BITCOIN'S ROLE IN THE MODERN PORTFOLIO

JANUARY 2022

GALAXY

FUND MANAGEMENT

BITCOIN HAS ARRIVED

DISCOVER ITS POTENTIAL

BITCOIN: AN EMERGING ASSET

Bitcoin has become a force of innovation since its invention in the aftermath of the 2008 financial crisis. The utility of its underlying blockchain technology has driven the value of the native digital asset that rides on top of it—bitcoin with a lowercase "b"—to become one of the world's best performing investment of the last decade.[1]

Originally conceived as a peer-to-peer electronic cash for the internet, bitcoin has become a next generation store of value, resistant to political censorship or interference and governed by the mathematical principles of its open source code. It is built on a long history of technological advancements in computer science, cryptography, and digital scarcity, and its disinflationary nature is designed to facilitate trust-minimized, peer-to-peer transactions without a centralized intermediary in a highly secure and transparent way.

The Bitcoin blockchain can best be thought of as distributed ledger that allows for the transfer of value via its native digital asset, bitcoin, without relying on trusted third parties. Its store of value characteristics are forged from its public, predictable, and unchangeable monetary policy that allows protection from unexpected inflation. Bitcoin has created a new asset class that may become the biggest technological development since the internet. As its open-source software evolves, bitcoin will continue to differentiate itself further from traditional asset classes.

BITCOIN HAS CREATED A NEW ASSET CLASS THAT MAY BECOME THE BIGGEST TECHNOLOGICAL DEVELOPMENT SINCE THE INTERNET.

LIMITED SUPPLY

Bitcoin offers one of the only verifiably scarce, immutable, and capped supply assets in the world

Only 21 million bitcoin will ever be mined

NON-SOVEREIGN STATUS

No single point of failure or control

Supply issuance resistant to macro or government influence

Democratized digital money

IMMUTABILITY

Hard-coded software defines user rules

All transactions between users are permanently recorded

Auditable transaction verification and history

SECURITY

Cryptographically secured and validated transactions

Security lies in the asymmetry of the costs of performing the "proof-of-work"

The Bitcoin blockchain has never been hacked[2]

1) Source: Galaxy Digital Research as of 12/31/2021.
2) While custodians and exchanges that hold bitcoin have been hacked, the Bitcoin blockchain itself has never been hacked. Source: Galaxy Digital Research, Federal Reserve Bank of St. Louis, Bitcoin.

DIGITAL GOLD FOR A DIGITAL WORLD

Historically, society has sought the time-tested reliability of gold as a safe, durable store of value. Investors look to gold in times of market stress to preserve wealth and protect against inflation in the financial system. Gold has also played a central role in physical trade for thousands of years, but we now live in a digital world.

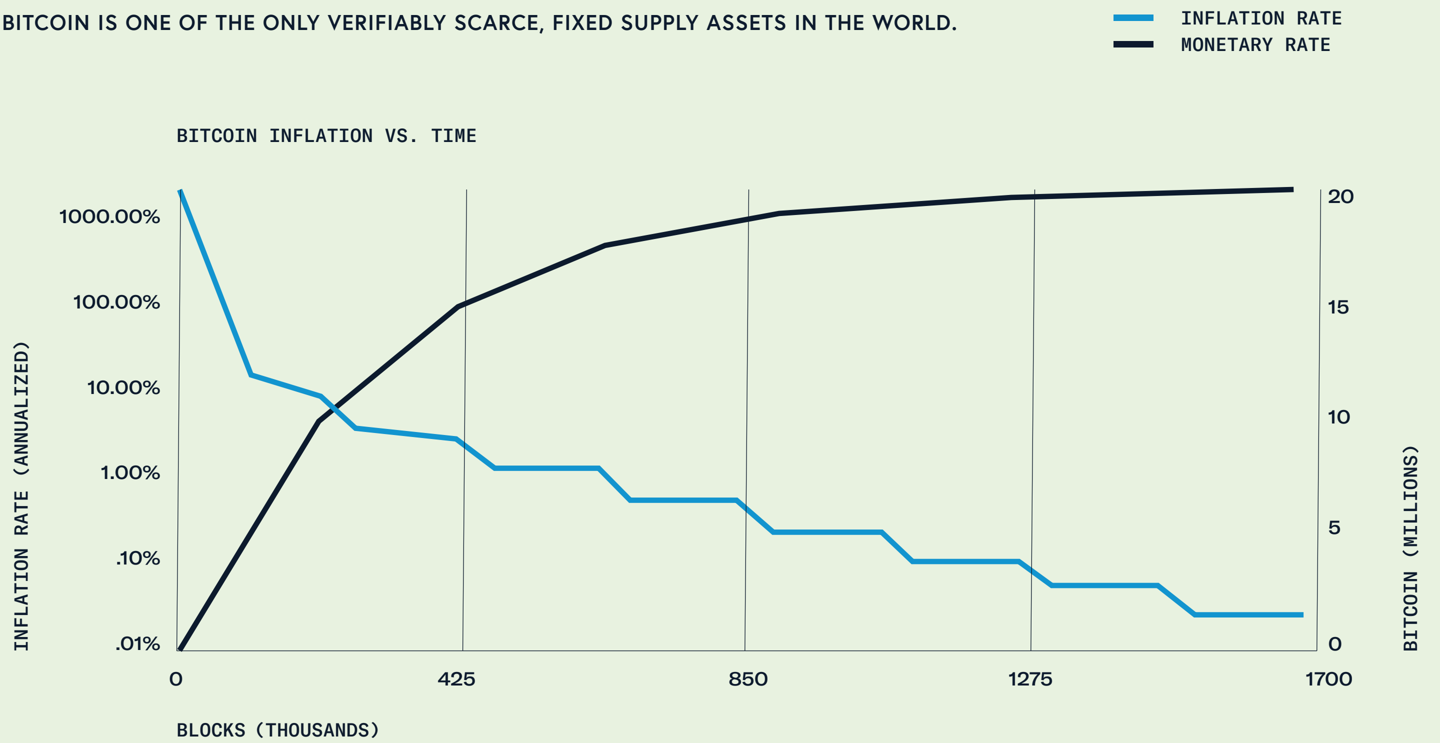
Bitcoin shares many of the same attractive properties of gold that have made it a great store of value for centuries. We see Bitcoin as an emergent store of value. In today's market, it's largely a risk asset, but it should trade similarly to non-fiat stores of value like gold in a steady state. Both gold and bitcoin are borderless and have no centralized power or government that controls their supply. Both are globally recognized, easily verifiable, and have limited supplies.

Yet, bitcoin has modernized and improved properties that position it as an attractive alternative to gold. Unlike gold, bitcoin is easily divisible into smaller units. While gold requires large and expensive storage facilities and is extremely difficult to physically transport, bitcoin does not require high storage costs and is weightless. Bitcoin can travel across borders in the same frictionless way that information is shared across the internet.

BITCOIN PROVIDES INVESTORS A DIGITAL STORE OF VALUE FOR A DIGITAL WORLD.

	LIMITED SUPPLY	BORDERLESS	DECENTRALIZED	EASILY VERIFIABLE	FAST VALUE TRANSFER	WEIGHTLESS	PROTECTION AGAINST COUNTERFEITING	EASILY DIVISIBLE	LOW COST STORAGE AND TRANSFER	CENSORSHIP RESISTANT
BITCOIN	●	●	●	●	●	●	●	●	●	●
GOLD	●	●	●	●						

BITCOIN IS ONE OF THE ONLY VERIFIABLY SCARCE, FIXED SUPPLY ASSETS IN THE WORLD.



Source: Galaxy Digital Research

FIXED SUPPLY

Bitcoin is one of the only verifiably scarce, fixed supply assets in the world. Bitcoin's underlying code controls how much new bitcoin is created and limits the maximum amount of bitcoin that will ever exist to 21 million. Bitcoin has a price-inelastic supply, meaning that a change in price cannot change its supply issuance. Said differently, bitcoin's supply is transparent and unchangeable; it is strictly bound and algorithmically hard-coded. An increase in the value of bitcoin does not affect its supply, and does not affect bitcoin's issuance schedule.

At time of writing, 18.9 million of that total supply has been issued as block rewards to the miners securing and validating Bitcoin's network.[1] Approximately every four years, the supply of bitcoin issued as mining rewards gets cut in half until eventually no more supply will be issued. The last bitcoin supply reduction occurred in May 2020, when the supply issuance was reduced from 12.5 bitcoin per block to 6.25 bitcoin per block. The next halving is expected in 2024. This "block reward" for miners will continue to be cut on a fixed schedule until it approaches zero around 2140.

Unlike most global currencies or commodities, bitcoin's transparent and immutable fixed supply properties make it a truly unique investable asset. Investors favor the fact that bitcoin's supply cannot be expanded, thereby allowing its inflation schedule to be predictable.

1) Source: Blockchain.com as of 12/31/2021

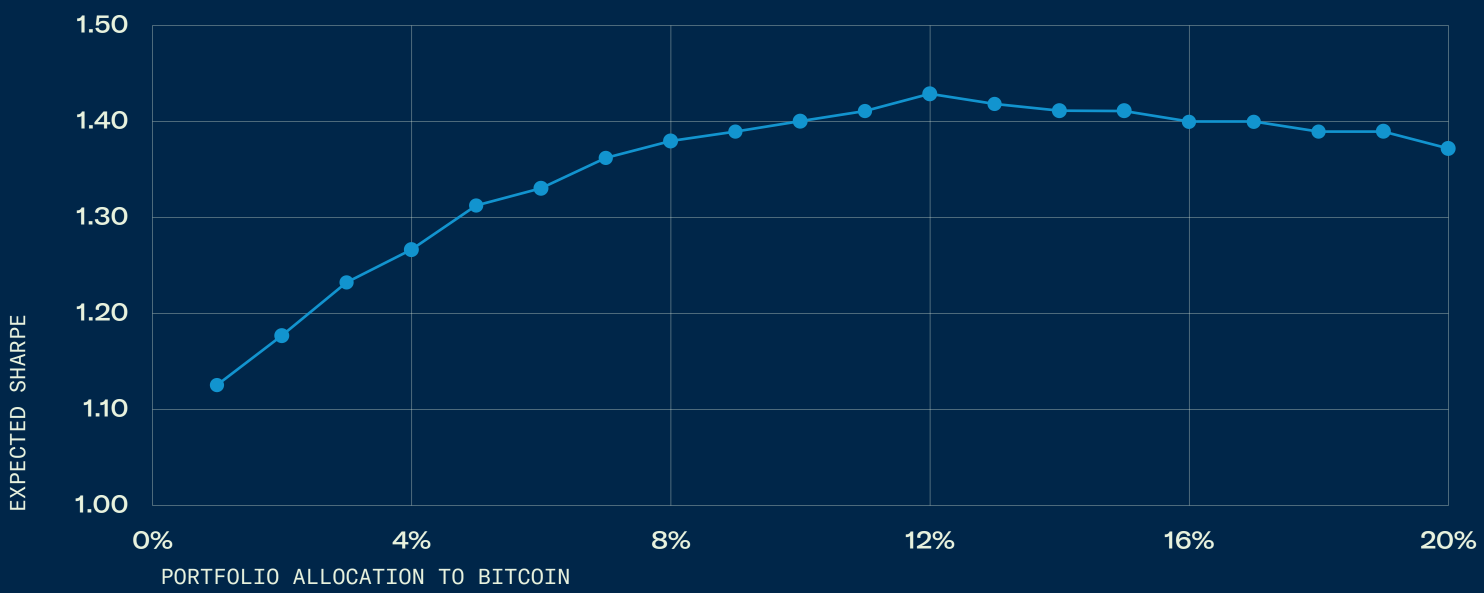
MODERN PORTFOLIO THEORY IN THE DIGITAL AGE

Modern portfolio theory (MPT) is a trusted analysis often used by investors to model scenarios of optimal portfolio allocations to various assets. Investors assessing the role of bitcoin in their portfolios are encouraged to utilize the same MPT approach for a quantitative-based analysis of bitcoin.

MPT demonstrates that bitcoin's history makes it an attractive addition to traditional portfolios. Despite its volatility, adding a portfolio allocation to bitcoin generally increases the overall expected return and improves the portfolio's expected risk-adjusted returns. It also potentially diversifies some of the systemic risk that exists in today's portfolios.

Most modern portfolios present a fair degree of inherent systemic risk in the financial system. Adding bitcoin to an investment portfolio may diversify away some of this systemic risk and offers additional portfolio benefits. Our study shows the Sharpe ratio of a portfolio may be optimized somewhere near a 12% allocation to bitcoin. However, the strongest marginal improvement to a portfolio's Sharpe ratio appears to occur in the 1% to 2% range. This demonstrates that even a small percentage allocation to bitcoin in a portfolio may have an impact.

AN ALLOCATION TO BITCOIN INCREASES EXPECTED PORTFOLIO RETURNS AND OPTIMIZES SHARPE.



Galaxy Digital Research as of 12/31/2021.

A MACRO HEDGE AGAINST GLOBAL UNCERTAINTY

Historically, bitcoin's correlation among established macro assets typically hovers within +/-0.20 around a zero correlation.[1] Over its 12-year history, bitcoin has demonstrated very low or even slightly negative correlation to most major global asset classes, including the S&P 500, Euro Stoxx 600, Nikkei 225, MSCI Index, US Agg Bond Index, Crude WTI, Gold, the DXY, EUR, and other emerging market currencies. While many see bitcoin mainly as a risk asset that is currently more correlated to equities, we believe that it will trade similarly to non-fiat stores of value like gold in a steady state.

Many believe that bitcoin can be used as a hedge against macroeconomic uncertainty. Without question, the onset of the COVID-19 pandemic and the resulting trillions in stimulus dramatically accelerated interest in bitcoin. As governments continue to "print money," bitcoin's fixed supply makes it all the more appealing. And as social sentiment across the world shifts away from trust in centralized institutions, bitcoin's decentralized nature makes it more appealing still.

Global markets will continue to be impacted by increasing uncertainty due to significant shifts in trade, tariff, and tax policies, as well as monetary and fiscal policies at the national level. Financial cycles are becoming increasingly severe and further quantitative easing threatens to swell central bank balance sheets, devaluing investors' purchasing power in the process. Bitcoin offers investors a potential hedge against this global uncertainty.

1) Source: Galaxy Digital Research as of 12/31/2021.

BITCOIN CORRELATION MATRIX MAY SERVE AS A GLOBAL HEDGE ON THE EXISTING FINANCIAL SYSTEM.

	BITCOIN	BGCI INDEX	S&P 500	EURO STOXX 6000	NIKKEI 225	MSCI EM INDEX	US AGG	PAN EURO AGG	ASIAN PACIFIC AGG	EM AGG	DXY	EUR	JPY	GBP	EM CCY	GOLD	CRUDE WTI
BITCOIN	1.00																
BGCI INDEX	0.89	1.00															
S&P 500	0.18	0.22	1.00														
EURO STOXX 600	0.18	0.21	0.71	1.00													
NIKKEI 225	0.09	0.11	0.27	0.47	1.00												
MSCI EM INDEX	0.12	0.16	0.55	0.64	0.59	1.00											
US AGG	-0.02	-0.02	-0.20	-0.15	-0.09	-0.12	1.00										
PAN-EURO AGG	0.05	0.06	0.05	0.07	0.01	0.06	0.61	1.00									
ASIAN PACIFIC AGG	0.04	0.07	0.26	0.36	0.21	0.33	-0.21	-0.10	1.00								
EM AGG	0.11	0.12	0.42	0.47	0.33	0.55	0.44	0.44	0.14	1.00							
DXY	-0.13	-0.14	-0.03	-0.06	-0.15	-0.23	-0.30	-0.11	0.10	-0.34	1.00						
EUR	0.09	0.11	0.01	-0.02	0.11	0.18	0.21	0.00	-0.08	0.24	-0.94	1.00					
JPY	-0.01	0.01	0.36	0.29	0.15	0.15	-0.52	-0.26	0.50	-0.13	0.58	-0.50	1.00				
GBP	0.15	0.18	0.20	0.22	0.18	0.29	0.18	0.24	0.04	0.34	-0.70	0.57	-0.32	1.00			
EM CCY	0.06	0.10	0.35	0.45	0.38	0.73	-0.09	0.03	0.38	0.47	-0.34	0.28	0.04	0.35	1.00		
GOLD	0.15	0.15	0.06	0.04	0.02	0.10	0.41	0.31	-0.10	0.25	-0.45	0.41	-0.41	0.33	0.10	1.00	
CRUDE WTI	0.10	0.09	0.17	0.11	0.10	0.12	-0.05	0.08	0.07	0.10	-0.03	0.00	0.08	0.09	0.09	-0.02	1.00

- 0.8 - 1.00
- 0.6 - 0.8
- 0.3 - 0.6
- 0.0 - 0.3
- < 0.0

Source: Galaxy Digital Research as of 12/31/2021.

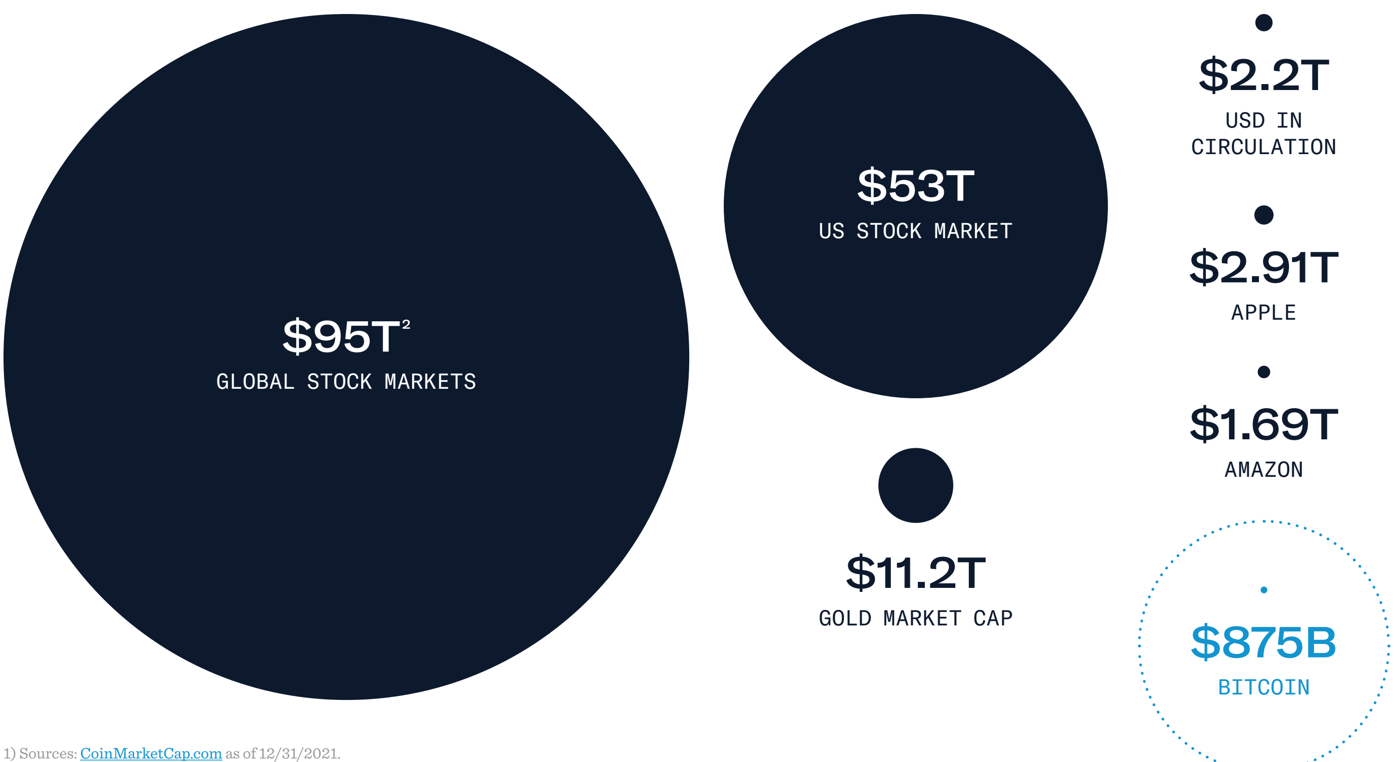
EARLY LIFECYCLE GROWTH

Bitcoin may seem like it has quickly exploded onto the scene, but it has steadily and consistently been making gains in adoption, usage, and awareness since its inception over 12 years ago. Its growth has been quite impressive and has provided investors with stellar absolute returns, far exceeding those of any other asset class in a similar time period.

Yet, bitcoin still has room to expand compared to other global markets. Bitcoin's current market cap stands at $875B at time of writing.[1] That is still smaller than individual companies like Apple ($2.3T) or Amazon ($1.7T).

Further still, when compared to the size of the gold market ($11.2T) or US stock market ($49T) bitcoin has tremendous upside growth potential. The total value of gold is over 16x the size of bitcoin and the US stock market is over 80x the size of bitcoin.

BITCOIN'S TOTAL MARKET CAP CONTINUES TO GROW, BUT STILL HAS TREMENDOUS ROOM TO EXPAND COMPARED TO OTHER GLOBAL MARKETS.



1) Sources: CoinMarketCap.com as of 12/31/2021.
2) Source: CNBC.com as of 11/12/2021.
Sources: Google Finance, Coin MarketCap as of 12/31/2021.

INSTITUTIONAL ADOPTION

Due to its open source ethos, bitcoin has traveled an unconventional growth path. Instead of being cultivated in the boardrooms or trading floors of large financial institutions like most transformative financial innovations, bitcoin first captured the hearts and minds of many retail, high-net-worth, and family office investors. Institutions took note and have started to embrace bitcoin as a part of their investment strategy given the transformative investment opportunity it presents.

Worldwide, billions of dollars of infrastructure investments have been made in the last few years to support bitcoin's robust ecosystem and enable institutional investors to invest, trade, and instantly transact with billions of dollars in daily liquidity. Progress on this front includes regulated custody, physically settled futures contracts, and regulated options contracts.

Announcements from BNY Mellon, the oldest and largest traditional financial institution, and German-based Deutsche Bank to service and custody digital assets deliver validity from players looking beyond fiat currency. Additionally, names like Fidelity, BBVA, Bakkt (primarily owned by Intercontinental Exchange), and Anchorage continue to set new standards for the custody, trading, and settlement of digital assets. They are collectively subject to regulatory oversight. Additionally, they receive ongoing audits by Big Four accounting firms and have received SOC reports as a result of routine independent SOC exams.

The "institutional herd" is arriving. BlackRock, JP Morgan, Goldman Sachs, Deutsche Bank, Morgan Stanley, Henyep Group, Square, MassMutual, Harvard and Yale are just a fraction of the growing list of traditional financial institutions and public institutions that jumped on the digital asset bandwagon just over the last few months.

Galaxy itself has played a role in crypto's institutional infrastructure build; in partnership with Bloomberg, we launched the Bloomberg Galaxy Crypto Index (BGCI) in 2018 to improve data integrity and standardization among digital assets. Infrastructure improvements have, in turn, established the rails for institutional quality products like our Galaxy Crypto Index Fund and Galaxy Bitcoin Funds, a key reason our funds received a positive operational due diligence score from a prominent global investment consultant.

TRADITIONAL WEALTH MANAGERS ARE ALSO WAKING UP TO THE POTENTIAL BENEFITS OF BITCOIN[1]

60%

OF ADVISORS INDICATE THAT THEY ARE LIKELY TO ALLOCATE CLIENT PORTFOLIOS TO BITCOIN WITHIN THE NEXT 12 MONTHS.

56%

OF BITCOIN HAS BECOME MORE POSITIVE OVER THE PAST SIX MONTHS

(30% MORE POSITIVE SINCE JULY)

1) Source: RIA Channel surveys as of 12/31/2021.

THE FUTURE IS BRIGHT

In just over a decade, bitcoin has transformed from a relatively obscure innovation into a $875B, globally recognizable institutional asset with room to grow.[1] If bitcoin were an asset class, it would be the best performing asset of the last decade.[2] For sophisticated investors, it can no longer be ignored.

More and more people are discovering and investing in bitcoin every day. Open to all, bitcoin's ability to settle immense value across borders, 24/7, is unprecedented in the history of money. Bitcoin is the world's first global asset that harnesses the power of computers—and humankind's innate need to innovate—to enable a worldwide decentralized store of value. 2021 is highly likely to see further increases in bitcoin interest, innovation, and adoption.

1) Sources: CoinMarketCap.com as of 12/31/2021.
2) Source: Galaxy Digital Research as of 6/30/2021.

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