BITCOIN MARGINALISM

Building a neutral monetary system for the digital epoch

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EPOCH MANAGEMENT
epochvc.io

They laugh at me because I'm different; I laugh at them because they're all the same — Kurt Cobain

Introduction

Bitcoin is a global network of millions of computers producing and transferring an asset that has achieved a $1 trillion market capitalization within 15 years. Most financiers have not discovered that it is the strongest performing asset since its inception, with the highest Sharpe ratio of any asset category today.[1]

The supply of bitcoin is immutable. It is the only asset in the world with a cumulative supply that is not changed by demand, all that demand can change is its price. The immutability of Bitcoin's supply schedule is, perhaps, the most important property driving its adoption as a global monetary standard.

However, having a finite supply on a predetermined schedule is not the only value proposition of Bitcoin. Others include:

- Permissionless payments
- Global payments
- Peer-to-peer payments
- Micropayments
- Programmable payments
- Self-custodianship
- Shared-custodial schemes
- Collateral for credit
- Data storage & verifiable timestamping
- Banking the unbanked
- Protection against hyperinflation
- Energy grid rebalancing

We believe Bitcoin will ultimately become the world's first global neutral monetary system. Bitcoin is used in all the above ways today and because the demand for it is so high it is encountering limitations. Such limitations create profitable opportunities for growth through technological innovations such as new protocols, software applications, and hardware.

We're Epoch, a private capital fund, focused on building the core technologies and infrastructure that will enable the evolution of bitcoin towards a global neutral monetary system. The intention of this writing is to:

- Articulate our fundamental philosophy of Bitcoin's value
- Define our expectations for bitcoin adoption
- Apply our philosophy toward those expectations
- Directly answer important questions about bitcoin-focused venture capital

[1] See casebitcoin.com for return and risk-adjusted return statistics: https://casebitcoin.com/

Bitcoin vs. Crypto

To effectively allocate capital to the Bitcoin ecosystem, we must have an accurate understanding of value, where it exists today, and where it may exist tomorrow. Various philosophical perspectives of value exist today, and they are, admittedly, challenging to define. For this writing, we will adopt the framework proposed by Pete Rizzo who has spent more than a decade studying the evolution of bitcoin and cryptocurrency philosophical views. Rizzo defines the following two ideological camps within the broader industry:

> *"**Bitcoin Maximalism:** Those who believe that Bitcoin alone satisfies the definition of a neutral, non-state monetary system and that this definition exists within the domains of economics and computer science. They believe the conditions that led to the launch and bootstrapping of the Bitcoin economy can't or won't repeat, and that the creation of cryptocurrencies undermines the economic scarcity that made Bitcoin novel in the first place. While some may tolerate the wider market for cryptocurrencies, this is only so long as it validates Bitcoin's dominance.*
>
> ***Crypto Agnosticism:** Members of this group believe Bitcoin has a narrow, major or even no place within a wider ecosystem of cryptocurrencies. Though they may see some as better or worse than others, they believe most cryptocurrencies to be inherently good as they provide an alternative to existing monetary systems. Most notably, they assume that by offering different feature sets or focusing on different use cases, cryptocurrencies are serving as a new kind of programmatic money that competes with Bitcoin. Thus, they believe the crypto market to be providing both evidence to this claim as well as arbitrating the validity of claims made by competing entrants."*[2]

Much has been written on bitcoin maximalism and crypto agnosticism —we do not seek to explore all those nuances here. Our goal is to focus on the margin of insight that can be found by applying an economic framing to this issue. Broadly speaking, the bitcoin maximalist ideology emphasizes supply-side considerations while the crypto-agnostic ideology emphasizes demand-side considerations. A supply-side view regards the finite and immutable supply of bitcoin as the primary monetary value proposition of bitcoin

[2] Cited from Pete Rizzo's Forbes article Against Cryptocurrency: The Argument for Bitcoin Maximalism: https://www.forbes.com/sites/peterizzo/2021/09/29/against-cryptocurrency-the-ethical-argument-for-bitcoin-maximalism/

while a demand-side view emphasizes a broader conception of consumer functionality as the primary driver of monetary value.

We will define Epoch's view as *Bitcoin Marginalism.*

> ***Bitcoin Marginalism:*** *an emphasis on value determinants from marginal analysis at the intersection of both supply and demand considerations for Bitcoin. Bitcoin Marginalism considers aspects of both the maximalist and agnostic philosophies. We maintain that the nature of bitcoin's immutable and finite supply is necessary for monetary adoption but acknowledge that bitcoin's long-term value will be enhanced by profitable innovations that are developed to meet the demand considerations "at the margin."*

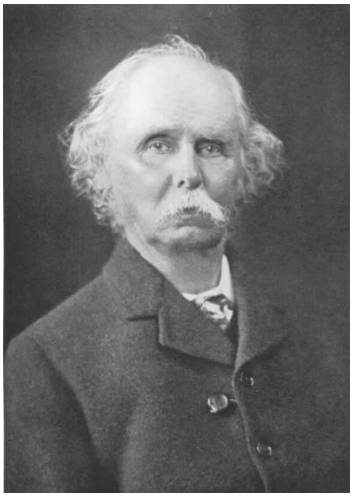
To explain this viewpoint, we must first understand *Marginalism*.

Marginalism

Marginalism was arguably the most influential thread of economic thought driving the development of modern microeconomic theory. The Marginalists developed many of the fundamental economic tenets we hold today — the most prominent being the supply and demand model of price determination.[3]

Marginalism was built upon economic ideas of *Classicism* (developed by early giants like Adam Smith, Jeremy Bentham, John Stuart Mill, and David Ricardo). Proponents of Classicism believed that the value of a good or service is determined by the labor cost required to produce it. This is often called the *labor theory of value.* The *early Marginalists* rejected this view in favor of the *subjective theory of value.* This theory argued that the value of a good or service was instead determined subjectively by the individuals who wished to consume it.

English economist Alfred Marshall, known as "*the great synthesizer*", then took the classical view and combined it with the view of the early Marginalists.[4] What determines a market price? The Classicists said the cost of supply, the early Marginalists said the demand for it, and Marshall said both supply and demand. Thus, the famous supply and demand chart was born, and many fundamental tenets of modern microeconomics emerged.



Alfred Marshall, 1921

[3] Interestingly, these economists developed similar theories independently and simultaneously during this period. A book that describes this general phenomenon is *How Innovation Works* by Matt Ridley.
[4] Technically speaking Marshall created Neoclassicism when building upon Marginalism but was still a Marginalist in the sense that he maintained the core Marginalist tenet of focusing on price determination at the margin.

By considering both supply and demand factors, Marginalists revealed that price/value determination occurs "at the margin" (hence the name). Think of the margin as an edge or border. Prices emerge from buyers and sellers who are willing to participate in the market at current prices (on the edge).

Marginalism solved the famous water-diamond paradox posed by Adam Smith in the *Wealth of Nations*.[5] Why is the price of diamonds greater than the price of water when water is needed to survive, and diamonds are not? Classists said that it's because the cost of finding diamonds is higher while Marginalists said that it's not the total usefulness of diamonds or water that determines their price but the usefulness of each marginal unit that determines price. The answer is obvious when we understand that prices are determined "on the margin." Water's abundance implies that the value (price) of one more drop of water is relatively low. If all the water dried up, the marginal unit would become infinitely valuable. This phenomenon perfectly illustrates the important Marginalist conception of diminishing marginal utility. As additional amounts of a good are added to available resources, their marginal utility decreases. Notably, a founding Marginalist Carl Menger defined money as the good with the lowest rate of diminishing marginal value (i.e., the most *salable* good).

The Marginalist view also provides a valuable framework for thinking about the information conveyed by changes in market prices over time. The insight that prices are simultaneously determined by supply and demand implies that a price increase can mean one of two things: either supply has decreased, or demand has increased. This framework is particularly helpful when thinking about an asset with a relatively fixed supply like bitcoin (more on this later).

In summary, the Classical school of economics only acknowledged supply considerations as value determinants, the early Marginalists only demand considerations, and the late marginalists combined the two views. When considering both supply and demand we can consider the abundance or scarcity of a good in a market alongside subjective demand value determinants.

[5] Given the labor theory of value, classical economists could not reconcile this paradox

Bitcoin Marginalism

The historical evolution of competing theories of economic value suggests some parallels amongst bitcoin and crypto ideologies. Bitcoin Maximalists align closely with the Classicists by focusing on supply-side considerations of monetary adoption (e.g., a finite, known, immutable supply and relative scarcity). Crypto Agnostics adopt the early marginalist view that subjective demand-side considerations are paramount to monetary adoption (e.g., programmability and user experience).

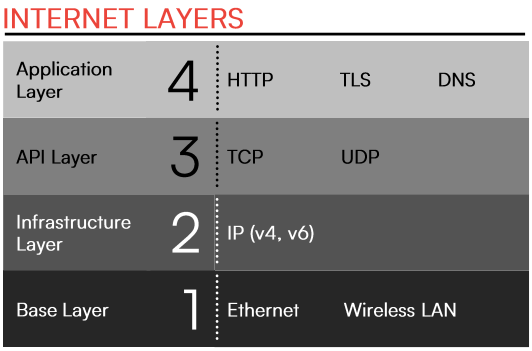
We believe Bitcoin Marginalism is a natural evolution from these ideologies whereby the supply side viewpoint can be held as a constraint on value which, if abandoned, would undermine the value of bitcoin itself. However, this value proposition - on its own - will possess diminishing marginal returns as bitcoin is adopted for the store of value function of money. With supply-side considerations intact, incremental demand-side enhancements will provide marginal value to bitcoin to grow beyond a store of value towards a medium of exchange and unit of account.

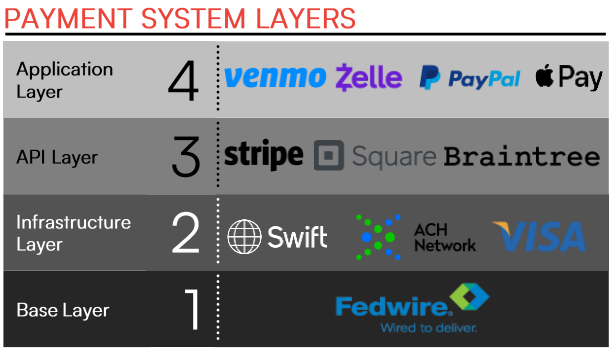
In fact, to become a neutral monetary system, demand-side considerations must expand. As bitcoin continues to scale in adoption across various functions, eventually the marginal value can only be increased through demand-side considerations (discussed later). This does not mean that Bitcoin the protocol must be changed. Such functionality and user experience for Bitcoin can be increased solely through businesses, software, hardware, and adjacent protocols that interact with it.

Bitcoin's relatively fixed supply schedule implies that — as prices continue to rise — demand-side solutions will become increasingly important (and profitable) to develop. Bitcoin Marginalism is ascendant.

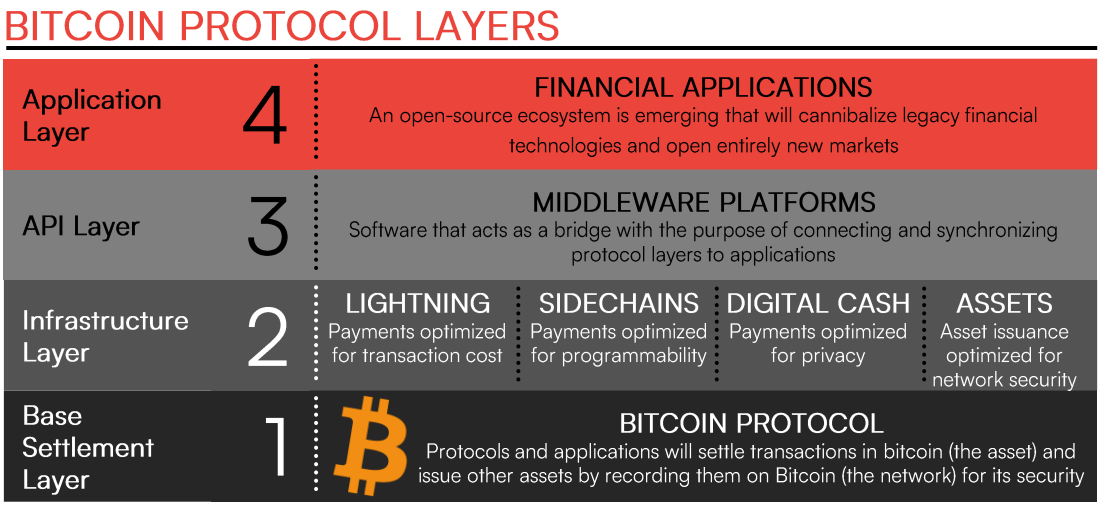
The Bitcoin Ecosystem

A common model used to describe the core technologies and infrastructure around Bitcoin is the "Bitcoin layers" framework. It is an easy narrative to comprehend because both the public internet and the legacy financial system utilize a layered architecture in certain respects.

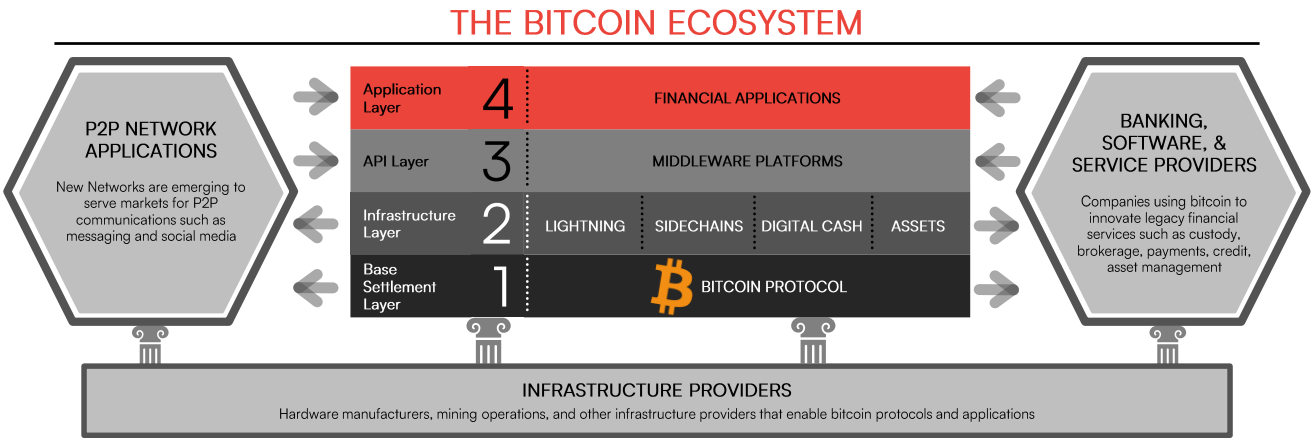




Applying this framework to Bitcoin, we can see a "layered" system of protocols:



However, this layered perspective is incomplete. There are large established centralized companies supporting Bitcoin, massive hardware and mining infrastructure industries, and even P2P protocols that are separate from Bitcoin but rely on its core utility. By expanding our aperture to capture all the infrastructure around Bitcoin, the ecosystem looks more like this:



To further complicate things, the definition of what is and is not a layer is highly debated. Technically speaking, a "layered protocol" maintains the property of unilateral exit which means that participants in the protocol possess a pre-signed Bitcoin transaction, equivalent to the amount of capital committed in the layered protocol, which can always be redeemed within the Bitcoin protocol. Unilateral exit provides trust minimization, effectively enabling the layered protocol to inherit many security assurances of Bitcoin. Without such a guarantee, a protocol is not a layer because it is not dependent upon the layer below, bitcoin, to function. Without the property of unilateral exit, a protocol is simply a protocol. With unilateral exit, a protocol can provide the economic security assurances of Bitcoin.

Today, there is only one protocol built on Bitcoin with the property of unilateral exit that has achieved scale (the Lightning Network).[6] Everything else is not a layer, technically speaking.

[6] There is another emerging known as ARK but it is only in ideation today

The Bitcoin Ecosystem is a Tree, Not Layers

Describing the bitcoin ecosystem as one of layers is, at best, misleading. It fails not only in definition but in scope. Describing the bitcoin ecosystem as a tree, however, makes more sense. In 1996 Adrian Bejan proposed the *Constructal Law* which states:

"*For a finite-size system to persist in time (to live), it must evolve in such a way that it provides easier access to the imposed currents that flow through it.*"[7]

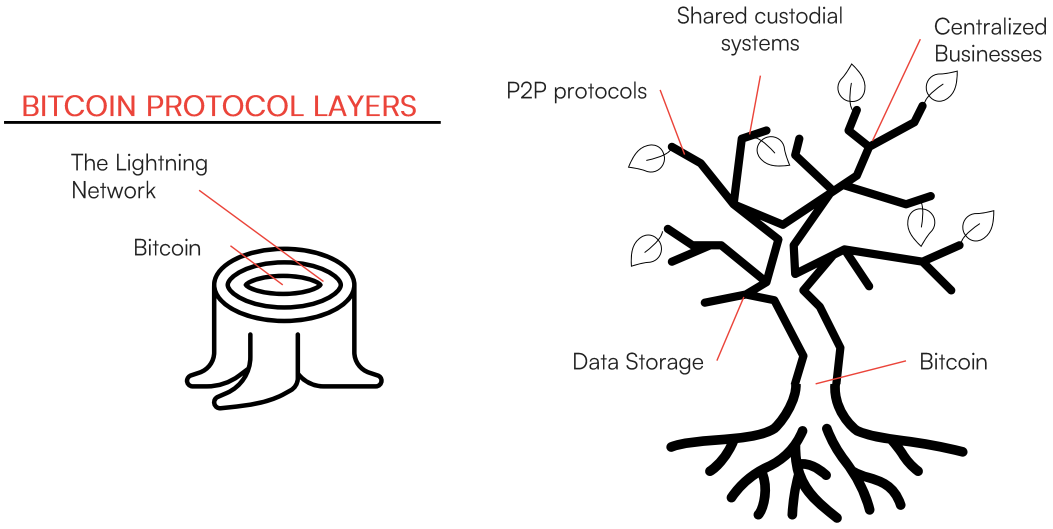
Put simply, systems that continue to grow must have access to increasing flow and continuous optimization of this state. Tree branching, river networks, and the veins in our bodies are examples of how these systems grow and expand.

Constructal Theory Patterns

[7] An overview of the Constructal Law: https://mems.duke.edu/research/energy/bejan-constructal-law

The Constructal Law tells us that Bitcoin network growth will follow the path of least resistance. Bitcoin infrastructure such as protocols, networks, and companies must find sustainable access to *flow* to create long-term value. Flow can be thought of as sustainable access to the market from demand (i.e., adoption). The growth of bitcoin infrastructure can be thought of as channels for flow. Forms of demand with a large flow today may branch off into a completely different direction tomorrow, but they would have never gotten there in the first place without the initial flow.

THE BITCOIN ECOSYSTEM



Illustrative image of the Bitcoin ecosystem when applying the constructal law

Think of a Bitcoin business or project as a branch and product market fit as sunlight. To continue growing, the branch must continuously find sunlight. Importantly, branches that find sunlight grow the trunk, and a trunk that finds water grows the branches, which benefits not just one branch, but all the other branches, and all potential future branches.

Some branches may grow but die once others above them grow much faster and cut off their access to sunlight. Others might grow rapidly but unsustainably and fall off during a storm. Forms of adoption with a large flow today may branch off into a completely different direction tomorrow, but they would have never gotten there without the initial flow. Most importantly, without the branches the trunk will not grow.

From an investment perspective, this informs our belief that there is ample opportunity to invest in promising “branches” of the Bitcoin ecosystem without missing out on one of the fastest-growing “trunks” in financial history. Branches grow faster than trunks, and without them, trunks wither and die.

The Path to a Global Monetary Standard

We have a strong conviction that bitcoin will become a global monetary standard, and we believe that there is an evolutionary process required to get it there. Bitcoin began as code that was built atop the accumulated capital produced by decades of pursuit towards an online system for "eCash".[8] Today bitcoin touts a $1 trillion market capitalization. This path was anything but straight; many branches grew and died along the way. In the broadest sense, we view the path toward a bitcoin standard in three broad phases.

Illustrative phases of monetary adoption

The above graphic illustrates a simplification of the process of convergence upon a fully functioning money. Today, bitcoin is rapidly growing as a store of value and the case for this is strong:

- Bitcoin is the only asset in the world with a provenly immutable supply that cannot increase beyond a fixed supply cap
- Bitcoin ownership exists on an immutable ledger redundantly recorded across one of the largest and most distributed networks in the world (other than the internet itself).
- The best-performing asset in measurable history since its inception both on a return and risk-adjusted returns basis[9]

[8] eCash was the original term to categorically describe internet native money based on David Chaum's blind signature cryptographic scheme.
[9] This can be viewed in many ways and casebitcoin.com describes much of the data: https://casebitcoin.com/

For these reasons and many others, bitcoin has achieved adoption by some of the largest financial institutions in the world[10] and it has become a primary campaign issue for many of the most powerful world leaders[11]. Social proof for bitcoin is now abundant.

However, bitcoin stakeholders have yet to demonstrate how bitcoin will become (and remain) the optimal medium of exchange and unit of account for the world. The achievement of these goals is paramount, and the path will be anything but straight.

To achieve the functions of medium of exchange and unit of account, at scale, a highly competitive financial system must be built around bitcoin. While this idea is farfetched today, a mere decade ago bitcoin itself was a micro-cap asset being speculatively exchanged within its primary market for drug trade.[12] Considering that bitcoin had the most successful ETF launch in history,[13] and is now over $1 trillion in market capitalization, the coming decade of growth and adoption will continue to achieve heights that are hard to imagine today.

[10] See e.g., Blackrock ETF product: https://www.blackrock.com/us/financial-professionals/investment-strategies/bitcoin-investing
[11] President Trump making Bitcoin a key campaign issue: https://www.forbes.com/sites/davidbirnbaum/2024/06/12/trumps-bitcoin-gambit-a-strategic-play-for-american-dominance/
[12] How Bitcoin grew through Silk Road adoption: https://bitcoinmagazine.com/culture/the-long-and-winding-story-of-silk-road-bitcoins-earliest-major-application
[13] The bitcoin ETF was the fastest ETF ever hit the $10 billion AUM threshold: https://www.etfstream.com/articles/blackrock-bitcoin-etf-hits-usd10bn-in-record-time

The Marginalist View of Bitcoin Adoption

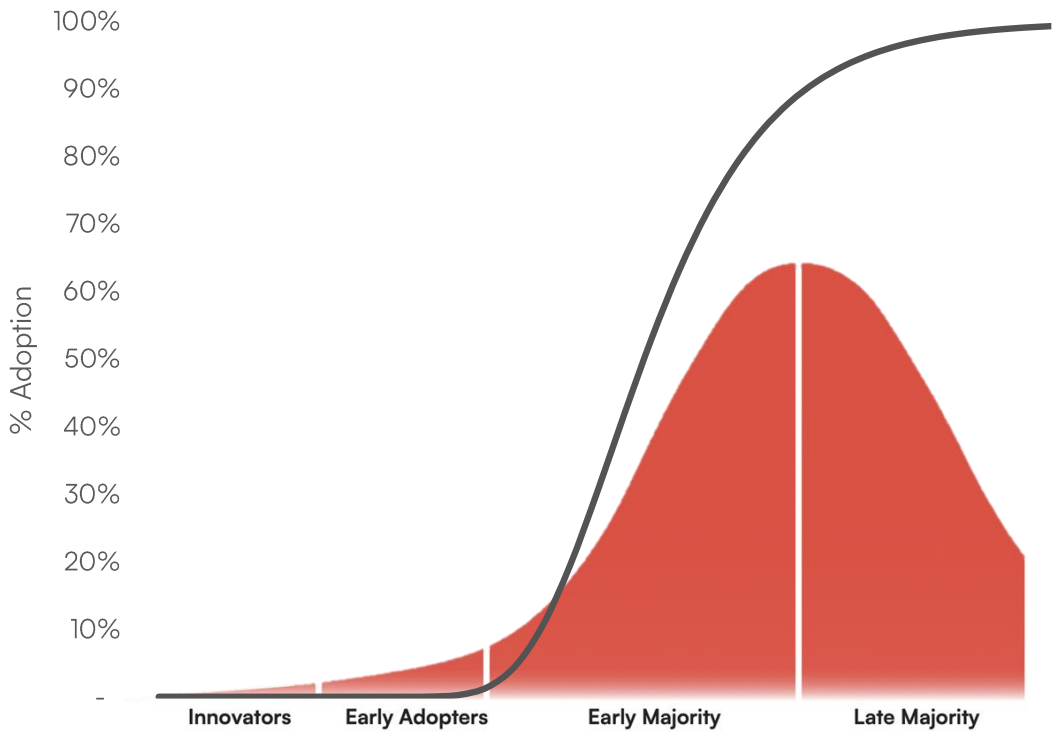
Imagining the types of investments that will be valuable in the Bitcoin ecosystem is not difficult. What *is* difficult is determining when the market is ripe for a *particular* investment to capture value, the lifespan of that particular investment, and the price to pay for it today. As the long-term vision of bitcoin unfolds, our success as capital allocators is predicated upon understanding the reality of demand for bitcoin in the near-to-medium-term to ensure our investments are best positioned for success in the long term.

We must be constantly asking ourselves: "Where is bitcoin demanded, *on the margin,* and what solutions are needed to enable that demand?"

The evolution of bitcoin to a global monetary standard requires a robust financial infrastructure that can be used for all forms of settlement, payment, lending, acquiring, public investing, corporate finance, insurance, and many other functions. Bitcoin's unique monetary features will also continue to lead to the development of new financial functions that haven't been conceived of yet.

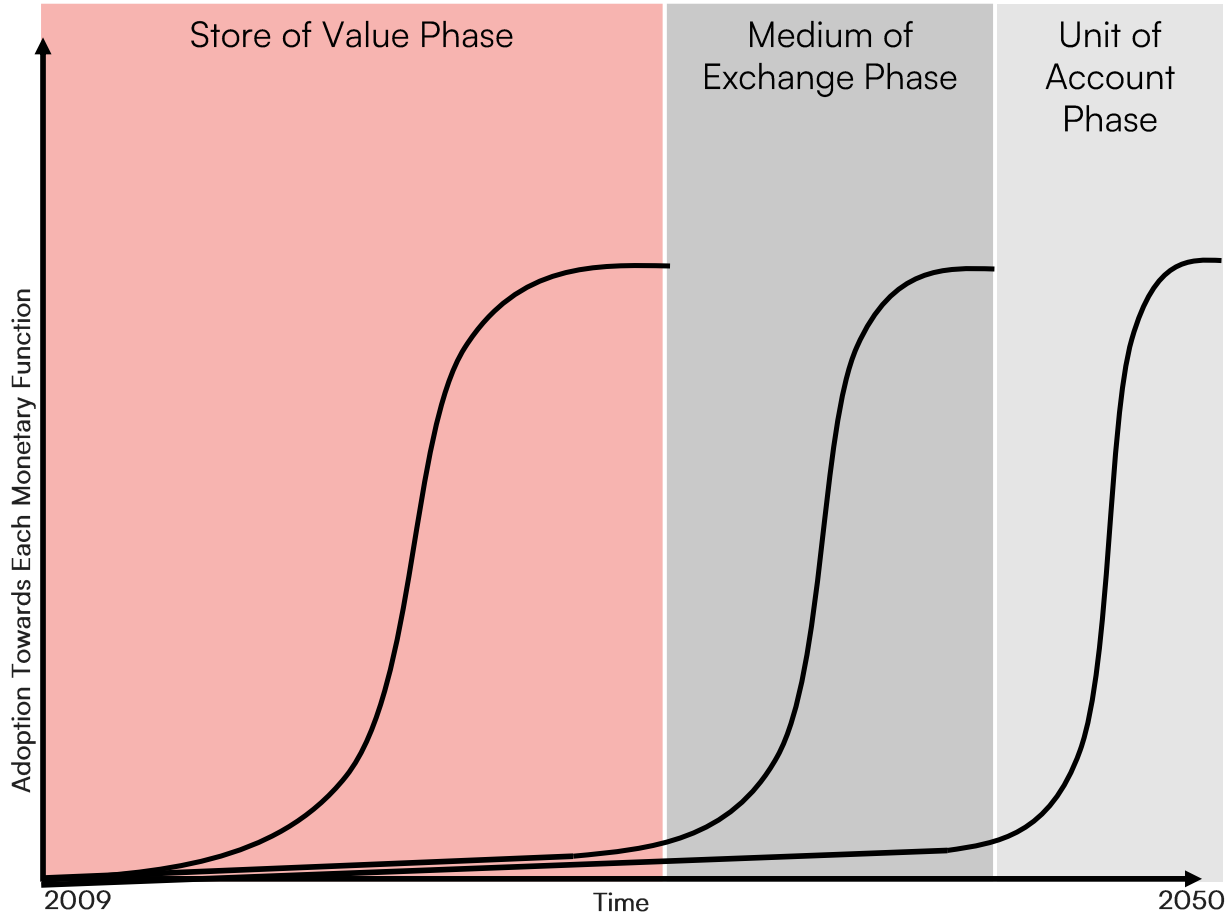
Building core technologies and services as infrastructure to expand bitcoin's viable use cases is how this new system will emerge over time. Organizations delivering valuable services and technologies today (e.g., supporting store of value adoption) are accumulating capital (growing branches) that can be leveraged towards the technologies and services of tomorrow. Organizations attempting to build for too long of a time horizon without accumulating capital today will be competitively disadvantaged.

As branches grow, we expect the commonly cited s-curve chart of adoption to apply to major adoption trends. Each branch is an s-curve and there will be many branches towards a neutral, global monetary system.

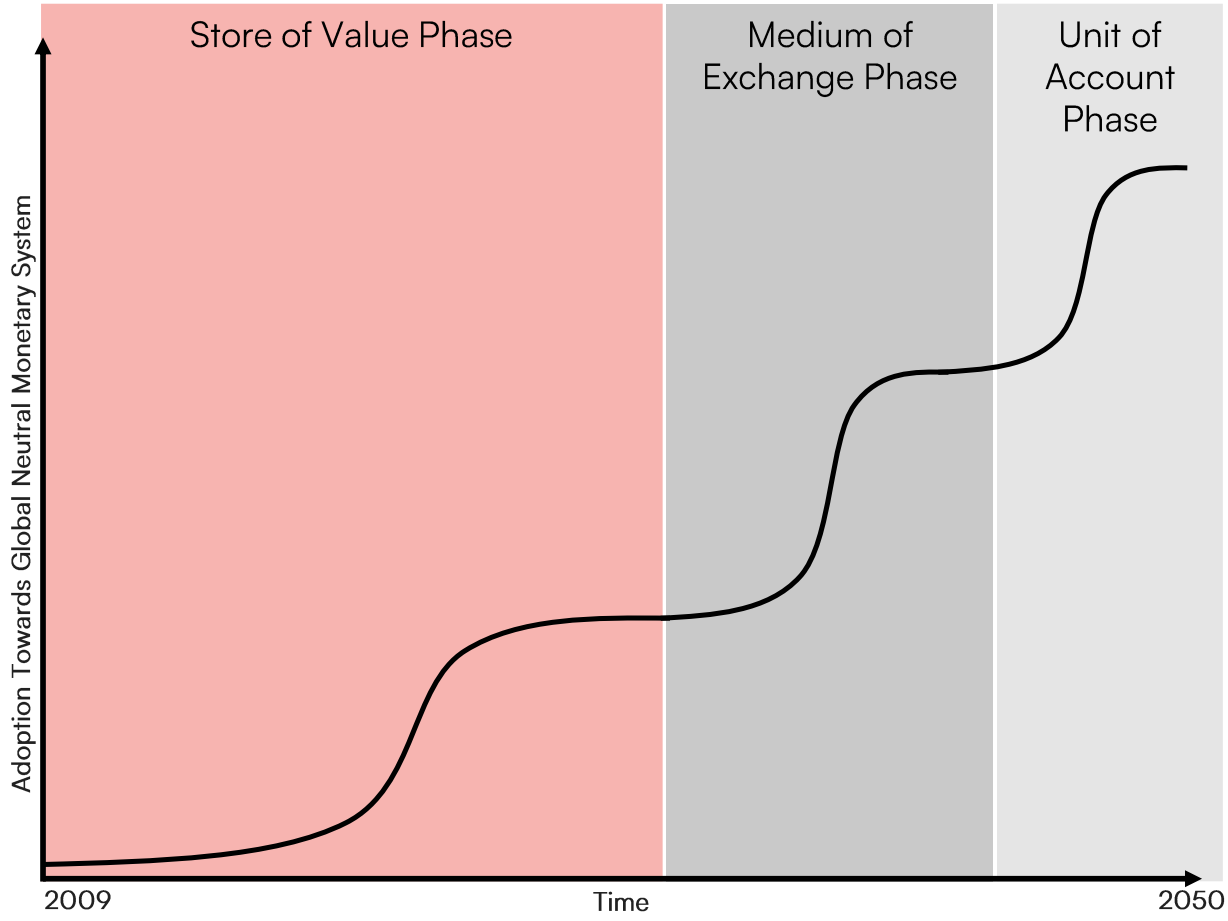


In the broadest sense, we consider adoption across the monetary functions stated earlier: store of value, medium of exchange, and unit of account. Adoption exists today across all three of these functions, but there is a large disparity in their degree. Store of value adoption is the furthest along and is reaching an inflection point in the early adopter phase. We believe investments predicated upon this form of adoption will vastly outperform in the near to medium term while the medium of exchange and unit of account functions are many years from reaching an inflection point. Thus, there will be much longer tails for the initial adoption of medium of exchange and unit of account because they are dependent upon bitcoin maturing in the store of value market.[14]

[14] Notably, medium of exchange demand is a nuanced concept. Many uses for the bitcoin network exist today for collateral settlement which can be viewed as medium of exchange functions but we consider store of value functions in the context of this writing.



Our view is that Bitcoin will follow s-curve adoption for each monetary function consisting of three major cycles. Because all forms of adoption exist to some degree, the timeline toward rapid inflection within each function will occur more rapidly than the last. For example, medium of exchange adoption exists today, but its likelihood of reaching an inflection increases exponentially as bitcoin matures in the store of value function. Similarly, maturity as a store of value and medium of exchange will rapidly accelerate unit of account adoption:



Considering this framework, businesses that are building infrastructure to support the store of value function (e.g., bitcoin's use case as collateral) are not only addressing a valuable market that could grow exponentially in the near term but also accumulating capital (brand, users, network, technical expertise, etc.) positioning them well for the next phase of adoption.

Applying the marginalist perspective, supply-side considerations are paramount towards all consecutive forms for monetary adoption, and thus, their marginal value today is significantly greater. This is the primary constraint within our framework of thinking and thus broader demand-side considerations are less relevant until this process reaches maturity. We can observe that the primary use cases during the store of value phase of adoption are:

- **Exchanges:** onramps to bitcoin.
- **3rd Party Custodial products and services**
- **Collaborative and self-custodial products and services**

- **General Financial Services:** a broad category but lending and insurance products are salient examples. Both capture the value of bitcoin as a superior collateral asset (the topic of a future writing).
- **Enabling technologies and services for the traditional financial sector:** ETFs, prime brokerage, institutional grade custody, data products, etc.
- **Supply side infrastructure:** mining infrastructure and hardware.

Ideally, these businesses and technologies are accumulating capital that induces the marginal adopter to get off the fence. Paper wallets were fine for the original adopters of bitcoin, and collaborative custody was better for the next group of marginal users. Each of these technologies/services is a form of capital that unlocks the savings/investment use case.

Considering this pattern, businesses focused purely on the medium of exchange or unit of account use cases will accumulate less capital in the near term and be disadvantaged in the long term. This doesn't mean adoption doesn't exist for them, just that the growth in demand for them will have a long tail for Bitcoin specifically. Their opportunity cost is a larger user base and network of resources to sell their future medium of exchange-based service later. It also doesn't mean they won't make good investments — this will be materially influenced by their valuation and stage.

As bitcoin continues to grow in adoption as a store of value there will be diminishing marginal returns towards supply and demand considerations related to this function of value. As the store-of-value market is consumed, marginal supply and demand for medium-of-exchange functions will begin to eclipse those of store-of-value functions. Of course, the immutability of bitcoin will always remain *sine qua non* but, at *some* point, this use case will become saturated and the relative balance towards demand considerations could shift.

So, at a certain point, it will be better to focus capital allocation on infrastructure for the medium of exchange and unit of account functions. Carl Menger, a Marginalist and father of the Austrian school, developed the initial theory of imputation, which describes how capital value is imputed by demand for use cases enabled by that same capital. For example, the consumer's marginal utility for a piece of iron is governed by the marginal utility of the final product made from the iron. We can reasonably expect that imputation value from bitcoin's demand characteristics will take center stage as a medium of exchange adoption occurs, justified by the imputation of value from downstream use cases. The branches will grow the trunk and vice versa.

Decentralization Comes from Competition

The marginalist perspective must be considered with political risks to the supply side of Bitcoin in mind. Political power acquired over the current financial system ultimately undermined the soundness of the money it is based on. Modern central banks started as clearinghouses in some sort or another and universally moved to abandon even the pretense of "reserve" over a long enough period. Arguably, a precondition for this shift is in theory and has been in practice the greater commercial and transactional utility of bank fiduciary media than of specie.

Bitcoin is significantly more transactionally and commercially useful in self-custodied contexts than gold or any other form of base money has ever been. Yet, trusted custodial systems have and will continue to provide greater transactional, programmable, and user experience-based efficiencies barring further zero-to-one innovations. As trusted solutions grow to provide demand-side efficiencies, the decentralization of the underlying Bitcoin network and its surrounding ecosystem must be maintained or risk undermining the entire value proposition of Bitcoin. Decentralization is a deterrent against political influence.

When Bitcoin began, it was completely centralized. While there are many drivers of its decentralization over time, one particular economic variable sets it apart: **a relatively low marginal cost of participation for network stakeholders**. This is a key variable when assessing novel protocols and architecture upon which services and applications are built.

Lowering the cost of participation in any network increases inter-participatory competition — benefiting the whole network instead of a particular group. Of the various stakeholder groups within Bitcoin, it is the miners who have the highest participation costs, and it is no mystery why they're subject to the highest centralization risks as well.[15]

As protocols integrated with Bitcoin continue to expand their functionality, their ability to lower participation costs relative to substitute solutions will be paramount. While we cannot know exactly how the future architecture will unfold — we *can* distill a few variables that will lead to low participation costs and competitive systems:

- **Open systems will outcompete closed systems:** in the 90s many believed closed networks would be used to access the internet. AOL and corporate intranets ultimately lost the battle against open systems, and the investible applications built

[15] A single custodian controls close to half of total hashrate across various mining pools: https://blog.bitmex.com/pow-centralisation-hysteria-what-size-war-chest-is-required/

atop this open architecture captured the rewards. Open networks provide collaboration and growth that rapidly outpaces many forms of centralized development.[16] Such an environment enables faster development, iteration, adaptation, and modularity but does have risks of fragmentation, poor governance, and lack of standardization.

- **Replacing traditional solutions with software:** software is capital that can automate labor. The current financial system is littered with inefficient processes and much of it can be automated. Building such systems natively in Bitcoin is a necessary step for this development as any alternative will require integration with the antiquated architecture of the traditional system — bottlenecking many achieved efficiencies. However, bitcoin native solutions must still have access to flow (for reasons stated earlier), and achieving both is a challenging process of optimization.
- **Cryptography mitigates the tradeoffs of open systems:** using open networks automated by software has the downside of privacy reduction. Privacy is a necessity in the online world. Applying cryptography to these systems will not only mitigate risks inherent to open and transparent systems but also create novel functionality we do not yet fully comprehend.
- **Incentive alignment:** a primary challenge of building trustless architecture is that marginal participation costs increase (all else equal). While innovation can, does, and will continue to occur amongst trustless solutions to lower participation costs, trusted solutions will always have a competitive cost structure and user experience advantage (barring a zero-to-one innovation). Trusted solutions that drastically lower participation costs and function systemically with aligned incentives are akin to "cutting the Gordian knot" of trustless solutions.

[16] As of 2023 GitHub reports over 100 million developers using the platform for open source projects. 2018 was a major inflection point in this growth: https://github.blog/2023-01-25-100-million-developers-and-counting/

Alexander Cutting the Gordian Knot, Fedele Fischetti (1734-1789)

Novel protocols such as the Lightning Network, Chaumian eCash protocols, ZK rollups, NOSTR, and others are pursuing goals aligned with these variables and we expect more to come. Developers are building on this architecture in a way that is effectively reconstructing systems of finance and the Internet itself.

At the same time, centralized companies are accumulating significant capital today. Through such technologies and more to come, a Bitcoin-native financial system can eventually emerge. Use cases and adoption will vary. The balance between trusted and trustless solutions will swing throughout adoption. As optimists, we see the potential for a cryptographically enabled trustless system but today we're focused on a variety of use cases and architectures (both centralized and decentralized) that are branching toward this long-term vision.

That may sound like hyperbole, or abstract nonsense. Let's get concrete. — David Foster Wallace

Epoch: Our Perspective

What is Bitcoin Venture Capital?

Bitcoin venture capital (i.e., Bitcoin VC) can be described as an investment strategy that acknowledges the ascendancy of Bitcoin as an emerging monetary standard and pursues profitable investments in the ecosystem of companies, technologies, and applications that will contribute to, and benefit from, this revolution in the global financial system.

A Bitcoin VC strategy is focused primarily on equity investments in companies that are participating in this ecosystem though, from time to time, may also include direct investments in bitcoin (or other non-equity instruments) when conditions are right.

Broadly speaking, there are several categories of companies that might fall under the umbrella of Bitcoin VC. In no particular order, they are:

- Bitcoin Infrastructure: companies developing layered protocols, side chains, or other "deep tech" solutions that enhance the functionality of the Bitcoin protocol.
- Bitcoin Financial Services: companies developing financial services products that cater to the community of people who have already adopted bitcoin ("bitcoin natives"). These might include lending, borrowing, investment products, novel custody, or solutions that enhance the utility of bitcoin for the people who already hold it.
- Bitcoin-Enhanced Applications: companies that integrate with bitcoin to build products with novel or improved functionality that is enabled by bitcoin's technological advantages. In many cases, end-users will not be aware that Bitcoin is involved in the product they are engaging with. These companies will span several verticals including fintech, AI, social media, data storage, energy, and many more.
- Bitcoin Hardware: companies developing innovative hardware to improve self-custody and key management, mining, and node operation, that contribute to the growth of the bitcoin network. Mining companies may also fall under this category.

- **Bitcoin Bridges:** companies delivering solutions that help connect the traditional financial system to bitcoin. These may include institutional-grade custodial and settlement solutions, accounting and data tools, investment platforms, exchanges, etc.
- **Bitcoin Harvesters:** companies that acknowledge the long-term trajectory of bitcoin and seek to use their balance sheets and operating leverage to accumulate capital in bitcoin as a means to drive future growth and investments.

Our particular approach to Bitcoin VC will draw heavily on Bitcoin Marginalism by continuously seeking to understand where additional demand for Bitcoin is coming from "on the margin" and investing in high-caliber teams that are building cutting-edge solutions to meet that demand.

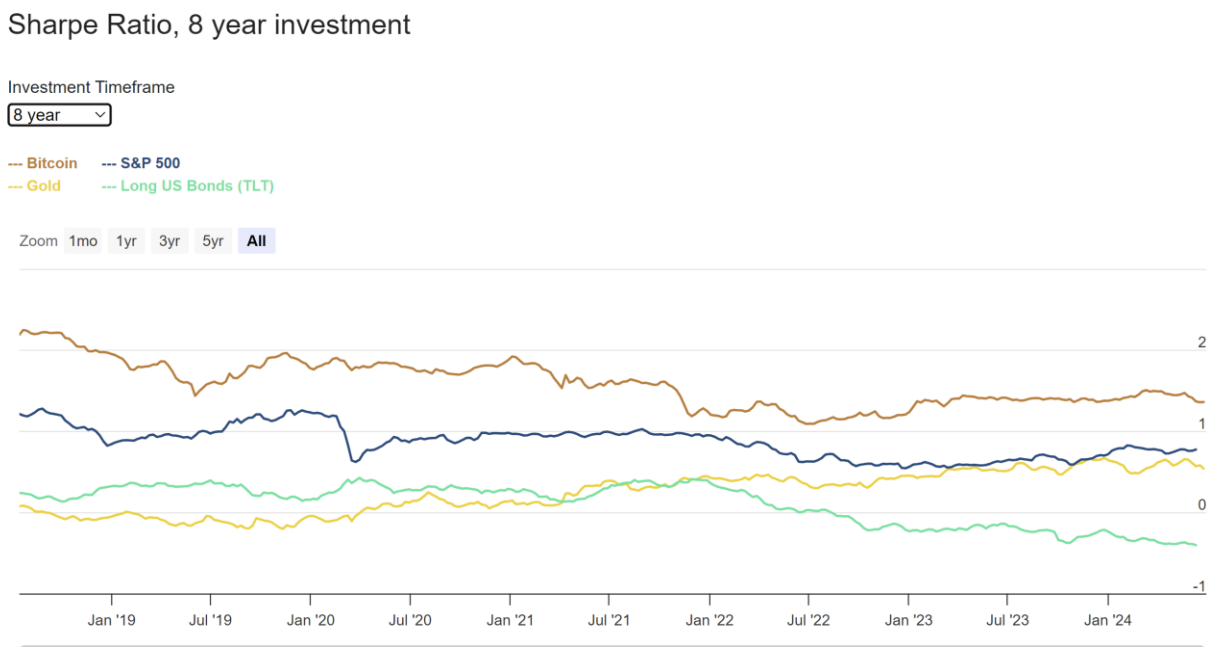
Why is Bitcoin venture capital valuable?

Bitcoin cannot create a global neutral monetary system on its own, and it must outcompete central bank fiat currencies to do so. Bitcoin integration with layered and adjacent protocols will enable optimization amongst various architecture tradeoffs. To exist as a system that serves everyone, infrastructure for financial services and a wide variety of use cases must be built around it. Capital allocation toward Bitcoin businesses, infrastructure, and technologies is a fundamental necessity for this vision.

Whether you view bitcoin as digital gold or the base layer of a neutral financial system, we're investing in picks and shovels today as well as the high-tech infrastructure of tomorrow. Bitcoin is reaching an inflection point as investors worldwide no longer require social proof to consider the best-performing risk-adjusted asset allocation that exists today based on historical price performance. We intend to capture significant value from businesses that grow from Bitcoin being used as collateral today.

Why not just invest in bitcoin?

We never recommend an investment in our fund without first investing in bitcoin itself and ideally in a self-custodial manner. Self-custodied bitcoin is financial system insurance, and a risk-adjusted bitcoin allocation should exist in all portfolios. Sharpe ratios demonstrate that it is irresponsible for asset allocators to ignore the best risk-adjusted public investment available today:



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With this understanding, there are several reasons to invest private capital in bitcoin infrastructure:

1. **Bitcoin infrastructure benefits Bitcoin:** all bitcoin owners benefit from infrastructure investment because it increases the addressable market of bitcoin and thus, potential returns (as branches grow the trunk). Considering a portfolio allocation to bitcoin infrastructure and businesses driving adoption is an investment that could have second-order effects on the existing portfolio over the long term. As bitcoin captures the store of value market and experiences diminishing marginal returns this consideration will only be more relevant.
2. **Exposure to distinct risk and growth factors:** businesses that capture economic value from traditional factors such as user growth, transaction volumes, or leverage (in addition to Bitcoin's ongoing price appreciation) can outperform or underperform bitcoin during particular periods. For example, a fee-based shared custodial service with a growing user base could continue to generate similar revenue while the price of bitcoin declines substantially. Other examples include exchange, insurance, and lending businesses. It is even possible to garner leveraged exposure to bitcoin by investing in businesses that benefit not only from bitcoin price appreciation but also from user growth or settlement volumes. A simple example would be the revenue generation occurring through ETF products while the price of bitcoin remains flat.

3. Investment Time Horizons: throughout bitcoin adoption, there will be periods where revenue generation of a business can grow substantially while the price of bitcoin is relatively stable. Branches will grow faster than the trunk. Through the s-curves of adoption described earlier, there could be extended periods like this where infrastructure and ecosystem businesses are appreciating materially in value.
4. Valuations: regardless of the market size bitcoin ultimately achieves, price appreciation always and everywhere reaches a point of diminishing returns to scale. As bitcoin grows this fact will only become more evident. Investing in entrepreneurs in the ecosystem at the early stages will generate opportunities to participate in the economics of projects before they hit the point of diminishing returns. There have been and may continue to be investments made in bitcoin companies that started in the millions and grew into the billions. We cannot say whether or not a private capital portfolio today could outperform bitcoin, particularly on a risk-adjusted basis. Nothing compares to self-custodial bitcoin as a protection against uncertainty over the long run. Investing in bitcoin businesses and infrastructure is simply a different investment. However, for the reasons above, we're optimistic about its return profile and believe it is a necessity for the full potential of Bitcoin to be achieved.

Can Bitcoin venture capital include token investments?

Adherence to the Bitcoin Marginalist view developed earlier strongly implies that we always remain objective when considering potential sources of value for bitcoin. However, it is unlikely that our Bitcoin VC strategy would deploy allocation to token investments, at least today. Determining when and where a token investment might make sense in a Bitcoin VC portfolio requires a precise definition of tokens and the value they may (or may not) offer as an investment.

In their most basic form, tokens are simply a technological construct of public and private key pairs that define unique digital property and prove ownership/control via cryptographic signatures. How this technological construct is used to create or represent economic value is a separate question. Much has been written about the potential use cases for this technology, and there is no shortage of proposed taxonomies to categorize these potential sources of value. We feel that the following framework flows most naturally from economic and legal first principles:

Tokenized Commodities: In the analog world, commodities are physical goods that have economic value derived from the demand for consumption or use in the production of other economic goods with consumption value. The cryptographic signature scheme of

digital tokens can be used to create digital commodities that potentially have similar economic uses. These uses might include:

- *Protocol/Utility Tokens:* Many protocols in the broader cryptocurrency ecosystem are designed with a "native token" that is required to interact within the protocol. These tokens act as a sort of special-purpose currency that is used specifically to provision whatever service is provided by the protocol (block space, computing resources, etc.). In theory, the long-term value of these tokens is tied to demand for the services provided by the protocol. These tokens often have the added benefit of incentivizing user acquisition for a protocol since early users who acquire the tokens will benefit from the value they create on the protocol if they choose to develop products and services on top of that protocol that make use of the token.
- *Digital Art:* The ability of cryptographic signature schemes to create unique digital identifiers for digital property allows for the generation of digital signatures with provable ownership represented by digital tokens. These are commonly referred to as "Non-Fungible Tokens" or "NFTs," but that is a broader category of tokens that can apply to non-commodity type assets as well. Digital art has consumptive value like other digital commodities, though its value is obviously the most subjective.

Tokenized Contracts: The other main source of economic value in the analog world comes from contractual agreements between economic actors. In traditional markets, these contracts are recorded on paper or in centralized databases that require a complex set of intermediaries to facilitate trading and settlement. In theory, tokens can be used to represent most types of contractual arrangements in a way that allows for disintermediated custody and trading of these contracts in an open and transparent global network. The following are some examples of tokenized contracts:

- *Tokenized Equity:* Companies may increasingly choose to issue their stock as a digital token rather than relying on traditional methods for recording ownership in their capitalization table. This is, perhaps, the most logical use of tokenized contracts, but it is currently very rarely used due to regulatory constraints on the issuance and trading of traditional equity.
- *Governance Tokens:* While tokenized equity likely has governance features, the term "governance token" is generally used to refer to a more limited-purpose tokenized contract that does not include any kind of ownership rights in the assets of an underlying business or protocol. Instead, governance tokens only grant holders the right to vote on changes to the token's affiliated open-source project. This offers a unique and potentially valuable formalization of the typically informal (potentially disruptive and fragmentary) approach to managing the development

of open-source protocols. In practice, however, it is often seen that governance token structures trend toward centralization, undermining their original purpose.

- *Revenue Sharing Tokens:* Some open protocols require fees for operation. Revenue sharing tokens are a mechanism for distributing those fees to all token holders, who are presumably users or other stakeholders in the protocol ecosystem. In theory, any kind of revenue sharing arrangement could be represented with a digital token, but sharing of network fees represents the most obvious use-case since all revenue collection and distribution occur natively on-chain.
- *Loyalty Tokens:* Companies can leverage tokenization to issue loyalty points (like airline miles) that provide unique opportunities for customer engagement and retention when compared to traditional loyalty schemes. The open and transparent nature of digital tokens allows third parties to freely develop outside experiences for customers to engage with their loyalty tokens in a way that is excluded by current "walled garden" loyalty systems. However, the value of these systems in the first place appears largely predicated upon the existence of a walled garden. Would airline miles exist if companies couldn't control the supply and/or people could freely trade them?

This is not an exhaustive list by any means, but the above overview provides a good framework for thinking about the potential sources of value that might arise in the token ecosystem. While there are certainly many interesting sources of economic value above, we don't think tokens warrant significant allocation in a Bitcoin VC portfolio for the following reasons:

1. *Valuations based on a Monetary Premium*: In most cases, we feel that tokens are overvalued at the venture stage. This is due to one core misconception: *over-attribution of monetary value*. Often, token functionality is just substituting monetary functionality. Many tokens exist today attempting to capture monetary functionality that would otherwise be captured by bitcoin itself. Fundamental to our thesis is that in the long run, the monetary dominance of bitcoin will continue to expand and competing against this expansion is unwise. One of the main benefits of tokens is that they turn assets that were traditionally locked in relatively illiquid walled gardens into assets that can flow freely in an interconnected global system. This unlocks an element of "moneyness" to these assets by potentially allowing them to be used more like media of exchange. We have seen that tokens with valuations implying some degree of "moneyness" will fail to remain competitive with bitcoin, and this valuation premium will diminish. It is unlikely that a large number of tokens achieve sufficient scale and utility to warrant the kind of

stable demand that would be required to justify the valuations commonly encountered in the market.

2. *Misalignment of Value Accretion*: There exists a misalignment between the concept of utility token and governance token sources of value and the reality of how that value accrues. It is challenging to directly ascribe price changes to particular sources of value, but it can be said that these tokens don't generally align with their purported narratives. We remain open minded to the idea that such value alignment could emerge incremental to a monetary premium but believe competition for a monetary premium is the primary source of their value today.

3. *Short-Term Incentivization*: Token investments are often immediately liquid to some degree, or they are liquid on a much shorter time horizon than a typical VC private capital investment. This is both good and bad. Good in the sense that we believe free markets are the best environment for removing capital inefficiency yet bad in the sense that information asymmetries between producers and consumers can be leveraged to extract zero-sum value unsustainably. The ability for projects to issue a token often incentivizes marketing and manipulation above building sustainable economic value. This problem has been exacerbated by capital allocators that pressure their investments to manipulate their token price in hopes of providing rapid distributions to their limited partners. At Epoch, we're long-term investors considering sustainable economics, which is often in conflict with such a model. We're confident that in the long run, these short-term economic games will not persist, and we intend to build a brand and reputation to rise above it when that time comes.

4. *Regulatory Uncertainty*: The regulatory environment for tokens in the US is still incredibly confused (to put it mildly). The passage of MiCA in the EU is an encouraging step in the direction of international clarity, but there are still many details that have yet to be worked out. The key, unresolved, regulatory question from a value perspective (though there are many) is: Should tokens be regulated like commodities or like securities? This question is most relevant in the US, where financial market regulation is bifurcated between the SEC (securities) and the CFTC (commodities). But there are similar versions of the same question that have yet to be definitively resolved in many other jurisdictions (including the EU). The resolution of this question will have a material impact on the long-term value of tokens because it significantly influences the marketability and liquidity of these instruments. Generally speaking, securities regulations require a high degree of intermediation, burdensome ongoing reporting, and limitations on the population

of users that would be able to interact with a token. If applied to tokenized commodities, these regulations would effectively suffocate a significant portion of their value proposition (i.e., their open, permissionless, and highly liquid features). The SEC's current position is that the vast majority of tokens should fall under this regulatory regime. While recent court rulings (and promising legislative efforts) suggest that the SEC's interpretation of the law on this issue is incorrect (or, at the very least, has an increasingly limited lifespan) the end point of token regulation is far from clear at this point. Although we are hopeful that the proper application of existing law and of passage new legislative frameworks for tokens will allow for these assets to achieve their full potential — there are enough interesting opportunities to pursue via traditional mechanisms to warrant an avoidance of tokens with outsized regulatory uncertainty.

Despite these reservations, there may be instances where token investments could make sense in a Bitcoin VC portfolio. In making that determination, we feel it is important to consider the following questions:

1. *Is this token's value predicated upon it being used as money?*
2. *If not, then can we reasonably expect it will accrue value from its described function?*
3. *If so, then will this value be sustainable in the long run?*
4. *If so, then does the offering valuation make sense given the inherent risks of the investment vehicle?*

We don't anticipate token investments to pass all four of these tests in the near term. We do understand however that in the long term, an ecosystem of many tokens replicating equity, debt, and novel functionality will eventually emerge. We're excited about this future as it will reduce friction and enable more open and competitive markets, despite all the false marketing, seigniorage extraction, and fraud that is happening in the meantime.

Does Bitcoin venture capital include investments in companies that simply buy and hold bitcoin?

Yes, but we don't consider this a fundamental investment strategy, but rather an ancillary function to consider for portfolio companies. Solvency risk is the primary consideration in managing a bitcoin treasury because of the inherent purchasing power risk of bitcoin. Effective implementation of a bitcoin reserve that does not place the company into unnecessary solvency issues can be a strategic differentiator for companies.

Further, depending on the nature of the company, non-bitcoin-focused companies that can leverage bitcoin adoption as a sales and marketing strategy can generate material economic value.[17] While such a strategy is not core to our mandate, we remain open to considering potential opportunities for private investments uniquely positioned to capture value from bitcoin adoption.

[17] Tahini's restaurant franchise is a great example. By converting their treasury into bitcoin and leveraging it as a marketing strategy they built a youtube channel with millions of subscribers and grew their franchise footprint by multiples: https://cointelegraph.com/news/shawarma-connoisseurs-serve-up-perfect-recipe-for-bitcoin-adoption

Conclusion

We firmly believe that the success of bitcoin as a neutral and global monetary system will be the most important innovation in our lifetimes. The financial system of today is littered with conflicts of interest that could be solved with technology. Systems using novel technologies with aligned incentives will emerge to build the first neutral monetary system.

Bitcoin adoption will take significant time, and we plan to position capital accordingly. We identify three sequentially dependent cycles of Bitcoin adoption across the three monetary functions. These cycles will play out in myriad ways as new branches explode with vibrant growth and feed strength into the trunk. We believe the first cycle is just beginning.

We're Bitcoin Marginalists. We consider both the supply side and the demand side to develop a realistic and differentiated view of value and growth over time. Such a perspective is only achieved by participating in the marginal discussion of the community and refusing to remain on the sidelines. Marginalism asserts that participation in the Bitcoin mindshare *on the margin* is better than passively ignoring new developments. Bitcoin is not yet a globally neutral monetary system, and an unfathomable amount of capital and labor is required to get it there.

We do not maintain passive indifference to controversial topics within the Bitcoin ecosystem while believing the market will solve everything. We are the marginal producers and we are the marginal consumers—we are the market. What we do, or don't do, matters.

An Epoch is defined as a remarkable period in time, and that time is *now*.

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