

Fidelity  DIGITAL ASSETSSM

Bitcoin as an Aspirational Store of Value Revisited

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Background

In 2020, we discussed bitcoin's properties and evaluated the case for the first and largest digital asset to be considered a store of value. More than three years later, Bitcoin's resilience and growth have continued to demonstrate bitcoin's value as a unique asset class and a potential fit in an investor's portfolio.

In this updated overview, we aim to reiterate bitcoin's competitive advantages while outlining Bitcoin's progress and potential catalysts that could help to shift investors' perception of bitcoin as an aspirational store of value.

Introduction

Bitcoin is many things to many people—why people choose to hold bitcoin depends on their circumstances, their views of what bitcoin is today, and their ideas about what it could become. We refer to the Bitcoin network, protocol, and system as a whole as "Bitcoin," whereas we refer to the system's unit of account, BTC, as "bitcoin." The differing views of Bitcoin's purpose(s) and why people choose to hold bitcoin have been the subject of misunderstanding, confusion, and debate. Historically, such debates have revolved around whether bitcoin, the Bitcoin network's native asset, is a store of value (an asset that maintains or increases its value over time), a medium of exchange (an instrument used to facilitate the sale, purchase, or trade of goods or services), an alternative asset (an asset that does not fit into the conventional equity/fixed income/cash categories), all of the above, or none of the above. Additionally, it is still unclear whether the Bitcoin network's underlying blockchain technology is best used to facilitate wholesale clearing and settlement, consumer payments, or the anchoring and timestamping of arbitrary data.

The truth is, as the ecosystem matures, Bitcoin may simultaneously serve many functions—either foundationally or through incremental layers. One interesting feature of Bitcoin is that its utility is not predicated on serving a single purpose.

In this piece, we will focus on the view that bitcoin is an aspirational store of value. We explore the programmed characteristics that might position bitcoin to fulfill this role in the future, consider whether it is being used in this way today, and discuss factors that may drive greater demand for such utility. This paper is for educational purposes only and is not intended to constitute a recommendation or investment advice, and any investment should be evaluated within the context of an investor's overall portfolio and risk profile to determine if it is suitable for their financial goals. Here, we aim to provide insight into some of the important concepts and debates that readers may want to consider as they explore bitcoin, the first and largest digital asset in a rapidly evolving ecosystem and asset class.



Key Highlights

- Many investors consider bitcoin to be an aspirational store of value because it possesses the properties of a store of value, even though it has yet to be widely accepted as such.
- A potential silver lining of bitcoin's volatility, at least in these early days, is that it is a catalyst that has attracted attention, development, and innovation.
- Scarcity is a key property of a good store of value because it is essential for helping to protect against the long-term depreciation of real value. One of bitcoin's most novel innovations is its programmed digital scarcity.
- Bitcoin's scarcity was coded into the protocol when it was created. The independence of Bitcoin's monetary policy is enforced by a decentralized network of computers supporting the network and proof-of-work.
- The U.S.' rising fiscal deficit and rising interest rates have led to annualized interest payments of approximately \$1 trillion, potentially adding fuel to awareness and adoption of bitcoin in the U.S. Longer-term drivers include catalysts such as the great wealth transfer to a Millennial demographic that has expressed a much more favorable opinion on digital assets than have older generations.

An Aspirational Store of Value

Bitcoin has the potential to be used as a store of value with the ability to create value as it matures. This is driven by the idea that bitcoin can offer protection against monetary debasement along with potential asymmetric upside. If bitcoin is widely adopted by retail and institutional investors as a store of value, the upside could be material relative to the initial up-front investment. Today, bitcoin is relatively new and has narrower demand than a traditional global store of wealth. Stakeholders' perception of its value and potential is also still evolving. There is no guarantee that bitcoin will fully mature into a long-term store of value. Investments in bitcoin could result in a loss.



However, investors' rationale for establishing exposure to bitcoin now is that it could become a much larger market if it becomes more widely used as a store of value in the future. Exposure to bitcoin markets in traditional areas of finance is expanding, including futures, options, and even on custody platforms like Fidelity, which enables customers to buy, sell, and hold bitcoin directly through an account with Fidelity Digital Assets.

One of the most common arguments against bitcoin as a store of value today is its volatility. Investing in bitcoin is speculative and may involve a high degree of risk. Demand can change rapidly and is affected by a variety of factors, including regulation and general economic trends. It is true that bitcoin has historically been volatile when priced in dollars or other fiat currencies and bitcoin market movements are difficult to predict.

Bitcoin holders counter with the idea that the trajectory of a new asset from negligible awareness and adoption to a global store of value is unlikely to be linear. A different perspective is that many participants initially learn about bitcoin because of its volatility. As new participants conduct further study, perceptions could shift to focus less on short-term performance and more on the long-term value proposition. Moreover, according to data provider Glassnode, as of December 2023, bitcoin's annual realized volatility has lessened over the long term, reaching another new all-time low in November 2023 and building on a long-term trend of lower volatility.

As seen in the past, higher volatility often attracts investment, development, and innovation. A digital asset cycle may start with an increase in the price of bitcoin and other digital assets which can spark new attention through commentary in news and social media. This may be followed by a potential inflow of talent culminating in new products, projects, and infrastructure and a maturation of the industry relative to the previous cycle.

Bitcoin's volatility may remain elevated relative to traditional assets, like stocks or bonds, because volatility is a side effect of bitcoin's inelastic supply and borderless, relatively intervention-free market. With bitcoin, supply is programmed not to change, regardless of price movement; therefore, any change in short- or long-term demand will have to be reflected by changes in price. This means that price will be more volatile. In other words, one cannot remove bitcoin's volatility without removing bitcoin's fundamental value proposition—its fixed supply.

Over time, we believe bitcoin's volatility may continue to decline relative to current levels if narratives converge, demand rises, institutional activity expands, and sophisticated investment and trading products emerge. In addition, while regulatory changes may lead to more intervention, they could also contribute to decreased volatility.

Bitcoin's potential as a store of value can be framed by comparing it to other investable assets that are used to store value. To achieve considerable status will depend on whether investors, after becoming more knowledgeable about bitcoin's inherent properties, decide that the



potential benefits of storing at least some value in bitcoin are superior to the opportunity costs of storing value in a different asset. Below, we discuss the leading factors that we believe most investors consider when investing in bitcoin.

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Bitcoin as a Potential Store of Value

Bitcoin's Digital Scarcity

A robust store of value asset retains purchasing power over long periods of time. An emerging store of value asset grows purchasing power until it matures and the price stabilizes. The key characteristics typically cited in reference to good stores of value are scarcity, portability, durability, and divisibility. The most important of these attributes is arguably scarcity, which is essential for protecting against the long-term depreciation of real value. Scarcity means there is a limited quantity, more cannot be easily created, and it is difficult to counterfeit.

One of bitcoin's most novel innovations is its "unforgeable" digital scarcity (the fact that even though it is digital, each bitcoin in existence was created through the same rules and expenditure of computing power, and every bitcoin that is created in the future will have to follow these rules. In other words, no one can "fake" a bitcoin's existence or create more out of thin air). Investors believe this property is foundational for understanding and appreciating bitcoin. Before bitcoin, multiple innovators made important contributions in the quest to achieve digital scarcity but were unsuccessful in enforcing it. Computer data has always been fleeting and shareable, at least as far back as Larry Tesler's invention of copy, cut, and paste functionality in the early 1970s. In more modern times, copying and sharing files has become a ubiquitous and an integral feature of the Internet.

Despite efforts at limiting the sharing of certain types of files (e.g., the development of Digital Rights Management [DRM] technology to track files and make them difficult to copy), creating unforgeable digital scarcity had remained elusive until 2009 when Bitcoin first went live. In inventing Bitcoin, Satoshi Nakamoto borrowed concepts from prior efforts but also addressed previously unsolved problems. Most notable was Bitcoin's solution to the double spending problem (i.e., the problem of using the same currency to make more than one payment), which used a clever combination of computing, cryptography, game theory, and other incentives to establish a decentralized protocol that enforces a fixed issuance schedule.

The bitcoin supply is inelastic and not susceptible to supply shocks. Bitcoin's supply essentially does not change to changes in production capacity (i.e., greater hash power, or computing power securing the Bitcoin network) or in response to heightened demand and higher prices. Even gold,

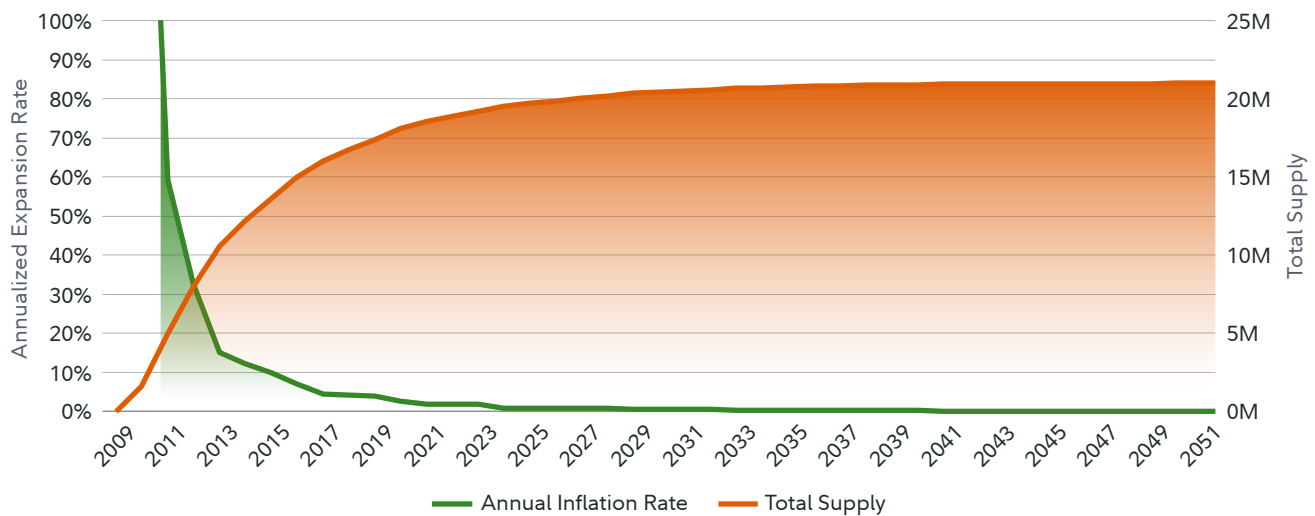


which has been used as a store of value for millennia, is not immune to supply shocks. While there is a limit to increasing gold production in response to higher demand, in the longer-term, gold supply is still somewhat elastic (i.e., supply can change in response to changes in price).

Rising prices both motivate existing bitcoin mining operations to become more efficient and attract new mining operations, but the increased hash power supporting the network is programmed not to affect supply. Bitcoin accomplishes this through its difficulty adjustment. The hash rate supporting bitcoin rises as miners join the network or as existing miners upgrade their mining hardware to become more efficient. Mining difficulty then rises (or falls) to ensure that block production occurs every 10 minutes, on average. The adjustment mathematically regulates the supply of bitcoin. In 2023 there were new all-time highs in hash rate, but the supply schedule remained unaffected.

Newly created bitcoin is released approximately every 10 minutes via block rewards paid to miners. This block reward halves every 210,000 blocks until the amount of bitcoin in circulation reaches 21 million. This fixed total supply is hard coded into the protocol and cannot be changed without overwhelming support from node operators, who have historically been loath to provide it because there is no incentive for them to dilute the value of the existing supply of tokens. The third halving occurred in May 2020, resulting in a 50% decline in the block reward from 12.5 to 6.25 bitcoin and a reduction in the rate of annual issuance from over 3.5% to under 2%. This was an interesting juxtaposition at a time when central banks globally started to unleash unprecedented and seemingly unlimited levels of monetary stimulus, which is expanded upon below.

Bitcoin Annualized Issuance Rate & Total Supply



Source: Coin Metrics, November 2023.

The stock-to-flow ratio (stock divided by flow) is a metric commonly used to quantify the scarcity, or hardness, of commodities. Stock is the total created supply of a commodity less the portion of supply that has been consumed or destroyed. Flow is the annual incremental production of new

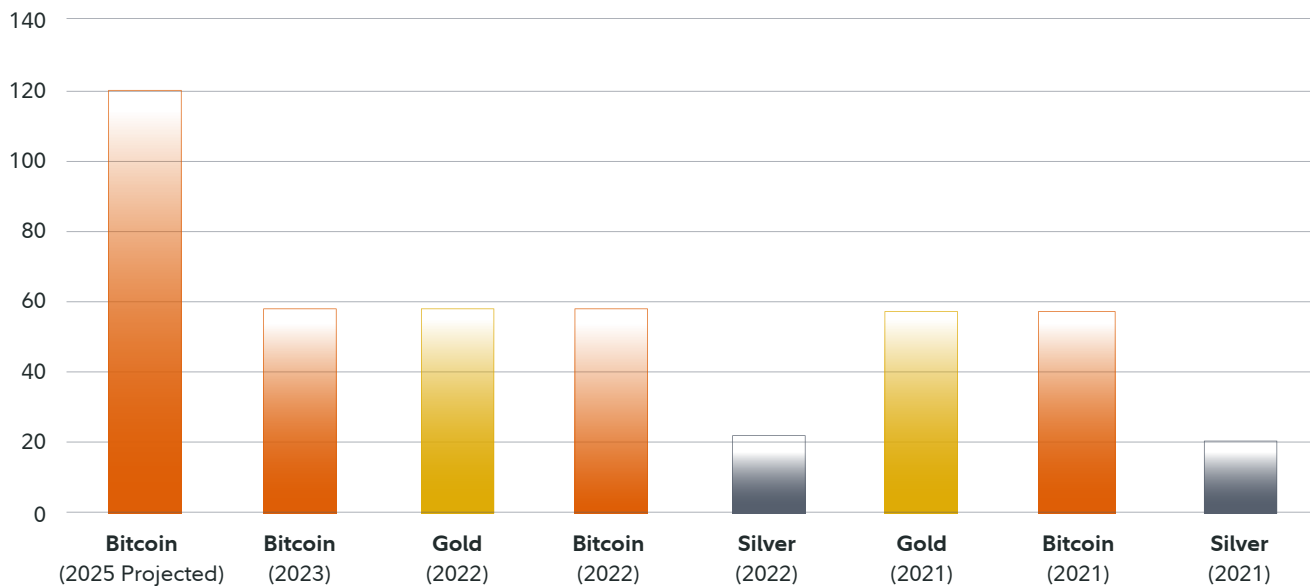


units. Together, the stock-to-flow ratio measures how many years of production are required to achieve the existing level of stock.

Commodities with a stock or supply that are difficult to double due to a low rate of production relative to existing supply have historically served as superior stores of value. Such commodities are largely used for investment purposes and occasionally industrial uses. On the other hand, consumable commodities that are susceptible to large increases in supply are less effective in storing value.

The stock-to-flow model is a now widely used model that is often used in the commodities market and has since been adapted to compare bitcoin to other commodities. The use of the metric has since expanded and even given rise to models based on the ratio. Gold, the most resilient store of value through the ages, has a nearly identical stock-to-flow ratio to bitcoin, followed in a distant third by silver. The fourth Bitcoin halving, estimated to occur in April 2024, is projected to change Bitcoin’s stock-to-flow ratio to surpass gold’s for the first time.

Stock-to-Flow Ratio



Source: Glassnode, November 2023; World Gold Council, October 2023; The Silver Institute, World Silver Survey 2023; U.S. Geological Survey (USGS), January 2023³

Proponents of the stock-to-flow model suggest that there is a statistically significant relationship between bitcoin’s market value and its scarcity as measured by the ratio.ⁱⁱ Critics of the model contend that it does not capture demand, a more important driver of market value. While the stock-to-flow model has been relatively accurate in the past in demonstrating bitcoin’s rise in market value and has been correlated to the rise in its stock-to-flow ratio, there is no guarantee that this correlation will continue in the future. It is also a model that can only show correlation and not necessarily causation, and so there may not be a causal link between market values and stock-to-flow ratios for any commodity.



Decentralized Checks and Balances

Bitcoin's monetary policy was established when it was created. Its credibility is enforced in part by decentralization and proof-of-work mining. Bitcoin has a leaderless network of decentralized full nodes (computers running Bitcoin software) in which every node stores the ledger of transactions and performs transaction verification independently, checking that rules are being followed. Because of this redundancy, there is no central point of failure. Full nodes that verify transactions are distinct from miners who expend energy to process transactions and mint new bitcoin. Unlike mining, transaction verification does not require significant resources in the form of hardware or electricity. Thus, any computer can join the distributed network to store and verify bitcoin transactions. Today, tens of thousands of nodes perform this function.

The two main types of transactions include 1) Coinbase transactions that programmatically issue new bitcoin per the supply schedule and 2) peer-to-peer payment or settlement transactions between users of the network. A transaction that does not follow consensus rules (e.g., attempts to create new coins or attempts to double-spend previously spent bitcoin) will be rejected by the decentralized computer network.

In addition to preventing transactions that do not follow consensus rules, the level of decentralization in the Bitcoin network protects core properties, such as the 21 million fixed coin supply, by making it virtually impossible to change. No central party has sole discretion over Bitcoin's monetary policy. Rather, such a change would require significant coordination among Bitcoin users, miners, and others running full nodes. Most stakeholders believe bitcoin has value because of its digital scarcity, resulting in negligible support for such a change.

Proof-of-Work

Proof-of-work (PoW) is an important design element that enforces bitcoin's fixed supply by making transactions irreversible. PoW provides evidence that a significant amount of computational work has taken place, though verifying that work has taken place is quick and easy relative to the effort and time it took to conduct the work. To create a block of transactions, miners repeatedly perform hash operations to find a solution to a computationally intensive cryptographic problem in a guess-and-check process known as proof-of-work. The process is computationally intensive in that it requires the use of specialized hardware (with a high fixed up-front cost) and electricity (an ongoing operating cost). These real-world sunk costs and the block reward that miners are awarded for processing transactions serve as the incentives for miners to perform transaction processing honestly.

Additionally, PoW makes it prohibitively difficult and expensive for a malicious actor to rewrite or reverse transactions, making transactions immutable, in effect. The immutability of a block of transactions rises as the number of confirmations increases—in other words, as the number of subsequent blocks increases. A block buried under 100 subsequent blocks is more immutable than



a block buried under 10 blocks because undoing the block's transactions would require reversing 100 blocks worth of transactions versus just 10. As a refresher, miners group transactions together to create blocks. A transaction is akin to an entry in a database and a block is akin to a page of entries in the database. Each block refers to the previous block such that blocks are linked together to form a chain. Thus, it is impossible to rewrite a block that is buried under 100 subsequent blocks without rewriting each subsequent block.

To summarize, Bitcoin's monetary policy was established at the outset. Stakeholders have faith in the policy because the network is decentralized. No centralized party can make changes to Bitcoin's core properties and force those changes upon stakeholders. Bitcoin transactions are programmed to be immutable, making it computationally and economically impractical to attempt to undo transactions and rewrite the Bitcoin ledger.

For a more in-depth review, read [Understanding Proof-of-Work](#).

Demand Drivers

Many investors believe that the next wave of bitcoin awareness and adoption could be driven by external factors, such as unprecedented levels of intervention by central banks and governments, rising fiscal deficits, increasing fiat money supply, and persistent inflation, many of which were accelerated by the COVID-19 pandemic and economic shutdown.

Longer-term tailwinds that could fuel adoption include the use of bitcoin to preserve wealth amid inflation and the looming generational wealth transfer to Millennials, who tend to view bitcoin more favorably than other demographics.

Near- to Medium-Term Catalysts

Monetary and Fiscal Policy

To offset demand destruction resulting from the pandemic-induced global shutdown, governments and central banks responded with never-before-seen levels of monetary and fiscal stimulus to manage the impact of an economic downturn, stimulate the economy, and placate markets. In 2020, many stimulus measures were announced in a matter of eight months, including zero or near-zero interest rates, increasing money supply through unprecedented levels of quantitative easing, and the opening of a range of new central bank lending facilities. After the sharp sell-off in equity markets as well as bitcoin in March 2020 and the ensuing actions mentioned above, bitcoin went on to rally over 1,700% to a new all-time high.



These monetary and stimulus measures ultimately led to decades-high inflation levels and a steep rise in interest rates to help combat them. Central banks and governments around the world continue to pull the levers of monetary and fiscal policy, respectively. It remains to be seen if these most recent efforts to curb inflation will lead to any economic contraction or recession. While the steady increase in interest rates was initially accompanied by a decline in bitcoin's price, bitcoin rallied to over \$40,000 in December 2023 despite elevated interest rates and some signs of a broader economic slowdown.

Current Interest in Bitcoin's Store of Value Properties

Tudor Investment Corporation's decision to allocate to bitcoin in the Tudor BVI fund indicates some institutional interest in bitcoin's store of value properties. Paul Tudor Jones, Founder and Chief Investment Officer, and Lorenzo Giorgianni, Head of Global Research, articulated the rationale for investing in bitcoin in their May 2020 investor letter, "The Great Monetary Inflation."

The Tudor Investments team scored financial assets, fiat cash, gold, and bitcoin based on four characteristics that define store of value assets: purchasing power, trustworthiness, liquidity, and portability. As of May 2020, Bitcoin's score was 60% of the score of financial assets but 1/1200th of the market cap of financial assets, and it was 66% of the score of gold but 1/60th of the market cap. The team concluded, "Something appears to be wrong here, and my guess is that it's the price of bitcoin." The details of the methodology used to calculate these numbers were not disclosed and, thus, it is unclear whether it is bitcoin or another asset that is mispriced, or none at all.

While many have expressed the same reasoning, this was seen as a watershed moment because the thesis and investment were coming from a traditional hedge fund manager/legendary macro investor (Paul Tudor Jones) and the former Deputy Director of the Strategy, Policy and Review Department at the IMF (Lorenzo Giorgianni). In October 2023, Paul Tudor Jones once again commented on bitcoin and the broader market, stating,

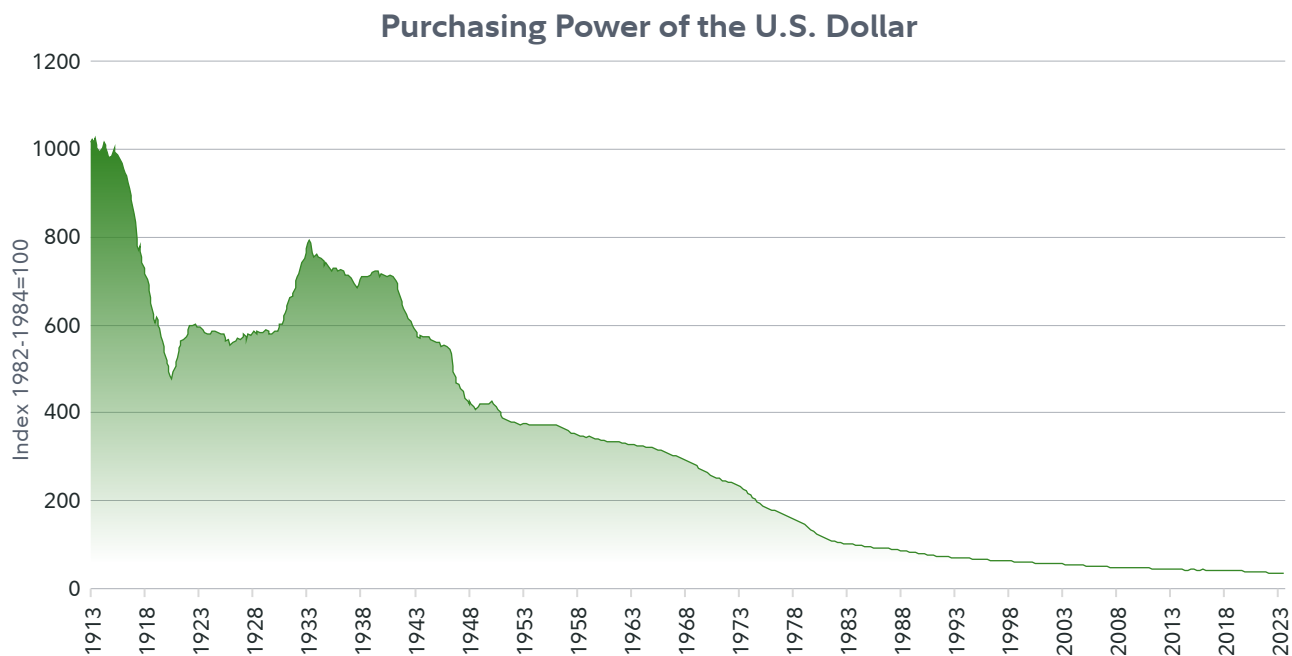
"As interest costs go up in the United States, you get in this vicious circle where higher interest rates cause higher funding costs, cause higher debt issuance, which cause further bond liquidation, which cause higher rates, which put us in an untenable fiscal position. I can't love stocks, but I love bitcoin and gold."



Longer-Term Catalysts

Long-Term Wealth Preservation Potential

A store of value asset is not important only in high inflation environments. Even “low and steady” inflation erodes the purchasing power of the most stable fiat currencies over a long enough period. This drives people to invest in financial assets to grow or simply preserve their wealth over longer timeframes. Proponents of the narrative that bitcoin is a potential store of value contend that demand could continue to grow as more people recognize it as a long-term wealth preservation tool.



Source: FRED, November 2023.

Great Wealth Transfer

A report released by Coldwell Banker in October 2019 shared data about the transfer of \$68 trillion in wealth to Millennials, estimated to be one of the most substantial transfers of wealth in history.ⁱⁱⁱ The study also found that there are almost 620,000 Millennial millionaires in the United States, about 2% of the population of millionaires in the U.S. The Millennial demographic (those born between 1981 and 1996) is more open to novel, digitally native alternatives compared to traditional products and services and is more comfortable holding new types of investments. According to a 2023 study from the CFA Institute, Millennials have the highest percentage of digital asset investment of any generation.^{iv} As Millennials continue to inherit tens of trillions over the next couple of decades, a significant portion of that wealth could be reallocated to digital assets.

This open-mindedness has been shaped in part by the 2008 financial crisis. Entering the workforce at such an inopportune time instilled a level of skepticism toward the traditional banking system among many Millennials.



According to WEF's 2017 Global Shapers Survey, 45% of the 30,000 Millennials surveyed said that they disagree with the statement that they trust banks to be fair and honest. Edelman's October 2018 survey of affluent Millennials (those aged 24–38 with \$50,000 in investable assets or \$100,000 in individual or joint income) found that 77% of affluent Millennials believe that "the whole financial system is designed to favor the rich and powerful" and that "it's just a matter of time before the bad behavior of the financial industry leads us into another global financial crisis."^{v,vi}

Gen Z, Millennials' younger counterparts, are also highly supportive of digital assets. The 2023 CFA Institute study also found that, while Gen Z is still coming of age and has yet to fully enter the workforce, much of Gen Z has already started investing and, unlike their parents, has primarily invested in digital assets (55%) over individual stocks (41%) and mutual funds (35%).^{iv} Furthermore, 20% of surveyed Gen Z invest exclusively in digital assets and non-fungible tokens (NFTs). This is a stark difference from older generations' portfolio constructions.

Conclusion

Bitcoin's inherent properties have given rise to the perspective that bitcoin has the potential to be a store of value, with complementary and interdependent components—the decentralized settlement network (Bitcoin) and its digitally scarce native asset (bitcoin). Equally important is the consideration of demand for bitcoin's unique features—if there is no sustained demand for these properties, there is no long-term value to create or store.

External forces that are accelerating interest and investment in bitcoin include unprecedented levels and exotic forms of monetary and fiscal stimulus across the globe, with unknown consequences. This has exacerbated the concerns that bitcoin was designed to address and may lead more investors and users toward bitcoin as a potential way to hedge against unknown consequences.

Simultaneously, the massive transfer of wealth from older generations to a younger demographic is a more gradual but important potential long-term tailwind. This could be an important catalyst for bitcoin adoption as younger investors inherit and grow their wealth.

While bitcoin is not guaranteed to succeed as a store of value, if sustainable long-term demand for the use case does not materialize, the tailwinds mentioned above could drive incremental demand for a novel asset with unique properties.

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