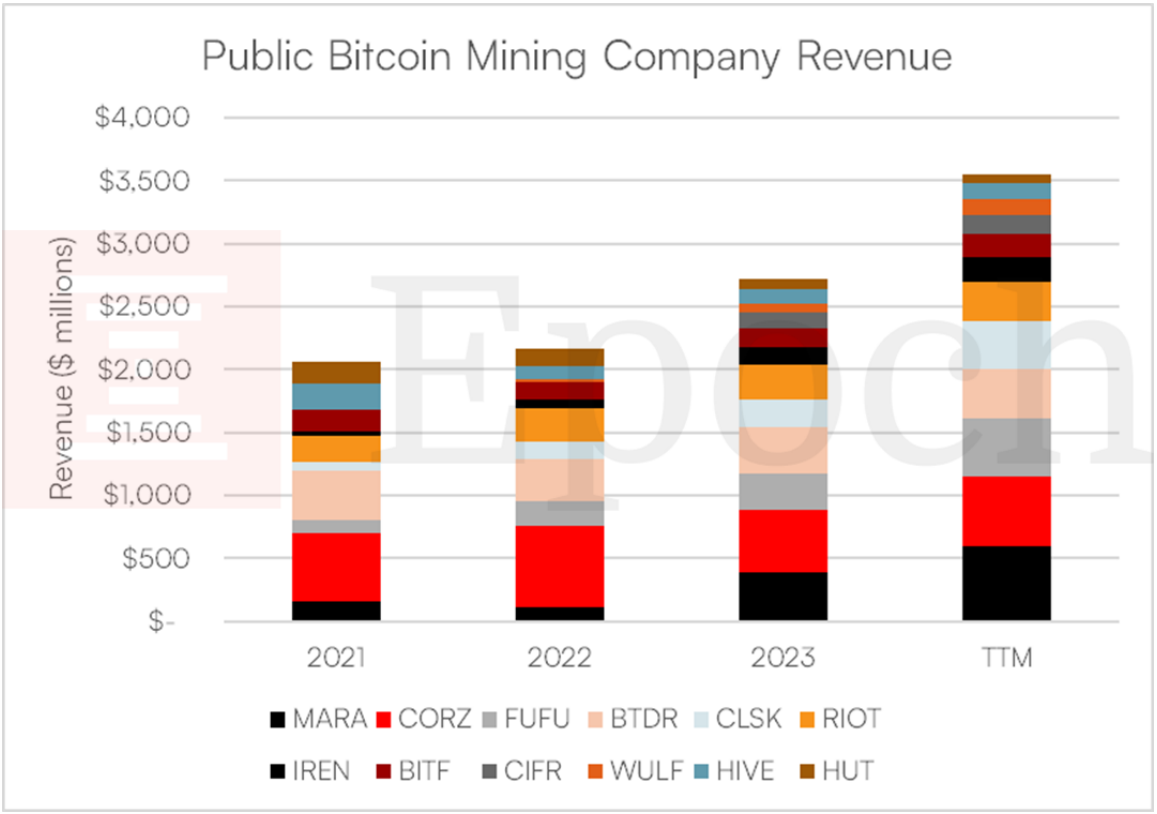
To avoid overwhelming readers with details, we define broad Bitcoin business categories and highlight some key business model considerations. We encourage readers to explore each category's specific constituents.

Protocol Nodes

The Bitcoin Ecosystem		
Type	Description	Examples
Protocol Nodes		
PoW Miners	Transaction ordering and block creation for the Bitcoin blockchain	Riot, Marathon, Hut 8, CleanSpark, Iren, Gridless, Barefoot
Validators	Validate that transactions follow protocol rules	Babylon, Stacks, Alpen Bridge Operators
Sequencers	Order validated transactions for L1 commitment batches	Citrea, Alpen, Lightspark Operator
Functionaries	Signers of bridge and block transactions for sidechain protocols	Liquid, Rootstock
Mints/Guardians	Signers of bridge and block transactions for federated eCash protocols	Fedimint, Cashu

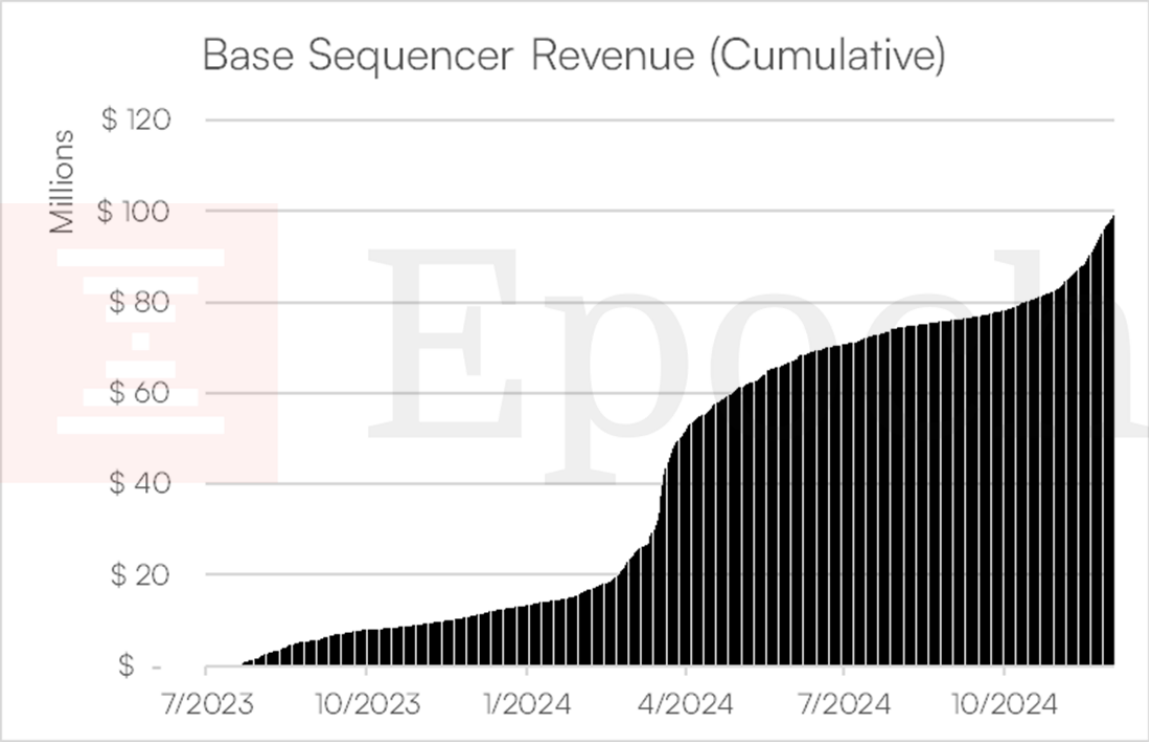
Bitcoin's underlying architecture is a layered network made up of various nodes (software) that interact with the Bitcoin protocol. Nodes can do so directly or indirectly through integrated protocols. Functionally, nodes order transactions, create blocks, and validate transactions. The various node types are defined by their functions, and protocols they interact with.

Businesses that own or operate nodes can extract revenue from block rewards, and fees. Bitcoin miners — many of which are publicly traded companies — showcase the most significant revenue model category with revenue topping $3.5 billion.



Source: sec.gov

Sequencers perform similar transaction-ordering functions to bitcoin miners, but for integrated protocols by using proof-of-stake consensus algorithms, primarily in Rollups. Like mining companies operate bitcoin miners, integrated protocol companies run sequencers. While Rollup technologies are still nascent (mostly in testnet), Base — an Ethereum based L2 protocol run by Coinbase with a single sequencer offers a glimpse of potential scale: its single sequencer has generated nearly $100 million in fees since launching in fall 2023.



Source: DefiLama.com[94]

Sequencers function as validators with potential downstream revenue models. Protocols will often attempt to bootstrap activity by subsidizing fees, typically through token issuance and inflationary economics. While we don't consider this a sustainable business model, we view network adoption subsidies as similar to traditional marketing customer acquisition costs.

However, we're highly skeptical of non-transparent inflationary token economics that rely on misleading marketing narratives — a pervasive issue in the broader crypto industry. As Bitcoin-adjacent protocols emerge, we recommend a best practice for protocols: raise capital, convert a portion to bitcoin, and to use that capital to bootstrap protocol network effects.

Protocol Middleware

The Bitcoin Ecosystem		Epoch
Type	Description	Examples
Protocol Middleware		
Node service providers	Businesses that professionally manage node infrastructure	Lightspark, Breez, Voltage, Ark Labs, Citrea, Bitcoin Layers
Mining Pools	Software for hashrate aggregation and profit distribution	F2Pool, Ocean, Foundry, Antpool, Braiins
Relays	Data storage and relay for adjacent protocols that interact with bitcoin	RSK relays, Mixing Relays
Bridges	Software that locks BTC on bitcoin to back tokens on other protocols	BitVM, Multisig, Nomic MBTC, Bitgo WBTC, Threshold TBTC
Oracles	Software that calls external data and puts it onchain	Lava oracles, Atomic Finance oracles
Developer Tooling	Platforms providing standardized developer tooling across protocols	Joltz, Galoy, Spiral, Breez, Voltage, BDK, LDK

[94] Link to source: https://defillama.com/fees/base

Middleware is defined as software that connects to other software to enable cross-platform integration. We categorize middleware based on the protocols they are interacting with, and their functional role.

Mining pools have achieved the highest degree of scale within middleware. While precise figures aren't available, we estimate aggregate annualized revenue for mining pools around $300 million. Foundry, the largest mining pool, controls roughly 33% of the hashrate, and likely generates close to $100 million in revenue annually.[95]

Mining Pool Annual Revenue Estimate*	
Blocks per year	52,560
Block subsidy	₿ 3.125000
Fees as % of total	10.0%
Block reward	₿ 3.437500
Bitcoin Price	$ 100,000
USD Block Reward	**$ 18,067,500,000**
Blocks mined via pools	80.0%
Mining pool Fee	2.0%
Mining Pool revenue	**$ 289,080,000**

**assumptions as of December 2024*

Node service providers are an emerging middleware model gaining significant traction. Multiple early-stage businesses are developing specialized services for the Lightning Network, which signals promising growth.

Native Applications and Platforms

The Bitcoin Ecosystem — Epoch		
Type	Description	Examples
Native Applications and Platforms		
P2P Payments	P2P payment protocol	Bitcoin
P2P Lending	Lending without giving full custody to a centralized intermediary	Debifi, Atomic Finance, Lava Finance, Hodl Hodl, Firefish
P2P Exchange	Exchange without giving full custody to a centralized intermediary	Hodl Hodl, Bisq, Noones Buy Bitcoin, Robosats, Sidepit
P2P Markets	Derivative markets without giving full custody to a centralized intermediary	LN Markets, Rigly, Blockspaces, bitcoinprediction.market, Magma
Real World Assets	Tokenization of tangible or intangible assets	Lava Finance, Ducat
Digital Assets	Non-btc assets that are represented or traded using the bitcoin protocol	Taproot assets, Runes, Ordinals
Staking	Lending BTC to add additional economic security to PoS protocols	Babylon, Botanix
Mixing	Protocols that obscure connections amongst pseudonimous wallets	Coinjoin, Wasabi, Joinstr, Samouri
Explorers	Tracks and organizes protocol activity for applications	Ordiscan, mempool.space
Wallet	UI for sending/receives bitcoin transactions and other financial functions	Bitcoin Core, Phoenix, Blink, Trident Wallet

Native applications and platforms represent the most ambiguous category, blurring lines between Bitcoin-specific and general consumer/institutional applications. We focus on businesses with core operations associated tied to Bitcoin and integrated protocols.

Peer-to-peer (P2P) markets for lending, exchange, and derivatives have scaled significantly. Hodl Hodl, a platform for lending and exchange, has over 100,000 registered users,[96] while Noones Bitcoin has nearly two million users transacting $3 million in daily volume.[97] Noones exemplifies

[95] Source: https://hashrateindex.com/hashrate/pools
[96] Source: https://hodlhodl.com/?filters%5Bcurrency_code%5D=USD
[97] Source: https://noones.com/

P2P businesses that enable financial services for underserved demographics, bridging mobile money, and digital wallets.

The market for Bitcoin wallets remains one of the oldest and most fragmented. Within this category. monetization remains a challenge, as standalone Bitcoin products typically require broader financial service inclusion — including lending, exchange, stablecoins, or other cryptocurrency support. The wallet category overlaps with other specialized domains.

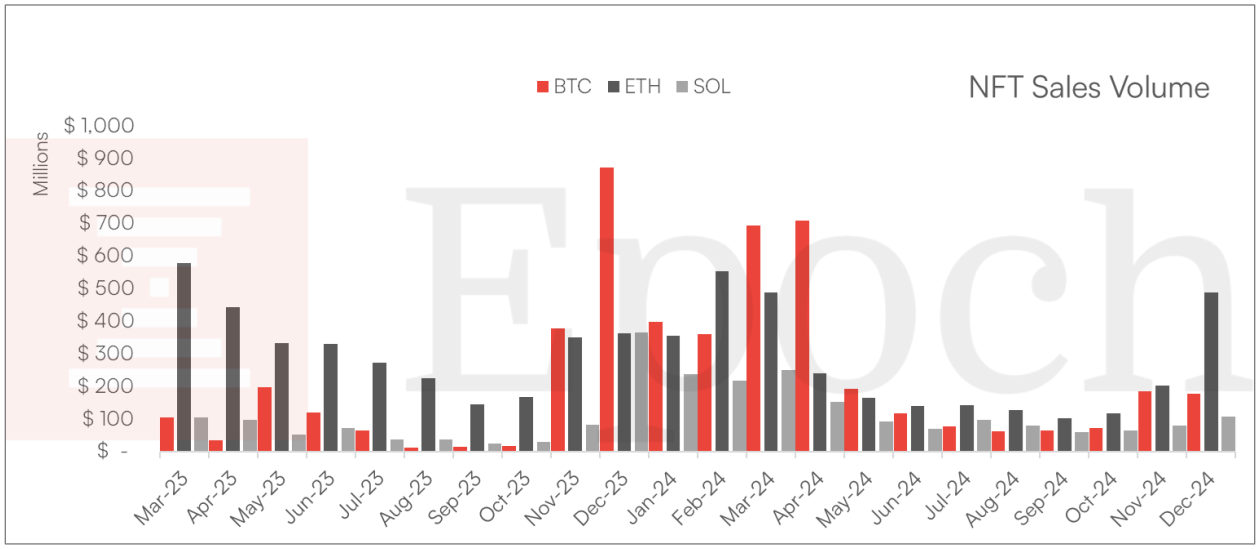
Notably, mixing services have emerged as a profitable function. For example, the Samouri Whirlpool mixing feature generated nearly $4 million in revenue in 2024.

Year	Revenue (BTC)	USD Revenue (Thousands)
2019	10.62	97
2020	44.55	502
2021	30.44	1,413
2022	44.92	1,185
2023	49.13	1,505
2024	66.19	3,864

Source: Clark Moody Bitcoin

Operating a for-profit coinjoin coordinator presents a profitable yet legally precarious business model. Minimal infrastructure requirements — typically a single server running stable software — enable exceptionally high operating margins. However, the legal landscape remains volatile. At the time of writing, both founders of Samourai Wallet are under federal indictment and have been arrested.[98]

In recent years, digital asset issuance has dramatically grown, outpacing alternative cryptocurrency blockchains that originally pioneered the model.



Source: Cryptoslam[99]

[98] You can donate to support the cause of privacy rights at: https://p2prights.org/
[99] Link to NFT volume data: https://www.cryptoslam.io/blockchains/bitcoin

Ordinals and Runes protocols inscribe arbitrary data to the Bitcoin blockchain, whose the value remains inherently subjective, driven primarily by marketing narratives. Yet these protocols (or others), may ultimately evolve to enable digital assets with real-world utility, and tangible value. Despite ongoing debates about demand sustainability, their initial popularity has been significant.

Consumer Financial Services

The Bitcoin Ecosystem		Epoch
Type	Description	Examples
Consumer Financial Services		
Exchange	Exchanges for fiat currency to bitcoin with centralized custody	Cash App, River Financial, Swan, Coincorner, BullBitcoin, Strike, Relai
Lending	Custodial lending platforms	Ledn, Nexo
Markets	Custodial orderbook for alternative markets (eg, hasrate derivatives)	Luxor
Onramps/Offramps	API infrastructure between banks and applications	Bringin, Swapido
eCommerce Payments	Sending and receive bitcoin payments for businesses	Zaprite, Flash, Opennode
Point of Sale Payments	Sending and receive PoS bitcoin payments for businesses	Square, BTCPay, Musqet, Opago,
Personal Finance Solutions	Cards, rewards, vouchers, and other consumer financial solutions	Fold, Azteco, BitRefill, Oshi
Remittances	Applications and infrastructure for international remittance payments	Strike, Crobo, NeutronPay, Osmo, Saf.money, Sati
Wealth Management	Comprehensive wealth management services for bitcoin	Bespoke, Sound Advisory, Basilic, Bitcoin Financial Advisors Network
Tax	Applications for tax accounting of bitcoin	Coinledger, Koinly, TokenTax, Taxbit
Life Insurance	Bitcoin denominated life insurance fund	Meanwhile
Shared Custody Solutions	Collaborative custodial solutions using multisignature technology	Unchained, Casa

Consumer financial services have achieved the most significant adoption in the Bitcoin ecosystem. Unlike native applications, these services abstract network interaction complexities, creating a user experience that drives market penetration.

Most businesses in this category share a strategic focus on Bitcoin-only services, anticipating that as Bitcoin gains market share, cryptocurrency diversification will become less critical. Strategically, their thesis is that a Bitcoin-specific product suite will increasingly appeal to the average consumer.

Many businesses have expanded their focus to include stablecoin support. By combining support for both types of cryptocurrencies, they can be the primary drivers of demand, relegating the remainder of the market to others — a strategy following the Pareto rule for consumer preferences.

Of the various financial services, exchanges and lending dominate core business models. Often, businesses will gain traction through lower-margin service that funnel users toward more profitable offerings.

Fold is an example of this model. By introducing a rewards feature that captures users without requiring the friction of KYC verification, the company effectively acquires customers and directs them to a broader suite of financial (and high margin) services. In 2023, Fold generated over $20 million in revenue and accumulated a bitcoin balance sheet exceeding 1,000 bitcoin.[100]

[100] Fold investor presentation: https://cdn.prod.website-files.com/609c10361da7b5749cae41a9/6706d15e043787d31215d3a1_P.%20Future%20Investor%20Presentation%20(October%202024).pdf

Institutional Financial Services

The Bitcoin Ecosystem		Epoch
Type	Description	Examples
Institutional Financial Services		
Prime Brokerage	Offer an array of financial services investment and risk management strategies	NYDIG, Galaxy Digital
Custody	Digital asset custodial providers to financial institutions	Bitgo, River Financial, Fidelity, Gemini, Anchorage, Fireblocks, BNY Mellon
Lending	Institutional grade lending (exclusive from prime brokerage)	Cantor Fitzgerald, NYDIG, Galaxy, Unchained
Asset Management	Managers of institutional bitcoin financial products	BlackRock, Bitwise, Van Eck, Valkyrie
Banking	Regulated banks with digital asset custody	Custodia, BNY Mellon
Custodial Insurance	Pure bitcoin custodial risk insurance and custody solutions	Anchorwatch
Analytics	Data analytics companies for L1 and L2 focus	Glassnode, Amboss, Hoseki, Bitcoin Layers
Sovereign Services	Technologies and financial services targeted at sovereign nations	Stokr, Jan3

Similar to consumer financial services, institutional-grade businesses often provide overlapping financial services. For example, industry prime brokers like NYDIG and Galaxy Digital offer comprehensive capital markets and asset management services, fulfilling institutional demands across Bitcoin and broader cryptocurrency markets.

Prime Brokerage is now dominated by NYDIG and Galaxy Digital, particularly after the 2022 Genesis market collapse. To get a sense of scale, Galaxy Digital earned nearly $200 million in net income from $4.6 billion in AUM during the first three quarters of 2024.[101]

Custodial services represent a specialized niche with firms like River Financial and Unchained focusing exclusively on Bitcoin custody. This domain requires industry-specific knowledge traditionally avoided by traditional financial firms. The fee-based model becomes attractive at scale, growing with Bitcoin's capital appreciation.

Traditional financial institutions increasingly compete in brokerage, lending, asset management, and banking through robust balance sheets, and regulatory advantages. Cantor Fitzgerald's $2 billion collateralized bitcoin lending program exemplifies this phenomenon.[102] While competitive, these firms lack the technological agility of Bitcoin-focused firms. Still, we view specialized technology providers as potential acquisition targets for traditional financial firms that seek to expand their niche. Combining capital and regulatory licensing with fine-tuned technologies is strategically rational.

Physical Infrastructure

The Bitcoin Ecosystem		Epoch
Type	Description	Examples
Physical Infrastructure		
Mining Hardware	Manufacturers of PoW mining servers	Bitmain, Bitdeer, Bitfury, Canaan, MicroBT
Mining Infrastructure	Mining operations specialized infrastructure providers	Giga Energy, Upstream Data
Wallet Hardware	Cold storage wallet hardware	Coldcard, Foundation Devices, Trezor, Ledger, Seed Signer, Bitkey
Satellite	Satellite infrastructure for bitcoin network remote access	Blockstream

[101] Galaxy investor presentation: https://s201.q4cdn.com/407453138/files/doc_financials/2024/q3/GLXY-Q3-2024-Overview.pdf
[102] Source: https://decrypt.co/293359/cantor-fitzgerald-plans-2-billion-bitcoin-lending-program-via-tether-report

Mining hardware is one of the earliest and most profitable sectors. Bitmain leads the category, with estimated billions in profits.[103] Jack Dorsey's Block entered the hardware manufacturing space in 2024 with a 3nm ASIC chip, offering open-source code to enhance decentralization, transparency, and resilience at the Bitcoin mining layer. Despite this, the supply remains heavily centralized, though market dynamics suggest a gradual reduction of concentration.

The mining hardware industry primarily focuses on increasing power density and operational reliability. Given the substantial capital and operating expenses of bitcoin mining sites, denser ASICs can improve economies of scale. Reducing the machine count while maintaining hashrate lowers real estate, installation, and maintenance costs.

For consumer hardware, Block also released Bitkey — an open-source self-custodial bitcoin wallet. The wallet market, historically dominated by Ledger (which achieved a series C valuation of over $1 billion in 2021),[104] features business pursuing diverse strategies: expanding bitcoin-specific functionality, expanding cryptocurrency support, or broadening security device offerings (e.g., Foundation Devices). As bitcoin adoption grows, a focused approach on Bitcoin functionality and security models may lead to increasing market penetration.

The Bitcoin Economy

The Bitcoin Ecosystem		
Type	Description	Examples
The Bitcoin Economy		
Media	Media channels, production, platforms, and outlets focused on bitcoin	What Bitcoin Did, Coin Stories, TFTC, Fountain, Bitcoin Magazine
Bitcoin Balance Sheet Companies	Companies with bitcoin treasury exposure as a core function	MSTR, Tahini's, Metaplanet
Gaming/Gambling	Bitcoin games and gambling applications	THNDR, Bitcasino, bustabit
Social	Bitcoin focused social applications	Geyser, Orange Pill App, Primal, Damus

The Bitcoin economy is a catch-all term for businesses that require interacting with bitcoin for success. The two dominant models are media companies and firms using bitcoin as a primary reserve asset.

Bitcoin media companies generate revenue through podcasts, social media, YouTube channels, and events or conferences. BTC Inc. is a salient example, reporting over $100 million in revenue.[105] Built in 2012, BTC Inc. operates major social media channels, some of the largest industry events, and an online publishing house, Bitcoin Magazine. As explored in our adoption section, mainstream media coverage to Bitcoin continues growing, suggesting this sector will expand across industries as adoption spreads.

Treasury reserves, much like media exposure, affect companies broadly. As detailed in our bitcoin corporate finance section, Bitcoin treasury adoption draws both outsized media attention while also improving their financial performance in a way that would not otherwise be possible.

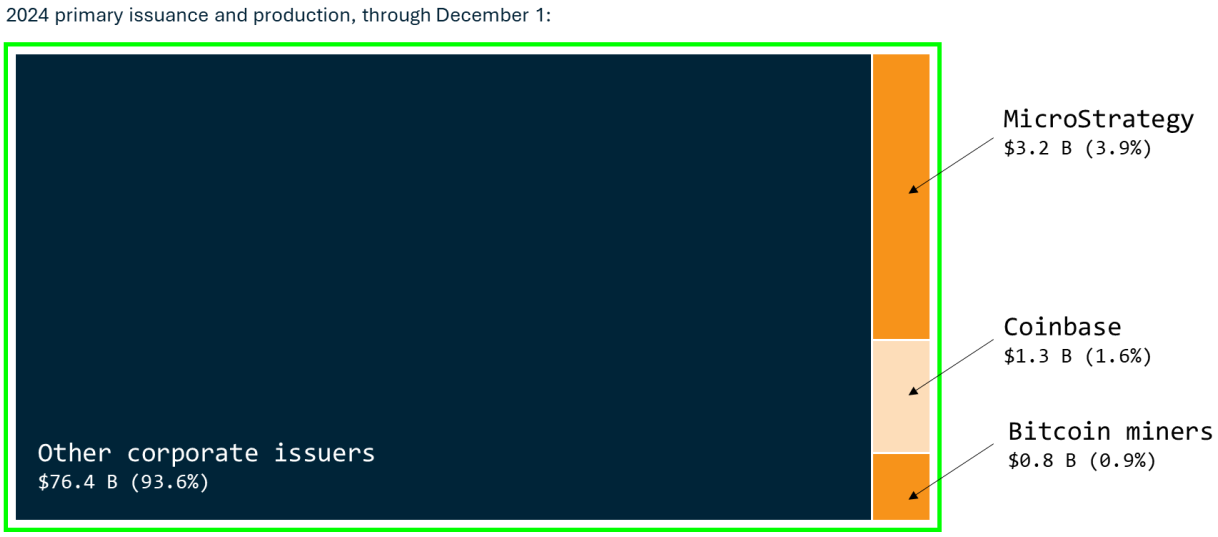
[103] Bitmain profit estimate from 2018: https://www.cnbc.com/2018/02/23/secretive-chinese-bitcoin-mining-company-may-have-made-as-much-money-as-nvidia-last-year.html\
[104] Source: https://www.crunchbase.com/funding_round/ledger-2-series-c--1f1c9902
[105] BTC Inc. website: https://b.tc/

Emerging Business Models

Having established the key categories of the Bitcoin ecosystem, we'll now examine a few emerging business models. These models are already established, and we see significant potential for growth in the near to medium term.

Lending Businesses

The lending section was written in consultation with Build Asset Management, a private credit manager specializing in Bitcoin ecosystem lending.[106]



Source: Build Asset Management

Bitcoin-related issuers represent approximately 6% of the USD convertible debt market, which is roughly 50 basis points of the entire lending market. As it reaches an inflection point -- Cantor Fitzgerald announced a $2B lending desk for collateralized bitcoin loans in 2024,[107] we expect this market to continue growing and is at an inflection point. We expect substantial growth, primarily in convertibles, with investment-grade and loans markets emerging as banks enter the space.

[106] You can contact the Build team at: https://getbuilding.com/
[107] Cantor Fitzgerald press release: https://www.cantor.com/cantor-fitzgerald-to-launch-bitcoin-financing-business/#:~:text=New%20York%2C%20NY%20%E2%80%93%20July%2027,to%20substantially%20grow%20the%20operation.

Market expansion brings keys risks, however. Collateral rehypothecation poses a primary risk to sustainability (as witnessed in the 2022 crash). We also foresee more market exuberance — which will drive replication of MicroStrategy's success, pushing further down the risk curve as competition intensifies.

Despite inherent cyclicality in growth and leverage, Bitcoin's superior qualities as collateral ready the market for further material growth sector. In particular, technology businesses with exposure to growth in the lending market — while not direct lenders themselves — could continue to be an attractive business model. These companies can capture loan origination volumes and transferability fees while maintaining relatively stable revenue, when compared to direct lending. We value middleware technologies and platforms within the lending space that can reduce rehypothecation risks.

Notably, the repeal of SAB 121 in the US will spark a new competitive dynamic of traditional banks entering this market. We will produce a detailed report on the impact of this phenomenon on the industry in the coming months.

Remittance Businesses

Cross-border payments rely on outdated infrastructure. When banks lack direct relationships, they must use a correspondent bank where both maintain accounts. Less common the currency pairs require more intermediaries, creating further inefficiencies.

This system degrades the quality of service while increasing costs through fees and delays. High-volume currency pairs benefit from fewer intermediaries, while low-volume pairs suffer through lengthy chains of correspondent banks, each extracting fees. Beyond the friction of the intermediation itself, the intermediaries also operate on obsolete systems. The global banking system, while intended to become a mosaic, remains a patchwork with several notable deficiencies:

Notable Deficiencies of Cross-border Payment Network Infrastructure	
Deficiency	Description
Incompatible data formats	Standards vary by jurisdiction, reducing automation, which causes increased technology and staffing costs.
Redundancy of compliance checks	Various regulatory regimes increase the number of intermediaries, creating additional redundancy in compliance checks with complexity, delays, and costs.
Limited Operating Hours	Settlement only occurs when systems are available, and this complexity increases across time zone differences. This causes delays while also increasing capital costs. In this case, cash, also known as trapped liquidity, must be held to cover unknown FX rate changes across downtime hours.
Physical dependencies	A material proportion of systems rely on paper-based processes, creating delays and trapped liquidity.
High funding costs	Uncertainty of incoming funds requires overfunding, leading to capital inefficiencies.
Long transaction chains	Correspondent banking chains increase costs, delays, funding needs, redundancy of validation checks, and the probability of error.
High barriers to entry	Incumbent infrastructure materially increases the costs for new entrants to enter the system.

[108]

Businesses leveraging Bitcoin and Lightning Network protocols offer a superior alternative to these banking deficiencies:

A Comparison of Cross-border Networks	
Bank Networks	Bitcoin and The Lightning Network
Incompatible data formats	Standardizes all data formats
Redundancy of compliance checks	Automates all processing and compliance checks
Limited Operating Hours	Available 24/7/365 globally
Physical dependencies	Has no physical dependencies beyond computer hardware
High funding costs	Removes intermediaries, and reduces funding costs when managing inbound and outbound liquidity
Long transaction chains	Minimizes intermediated chains to instant P2P payments via a routing protocol
High barriers to entry	Open network accessible to anyone with an internet connection

[109]

Businesses built on Bitcoin continue emerging to eliminate infrastructure redundancy, reduce counterparty risk, and lower switching costs in these systems. Stablecoin adoption is also noteworthy. We focus on businesses that leverage Bitcoin-native stability technology, enabling asset stability without reliance on alternative blockchains.

[108] A detailed discussion of these problems can be found here: https://www.bankofengland.co.uk/payment-and-settlement/cross-border-payments

[109] A detailed discussion of these problems can be found here: https://www.bankofengland.co.uk/payment-and-settlement/cross-border-payments

Founders looking to build in this area should be aware this is a game of customer acquisition costs, since the infrastructure is commoditized. Our primary concerns at this stage are:

- Large scale incumbents can temporarily lower prices in specific channels, significantly increasing operational costs.
- Many of the factors that make remittances valuable also make them less scalable and transferable: local vendor relationships, integrating with local partners, targeting local users.
- Payment method onboarding presents additional challenges, as traditional money transfer operators offer credit cards, and alternative payment methods. While not accepting credit cards reduces chargeback risk, it may also limit user adoption.

Given these challenges, we seek remittance businesses employing novel go-to-market strategies focused on valuable niche demographics to achieve meaningful scale.

Node Service Provider Businesses

The emergence of open network node infrastructure required businesses to maintain in-house technical expertise — creating operational burdens. Businesses now increasingly outsource infrastructure management to service providers. Early-stage businesses focusing on the Lightning Network demonstrate this trend, which we expect to expand across Bitcoin-native protocols as adoption grows.

This model is comparable to traditional IT managed services model but differs in its transaction-based nature. Providers can choose to migrate from a standard SaaS pricing model towards a volume-based fee structure. Built atop open protocols, businesses can choose open-source, proprietary, or hybrid models.

Open-source models, while generally less defensible through contracts and copyright ownership, can take hybrid proprietary forms. Its defensibility increases by community growth, however. Network effects and switching costs increase alongside community growth. The optimal approach is a network effect from a community (developers and contributors), while also maintaining proprietary versions or features being sold for monetization.

Comparison of Open Source and Proprietary Models	
Open Source	
Pros	Cons
Attracts users from free pricing	Corporate clients struggle to approve open source uses
Customization of products to needs	Monetization more challenging
Brand Recognition	UX uncertainty
Community testing for vulnerabilities	Updates less flexible
Portability of applications	No Copyright
Proprietary	
Pros	Cons
Protected by copyright	Limits community engagement
Direct monetization	Less customization ability
Greater certainty of UX	Less brand recognition
Update Flexibility	Vulnerabilities more likely
Simpler corporate client approval	Challenging to integrate

We're curious to see how models evolve but suspect the standard to become a hybrid approach between software and monetization. An open core model with paid features can build ecosystem momentum, with community scaling, and enterprise services winning out. The models we expect to see are subscriptions, transaction fee, usage-based pricing, and support services.

Bitcoin as a Feature

Traditional financial institutions are increasingly adding support for Bitcoin, driven by favorable regulatory tailwinds. Rather than viewing Bitcoin-native businesses and Bitcoin-as-a-feature firms as opposing models, we simply view them as complementary adoption channels. We anticipate this will emerge in several forms in the near to medium term:

- **Custody**: Institutions will demand support for traditional and digital assets from their banking providers. America's oldest bank and largest custodian, BNY Mellon, developed their own digital asset custodial service after finding that 41% of institutional investors hold cryptocurrency.[110]
- **Transfer and Settlement**: We predict traditional financial service providers integrating directly with the Bitcoin network. For example, BNY Mellon partnered with Fireblocks to tap into its native transfer and settlement network. Bitcoin is superior to Fedwire and Tier-1 banks could add it as another clearing native digital service.
- **Credit Market Participation**: With increasing demand for bitcoin as credit collateral, we're witnessing traditional financial firms increasingly take part in bitcoin lending

[110] Source: https://www.marketsmedia.com/bny-mellon-launches-digital-asset-custody-platform/

activities. In 2024, Cantor Fitzgerald launched a $2 billion lending program for collateralized bitcoin loans, while taking a 5% stake in stablecoin giant Tether.[111]

- **Payment Support**: Payment integration continues as service providers continue to add bitcoin functionality. In fact, Bitcoin-native businesses are currently building wholistic payment technology with bitcoin support serving as a differentiating feature. At scale, Block is leading the way via CashApp and Square PoS services.

As these features drive margins, we anticipate traditional financial institutions will increase acquiring Bitcoin businesses. The trend we're seeing is: institutions announce Bitcoin support, form industry partnerships, and take equity positions. Particularly, we expect middleware integrations connecting traditional and Bitcoin systems to become the most valuable partnerships and subsequent acquisition targets.

However, a primary deterrence of this trend would be another significant contraction in the industry. As discussed ad nauseum in the Bitcoin Corporate Finance section of this report, another credit crash similar to 2022 could emerge if leveraged bitcoin corporate finance strategies create structural exuberance. A significant crash leading to widespread insolvency would likely push traditional institutions, particularly banks, to distance themselves from the industry.

What Epoch is Looking For

We conclude this section by outlining desirable characteristics in Bitcoin businesses — and where we expect them to emerge. While there are many desirable characteristics, our focus is to describe what specific features of Bitcoin businesses are attractive to us. Ideal Bitcoin business models would possess the following:

- **Protocol Exposure.** Bitcoin-native protocols are built to capture growing network effects. Though Bitcoin's architecture is still nascent, we expect this to rapidly evolve in the near to medium term. Founders who are able to anticipate this change, and model their business around emerging protocols face risks, but if they find the right timing and align with emerging protocols can achieve competitive advantages.
- **Bitcoin Price Exposure.** We seek businesses that grow their balance sheet and revenue alongside Bitcoin price appreciation. While many capital allocators view this as risky, it aligns with Epoch's thesis. However, exposure to Bitcoin's volatility demands conservative cash balance forecasting and active management.
- **Adoption Exposure.** We value exposure to broad adoption metrics, including ownership growth, user expansion, transaction volume increases, and lending. Lending is a great example as it provides bitcoin price exposure alongside exposure to bitcoin as a collateral asset. Generally speaking, we prioritize businesses exposed to Bitcoin as a store of value

[111] Source: https://www.ledgerinsights.com/analysis-cantor-fitzgerald-to-launch-bitcoin-lending/

(as opposed to medium of exchange or unit of account), which we expect to dominate growth in the near-term.

- **Legacy infrastructure integration.** We are interested in Bitcoin businesses that are competing directly with legacy financial services. Success requires matching incumbent capabilities while adding distinctive Bitcoin features. Zaprite is a prime example, enabling standard payment and accounting functionality with native Bitcoin support.
- **Build for problems, align with ideology.** We're idealists, seeking alignment between problem-solving and ideology. However, though Bitcoin culture draws ideological founders, and we share those convictions, businesses must address concrete consumers needs. The ideal is a combination of passionate conviction with practical problem-solving.

These fundamentals guide our evaluation of attractive business models, and the trends we expect to emerge:

Middleware: Developer Tooling and Infrastructure

Bitcoin protocols are in their infancy, which creates market opportunity for middleware addressing developer pain points in application development. By reducing friction in Bitcoin-native application development, middleware will catalyze further adoption of Bitcoin architecture. Two factors make middleware particularly attractive:

- **Developers will be most valuable customer in the market.** Businesses effectively marketing to developers will be able to influence the decision makers controlling significant amounts of market value.
- **Investing in middleware is often a diversified play across protocols.** Middleware integration across protocols provides diversified exposure without depending on any single protocol's success.

Middleware businesses capture both Bitcoin adoption growth and protocol expansion. The primary risk of these models, however, is delayed or limited protocol growth. We expect custodial middleware and developer tooling platforms to find product market fit in the medium term.

Applications: the Goldilocks Zone

At the application layer there is a tradeoff between centralized services and "decentralized" native architecture.[112] Centralized services provide a superior UX, while their decentralized counterparts can reduce counterparty risk.

[112] We put decentralized in quotes as it is a misunderstood term. Our view is that any degree of distributed control over a system falls somewhere on the spectrum of decentralization. However, many define this term as meaning permissionless architecture. We view only bitcoin as permissionless and other decentralized protocols that can be

We view centralized UX applications that reduce counterparty risk as belonging within the "goldilocks zone". Examples of this model include Debifi, Anchorwatch, and Unchained. These firms leverage a unique Bitcoin script, using shared custodial systems, and create user assurances while centralizing their UX and providing direct customer support. We believe that a relentless focus on user experience, and a shared custodial model can serve for a broad model across various financial service providers.

Financial Services: Proven Services in Novel Markets

Centralized financial services — including exchanges, lending, remittances, and personal finance — often require local partnerships and regulatory compliance. As such, these geographic requirements create natural barriers to entry, simultaneously increasing defensibility while limiting the addressable market.

We target financial services businesses that want to take proven business models from one geographic market and execute them another. Market characteristics such as size and demography determine achievable scale within these focused segments.

Furthermore, as traditional financial services continue to expand their services for Bitcoin-native businesses, expect these localized successes to become attractive acquisition targets for rollup strategies.

Insurance: bitcoin native risk solutions

The combination of blockchain transparency with programmable spending conditions (through smart contracts) enables novel solutions for risk management. As such, we expect native insurance services and technologies to expand within the ecosystem.

Custodial insurance has historically been a centralized point of risk for institutions, often with drastic mispricing. New custodial arrangements reduce loss, theft, and attack risks while enabling more efficient risk pricing. Bitcoin-native Insurtech solutions can leverage blockchain transparency to disintermediate today's highly fractured settlement system.

Conclusion

The Bitcoin ecosystem resembles a growing tree, where businesses and technologies "branch out" by finding product-market fit ("sunlight") while strengthening the core Bitcoin network — which we think of as a tree trunk.

This ecosystem can be categorized into several sectors:

influenced or controlled in a variety of ways but could still maintain decentralized benefits such as a reduction of counterparty risk.

- **Protocol Infrastructure:** This is the foundational layer, with nodes and middleware facilitating network interaction. Companies operating mining pools, node services, and sequencers have achieved significant scale, and provide essential network support.
- **Native Applications and Platforms:** This category enables direct network interaction through peer-to-peer markets, wallets, and asset issuance platforms. While these applications are vital for direct user engagement, they face ongoing monetization and regulatory challenges.
- **Consumer and Institutional Financial Services:** These drive adoption by simplifying interaction with the network. Consumer services improve user experience, while institutional services like custody, prime brokerage, and lending continue growing, especially as traditional finance integrates more deeply with Bitcoin.
- **Physical Infrastructure:** This layer continues to evolve, from Bitmain's dominance in manufacturing mining equipment, to Block's open-source hardware initiatives.
- **The Bitcoin Economy:** Beyond direct financial services, Bitcoin influences media and corporate treasury strategies, which brings broader economic impact.

At a granular level, we expect some markets to continue expanding:

- **Lending:** Collateralized Bitcoin lending continues to expand, with the expectation of significant market growth, particularly for convertible loans.
- **Remittances:** Bitcoin protocols offer solutions to traditional cross-border payment inefficiencies, with potentially lower costs and faster transactions.
- **Node Service Providers:** These grow alongside Bitcoin protocols, especially Lightning Network, indicating more demand for specialized service providers.
- **Bitcoin as a Feature:** Traditional financial institutions are increasingly offering Bitcoin-related services from custody, transfer and settlement, credit market participation, to payment support. We expect these institutions to acquire or partner with Bitcoin-native businesses to integrate these services, particularly middleware — barring any significant market downturns.

Fundamentally, we seek business model characteristics that are unique to the Bitcoin ecosystem:

- **Protocol Exposure:** We seek businesses led by founders who anticipate and model their businesses around Bitcoin-native protocols. Our goal is to have a first mover advantage with scale and network effects.
- **Bitcoin Price Exposure:** We value businesses that grow their balance sheet and revenue alongside bitcoin's price appreciation, while maintaining conservative cash management during fundraising.
- **Adoption Exposure:** Beyond price increase, we seek companies benefiting from broader adoption metrics — including growth in ownership, transaction volume, and lending activities — with a particular focus on Bitcoin's store of value proposition.

- **Legacy Infrastructure Integration:** Often successful companies must compete with traditional financial services by offering solutions that incorporate unique Bitcoin features.
- **Build for Problems, Align with Ideology:** Businesses should solve real consumer problems, while aligning with Bitcoin's ideological foundations. It's not a deal breaker, but we value a founders' passion for Bitcoin combined with practical business acumen.

Lastly, we identify several business models emerging in the near-term:

- **Middleware developer tooling and infrastructure:** Middleware tools reduce developer friction in building on Bitcoin protocols. Investing in this layer is a diversification strategy across various protocols, particularly in node infrastructure, custodial middleware, and developer tools.
- **Applications in the "Goldilocks Zone:"** These balance centralized user experience with decentralized risk reduction, particularly in financial services that leverage Bitcoin script for custody.
- **Financial Services in Novel Markets:** Businesses that apply proven financial service models in new geographical areas, leveraging local partnerships and regulatory environments for natural market defensibility.
- **Insurance:** We see opportunities in providing Bitcoin-native risk solutions, particularly in custodial insurance, where blockchain transparency and smart contracts can offer more efficient risk management and pricing.

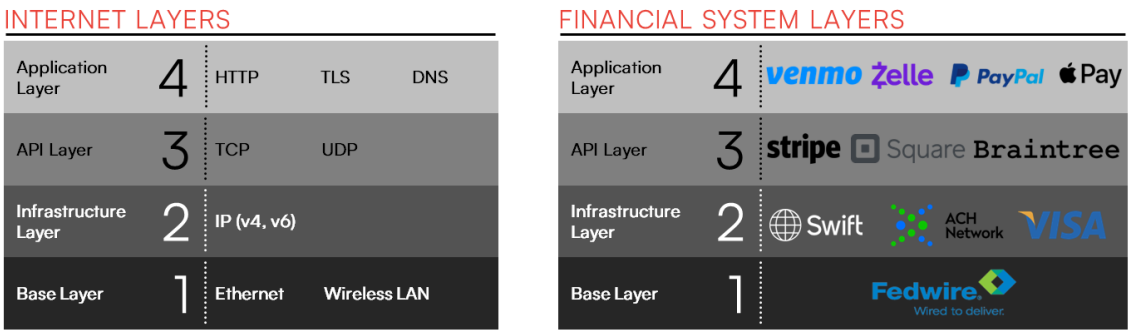
In short, Epoch targets businesses combining Bitcoin's technological and ideological advantages while addressing real-world problems, exposure to Bitcoin's growth metrics, and integration with traditional financial systems.

Bitcoin Protocols

Introduction

Bitcoin protocols extend beyond Bitcoin itself, encompassing separate protocols that interact with the core network. More specifically, these protocols leverage bitcoin as the native monetary asset while accepting distinct tradeoffs to enable greater functionality and throughput beyond Bitcoin's base layer capabilities.

This section examines the current protocol landscape and why it matters. At Epoch, we view these protocols as the foundation of an emerging financial system, with their development shaping the system's long-term neutrality. Just like the internet and traditional financial systems evolved through layered protocols and applications, Bitcoin — the internet's native money — follows a similar path.



We begin by defining key concepts before providing a categorical overview of relevant protocols, our analysis of architectural tradeoffs, and their likely evolution.

Defining Functionality and Throughput

Satoshi's announcement of the Bitcoin whitepaper[113] was met with skepticism[114] over the network's apparent scaling limitations — and if it could spread monetary value to other tokens. Critics compared Bitcoin's seven transactions per second to Visa's millions, questioning whether certain constraints would prevent Bitcoin from becoming a true peer-to-peer electronic cash system.

As if to hand ammunition to skeptics, Bitcoin's design intentionally limited payment functionality to basic operations, avoiding complex smart contracts. These were a concept introduced by Nick Szabo a decade earlier as software with pre-set conditions to secure digital property.[115] This deliberate simplification aimed to reduce protocol risk and clarify incentives for network participants.

[113] The Bitcoin Whitepaper: https://bitcoin.org/en/bitcoin-paper
[114] Cryptography Mailing List, November 2, 2008: https://satoshi.nakamotoinstitute.org/emails/cryptography/threads/1/#014814
[115] The Idea of Smart Contracts: https://nakamotoinstitute.org/library/the-idea-of-smart-contracts/

Bitcoin's early competitors sought to address perceived limitations in throughput, energy efficiency, and transactional complexity. They introduced faster block times, proof of stake systems, and Turing-complete smart contracts, as seen in Ethereum. However, these so-called improvements came at the cost of centralization — creating vulnerabilities where a small number of nodes, developers, or companies could unilaterally affect a network's properties.

Bitcoin prioritized decentralization, and its market dominance speaks to the success of this strategy. Beyond the initial intentions of its community, Bitcoin introduced monetary immutability through decentralization. This relation has proven fundamental: to undermine Bitcoin's decentralization is to undermine its primary value proposition.

Defining Decentralization

Decentralization resists simple definition, encompassing technical, economic, geographic, and regulatory dimensions. Broadly, we can measure a protocol's centralization by stakeholder distribution — the more concentrated a particular stakeholder group, the greater their potential to impose control over the network.

People often confuse decentralization with *permissionless*. We define permissionless as the ability to participate in the network without third-party approval. Unlike decentralization's ambiguity, permissionless offers concrete measurement: either one can independently run the Bitcoin software and transact, or one cannot. External constraints like state-level actors controlling telecommunications to censor network behavior, may limit participation, creating degrees of permissionlessness despite protocol-level openness.

Many networks achieve decentralization without permissionlessness. While "decentralized blockchain" is technically correct for alternative cryptocurrencies, these chains often require permission. For example, DeFi (decentralized finance) faces criticism for being neither truly decentralized nor genuine finance.[116]

A protocol need not be fully permissionless to drive value from decentralization. Multiple-node validation provides fraud protection that single-node systems cannot match. As validator numbers increase, fraud risk decreases.

This creates tension: decentralization offers value, and Bitcoin's premissionlessness remains paramount to adoption. The challenge lies in increasing functionality and throughput without undermining its permissionless properties.

[116] Farrington, Allen. *Only the Strong Survive*. https://www.uncerto.com/only-the-strong-survive

Technical vs. Economic Scaling

With these definitions established, we turn to the ever-evolving Bitcoin scaling debate: How will Bitcoin scale to serve more use cases for more people while improving both throughput and functionality?

While the debates are numerous, we view one key distinction: technical vs. economic scaling. Early on in Bitcoin, the renowned developer Hal Finney stated on the BitcoinTalk forum:

> *"There is a very good reason for Bitcoin-backed banks to exist, issuing their own digital cash currency, redeemable for bitcoins. Bitcoin itself cannot scale to have every single financial transaction in the world be broadcast to everyone and included in the block chain. There needs to be a secondary level of payment systems which is lighter weight and more efficient. Likewise, the time needed for Bitcoin transactions to finalize will be impractical for medium to large value purchases.*
>
> *Bitcoin backed banks will solve these problems. They can work like banks did before nationalization of currency. Different banks can have different policies, some more aggressive, some more conservative. Some would be fractional reserve while others may be 100% Bitcoin backed. Interest rates may vary. Cash from some banks may trade at a discount to that from others."*[117]

Here Hal describes scaling Bitcoin *economically*. Today, Bitcoin's economic scaling takes place through various financial service providers. In contrast, technical scaling enhances Bitcoin's functionality and throughput while preserving its permissionless security. The most important property of a technical scaling protocol is *unilateral exit*. This refers to return to Bitcoin's main chain without permission. This property effectively extends Bitcoin's permissionless qualities to protocol interacting with it.

The various scaling protocols exist on a spectrum from fully centralized bank to permissionless protocols with unilateral exit, each offering different degrees of decentralization. We now examine these protocol categories in detail. For practical implications, readers may skip to the Tradeoffs section.

Base Layer

Bitcoin's base layer is known as a blockchain, which confirms transactions in blocks approximately every ten minutes. The blockchain is designed to achieve eventual global consensus on the state of each unspent transaction output (UTXO).[118]

Blockchain scaling faces complex tradeoffs. While optimizations in the Bitcoin core and innovations like the SegWit discount have achieved marginal improvements in transaction

[117] Source: https://bitcointalk.org/index.php?topic=2500.msg34211#msg34211

[118] This just means the state of what addresses control what amounts of bitcoin. You can learn more about UTXOs here: https://en.bitcoin.it/wiki/UTXO

throughputs, each scaling approach requires careful considerations of their impacts on the network.

One primary scaling proposal is increasing block size. However, this change would constitute a hard fork, requiring all network participants to upgrade their software. Larger blocks require more resources to process, which can lead to some degree of centralization. Similarly, reducing block times could increase throughput but risks centralization as node proximity to hash production becomes critical. High-speed blockchains demonstrate these centralization pressures.

The main chain's primary economic purpose is final settlement of funds. Risks of chain reorganizations mean users must wait for multiple block confirmations — up to an hour in some cases — before considering a transaction settled. While this can be tolerated in large transfers like buying property or overnight funds settlement between banks, it proves impractical for daily commerce that expects instant confirmation.

Why the Main Chain is Important

Bitcoin's main chain provides foundational certainty for the entire ecosystem. Not only does it provide final settlement of funds, it also guarantees Bitcoin's monetary supply schedule. This chain enables access to digital sound money that remains trustless, permissionless, censorship-resistant. It must be protected.

Bridges to Protocols

Bridging funds between Bitcoin's main chain and off-chain systems requires specific protocols and/or operators. A bridge is a protocol or operator that facilitates Bitcoin "transfers" of Bitcoin between the main chain and an offchain system. These bridges make varying tradeoffs in custody, privacy, timeliness, and security. Layer 2 bridges typically use multi-signature (multisig) transactions, allowing participants to exit back to the main chain without third-party permission. BitVM based bridges allow Turing-complete computation on Bitcoin, with fraud proofs creating economic incentives for honest behavior through financial penalties for malicious actions. This enables bridging to higher layers.[119] For less-sovereign systems, bridging requires permission for entry and exit.

Sidechains lock bitcoin in a custodial multisig arrangement, issuing equivalent amounts of the sidechain's token (e.g. LBTC on Liquid). eCash mints lock Bitcoin on chain or in Lightning balances, issuing notes as Bitcoin claims. Exchanges function as bridges by accepting deposits, crediting depositors with Bitcoin IOUS. These can either be traded, or potentially seized by authorities.

[119] Fraud proofs create an economic incentive for actors to be honest, as they can be financially punished for dishonest/malicious transactions behavior

While multisig transactions inherit Bitcoin's security, other bridging systems may lack the same security guarantees. For instance, exchange funds are stored on chain, but the user balances are simply entries in a database.

State Channels as Layer 2

Early Bitcoin pioneers recognized that two parties with moderate trust in each another could establish blockchain "channels" enabling repeated payments without constant main chain settlement. These channels operate through a set of signed transactions that each party holds as the state of who owns which funds (representing ownership), but broadcast to the Bitcoin network only when the channel closes. The theoretical transaction rate between the two parties is huge, limited only by the speed of the network and the rate at which the CPU can perform cryptographic operations.

While two-party state channels work effectively, they require pre-establishing channels with each counterparty, creating onboarding friction and locking up liquidity.

The Lightning Network, a routed state channel system, solved these limitations through routed state channels. Clever script construction and new opcodes enable payments to flow between parties lacking direct relationships. Those same clever scripts also make Lightning a true "Layer 2," meaning participants have the choice of unilateral exit from the network to the base chain at any time. Self-custodial users of Lightning are always also in full custody of their own funds, albeit in the form of unbroadcasted transactions. In practice however, most use lightning in a custodial manner.

Despite its tradeoffs, the Lightning Network has emerged as Bitcoin's dominant payment network, offering exponentially higher transaction throughput than the main chain.

Why Lightning is Important

As Bitcoin's first and only production Layer 2, the Lightning Network plays a crucial role in the scaling and payments ecosystem. It provides trustless, and permissionless access to high-speed transactions atop Bitcoin's main chain.

Lightning's instant Bitcoin settlement offers unique value to banks and other financial institutions. The network's unilateral exit rights make it particularly suited for institutional settlement needs.

However, retail users usually find Lightning technically cumbersome. Even among technical Bitcoin users, few achieve sovereign Lightning use, typically accepting various levels of custody and privacy degradation for a simpler user experience. Alternative systems like ARK and eCash offer a range of custody tradeoffs while maintaining Lightning compatibility.

Ultimately, Lightning emerges as critical infrastructure connecting institutions, businesses, and custodial payment systems.

How Lightning Fails

Lightning faces three key challenges: include liveness requirements, liquidity commitment, and operational complexity. Lightning Service Providers address liveness requirements and channel management for business customers, falling under the node service provider category. However, the fundamental liquidity constraints persists: participants must lock bitcoin in transactional channels.

Since payments flow between a network of nodes, when each node passes payment information along, it could face potential regulatory risk — with nodes deemed money transmitters. The protocol's design encrypts source and destination information for final payment. This means no one node can know details about the sender or receiver. However, an overzealous regulator could introduce uncertainty into nodes wanting to participate in Lightning.

What it takes to Succeed

Lightning has already succeeded in becoming the preferred fast settlement system between businesses and other larger players in the realm of technical Bitcoin scaling. However, broader improvements to both Lightning and Bitcoin may make it more compelling for users. On the protocol front, BOLT12 Offers would remove the friction of generating invoices prior to receiving payments by creating static addresses. More advanced cryptography may help reduce the protocol's complexity, driving more adoption. Other proposals like channel factories and splicing allow existing channels to be split up into parts, enabling instant onboarding without new users needing to wait for an onchain transaction confirmation.

Important Players in Lightning

Lightning Labs, Core Lightning (Blockstream), ACINQ.

eCash: Trading Custody for Speed

Chaumian eCash, invented in the 1980s, enables banks or mints to issue cryptographic notes redeemable for underlying assets at any time, while preserving transaction privacy. eCash systems achieve remarkable scaling through network latency and CPU speed limitations, although they bring significant trust tradeoffs.

In recent years, eCash has seen a resurgence in the Bitcoin world in two forms: Cashu and Fedimint. Both systems exchange eCash notes for payments over the Lightning network. Cashu operates a single-mint solution in which one party holds all user funds, while Fedimint splits custody across federation members.

Lightning Network interoperability leverages existing network effects, while strong privacy guarantees offer eCash users a more "cash-like" experience. The simplicity of implementation means that eCash software is easier to deploy — and use — than Lightning or main chain wallets.

The primary tradeoff is custody. Mints may disappear with funds or inflate the supply of notes undetected. However, both projects are exploring technical means to mitigate these risks. The primary deterrent against misconduct is the speed at which a bank run against an eCash mint can take place. Digital convertibility of notes served so bank customers could prove to themselves that the bank held enough reserves to meet its obligations. Digital convertibility enables instant, automated verification of mint reserves.

eCash achieves exponential scaling *beyond that of Lightning's throughput*, as single mints service many users. Internal mint transactions leave no Lightning footprint, enhancing privacy and efficiency.

Characteristics of Success for eCash Systems

Bitcoin-denominated eCash systems like Cashu and Fedimint interoperate with the Lightning Network, leveraging its network effects. Small eCash communities likely emerge around shared transactional needs. Fedimint targets small federations in developing nations. Cashu mints may be started quickly to service customers of a single website.

Success will be localized, with some mints growing to service many thousands of clients, while others fail or disappear with customer funds. Long-term success brings a rich set of wallets with many individuals choosing to hold eCash balances. Business adoption is not required for success, thanks to the Lightning Network interoperability.

How eCash Fails

Historically, eCash systems suffer from regulatory threats as they resemble banks minting their own currency. While federations may protect against single points of failure, individual operators still risk regulatory scrutiny.

Trust in eCash systems could erode through either unethical operators stealing customer funds or federated systems might prove to be too complex over the long run.

Deploying a regulated eCash environment requires: participants undergo standard KYC/AML controls, but maintain transaction privacy from the mint through API cryptography. This approach would restrict access to authorized users while maintaining internal privacy, revealing identity only during withdrawals.

Treating eCash like physical cash offers a potential regulatory framework.

Important Players in eCash

Fedi, Cashu Protocol.

Statechains: Transferring UTXO Ownership Directly

Statechains enable direct UTXO ownership by transmitting private keys between participants. A statechain operator participates in a 2-of-2 multisig transactions with each user, preventing their ability to unilaterally move funds. Operates can remove centralization risks by becoming a federation with certain threshold requirements that prevent cheating.

Statechains create novel scaling opportunities, particularly through Lightning channels or Channel Factories. Such a construction would offer exponential scaling of main chain capacity.

How Statechains Succeed

Statechains operate today but lack adoption. Unlike the Lightning Network, statechains rely on a central operator to coordinate transactions. To succeed, statechains must offer compelling features that justify their centralized tradeoffs.

Important Players in Statechains

Spark, Mercury Layer.

Sidechains: Custody Meets Blockchains

Sidechains are an old idea in the Bitcoin world: users transfer funds from the main chain to a separate blockchain through a custodian. On the main chain, users send funds to an operator and receive equivalent funds on the sidechain, while returning funds requires permission from the sidechain's bridge operators. The Liquid sidechain, operated by a dozen parties, aims to prevent single points of failure.

Some benefits include: low-variance block intervals, faster block times, exotic new script opcodes, and token issuance. However, sidechains don't fundamentally solve blockchain scaling. At best, a sidechain can offer linear improvement through larger and more frequent blocks.

Why Hasn't Liquid Taken Off?

The Liquid Network launched in 2018 but has seen limited adoption. A semi-permissioned blockchain with faster blocks doesn't offer a strong value proposition to attract developer

interest. Successful scaling solutions have been either application-specific (best in class at one thing) or driven by token incentives. In contrast, both Lightning and eCash have generated more excitement without issuing a token.

Important Players in Sidechains

Liquid, Rootstock, Stacks, Core.

Rollups: Posting Offchain State to Bitcoin

A rollup is an offchain system that posts checkpoints of its internal state to the Bitcoin main chain.[120] More technically, it's a modular blockchain using a parent blockchain for data availability. The blockchain stores its state root and enough transaction data to reconstruct its full history. Similar to statechains, Users can make millions of transactions between checkpoints. Each operation changes the rollup's state, but only the final state commits to the main chain.

Rollups differ from sidechains by their checkpointing. In a sidechain like Liquid, the chain state is managed entirely by the sidechain nodes. The only evidence of Liquid on the base layer of Bitcoin are the peg-in and -out transactions.

The concept resembles a Lightning Network channel close, where many offchain transactions post to the main chain once. In the case of Lightning, a channel close ends the relationship between the parties. In a rollup, the onchain state snapshots are used to recreate the full state of the offchain system.

Key distinctions between rollups and state channels exist:

- State channels are two-party, while a rollup is multi-party (global).
- State channels open and close once, rollups use regular checkpoints, requiring another.
- Rollups require another blockchain to maintain checkpoints.

Rollups offer sub-exponential scaling because the system's state must be committed to the main chain by an operator. In contrast, the Lightning Network, with no global state or central operator, enables offers exponential scaling.

One potential scaling path involves nesting or chaining rollups, where a third-layer rollup checkpoints its state to a second-layer rollup.

[120] More detail on rollups can be found on bitcoinlayers.org: https://www.bitcoinlayers.org/glossary#rollup

Important Players in Rollups[121]

Bsquared Network, Rollux.

Wrapped Bitcoin: Scaling on Other Chains

The ERC-20 protocol standardized token issuance on Ethereum, enabling new cryptocurrency projects. One token is Bitgo WBTC, or wrapped Bitcoin, which represents a claim on Bitcoin held by a custodian. Authorized participants create tokens by depositing Bitcoin, destroying them during withdrawal. End users undergo KYC and must trust the custodian to maintain full Bitcoin reserves.

WBTC provides liquidity as a Bitcoin stand-in on decentralized exchanges. For institutions, it simplifies management compared to maintaining full nodes, sitting alongside other ERC-20 tokens on an Ethereum full node.

Ultimately, the fate of WBTC depends on future adoption of Bitcoin for decentralized finance. As more Bitcoin-native smart contract systems grows, WBTC becomes less necessary. All else equal, we think users will prefer Bitcoin's superior trust and security over WBTC's custodial claim.

Does WBTC Make Ethereum a Scaling Layer for Bitcoin?

WBTC extends Bitcoin's usefulness to Ethereum, expanding its reach. However, Ethereum's economic activity may be completely unrelated to Bitcoin, with transactions that never would never occur on Bitcoin. Only when WBTC serves as a desirable substitute to Bitcoin in commerce can we claim it scales Bitcoin economically by driving demand for Bitcoin as collateral.

Ark: Layer 2 Payments via Shared UTXOs

The Ark protocol shares UTXOs between hundreds or thousands of participants. Each user holds virtual UTXOs (VTXOs), representing a claim on part a shared UTXO. A central Ark Service Provider facilitates payments but users may unilaterally exit by broadcasting their VTXO transactions, making Ark a true Layer 2.

While Ark works under current Bitcoin consensus rules, a covenant opcode would improve its efficiency and security. Covenants ensure each users claim on the shared UTXO. Without them, pre-signed transactions secure future spending, with Covenants also mitigating risks from colluding parties.

[121] Listed players are not bitcoin specific rollups. Those that are bitcoin specific are currently in testnet such as Citrea and Alpen Labs.

How Ark Succeeds

As a true Layer 2, Ark has a theoretical tailwind for adoption.

Important Players in Ark

Second, Ark Labs.

Soft Fork BIPs: Covenants and More

The Bitcoin protocol exists as voluntary computer code. To change, a network majority must update their software — a hard fork. Individuals can add compatible code through a soft fork. Bitcoin Improvement Proposals (BIPs) propose updates to Bitcoin's code.

Multiple BIPs seek to add covenant opcodes to Bitcoin's scripting system. A covenant restricts how Bitcoin may be spent, offering interesting scaling opportunities. For example, a UTXO could lock to specific subsequent addresses, allowing off-chain transactions via script rules.

Covenants improve second-layer efficiency and safety. ARK and BitVM demonstrate the advantages of having a covenant opcode. The new CatVM protocol builds on the Satoshi-era OP_CAT opcode. Both CatVM and BitVM enable Turing-complete computation on Bitcoin's scripting system.

Bitcoin self-custody could improve through vault construction, giving users a timeout to redirect funds to a backup location. The OP_VAULT proposal builds on OP_CTV.

Covenant proposals require a soft fork, subject to Bitcoin fork game theory. Proponents highlight potential benefits, while skeptics and Bitcoin conservatives warn of unknown risks. Some argue for protocol ossification, freezing consensus rules except for existential bugs.

Recently, Core contributor James O'Beirne raised concerns about Bitcoin's lack of leadership in pushing through soft forks. Sjors Provoost responded that the lack of progress stems from proposals failing to excite Core contributors. Prudence demands careful, consensus-driven changes to Bitcoin's rules. Covenant proponents must demonstrate order-of-magnitude advancements that excite developers, entrepreneurs, and users.

Tradeoffs All the Way Down

Why does all of this matter? Scaling protocols reveal fundamental tradeoffs between two extremes: economic and technical scaling.

Technical Scaling

At one extreme, Bitcoin scales through technical innovation to meet humanity's monetary needs. Permissionless protocols target distinct functions while keeping participation economically viable for all users. This is a utopian vision that we seek but recognize as unlikely.

Economic Scaling

At the other end, Bitcoin ossifies, and scales economically. A more transparent financial system is born. Imagine a world in which users dollar-cost-average into Bitcoin via Ark, join federated custodial solutions, and use eCash as their private cash balance for everyday transactions. Node service providers clear balances through the Lightning Network, with Fedimints and ASPs acting as banking infrastructure. Lightning becomes an institutional clearinghouse in a hub-and-spoke model.

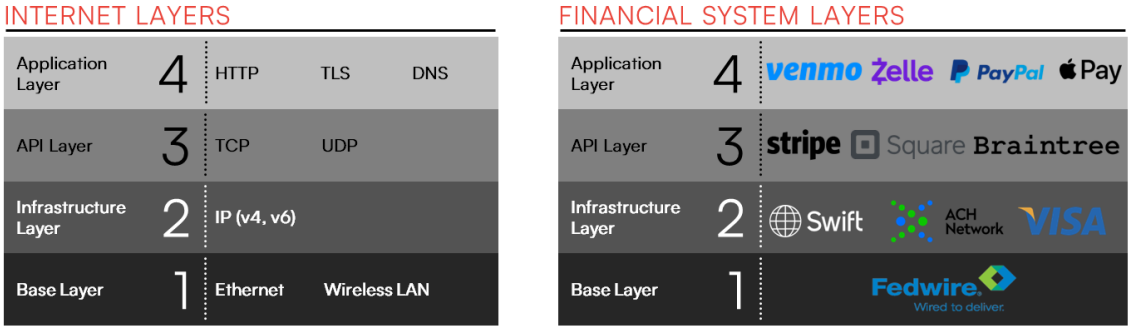
As value settlement on Bitcoin grows, its potential as a unit of account grows. Unlike historical systems, this Bitcoin banking system uses cryptography to shift agency from institutions toward individuals. Some third-party functions disappear entirely. High transparency and free market competition reduce the incentive risks without the need for strong technical assurances.

Ultimately, decentralization depends on scope. A competitive market with numerous actors could provide systemic resilience, withstanding individual node censorship.

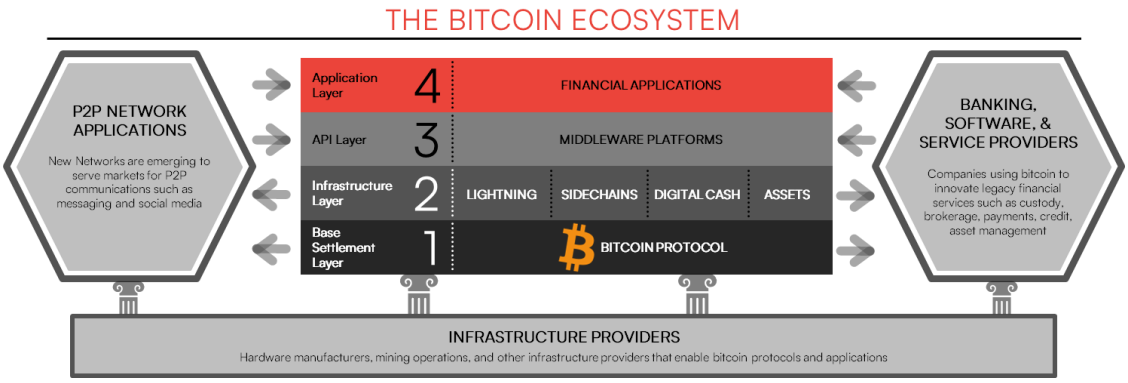
Epoch's View

As with many things, we expect the system to exist somewhere in the middle.

Trustless protocols will always be less practical, and economically viable than trusted solutions. Specialized financial service providers will intermediate operations for users. Our view is that the Bitcoin native financial system will be like other digital, and financial systems:



The bitcoin ecosystem system will continue to exist as-is with optimizations and advancements throughout:



Bitcoin aims to provide a fixed supply sound money for human civilization, repairing the damage done central bank penchant for inflation. Its transactional promise is empowering any economic agent — human, institution, or machine — to participate in a global monetary network without permission. Many of the systems outlined make trust and custody tradeoffs, often removing transactions from the blockchain. The critical question is whether Bitcoin can achieve its full potential through such functional compromises.

If Bitcoin remains permissionless at the base layer and true Layer 2 systems, the risk of fractional reserve inflation drops significantly. Users can make individual tradeoffs without compromising the system's resilience, provided no single off-chain scheme dominates economic activity.

Conclusion

Bitcoin protocols reveal a vibrant ecosystem striving to expand functionality while preserving its fundamental principles of decentralization and permissionlessness. We explored various scaling approaches that balance security, privacy, and efficiency tradeoffs — both economically and technically.

Bitcoin's base layer remains a bedrock of certainty and security, ensuring the integrity of the monetary supply and transaction immutability. Innovations like the Lightning Network enable exponential scaling while maintaining permissionless principles.

However, not all scaling solutions align perfectly to Bitcoin's ethos. Sidechains, eCash systems, and wrapped Bitcoin introduce trust and centralization, trading core security assurances for increased speed and functionality. These approaches highlight tensions between the desire to scale, user-friendly systems and Bitcoin's decentralized integrity.

Bitcoin's scaling future likely exists somewhere between technical and economic approaches. Technical advancements might optimize network structure while economic scaling could leverage a network of service providers using Bitcoin's security.

At Epoch, we envision a Bitcoin ecosystem where users choose their level of trust and participation without compromising the network's resilience or decentralization. The key to success requires continuous alignment with foundational principles: financial sovereignty, security, and innovating without sacrificing integrity.

The challenge is scaling Bitcoin while upholding its revolutionary promise of peer-to-peer electronic cash for all, truly embodying a decentralized, transparent, and censorship-resistant financial system.

Bitcoin Regulation

Introduction — Mr. Gensler, Tear Down That Wall!

"First they ignore you, then they laugh at you, then they fight you, then you win." - Mahatma Gandhi

The topic of regulation has required a trigger warning for founders in the Bitcoin ecosystem for as long as they have existed. There was no shortage of attacks on Bitcoin from lawmakers and regulators in 2024, but several emerging trends over the course of the year suggest that the headwinds may finally be dying down.

We see three main trends emerge:

1. ***Return of The ~~King~~ Rule of Law:*** US Federal Judges, State Attorney Generals, and politicians are challenging regulatory overreach from authorities.

2. ***The Bitcoin Caucus***: The 2024 US presidential election cycle marked a dramatic acceleration of cryptocurrency industry involvement in US politics, highlighting the rise of a pro-crypto political bloc, and putting an end to an administration that seemed to actively work against Bitcoin and cryptocurrency adoption.

3. ***New(ish) World Order:*** Clearer international frameworks led by the Markets in Crypto-Assets (MiCA) in the European Union, and an increasingly multi-polar world order is creating a global environment ever more predictable and receptive to Bitcoin adoption. We are dubbing this the "New(ish) World Order."

For the first time in the history of the industry, there are helpful precedents, eager allies, and robust political infrastructure in place that can help facilitate productive conversations on how we regulate the future of money. Yet the industry faces a new challenge: as Bitcoin gains momentum, and attracts political allies, proposed regulations could contain trojan horses (both accidental and malicious) that limit its potential.

Return of The ~~King~~ Rule of Law

Barack Obama famously once said, "The rule of law is not a rule of lawyers; it is a rule of laws." Sadly, a rule of lawyers would have been preferable to the crypto regulatory environment since at least 2020. SEC Chairman Gary Gensler (not a lawyer) has become emblematic of an apparently sweeping strategy of weaponizing the administrative state (not laws) to advance the political goals (also not laws) of unelected bureaucrats (sometimes lawyers…but not Gary). The evidence of this strategy should be obvious to anyone with a J.D. (again…not Gary).

We're sure that former US President Obama would likely welcome the 2024 shift in Bitcoin's regulatory landscape. The table below highlights a partial summary of the most significant examples of this regulatory shift.

Significant Wins for the Rule of Law in 2024	
Month	**Development**
March 2023 (Honorable Mention)	Federal Court of Appeals finds that the ***SEC was "arbitrary and capricious" in rejecting Grayscale's*** application to convert its Bitcoin Trust product into a spot bitcoin ETF.
Dec-23 (Honorable Mention)	***FASB issues ASU 2023-08*** which changed allowed for fair value accounting for crypto assets. Effective December 2024.
Jan-24	SEC approves 11 ***Bitcoin spot ETF*** applications.
January-October 2024	The ***resolution of the Celsius and FTX Bankruptcy plans***, and conviction/sentencing of Sam Bankman-Fried and Alex Mashinsky brought much-needed clarity and closure to the prior market cycle's chaos.
Mar-24	District Court grants ***Coinbase's motion to dismiss SEC's enforcement claim*** that Coinbase acted as an unregistered broker through its self-custody wallet product (some claims are still pending).
May-24	The House and Senate both pass H.J. 109 with significant bipartisan support. The ***bill would have repealed the SEC's Staff Accounting Bulletin 121 (SAB 121)*** which requires financial institutions that custody crypto assets to record those digital currencies as liabilities on their balance sheet (vs. the off-balance sheet treatment that traditional securities receive). President Joe Biden vetoed the bill, although in Trump's first week of administration the SEC rescinded SAB 121.
May-24	The U.S. House of representatives ***passed the Financial Innovation and Technology for the 21st Century Act (FIT21) in a bipartisan vote.*** The bill stalled in the Senate but marks the most meaningful progress towards a comprehensive regulatory framework for digital assets in the US to-date.
Jun-24	***Coinbase sues FDIC to compel FOIA*** disclosure of letters from authorities to US banks allegedly asking them to "debank" crypto companies.
Jul-24	US Supreme Court ***overturns the Chevron Doctrine*** in *Loper Bright Enterprises v. Raimondo*
Aug-24	Ripple cements a partial ***victory over SEC with a final ruling*** that XRP token sales are not inherently unregistered securities offerings.
Nov-24	US Court determines that the ***SEC exceeded its regulatory authority*** in expanding its definition of 'dealer' in a way that would have included many non-custodial, open-source protocols, among others.
Nov-24	***18 US states sue the SEC*** arguing that the agency is trying to "unilaterally wrest regulatory authority away from the States."
Nov-24	***Court overturns US sanctions*** against Tornado Cash.
Nov-24	NY State Supreme ***Court rejects State efforts to shutter bitcoin mine*** over climate concerns.
Dec-24	Crypto industry ***groups sue the IRS to block implementation of their final broker rule*** which would require tax reporting from non-custodial crypto services. IRS delays implementation until January 2026.

A lot could be written about each of the 14 individual examples listed above — and how much regulatory debt Bitcoin and the cryptocurrency ecosystem has accumulated in the last decade. This report doesn't intend to explore in detail each of these cases, but we found some important themes:

- Many legal issues that include the Securities law, tax implications, AML/Sanctions, self-custody, and bankruptcy law, reached some meaningful resolution in 2024.
- Many of the legal outcomes represent years of collaborative efforts amongst many industry participants including companies, trade organizations, think tanks, and crypto-law firms. This significant investment will yield increasing returns in the years ahead.

- These legal outcomes marked meaningful progress with nearly every kind of policymaker at both the federal and state level. This includes federal courts, regulatory agencies, Congress, standard setting bodies, and state courts.
- While engaging with regulators, our industry decidedly shifted to an offensive strategy. In 2022, the SEC sent Coinbase a Well's notice threatening to sue over the planned launch of their Lend product. Coinbase scrapped the launch, along with months of work.[122] In 2024, Coinbase pursued pro-active legal action against several regulators, defending multiple cases simultaneously.
- The legal advancements are a result of concerted efforts from members across the industry. We also benefitted from a general backlash against regulatory overreach that has been brewing for decades. This culminated in the *Loper* decision, which overturned *Chevron* deference — a supreme court precedent that grants executive agencies substantial discretion in crafting regulations. This will likely end a decades-long trend of Congressional abdication of legislative authority to the executive, and should (hopefully) incentivize congress to break political deadlocks, and pass more legislation themselves more frequently.
- Despite the significant progress, in 2024 the White House remained as the undefeated "final boss" of crypto regulation. 2025 looks more promising.

Taken together, these developments represent an unprecedent shift in cryptocurrency regulation. In previous years, any one of these rulings would have been viewed as a win for sound crypto regulation.

While specific outcomes like spot Bitcoin ETF approvals or FASB changes advance Bitcoin adoption, the procedural transformation matters more. The US legal system *should* function as follows:

1. Congress creates legislation.
2. The executive branch implements laws through formal regulation (with public input) and enforces violations.
3. Courts ultimately decide whether the regulations are proper under the law, or if the agency has exceeded the authority granted to them by congress
4. When new issues arise that fall outside of the scope of the original law, the executive branch (or regulatory agencies) must seek congressional action.

This foundational system of checks and balances ensures: (a) no one branch of government accumulates too much power and (b) that the laws are applied equally and without prejudice and (c) that new substantive law is only created through a process that is democratically accountable (i.e., via congressional legislation and not bureaucratic regulation).

The system has slowly eroded over the last 40+ years, with Bitcoin's painful regulatory odyssey since 2020 showcasing its dysfunction. In light of revolutionary new technology like Bitcoin, Congress remained divided on meaningful crypto legislation, while regulators bypassed formal rulemaking in favor of enforcement actions.

[122] Coinbase. "The SEC Has Told Us It Wants to Sue Us Over Lend. We Have No Idea Why." Coinbase Blog, 7 Sept. 2021, https://www.coinbase.com/blog/the-sec-has-told-us-it-wants-to-sue-us-over-lend-we-have-no-idea-why.

In many cases, these gaps can be filled in a thoughtful (if slightly less democratic) way via a formal notice and comment rulemaking by appropriate regulators in the executive. However, this has not happened. Most likely because of bureaucratic turf wars and influence from industries that may be threatened by the new technology. Instead, regulators have largely chosen to pursue "regulation by enforcement."

This "regulation by enforcement" approach is particularly odious to the rule of law because it allows regulators to side-step the courts entirely, thereby undermining any true "regulatory clarity." The final blow is delivered by enforcement actions against small, poorly funded startups or individuals — many times with threats of crippling fines or prison time. These cases almost always settle out of court without offering judges the opportunity to weigh in on the merits.

In retrospect, it appears as though the Court's decision to remand the SEC's Grayscale ETF rejection in 2023 was the final bit of momentum needed to avoid the continued spiral into the purgatory of "regulation by enforcement." The Sisyphean efforts of industry players like Grayscale, Coinbase, the Blockchain Association, Coin Center, Ripple and others will pay dividends to the industry for years to come and should be celebrated important achievements for our industry in the United States.

While the precise legal structure of Grayscale's exchange-traded product, or the correct legal treatment for XRP under securities law may not directly impact Bitcoin or companies in the ecosystem, these developments *will* make it harder for regulators to devise new strategies behind closed doors that could ultimately limit Bitcoin's potential. Best of all, these changes are — in many ways — anti-fragile. Court precedent tend to solidify over time, freeing the industry from the slings and arrows of the political cycle.

While the crypto-specific legislative efforts of 118th Congress failed, it seems likely that the results of the 2024 US presidential election significantly increase our odds of better regulation in 2025 and beyond.

The Bitcoin Caucus

"You will not find a solution to political problems in cryptography."
-Satoshi Nakamoto, February 15, 2009

The 2024 US General Election transformed Bitcoin regulation in many ways, though its impact compared to structural changes remains unclear. However, the nature of tribal politics in the US, with reactionary and lack of political nuance could limit thoughtful policy for disruptive technology like Bitcoin.

There are good reasons for many industries to work with regulators in developing thoughtful regulatory frameworks, without entering the political limelight (see, the history of high frequency trading in the US).[123] However, despite years of concerted efforts, that option was never truly

[123] Quantified Strategies. (n.d.). *History of high-frequency trading (HFT).* https://www.quantifiedstrategies.com/history-of-high-frequency-trading-hft/#:~:text=In%201998%2C%20the%20authorization%20of,and%20evolution%20of%20HFT%20strategies.

available to the cryptocurrency industry. There is a proud legacy of Bitcoin and crypto think-tanks, trade organizations, and policy teams engaging in Washington since 2013, but 2024's election saw unprecedented political activity.

The industry's political engagement delivered impressive results. Crypto PACs invested over $133 million across 68 Senate and Congressional races, with 82% of supported candidates winning. In several races, Fairshake PAC's spending dominated outside spending.[124] All 34 of the candidates endorsed by Coinbase's "Stand With Crypto" advocacy group win their races.

The most tangible victories were defeating Ohio Senator Sherrod Brown and Katie Porter in the California's Senate Primaries. Senator Brown has long been one of the industry's most vocal opponents while Porter is a key member in Senator Warren's "Anti-Crypto Army." Fairshake PAC spent $50 million (out of their $133 million total) on these two races alone.

The industry's demonstrated ability to organize, fundraise, and influence elections nationwide should command attention from policymakers in the 119th Congress. However, mainstream media coverage suggests potential backlash against this new level of advocacy.

CNBC's post-election headline — "How tech bros bought 'America's most pro-crypto Congress ever'" — highlights this tension.[125] Though we may resent the tag "tech bros," it is an exciting headline (and you all said we couldn't buy anything with Bitcoin!). That said, it's exciting if you're a fan of the industry. To outsiders, those types of headlines may lead to a distorted view of policy proposals down the road. This is an example:

Again, if you're an active participant in the Bitcoin ecosystem — you know that the Strategic Bitcoin Reserve is more likely to bailout the US Government than it is to bailout any "Crypto Whales." But, to the Bitcoin skeptics, this narrative may have much more appeal.

On the other hand, divisive anti-crypto narratives are nothing new, and it won't matter anyway if we truly "bought" the congress. So — let's examine what we got for all those hard earned sats. Figures 1 & 2 below show how the 119th Congress (post-election) stacks up against the pre-election congress. "Most pro-crypto congress ever" is a relatively low bar, but we did make some very meaningful gains in the senate.

Of the 8 net new "pro-crypto" Senators, the crypto industry directly supported 3 — certainly a meaningful share, but the majority of these candidates seem to have come around to a pro-crypto position without any financial contribution. Additionally, 3 of the net new pro-crypto senators are Democrats, which also violates some of the politicized narratives that have emerged after the election.

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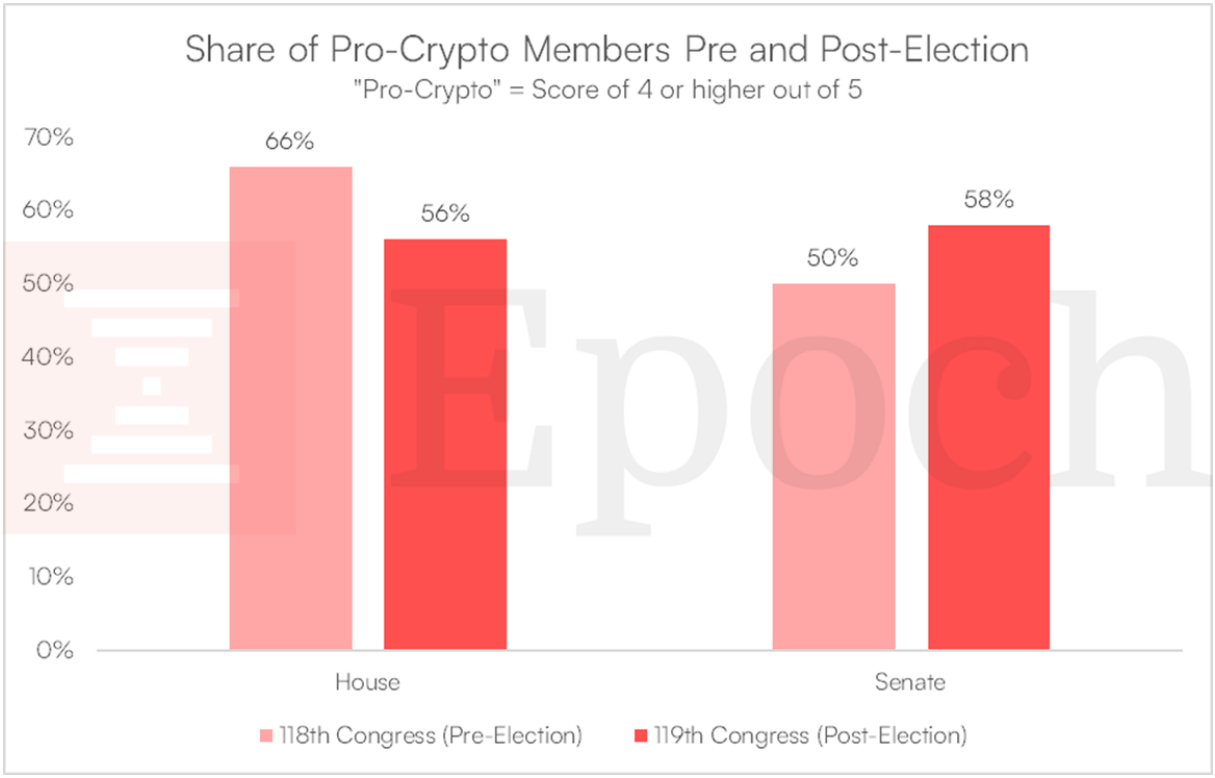
[124] Opensecrets.org

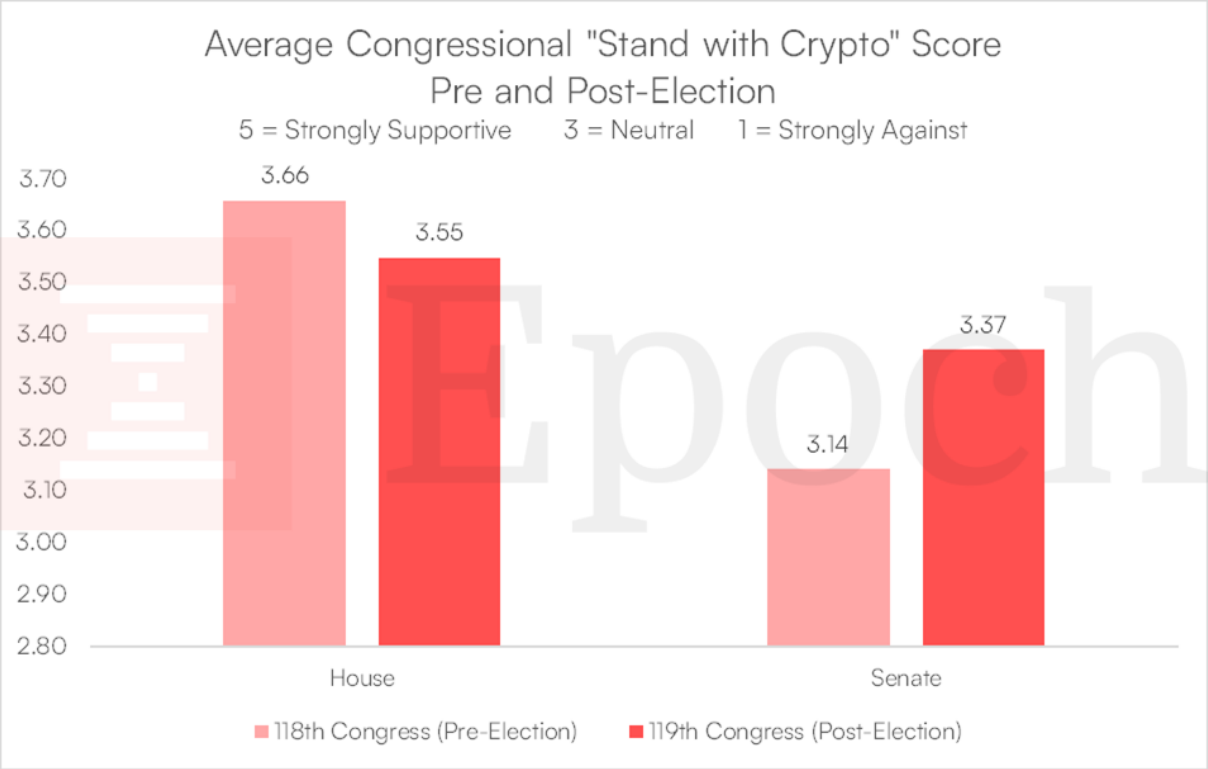
[125] Author(s). (2024, November 23). *How tech bros bought America's most pro-crypto Congress ever.* CNBC. https://www.cnbc.com/2024/11/23/how-tech-bros-bought-americas-most-pro-crypto-congress-ever.html

The results in the house are more complicated. Of the 59 candidates that Fairshake supported in the election, 47 were elected. The 80% success rate is another great indicator, but the overall tenure of the share of "pro-crypto" members of the house in the 119th congress remains a mystery since 61 of the 63 newly elected representatives don't have any track record to gauge their support. Of the 63 seats that turned over to newcomers, only 15 were "anti-crypto" in the previous congress.

Overall, the average "Stand With Crypto" scores of both the House and Senate remain in the slightly better than neutral range in Figure 2. So — it feels like we're on the right track, there may still be significant work to do in congress to get meaningful legislation passed this next term.



Source: https://www.standwithcrypto.org/politicians



Source: https://www.standwithcrypto.org/politicians

None of this analysis is intended to criticize the effectiveness of the strategies deployed by Fairshake or other crypto advocates this cycle. It is more an attempt to appropriately set expectations for our level of support in congress and to counter potentially damaging narratives about "Bitcoin Billionaires Buying Elections." The $133 million spending campaign was incredibly impressive and strategically effective where it counted. However, it is a vanishingly small sum in the context of the $15.9 billion that was spent this election cycle.[126] $14.7 billion of that total came from nearly 11,000 independent political groups.[127]

The most interesting aspect of the "Crypto bros bought the election" narrative is that, it seems to bleed into many observers' analysis of the outcome at the top of the ticket. A representative example of this tendency can be seen in the New Republic Headline below:

Trump Shows He's Fully in Crypto Industry's Pocket With New Nominee

Donald Trump just tapped David Sacks for a White House job.

Source: https://newrepublic.com/post/189105/donald-trump-elon-musk-cryptocurrency-david-sacks

The interesting thing about this narrative is that the Crypto Industry spent very little money directly on the Trump campaign. Fairshake is a nonpartisan PAC and actually directly contributed to slightly more Democratic candidates than Republican candidates. They spent more money on

[126] https://www.opensecrets.org/news/2024/10/total-2024-election-spending-projected-to-exceed-previous-record/
[127] Bloomberg News. (2024). *U.S. election PAC spending and donations*. Retrieved January 2, 2025, from https://www.bloomberg.com/graphics/2024-us-election-pac-spending-donations-fec/

Republican races, but that was largely driven by the $40M they spent supporting Bernie Moreno in order to unseat Sherrod Brown. Excluding that race, the spending split was equally split.

Trump did receive $2.5 million from the Winklevoss Twins, and $5.5 million from Marc Andreesen, though he is not a single-issue crypto donor.[128] Kamala Harris received $13 million from Chris Larsen (the Chairman of Ripple Labs) and $2.5 from Ben Horowitz (whose crypto interests likely align closely to his a16z partner).

What the New Republic (and many other commentators) want to imply is that Elon Musk's $243 million in donations to Trump affiliated PACs is the thing that put the President in the Crypto Industry's pocket. This is another narrative that has surface-level appeal to readers who might confuse "tech bros" with "crypto bros." But…they're not the same.

It seems highly unlikely that the world's richest man is using his new-found (and very expensive) political leverage to advocate for businesses he doesn't own instead of…you know…advocating for the 3 *highly regulated* companies that he *does* own.

The more interesting explanation for Trump's new-found support for our industry is that he's using his exceptionally well-tuned populist antennae to pick up on the fact that Bitcoin (and crypto more broadly) is a political issue that has broad based, bi-partisan support across the entire country. It resonates most strongly with his male voting base, has disproportionate support amongst the male minorities who increased their support for him this cycle, and it is an industry that has faced years of (often unwarranted) political and legal oppression — something that he is very effective at speaking to.[129]

The reason this explanation is more exciting from the standpoint of positive change, is that it is also anti-fragile. If Trump's campaign promises to support Bitcoin were made in exchange for political donations to support his final term in office — it wouldn't be much to hang our collective hats on. But President Trump seems to seek the support and adoration of his fans/constituency regardless of whether he's running for office or not. If this explanation is correct, it seems likely that the Second Trump administration will maintain a genuine willingness to engage with the industry constructively long past inauguration day.

Either way, we can be certain that Trump's slate of financial regulators will be far more interested in working with the industry than the previous administration. This is another low bar, but we can feel more confident that we will clear it. So far, President Trump has made the following key appointments from the perspective of Crypto regulation in his second term:

[128] The Guardian. (2024, December 7). *Campaign spending: How crypto and tech influence the 2024 election.* https://www.theguardian.com/us-news/2024/dec/07/campaign-spending-crypto-tech-influence
[129] Pew Research Center. (2024, October 24). *Majority of Americans aren't confident in the safety and reliability of cryptocurrency.* Retrieved January 2, 2025, from https://www.pewresearch.org/short-reads/2024/10/24/majority-of-americans-arent-confident-in-the-safety-and-reliability-of-cryptocurrency/

Major Trump Appointments		
Appointee	Position	Bitcoin Stance
David Sacks	AI & Crypto Czar	Describes Bitcoin as a "sci-fi" future where you can decouple money from state control. But, is also a major investor in Solana[1]
Scott Bessent	Treasury Secretary (and acting CFPB Director)	Believes that "Crypto is about freedom"
Paul Atkins	Chairman of the SEC	Generally, advocates for more accommodating crypto regulations and previously served on the board of a crypto policy advocacy group
Howard Lutnick	Secretary of Commerce	Investor in Tether and launching $2B Bitcoin-backed lending product at Cantor Fitzgerald. Generally, sees Bitcoin as a commodity like Gold, and not necessarily as a global currency.
Stephen Miran	Chairman of the Council of Economic Advisors	Generally pro-crypto but has not made many specific public statements on his stance. Believes crypto has a "big role potentially to play in...ushering in another Trump Administration economic boom."

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President Trump has yet to nominate anyone to lead the OCC, FDIC, or FTC as of this writing. Those positions will also be very influential in setting the direction of crypto policy over the next four years.

Of the important financial regulators already selected for Trump's cabinet, Treasury Secretary, Scott Bessent, is likely to be the most impactful appointment from the standpoint of Bitcoin regulation specifically. The Treasury Department oversees the FinCEN, OFAC and the IRS, three of the primary Federal regulators for Bitcoin focused companies. Bessent's expressed appreciation that "crypto is about freedom" would suggest that he is unlikely to continue pursuing policies that attempt to draw self-custody tools under the purview of these agencies.

There have been some indications that Trump is considering moving the FDIC under the treasury department. This would position Bessent well to put an end to Operation Choke Point 2.0 (which is rumored to be largely driven by FDIC).

Finally, Bessent would also likely be heavily involved in any potential implementation of the Strategic Bitcoin Reserve. One of the reasons that Bessent was selected for the role is that he is a more traditional-minded and steady-handed nominee than some of mavericks that Trump was considering leading the Treasury department. It will be interesting to see how he handles this potential policy. Supporting Bitcoin as freedom money for individuals is a very different ballgame than being the first treasury secretary to put it on the balance sheet of the US Government.

The appointments above are only the most relevant to the future of Bitcoin regulation, but they are not the only strong advocates for Bitcoin and cryptocurrency in his administration. Elon Musk, Vivek, RFK Jr, J.D. Vance, and many others in President Trump's inner circle have expressed very encouraging support for Bitcoin and the things that make it perfectly situated play its role as a neutral global currency. If this team is effective at enacting meaningful change, and our industry is effective in working with them to guide that change in the most productive direction — Bitcoin may step into that role sooner than anyone could have imagined a year ago.

[130] Cointelegraph. (n.d.). Bitcoin is a way to separate money from state: David Sacks. https://cointelegraph.com/news/bitcoin-way-separate-money-state-david-sacks

Are We Actually Going to Get Tired of Winning?

The stars seem to have truly aligned in 2024 for Bitcoin regulation in the United States. For the first time in the history of the industry it's starting to feel like the wind is at our back. To reiterate, this is the state of play heading into this next phase of Bitcoin Regulation in the US:

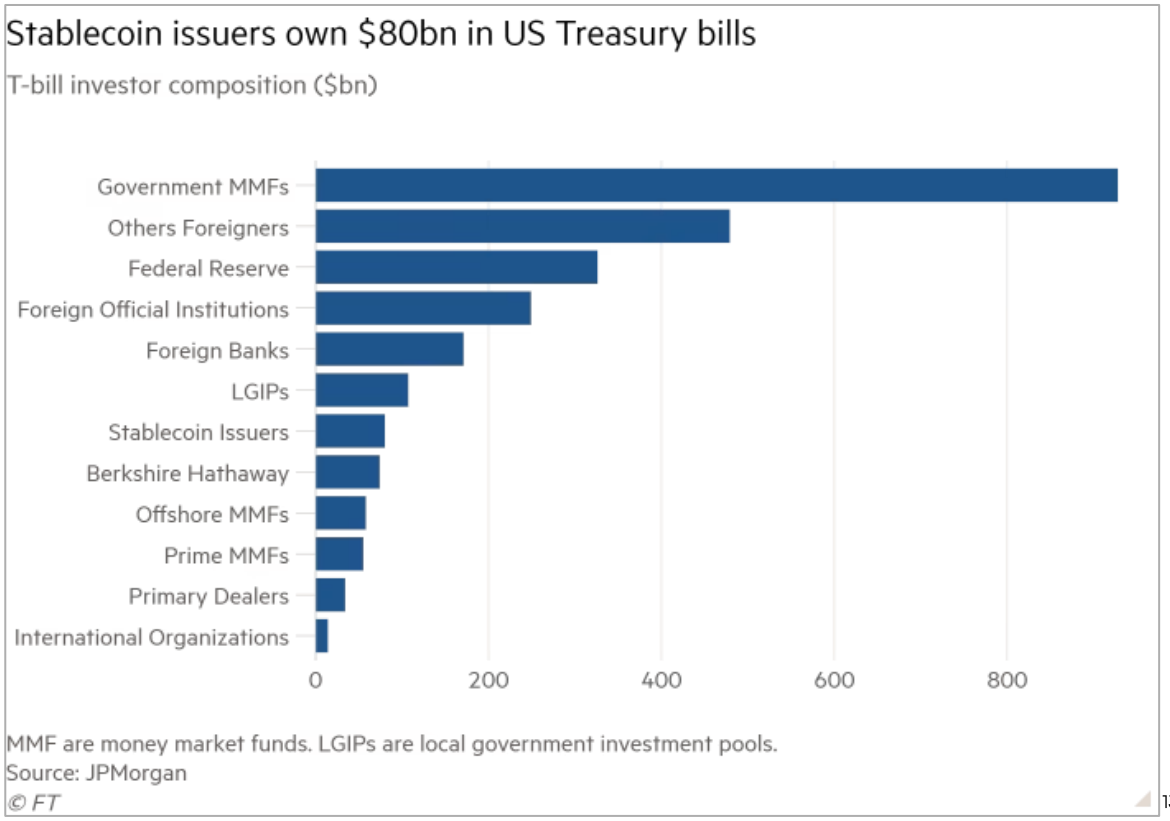
- The bureaucratic state suffered a string of major setbacks leaving us with strong legal precedents that support self-custody and financial innovation
- We have sufficient regulatory clarity to allow the largest financial institutions in the world to participate in the Bitcoin ecosystem
- The Bitcoin and Cryptocurrency industries have built up an impressive bench of industry advocates, litigators, and policy wonks to fight for continued progress
- The industry has demonstrated its legitimacy as a powerful voting block and political constituency in congressional and presidential elections
- The majority of the President's regulatory team sees Bitcoin as freedom money and are considering the possibility of putting Bitcoin in the United States Treasury

These are truly unprecedented times. Despite all of the positivity, there are still significant risks to the future of Bitcoin regulation in the US — and they may be harder to spot if the good times continue. So, to conclude, it's worth highlighting some loose ends from 2024 to ensure we keep our eyes on the ball in the years ahead.

1. **Strategic Bitcoin Reserve:** It seems increasingly likely that the US Government will officially begin "stacking sats" at some point in the near future. In the event this happens, several other countries are likely to follow suit shortly thereafter. It will be exciting. It may also represent the biggest risk to Bitcoin achieving its full potential. Sovereign State adoption could pose the largest risk to the neutrality of Bitcoin if sufficient regulatory and technological protections are not in place to guarantee the right of self-custody. States will have increased incentives to control the flow of Bitcoin in and out of their countries if the value of their currencies are tied to its value. Establishing the groundwork for a safe transition to this next era of Bitcoin's growth should be squarely in our crosshairs in 2025.
2. **Custodia Bank:** Custodia is another victim of political favoritism and disfavored status as a financial institution trying to serve our industry. They have worked for years to receive access to a Master Account at the Fed and were not fortunate enough to ride the positive wave of judicial precedent in 2024. Their case is under appeal and will likely be decided in 2025. If the appeal goes against Custodia, we should advocate for a more level playing field for applicants as a part of any reform to the Fed/OCC/FDIC structure that may be underway in the Trump Administration.
3. **The End of OCP 2.0 (and Transparency on what happened):** Coinbase has led the charge in Court getting information on the FDICs campaign to debank crypto companies. This is one of the single biggest pain points for Bitcoin founders and we should not forget it. If the Trump administration follows-through with the FDIC reforms they are considering, we should work to include provisions that make an OCP 3.0 an impossibility.
4. **FIT21 Redux:** Bitcoin has achieved a great deal of regulatory clarity as a store of value and medium of exchange. But broader market structure bills like FIT21 may still be important to the future of the Bitcoin ecosystem as it scales to support additional functionality. Given Larry Fink's increasing conviction that tokenization represents the future of financial markets, it seems likely that some broader push to modernize trading,

settlement, clearing, and custody of all financial assets will occur in the next few years. Something like FIT21 is likely to be the first step in that direction. The crypto industry will have new allies in this effort, which brings opportunity and risk. Traditional financial institutions are likely to try to use new market structure arrangements to create new walled gardens for them to own. We should be on the lookout for anything that undermines the ability for all forms of value to flow as freely and openly as possible…it may be flowing on top of Bitcoin in the near future.

5. **Comprehensive Stablecoin Regulation:** With Scott Bessent's focus on strengthening the dollar, openness to cryptocurrencies, and preference for a steady hand at the wheel, it seems highly likely that some form of comprehensive stablecoin regulation will be passed in 2025. Frankly, it's a little surprising that the US hasn't already done it given that Stablecoin issues now hold nearly as much US Treasury bill as Foreign Banks. This regulation is likely to add much needed standardization and transparency to the burgeoning stablecoin market. It is also a perfect vehicle to deliver new mechanisms of financial surveillance and control that may hamper Bitcoin's progress down the road. We should pay close attention to any developments on this front in 2025.



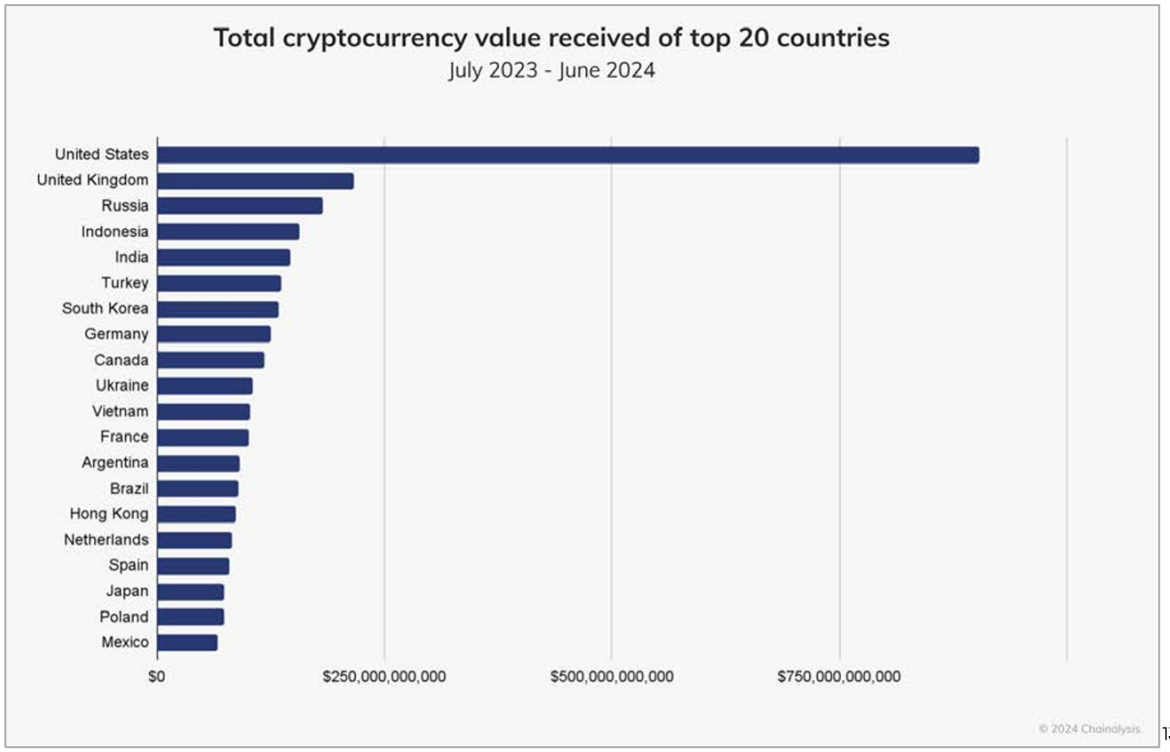
[131]

[131] Financial Times. (2024, June 17). *Stablecoin issuers rank as 18th largest holders of US debt.* https://www.ft.com/content/ab02119a-7696-4292-a2f6-578a13469992

The New(ish) World Order

"Bitcoin doesn't care about borders, but regulators do." — Andreas M. Antonopoulos.

By a large margin, the United States is the largest market for Bitcoin and cryptocurrency activity (see Figure 3 below). However, the international regulatory landscape will play a significant role in supporting, or inhibiting, Bitcoin's rise to a widely adopted neutral alternative to the incumbent financial system. While the US had its most dramatic regulatory shift in 2024, last year also brought significant international changes that will impact Bitcoin's development in the years ahead.



[132]

The most significant implementation was the Markets in Crypto-Assets (MiCA) framework led by European Union regulators. It went into effect through two phases, in June and late December 2024. Authorities in the EU began developing MiCA in 2020, representing a paradigmatic example of how sluggish regulators in the US had been. In 2024, the EU also published a Travel Rule guidance, culminating a multi-year effort to create a region with clear regulations in Bitcoin and cryptocurrencies.

One goal of these regulations is to incentivize innovation and investment by providing clarity to founders and developers. The regulatory framework offers a stark contrast to the uncertain US

[132] Chainalysis. "The 2024 Geography of Crypto Report." Chainalysis, October 2024. https://www.chainalysis.com/wp-content/uploads/2024/10/the-2024-geography-of-crypto-report-release.pdf

landscape, signaling increasing acceptance and institutionalization of cryptocurrency technology in Europe and globally.

Key provisions of MiCA include:

1. Clear taxonomy: MiCA classifies digital assets with specific regulatory requirements:
    - Asset-References Tokens (Real-world assets, RWAs)
    - E-money tokens (Stablecoins)
    - Utility tokens (Chainlink's LINK, Binance's BNB)
    - Other crypto assets (Bitcoin, Ethereum)

Decentralized assets in the fourth category fall mostly outside MiCA's scope. For other asset types, MiCA imposes disclosure, reporting, and marketing restrictions on issuers.

2. License for Crypto-Asset Service Providers (CASPs):
    - Require licensing in European Union member states.
    - Must comply with disclosure, anti-money laundering, and consumer protection regulations.
    - Can use "passporting" to operate across EU countries with a single license.
3. Market Integrity:
    - Introduces measures to prevent market abuse.
    - Addresses insider trading and market manipulation.
    - First jurisdiction with specifically-tailored rules for the crypto industry.
4. Stablecoin regulation:
    - Requires licensing for stablecoin issuers.
    - Mandates 100% reserve requirement (60% in EU instituions).
    - Ensures redeemability for fiat currencies.
    - Limits daily aggregate merchant transactions to €200M

Key Travel Rule Provisions:

1. Data Sharing:
    - Requires financial institutions to transfer identifying information for money transfers
    - Global regulation by the Financial Action Task Force (FATF)
    - EU implementation exceeds other jurisdictions' requirements
2. Transaction Information Requirements:
    - Mandatory inclusion of:
        - Name
        - Account numbers
        - On-chain addresses
    - Checks against OFAC sanctions list
    - No minimum transaction value threshold
3. Compliance Obligations:
    - CASPs must monitor incoming transactions
    - Freeze or return funds lacking required information

- Report non-compliance to Anti-Money Laundering Authorities

4. Self-Custody Wallet Transactions:
    - Collect and retain sender and recipient information
    - Additional verification for transactions over €1,000

Global impact:

MiCA has triggered regulatory efforts in over a dozen countries in 2024, including the UAE, Saudi Arabia, Qatar, Hong Kong, Singapore, Japan, India, Thailand, Australia, Argentina, Brazil, and Uruguay. This global momentum may pressure the US to pass similar legislation — especially along the lines of FIT21.

Potential challenges:

The implementation has caused significant disruption, particularly for stablecoin issuers. Major crypto exchanges like Kraken, Coinbase, and Crypto-com have delisted non-compliant stablecoins (notably Tether's USDT) from European platforms, signaling the regulation's significant market impact. Market analysts have long predicted Tether's demise, and with this latest bout of regulatory clampdown, commentators are using it as evidence that the "ticking time bomb" will trigger an imminent market collapse.

[133]

It's possible that Tether is refusing to comply with MiCA because it represents a house of cards that doesn't have enough reserves to back its $140 billion circulating supply. However, another explanation is that MiCA is not as friendly as it seems. Several of the provisions above belie the rhetoric that the EU is "open for business" for crypto companies. In Tether's (and other stablecoins) case, these include:

[133] Source: https://x.com/JacobKinge/status/1872420454440546776

1. **Daily $200 million Euro transaction limit:** While Tether is predominantly used in the US, in the European Union, stablecoins are gaining market share in payments. This provision limits users' ability to fully use cryptocurrencies. More importantly, for Tether it would be costly and operationally intensive to implement effective monitoring and enforcement mechanisms in line with this provision. Individual and merchants' decisions to use USDT are outside of Tether's purview, turning compliance into a Sisyphean effort.
2. ***Reserve requirements:*** MiCA requires stablecoin issuers to hold 60% of reserves in EU institutions, likely triggering specific controls over the composition of reserve assets. While reasonable at face value, these restrictions impose significant costs and operational burdens on stablecoin issuers. We view these as a form of capital control.
3. ***Redeemability:*** MiCA requires stablecoin issuers to allow users to redeem their tokens for fiat. Tether currently supports redemptions of $100,000 or more, suggesting they do not have the operational infrastructure to support users redeemability option.

The regulatory approach reveals a nuanced tension between consumer protection and financial innovation. While MiCA demonstrates some progressive thinking by exempting Bitcoin from its most restrictive provisions, the Travel Rule's implementation reflects continued regulatory skepticism towards decentralized finance. The crypto industry must remain vigilant in 2025, balancing regulatory compliance with the core promise of an open financial system. Maintaining momentum requires careful navigation of these regulatory landscapes while advocating for frameworks that support technological innovation.

Conclusion

The monumental changes from 2024 made clear that regulatory progress is one of the many phenomena that seem to happen "gradually then suddenly." The re-assertion of judicial oversight, solidification of Bitcoin as a political force in the United States, and acceleration of international acceptance of Bitcoin and cryptocurrencies by global regulators are all impressive cornerstones to the foundation of a new regulatory landscape that is likely to benefit the industry immensely. There is still much work to be done, and many threats to be wary of, but it is likely that 2025 will mark the first time in history that founders will truly be able to work *with* regulators in their efforts to create a new global financial system built on Bitcoin.

Return of The Rule of Law

- **End of "Regulation by Enforcement:"** Courts, rather than regulators, are increasingly shaping crypto policy, reducing the ability of the SEC (and other regulators) to avoid formal rulemaking by regulating through extortionary enforcement actions. Legal precedents set by industry leaders like Grayscale, Coinbase, and Ripple strengthen the industry's defenses against arbitrary regulation, paving the way for more transparent and stable regulatory frameworks in the future.

- **Regulatory Shift and Legal Victories:** In 2024, major legal issues surrounding Bitcoin and cryptocurrency—such as securities law, taxation, AML, and self-custody—saw significant resolution. These outcomes were the result of years of collaboration across the crypto industry, marking progress at federal and state levels and signaling a shift towards proactive legal engagement.
- **Curtailing Regulatory Overreach:** The industry's fight against regulatory overreach gained momentum, and is likely to be aided by the Loper decision overturning Chevron deference, reducing executive agencies' ability to craft expansive regulations without congressional oversight. This shift aims to restore the balance of power between Congress, the executive branch, and the courts, promoting clearer and more accountable lawmaking.

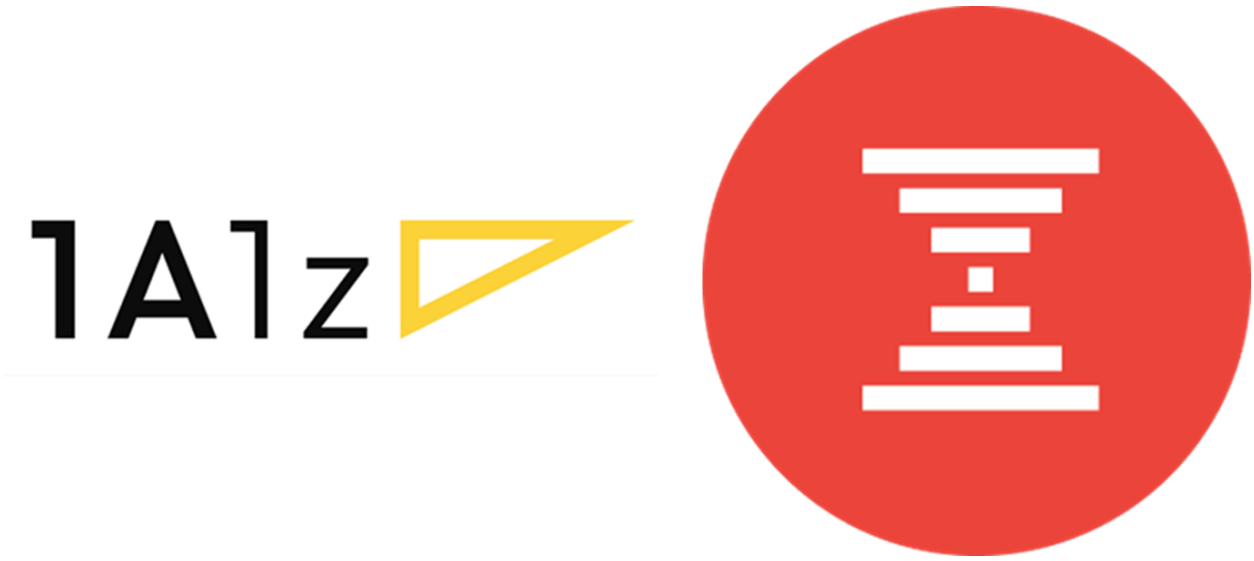
The Bitcoin Caucus

- **Crypto's Political Breakthrough:** The 2024 election saw unprecedented political engagement from the crypto industry, with $133 million spent influencing key races, leading to major wins such as the defeat of anti-crypto Senator Sherrod Brown and an overall increase in pro-crypto lawmakers.
- **Shifting Perceptions and Potential Backlash:** While the crypto industry successfully influenced elections, media narratives framing this as "tech bros buying Congress" may create political headwinds, despite bipartisan support and a relatively small share of total campaign spending.
- **Trump Administration's Crypto-Friendly Future:** With Trump's return, key financial appointments like Treasury Secretary Scott Bessent signal a friendlier regulatory environment, potentially ending hostile policies like Operation Choke Point 2.0 and paving the way for Bitcoin's deeper integration into the U.S. financial system.

The New(ish) World Order

- **Europe's Crypto Regulatory Leap:** The EU's Markets in Crypto-Assets (MiCA) framework, implemented in 2024, establishes clear classifications, licensing requirements, and market integrity rules, increasing the incentive for the U.S. to "catch up" to Europe in passing sensible crypto regulation.
- **Global Ripple Effects and U.S. Pressure:** MiCA's influence has sparked regulatory efforts in over a dozen countries, further increasing the likelihood that the U.S. will follow suit with similar legislation, such as FIT21, to remain competitive in the global financial landscape.
- **Stablecoin Challenges and Hidden Restrictions:** Despite claims of fostering innovation, MiCA's strict stablecoin regulations—including transaction limits, reserve requirements, and redemption rules—have led to major delistings and raised concerns about potential capital controls and market disruption.

Bitcoin Venture Investment



The final section of this report is an overview of the Bitcoin venture investing which we, Epoch, chose to have the 1A1z contribute independently as we ourselves are a venture firm. They did an exceptional job and were very thorough, enjoy.

1A1z is an independent Bitcoin and freedom technologies research and advisory organization with a mission to help technologists build commercially viable companies to further freedom and human rights.

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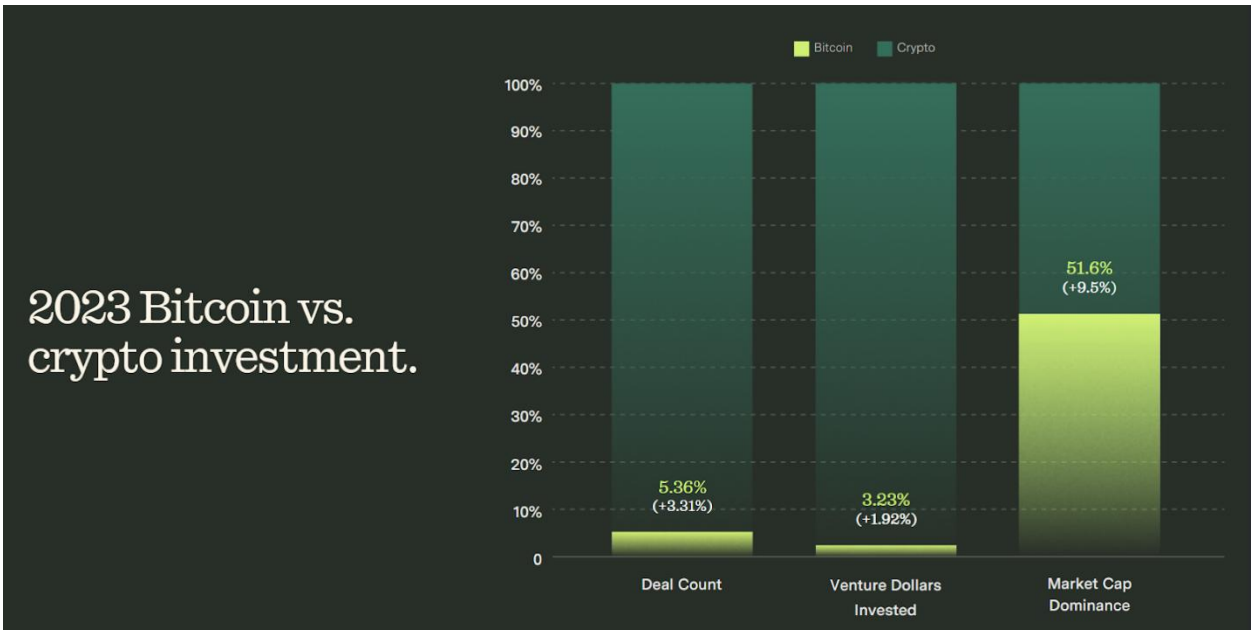
Introduction

The Bitcoin venture investment section covers 15 firms that focus on funding Bitcoin companies, presenting an overview of the landscape, activity and investment trends. Our supporting data is from primary and secondary research, as well as direct anonymized interviews with partners from most of the largest Bitcoin-venture firms.

Even though Bitcoin's market capitalization is larger than that of the entirety of crypto combined, venture investments and dollars invested are comparatively a tiny fraction, as illustrated by Trammel Venture Partners for 2023:



The Emerging Bitcoin-Native Venture Capital Landscape[134]

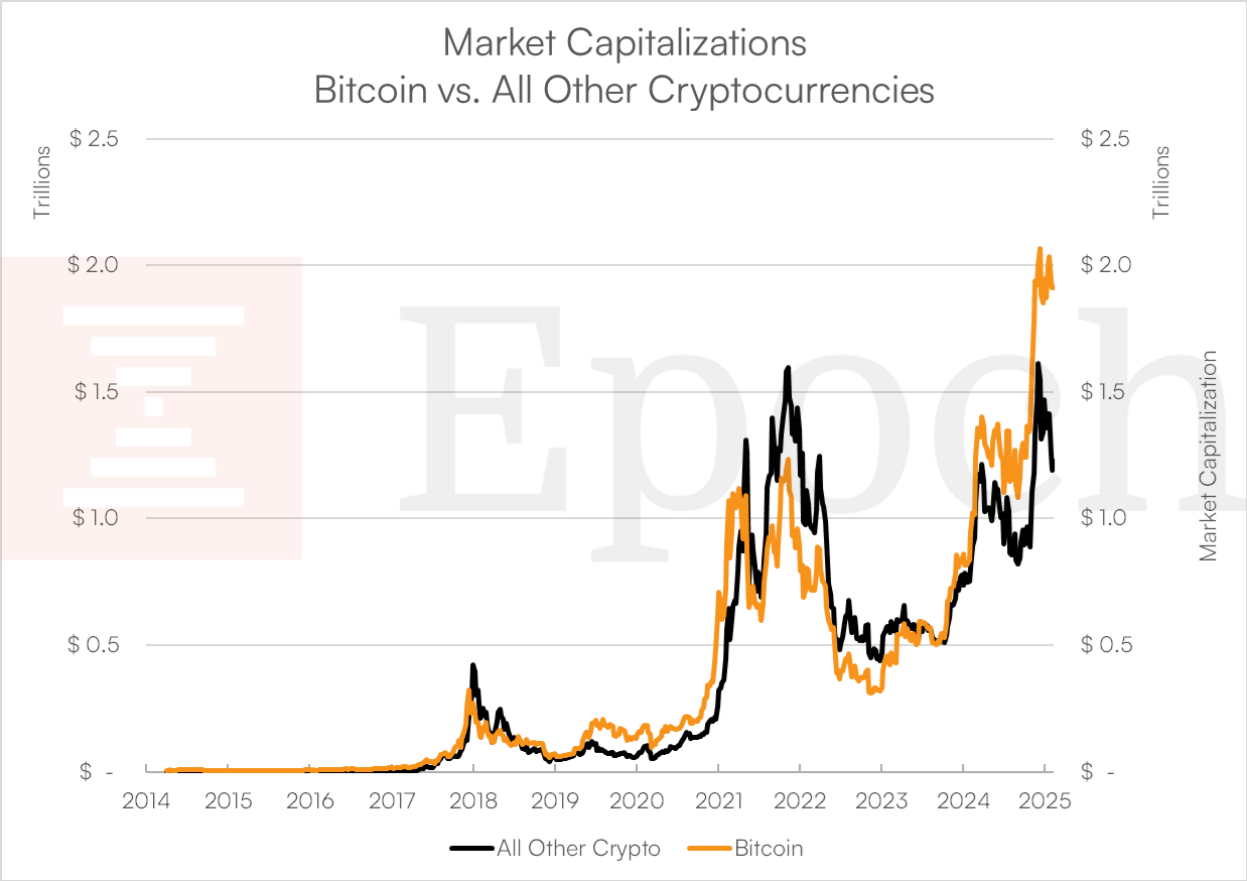
This section will cover the following:

- Why Bitcoin Venture Capital, and how it compares to Crypto Venture Capital or buying Bitcoin directly.
- An overview of the firms that focus on investing in Bitcoin companies, their focus stages and portfolio sizes.
- Activity in sub-sectors of the Bitcoin industry and overlap in exposure between venture firms.
- Emerging venture investment trends, and areas we expect to change over the next few years.

[134] Source: https://tvp.fund/whitepapers/bitcoin-venture-capital-research/

Why Bitcoin Venture Capital

As the market continues to mature, evolving from "crypto" and "digital assets" to differentiating Bitcoin and Crypto, many investors and capital allocators want exposure to Bitcoin-only companies. Within a sea of generalized crypto funds, several venture firms are filling this void, raising and deploying capital exclusively or with a focus on Bitcoin companies.



Source: CryptoCap[135]

What are Bitcoin Companies and Venture Firms

What constitutes a Bitcoin company, or a venture firm, may not be obvious.

Broadly speaking, the general definition is any Bitcoin company is one whose primary focus increases the adoption or utility of Bitcoin. In addition to providing returns to investors, many venture firms see themselves as mission-aligned with Bitcoin — committed to increasing its utility and advancing freedom being not just an important side effect but critical to motivating and attracting the right founders.

[135] Source: https://cryptocap.com/

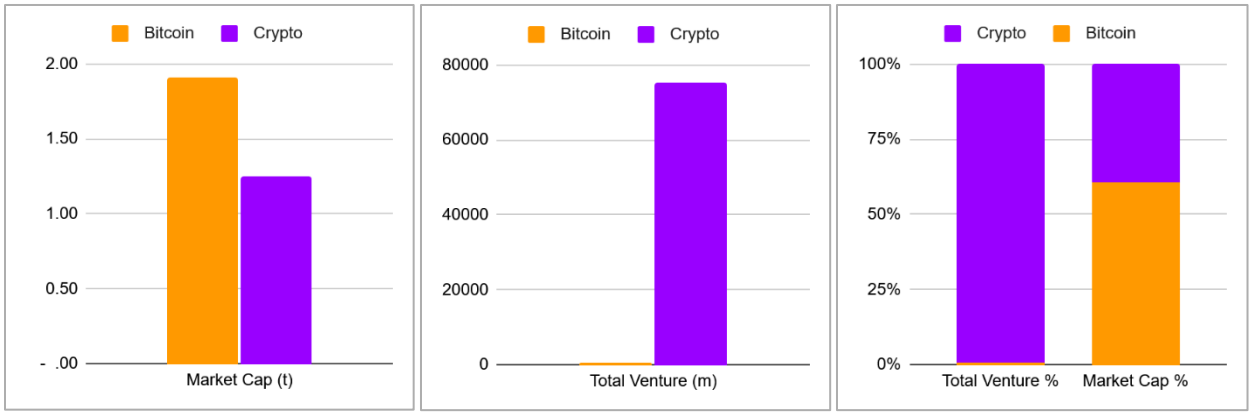
We define adoption to include the full spectrum — using Bitcoin the monetary asset as currency, and Bitcoin the network as-is on one end to unlocking new functionality, use-cases, and assets by leveraging non-monetary capabilities or secondary layers secured by Bitcoin on the other. Beyond this, the definition becomes more controversial as some companies and firms exclusively focus on Bitcoin the asset and some Bitcoin as more of a platform. For the purpose of this report, both are included in the widest definition, with differences between Asset and Platform provided where we found meaningful deviations. However, data in this report is limited to companies that primarily invest in Bitcoin companies — so data does not include other funds that may also invest in Bitcoin companies if it is not a focus.

We interviewed a number of venture funds, and found the main difference lies in the use of Bitcoin technology-based tokens and Bitcoin as the sole asset. In general, most firms support stablecoins like USDT coming to Bitcoin and its layers. However, Bitcoin layers built with a native token, or with a focus on tokenizing other assets, was met with much higher skepticism. Despite some perceptions, most firms are not entirely opposed to Bitcoin-based tokens, but some indicated that companies issuing native tokens would be less likely to receive investment due to the additional regulatory challenges and incentive misalignments — unless they could prove it was absolutely necessary. Some firms are open to the potential future tokens but indicated that the overwhelming majority of projects with tokens today did not meet that bar. Others were much more laissez-faire and open to tokens or other artifacts as long as they generally increased Bitcoin awareness and usage.

Bitcoin vs Crypto Venture

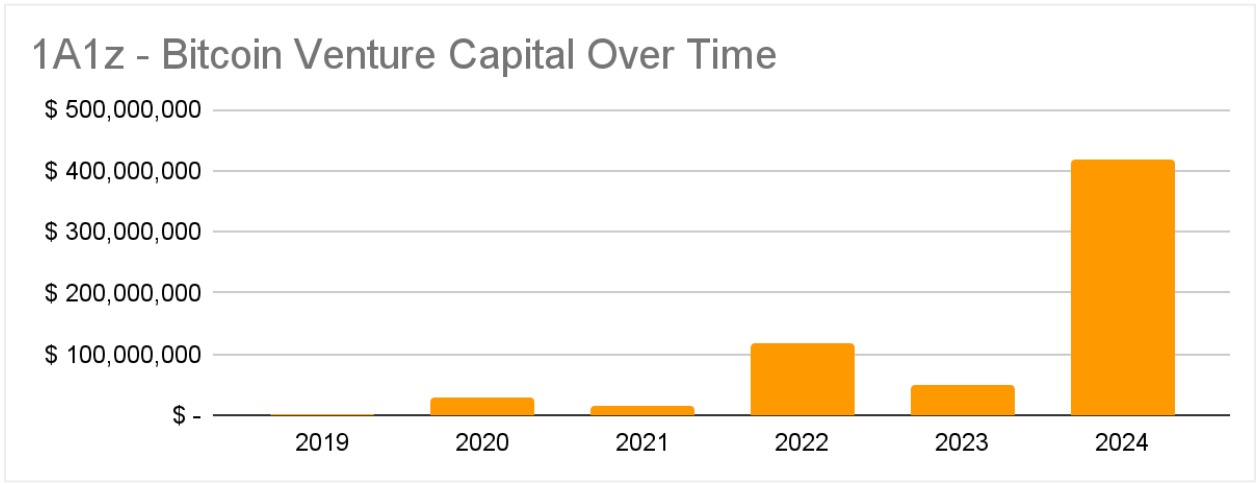
Bitcoin and crypto companies differ fundamentally in their access to capital. While Bitcoin companies operate mostly without tokens, crypto companies can raise capital through Initial Coin Offerings (ICOs) and Token Generation Events (TGEs), similar to public equity markets. This distinction affects company operations, and timeline liquidity for venture investors.

Bitcoin is a decentralized project where coins must be mined, earned or bought instead of merely minted, allocated and sold. This rapid access to short term liquidity at the expense of retail investors, combined with misplaced hype, misleading narratives and the misguided perception of innovation, drives the fundamental difference in funding between Bitcoin and crypto companies.



Bitcoin vs Crypto Market Capitalizations and Venture Investments[136]

The charts above show Bitcoin's market capitalization compared to the entire cryptocurrency industry combined. As of publication, Bitcoin commands $1.9 trillion in market value while all other crypto-assets account for $1.25 trillion. Funding figures since 2019, show the total amount of venture funding invested across crypto companies reaches a staggering $75.4 billion, while Bitcoin tops $546.3 million. The final chart shows the disparity even clearer: despite Bitcoin commanding 1.5 times the market capitalization of the crypto industry, it has only received 0.6% of total venture investments. The ratio of market capitalization to investment for Bitcoin is 4,150 times compared to crypto's 17 times. This data reveals a staggering misallocation of venture capital and represents an important opportunity for firms focused on Bitcoin investments.

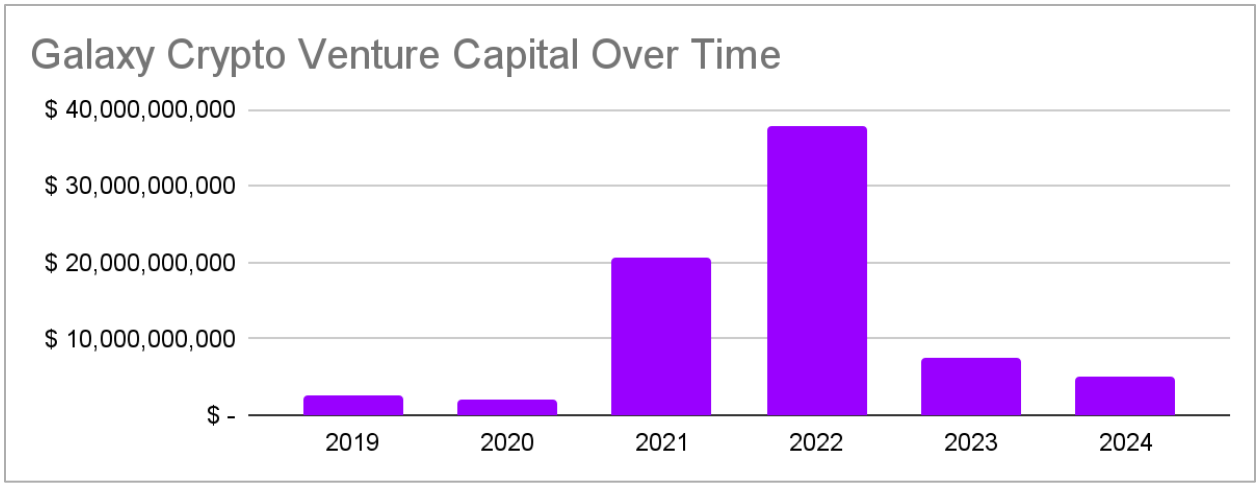


Bitcoin Venture Capital[137][138]

[136] Source: 1A1z and Galaxy Q4 2024 report, Galaxy report does not include any Bitcoin venture firms referenced in this report

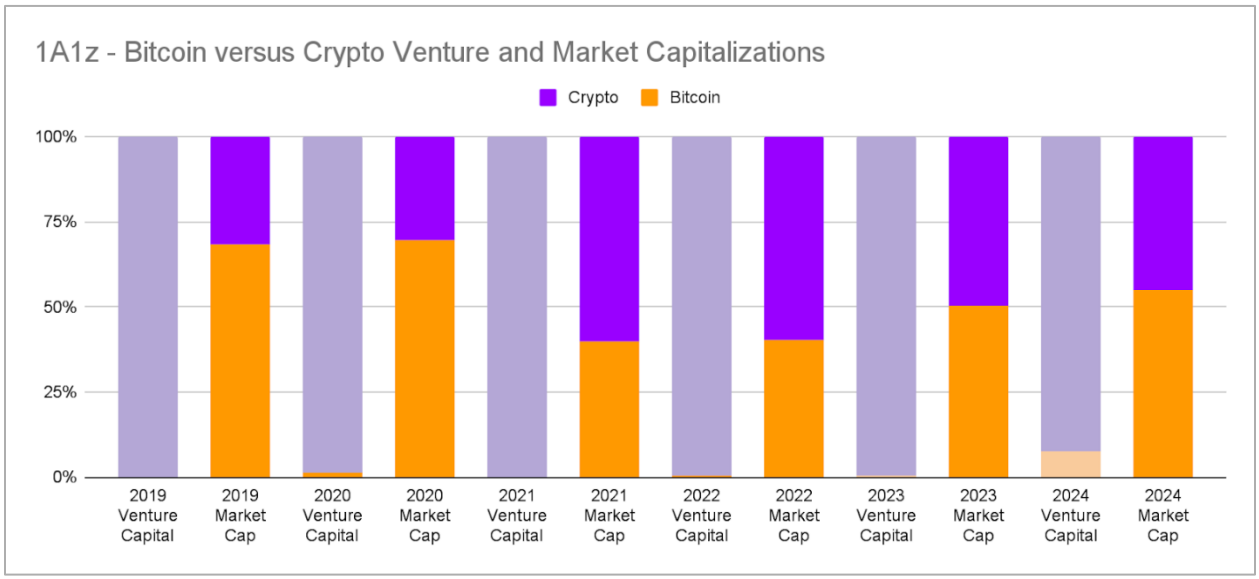
[137] 1A1z sourced through SEC Form D filings, firm websites, firm investor presentations and interviews

[138] Bitcoin venture fundraising numbers inclusive of SPVs



Crypto & Blockchain Venture Capital[139]

Breaking out capital raised by year shows a similar story but shows a clear downtrend in crypto venture capital raised since peaking in 2022, and, conversely, a material increase in capital available for Bitcoin companies since the prior peak of $118m in 2022 to $417.5m in 2024, in large part driven by Fulgur Venture and others' $210m convertible note financing in Blockstream and Sygnum. While the relative trends are clear, given that the y-axis for crypto is 100 times larger than Bitcoin, these scales overstate how much capital rebalancing is taking place between Bitcoin and crypto.



The chart above puts the scale of these trends in perspective. It compares the relative dollar amounts of venture capital available to crypto and Bitcoin companies, while comparing the

[139] Source: Galaxy Q4 2024 report

relative market capitalizations of crypto and Bitcoin for each year over the past six years. Despite Bitcoin's market capitalization dominance being between 40% and 70% over the last 5 years, Bitcoin's share of venture capital funding for each year was less than 1%. That's until 2024, when it spiked to 7.5%. This indicates that while there's growth in the amount invested in Bitcoin companies, there is still huge potential for further investment.

Another key development impacting overall capital allocation to this broad sector of Bitcoin and crypto is the approval of the spot Bitcoin exchange-traded products in the US public markets in January 2024. These new instruments attracted inflows of $32.2 billion in 2024, which is near to the $37.7 billion raised by crypto venture firms at the 2022 peak. We assume allocator flows that would otherwise have gone into crypto venture capital instead of exposure in more traditional liquid vehicles.

The disparity also lies in the number of venture firms with Bitcoin or crypto mandates. In 2024, there were 15 active Bitcoin-focused venture firms in total, compared to 79 newly launched crypto venture firms. The most Bitcoin venture firms created in a single year was three in 2021, whereas 250 new crypto venture firms launched the following year. In 2024, at the single-fund level, the largest crypto fund raised topped $850 million. It was led by Paradigm, with ten crypto funds in total having raised over $100 million each. Meanwhile, the largest funds raised in Bitcoin reached $125 million by Ten31 in 2022, and $70 million (committed of $100 million) by Ego Death Capital in 2024/25.

Why Invest in Venture Instead of Bitcoin?

The most common question asked by prospective investors is: Why invest in a fund instead of just buying Bitcoin?

Although the empirical data is not conclusive, since venture funds typically follow a J-curve where returns are harvested in later years and therefore most funds are too recent for the performance data to be meaningful. With that said, it is a common — and perhaps the most important — question, so we provided a summary of responses.

A common theme was that allocations to Bitcoin itself are not mutually exclusive with exposure to Bitcoin venture funds or Bitcoin public equities. In fact, some firms recommend that investors start with a core Bitcoin position first before considering venture capital as they want to ensure alignment.

For those who are already Bitcoin investors, firms spoke to the upside potential of companies bringing utility to Bitcoin in some cases akin to leveraged positions in Bitcoin such that as Bitcoin succeeds, companies building around Bitcoin are best placed to reap the benefits. Some of these benefits include taking revenue in and holding Bitcoin, increasing the value of the company with ever increasing (and appreciating) treasury positions, in addition to the value creation of the company's products.

Many spoke to the flywheel effect of investment in Bitcoin companies driving utility, which ultimately drives price, a portion of which is ultimately recaptured by companies driving utility. By increasing utility you increase adoption, by increasing adoption you increase the market size, by increasing the market size you increase utility.

Bitcoin Hurdle Rate

In venture capital a "hurdle rate" is the minimum rate of return that must be achieved before its fund managers receive a share of profits. To some, Bitcoin is the cost of capital, the baseline return they look to as the opportunity cost of investing in something else and hence the right hurdle rate.

Most partners interviewed philosophically agreed with the notion of a Bitcoin hurdle rate both for their funds as well as their portfolios in terms of how they think about capital allocation, with a few explicitly stating that their fund return target was to beat the Bitcoin CAGR, but no one we spoke to had yet implemented it formally as a preferred return in their funds. Some other outlier responses were that it may not be possible, to another believing this was fundamentally counter productive as their investments in portfolio companies are large drivers of the appreciation of Bitcoin and so it would be a circular reference, penalizing successful fund managers for increasing the value of Bitcoin.

In terms of how a Bitcoin equity investment can actually beat Bitcoin returns, the theory rests on two corporate finance underpinnings which can be classified as the following:

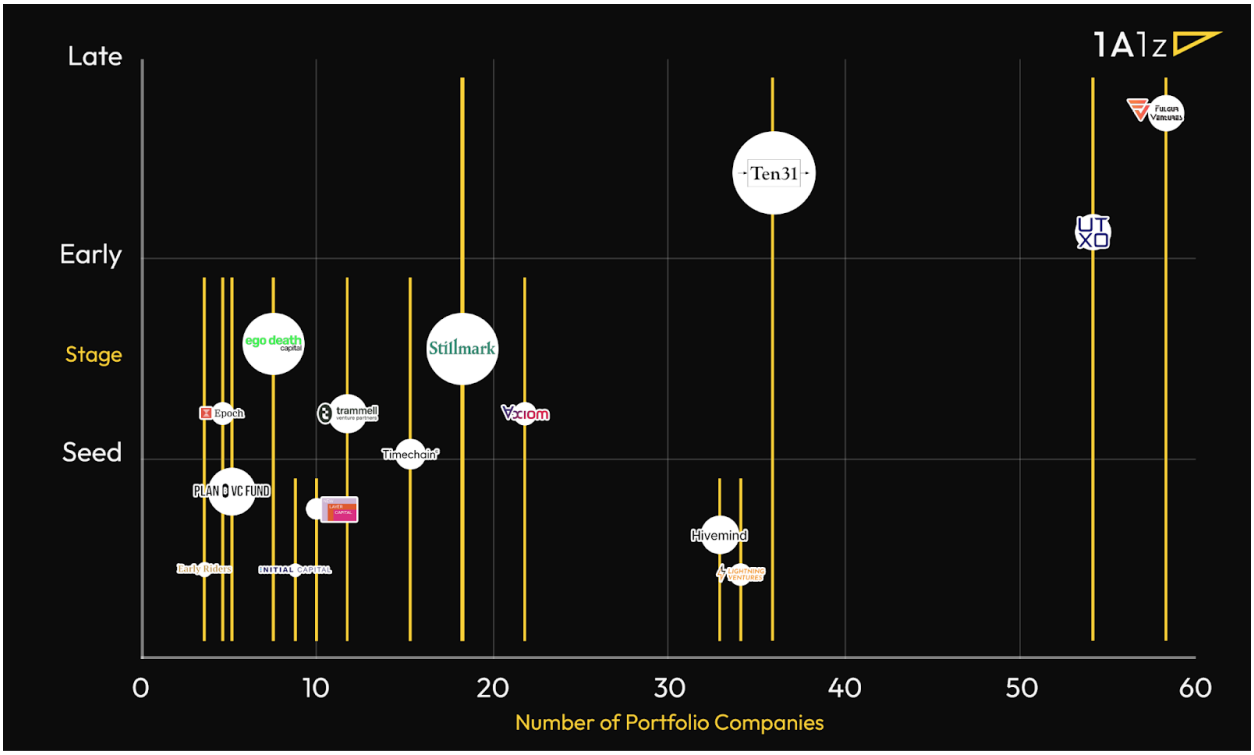
- Independent of Bitcoin, all corporate valuations are based on multiples of different financial metrics which in turn represent the present value of all the future value accruing to the business that someone is willing to pay for today. In this context, a successful Bitcoin business embeds all the future value yet to accrue to it that someone will pay a multiple for. If that business is tied to the growing asset and based on a sound monetary system that is Bitcoin, that multiple at any given time T will in theory make the equity act like a levered play on Bitcoin.
- The other is that most valuation is typically driven by financial metrics on the income statement (e.g. EBITDA). By building their balance sheet on a more solid monetary base, Bitcoin companies will eventually be able to drive value through both their income statement and their balance sheet which we see playing out in the public markets through $MSTR.

Finally, some highlighted the sheer asymmetry presented by investing in building the Bitcoin ecosystem. Per the statistics presented earlier regarding the proportion of venture capital available to Bitcoin in comparison to crypto, they argue there is a tremendous misallocation of capital and once Bitcoin's larger TAM is realized the underinvested ecosystem will experience dramatic growth, increased valuations, and ultimately large exits.

Venture Landscape

Bitcoin-focused Venture Firms

Across the spectrum of investment firms we identified 15 firms that exclusively or predominantly invest in Bitcoin companies who have collectively raised about $550 million since 2019 and invested in 183 companies, with the X-axis showing number of companies in each firm's portfolio, the Y-axis showing stages that they invest, and the size of the bubble representing each firm's aggregate committed capital across funds:



Note: Excludes Fulgur and other investors' Special Purpose Vehicle investments in Blocksteam and Sygnum but may include other SPVs

Other Bitcoin Investment Models

Investment in the Bitcoin ecosystem is not limited to the traditional venture capital model. Other approaches include:

- **Public / Private Hybrid:** The Bitcoin Opportunity Fund blends both investments in publicly traded Bitcoin equities, Bitcoin itself along with associated derivatives, with direct investments in typically later stage private companies.

- **Fund of Funds:** Cantilever's first fund primarily invested in multiple Bitcoin venture funds, combining exposure across multiple different fund managers and portfolios, with the intention of making 2-3 direct co-investments as well
- **Equity Crowdfunding:** Thunder Funder is a regulated equity crowd funding platform that enables retail investors to participate in investing in early stage Bitcoin and open source companies.
- **Venture Studios:** Thesis and Cow Labs incubate, fund and spin out standalone Bitcoin product companies.
- **Accelerators:** Wolf, created by the founder of NYDIG and Stoneridge, and BitcoinFi, backed by Draper Associates, Boost and Thesis, provide structured programs for Bitcoin entrepreneurs to receive coaching and exposure to potential investors in demo days.
- **Strategic Investments:** Bitcoin companies are now large enough that they are investing in other companies such as the $75m investment in Komainu by Blockstream Capital Partners.

Other Venture Capital

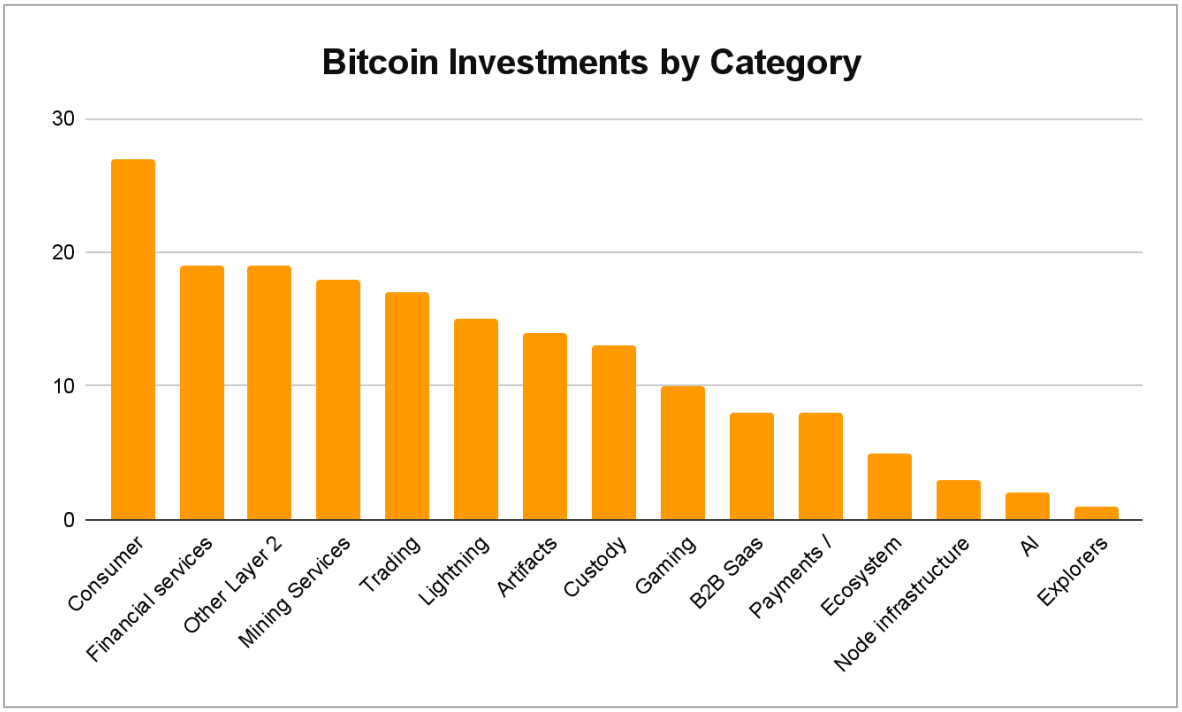
It's important to note that our coverage of firms that are focused on investing in Bitcoin companies does not imply that Bitcoin companies should raise capital exclusively from Bitcoin-focused investors. Our intention is to provide an overview of Bitcoin-focused firms for founders and investors who are also focused on Bitcoin, but that does not mean other firms or funds should not be considered.

Not covered in this report are general crypto funds who also occasionally invest in Bitcoin companies such as Castle Island Ventures, Paradigm, HashKey and Greenfield.xyz. While these firms may or may not be as mission aligned with Bitcoin founders and those listed above, that does not mean they cannot add value to entrepreneurs and should also be considered in fundraising activities.

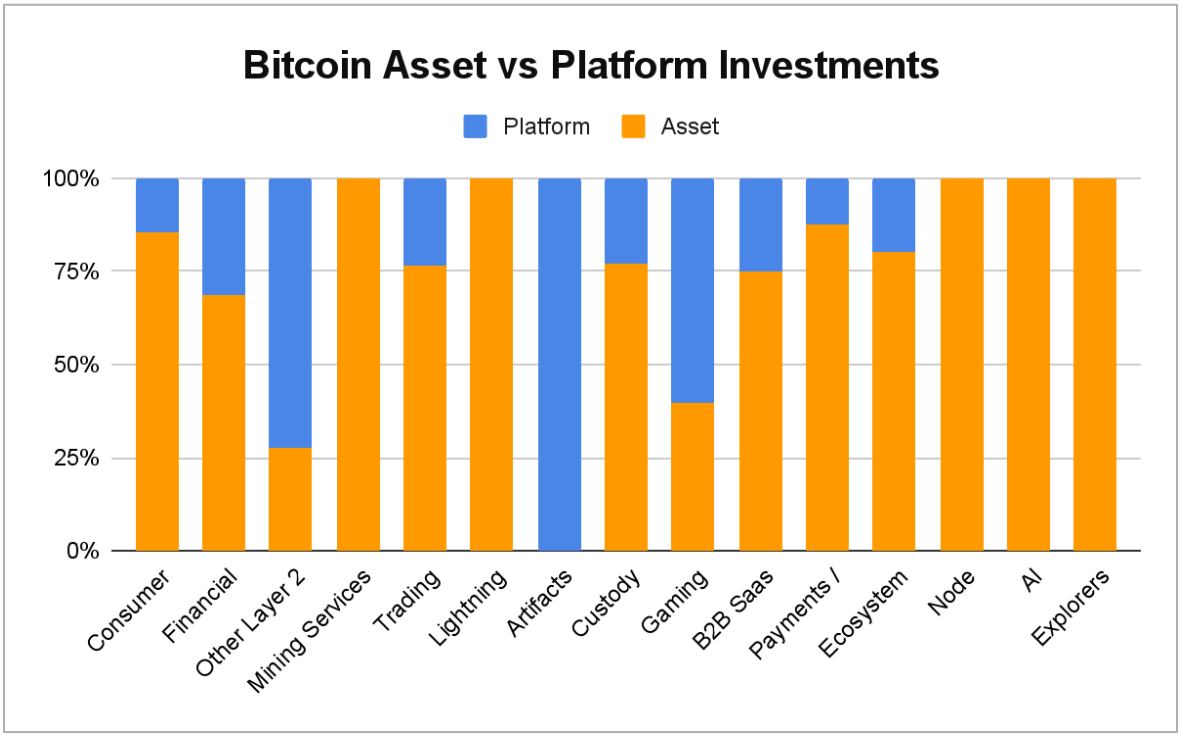
Additionally, traditional software venture capital firms are also starting to invest in Bitcoin companies and bring a wealth of experience, scale, and networks that may not be accessible to Bitcoin-only firms. For example, firms like Founders Fund (Lava), Entreé Capital (Breez), Craft Ventures (Lightning Labs, Fold, Blink, LND Work), Andreessen Horowitz (Lightspark), Google Ventures (Voltage), Valor Equity Partners (Lightning Labs, Voltage, Amboss, Hoseki), and many others have invested in Bitcoin-native companies, as well as world class incubators such as Y Combinator (Bitstack, Striga, Theya).

Investments by Category

Across the 15 Bitcoin-focused venture firms above we analyzed all 183 publicly-disclosed portfolio company and identified 15 distinct categories that each company fell into:



Consumer, which includes rewards, social and crowdfunding, was the largest category by number of invested in companies, with Financial Services, including collateralized lending, insurance and banking, and non-Lightning Layer 2s the two next largest. Mining services and Trading follow, with Lightning companies perhaps surprisingly low as the 6th largest category.

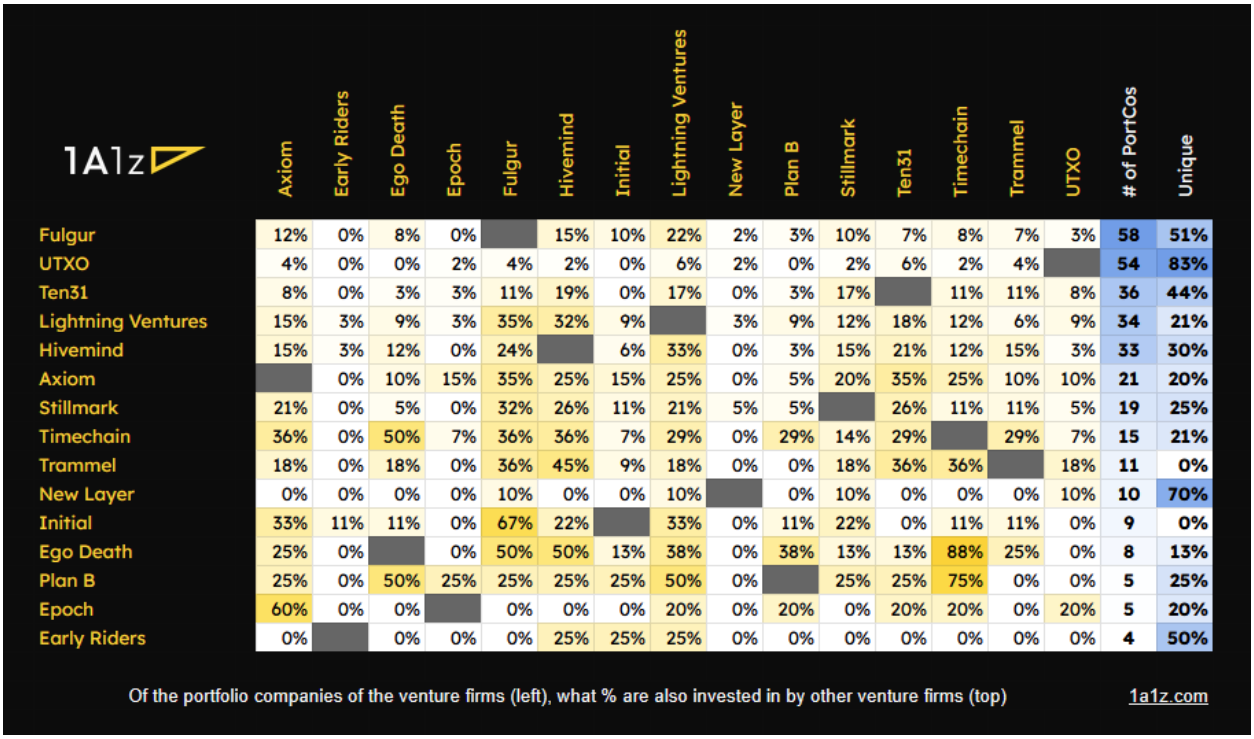


However, breaking out each category by pure Bitcoin the asset companies versus general platform investments shows all of Artifacts and significant portions of Other Layer 2s and Gaming are driven by use cases other than directly supporting Bitcoin itself. Overall, 70% of the portfolio companies invested in by the Bitcoin-focused firms build on Bitcoin as a monetary asset or store of value. We highlight this as there is disagreement over what constitutes a Bitcoin company, for example with the Artifact category being ordinals, inscriptions, runes etc., and Layer 2s that claim to be built on Bitcoin but have their own blockchain and token, some of these more Bitcoin adjacent use cases are debatable.

Portfolio Uniqueness and Co-investments

Analysing the 183 Bitcoin companies with public investments from the 15 Bitcoin-focused firms, we can see overlaps in portfolio companies and which firms commonly co-invest or follow others:

1A1z - Bitcoin Portfolio Crossover Analysis



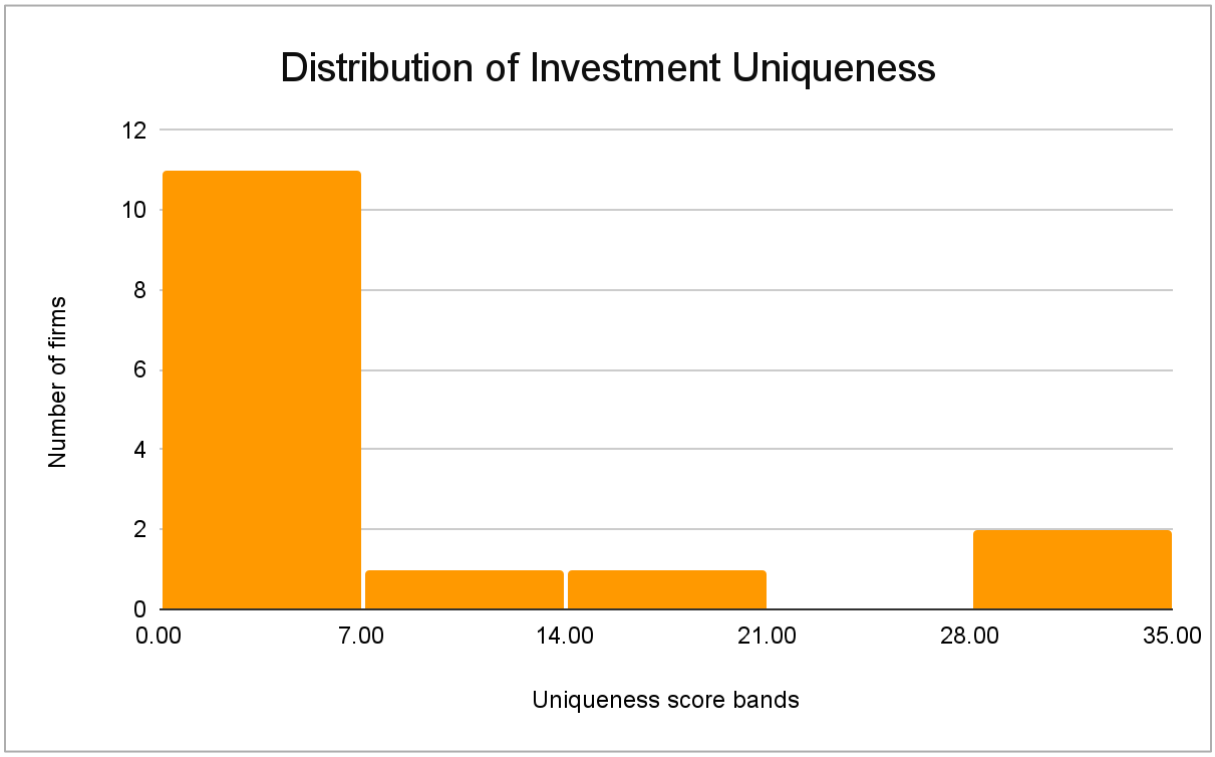
The heatmap above shows relative co-investments across each of the 15 firms:

- Y-Axis: Bitcoin-focused venture firms ordered by number of portfolio companies
- X-Axis: Bitcoin-focused venture firms in alphabetical order
- Rows: Of the firms on the left, what percentage of their portfolio companies also received investment from firms on the top

- **Unique:** What percentage of the firms on the left's portfolio companies did not receive investment from any of the other 14 firms

The highest overlap between venture firms is between Ego Death Capital and Timechain, who invested in 7 out of 8 of the companies in Ego Death's portfolio. In terms of unique investments, notable outliers here are UTXO with 83% unique investments as they have a broader mandate and invest in a lot of Artifact and Other Layer 2 companies that others do not, and New Layer Capital, who have very little overlap with other firms.

Note that this heatmap does not take into account the number of portfolio companies, amount invested, or whether the firm led the round, just the percentage overlap between companies in respective portfolios.



To take portfolio size into account, we created a weighted uniqueness score for each of the firms, measuring how distinct their portfolios are relative to each other. The weighting adjusts for portfolio size, ensuring that smaller firms with a few unique investments do not disproportionately impact the analysis. The histogram above shows the distribution of uniqueness scores across firms, showing whether most firms concentrate on similar investments or if distinct strategies are common.

Here you can see that the majority of firms have relatively low uniqueness, indicating that most firms invest in the same companies. Only a couple of firms demonstrate significantly high uniqueness, and those that do tend to have differentiated mandates, for example investing in Artifact companies or non-lightning "layer 2s" that have their own token.

To summarize, 67 out 183 portfolio companies, or 36.6%, have more than 1 investor from this group. This general overlap of investing is to be expected with multiple firms all seeking to invest in the best founders in a still limited number of Bitcoin companies. Since only a few firms lead rounds, many of the smaller firms participate in those rounds, creating overlap between them.

Venture Trends

This is actually a very interesting time to be in Bitcoin venture capital. From our numerous conversations, here are some high-level themes that emerged as key trends and developments to watch that will ultimately drive Bitcoin adoption and in turn Bitcoin venture returns.

- Increase in Capital from Crypto and Traditional VCs
    - Bitcoin is increasingly gaining mindshare amongst the allocators as differentiated from crypto and this is manifesting itself currently in the spot markets and starting to flow into the venture markets as well. We have been hearing anecdotally about LPs asking their crypto VCs about their lack of exposure to Bitcoin companies and looking to hire investors with Bitcoin expertise as well. Some of this interest is due to sectors in the broader crypto ecosystem that had some product market fit migrating to Bitcoin (stablecoins, DeFi, NFTs), both on Bitcoin L1 and in newer L2s (EVM compatible) that use Bitcoin as a settlement layer, such as ZK rollups.
    - The same phenomena is also starting to manifest itself in the traditional VC sector where LPs are starting to ask about Bitcoin company exposure specifically.
    - As previously mentioned, there is tremendous under allocation to Bitcoin venture capital as measured by the Bitcoin market capitalization to Bitcoin venture capital raised ratio of 4,150X. This is in comparison to the equivalent ratio for crypto of 17X. This misallocation is starting to correct as investors start understanding the sheer difference in TAM of a fundamentally new monetary system versus what are mostly interesting computer science experiments.

- Bitcoin Treasury Plays
    - The financialization of Bitcoin continues unabated.
    - With the success of MSTR, more corporates, be they public or private companies, are increasingly looking into how to generate enterprise value through the implementation of a Bitcoin treasury strategy.
    - Most venture-backed private Bitcoin companies do currently implement a Bitcoin treasury strategy, to the extent that it is feasible given the stage of their business and scale of funding.
    - We expect this trend to continue across the board and have been hearing of potential de-SPAC transactions where a key pillar is a Bitcoin treasury play.
    - At the fund level, we have seen 3 approaches to the Bitcoin standard:
        - The venture fund can directly purchase Bitcoin on an opportunistic basis
        - A hybrid fund can purchase Bitcoin as part of its liquid investment sleeve

    - An investment group, has a liquid fund in its overall complex, that invests in liquid assets like Bitcoin and pubcos

- Infusing Bitcoin
    - Another emerging theme is that of infusing Bitcoin into an operational, traditional businesses that are revenue / EBITDA positive
    - Ideally this is not just a pure balance sheet play and Bitcoin fundamentally enhances the core revenue-generating end of the business as well
    - "Bitcoin private equity" is a term that a few investors have used to describe this play of a control investment in a traditional business and transforming it through Bitcoin
    - Strategic investments or acquisitions of non-Bitcoin companies like fintechs or banks

- M&A / IPOs / SPACs
    - Many expect some significant transaction this year in all of these categories
    - On the M&A front, many expect traditional fintech and TradFi firms to start acquiring Bitcoin companies that have real traction
    - The Fold IPO (via SPAC) will mostly likely be the first one out the door for a Bitcoin company this year

- Store-of-value (SOV) vs Medium-of-exchange (MOE)
    - As exemplified by MSTR, currently the dominant investment narrative by far for Bitcoin is SOV
    - However through the maturation of layered technologies like Lightning, the expectation is that use cases like payments will reach critical mass and result in the MOE becoming a reality as well

- Programmability
    - Bitcoin the network has historically been very limited in its programmability by design which in turn has limited the range of its use cases
    - **Bitcoin L1 contracting primitives like Discreet Log Contracting primitives are picking up traction to implement borrow/lending protocols, and financial instruments like covered calls directly on Bitcoin L1**
    - Bitcoin "L2s" besides Lightning have been one of the most invested sectors over the last couple of years and many are expected to go live this year
    - **BitVM is enabling more trust-minimized bridging to the Bitcoin L2s, reducing bridge risk, which caused billions to be lost in the broader crypto ecosystem last cycle**
    - These L2s often enable full Turing complete programmability on top of or around the core Bitcoin protocol and are expected to enable completely new functionality
    - That combined with the support for stablecoins, specifically USDT on Lightning, should result in a Cambrian explosion of new functionality and applications which should ultimately increase Bitcoin usage and adoption

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See you next year

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