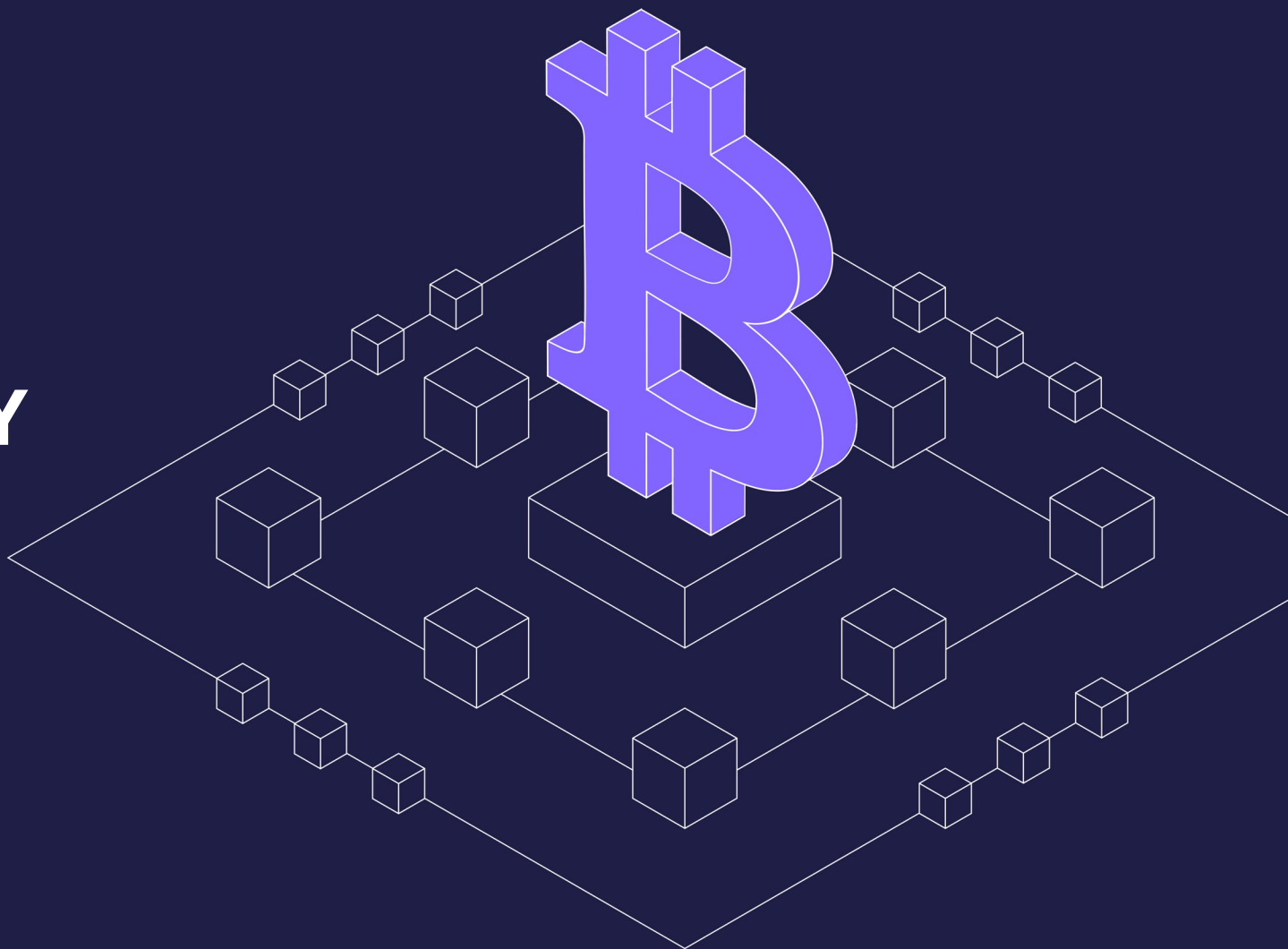




As of September 30, 2022

# THE BITCOIN MONTHLY

**TUG OF WAR: BITCOIN ECONOMICS  
vs. MACROECONOMICS**



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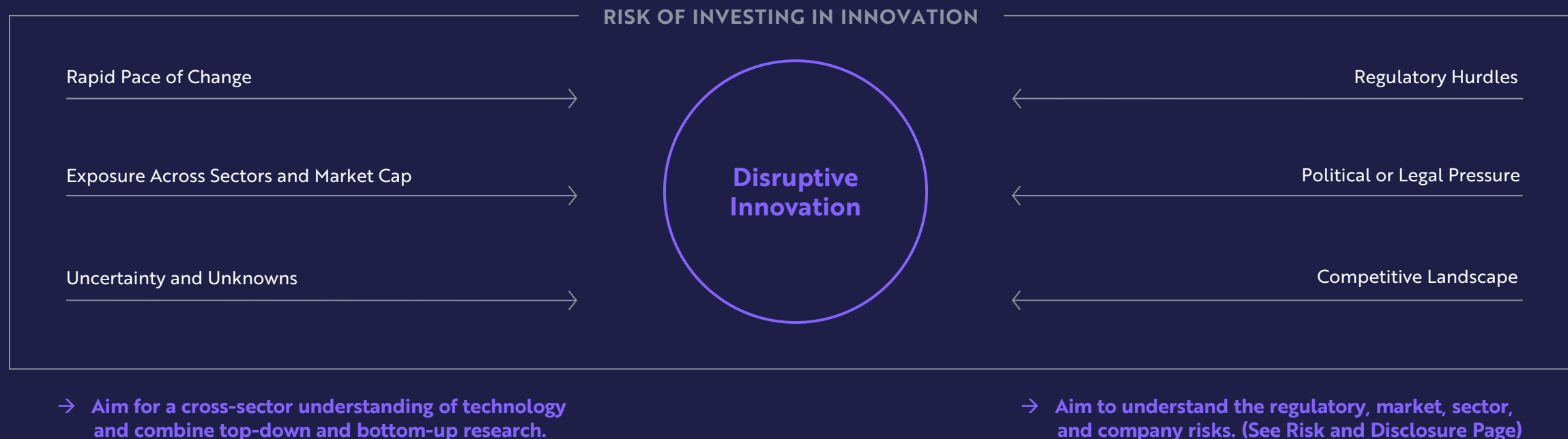
**PAST PERFORMANCE IS NOT INDICATIVE OF FUTURE PERFORMANCE; FUTURE RETURNS ARE NOT GUARANTEED.**



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Please note: Companies that ARK believes are capitalizing on disruptive innovation and developing technologies to displace older technologies or create new markets may not in fact do so. ARK aims to educate investors and seeks to size the potential investment opportunity, noting that risks and uncertainties may impact our projections and research models. Investors should use the content presented for informational purposes only, and be aware of market risk, disruptive innovation risk, regulatory risk, and risks related to certain innovation areas.

Please read risk disclosure carefully.





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### **Macroeconomics: Uncertainty Continues To Weigh On Bitcoin's Outlook**

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### **Appendix: Glossary Of Terms**

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## Section 01

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# Market Summary





# A Chaotic Macro Environment Tests Bitcoin's Seemingly Strong Holder Behavior Amid Oversold Conditions

## On-Chain Activity

- Bitcoin continued to find resistance at its 200-week moving average (\$23,500) and support above its investor cost basis (\$19,000).
- Bitcoin's short-term-holder cost basis crossed below its long-term-holder cost basis for the first time since late 2018, which usually indicates a strong market bottom.
- Bitcoin's long-term-holder supply reached an all-time high, currently 13.7 million BTC, which is 71.5% of total outstanding supply.

## Macro

- Despite signs of a recession, the Fed remains committed to tightening rates to curb inflation, delivering its third 75 bps rate hike in three months.
- The dollar strengthened amid tightened policy, negatively impacting risk-on assets.

## ARK KEY TAKEAWAYS

- Bitcoin's on-chain activity suggests that holding behavior and network fundamentals are much stronger than its current price would suggest.
- Ethereum's successful transition to proof-of-stake marks a monumental accomplishment for its ecosystem.
- An uncertain macro environment continues to weigh heavily on risk assets, including crypto.

Source: ARK Investment Management LLC, 2022. Data from [Glassnode](#) unless otherwise specified. Data valid as of September 30, 2022, and subject to change. For more information on certain terms, please read our Appendix: Glossary Of Terms on page 23 of this report. For informational purposes only and should not be considered investment advice or a recommendation to buy, sell, or hold any particular security or cryptocurrency. Forecasts are inherently limited and cannot be relied upon.



# News Of The Month

<a href="#"><u>Ethereum Activates The Merge As It Shifts To Proof-of-Stake</u></a>	<a href="#"><u>Robinhood Launches Self-Custody Wallet To 10,000 Waitlist Users</u></a>
<a href="#"><u>Fidelity To Offer Bitcoin Trading To Retail Customers</u></a>	<a href="#"><u>BitGo Confirms \$100 Million Lawsuit Against Galaxy Digital Following Merger Breakdown</u></a>
<a href="#"><u>Amazon Among Five Companies To Develop Digital Euro Prototype For The ECB</u></a>	<a href="#"><u>Abra Plans To Form State Regulated Bank For Digital Assets</u></a>
<a href="#"><u>Charles Schwab, Citadel, Fidelity Digital Launch Digital Asset Exchange</u></a>	<a href="#"><u>GameStop Announces FTX Partnership</u></a>
<a href="#"><u>FTX Wins Auction For Bankrupt Crypto Lender Voyager</u></a>	<a href="#"><u>Revolut Expands US Crypto Offering, Adding 29 Tokens Including Dogecoin</u></a>
<a href="#"><u>South Korean Court Issues Warrant For Do Kwon's Arrest</u></a>	<a href="#"><u>FTX.US President Brett Harrison Is Stepping Down</u></a>
<a href="#"><u>Kraken's Jesse Powell Stepping Down As CEO Of Crypto Exchange</u></a>	
<a href="#"><u>CME Set To Launch Ether Options</u></a>	
<a href="#"><u>Celsius Network CEO Mashinsky Resigns</u></a>	
<a href="#"><u>Banking Giant Nomura Launches Crypto VC Unit</u></a>	
<a href="#"><u>SWIFT, Chainlink Labs Reveal Work On Cross-Chain Proof-of-Concept</u></a>	
<a href="#"><u>Infura To Launch Open-Source Decentralized Protocol For Web3 APIs</u></a>	
<a href="#"><u>Bitcoin Payments Firm Strike Raises \$80 Million</u></a>	
<a href="#"><u>MicroStrategy Making New Bitcoin Play, Developing Lightning Network-Based SaaS Platform</u></a>	
<a href="#"><u>Lightning Labs Releases Initial Taro Protocol Code</u></a>	



# Network Activity Remains Diminished Despite Strong Holder Behavior

	Bitcoin Metrics <sup>1</sup>	Unit	September 2022	1M Change	1Y Change	ARK's View	Upgrade/ Downgrade <sup>3</sup>
Network Security	<u>Mining Difficulty</u>	Exahash/sec <sup>1</sup> (Thousands)	134.6	+1.23%	+65.07%	Bullish	No Change
	<u>Miner Revenue</u> (7-Day Moving Average)	USD (Millions)	\$18.05	-11.68%	-55.7%	Bearish	No Change
Network Usage	<u>Active Owners</u> <sup>2</sup> (Active Entities, 7-Day Moving Average)	Thousands	232	-1.66%	-6.2%	Bearish	No Change
	<u>Transaction Volume</u> <sup>2</sup> (7-Day Moving Average)	BTC (Thousands)	288.65	-13.88%	+129.54%	Neutral	↓
Holder Behavior	<u>Long-Term-Holder Supply</u> <sup>2</sup> (Coins Held for 155 Days+)	BTC (Millions)	13.69	+0.85%	+2.19%	Bullish	No Change
	<u>Locked Supply</u> <sup>2</sup> (Illiquid Supply)	BTC (Millions)	14.81	+0.28%	+5.39%	Bullish	No Change
	<u>Time-Weighted Turnover</u> <sup>2</sup> (Coindays Destroyed, 7-Day Median)	Coindays (Millions)	7.81	+11.18%	-5.65%	Bullish	↑

[1] For more information on these metrics and their units of account, please read the Appendix: Glossary of Terms on page 23 of this report. [2] Data may be subject to change over time since they are entity-adjusted in real time via a machine-learning algorithm. [3] Arrows displayed in the "Upgrade/Downgrade" column convey the change in our view of that metric compared to last month. For instance, if our view changes from bearish to neutral, the arrow will be green, and so forth.

Source: ARK Investment Management LLC, 2022. Data sourced from [Glassnode](#). Some data may be subject to change over time since they are entity-adjusted in real time. Information as of September 30, 2022.

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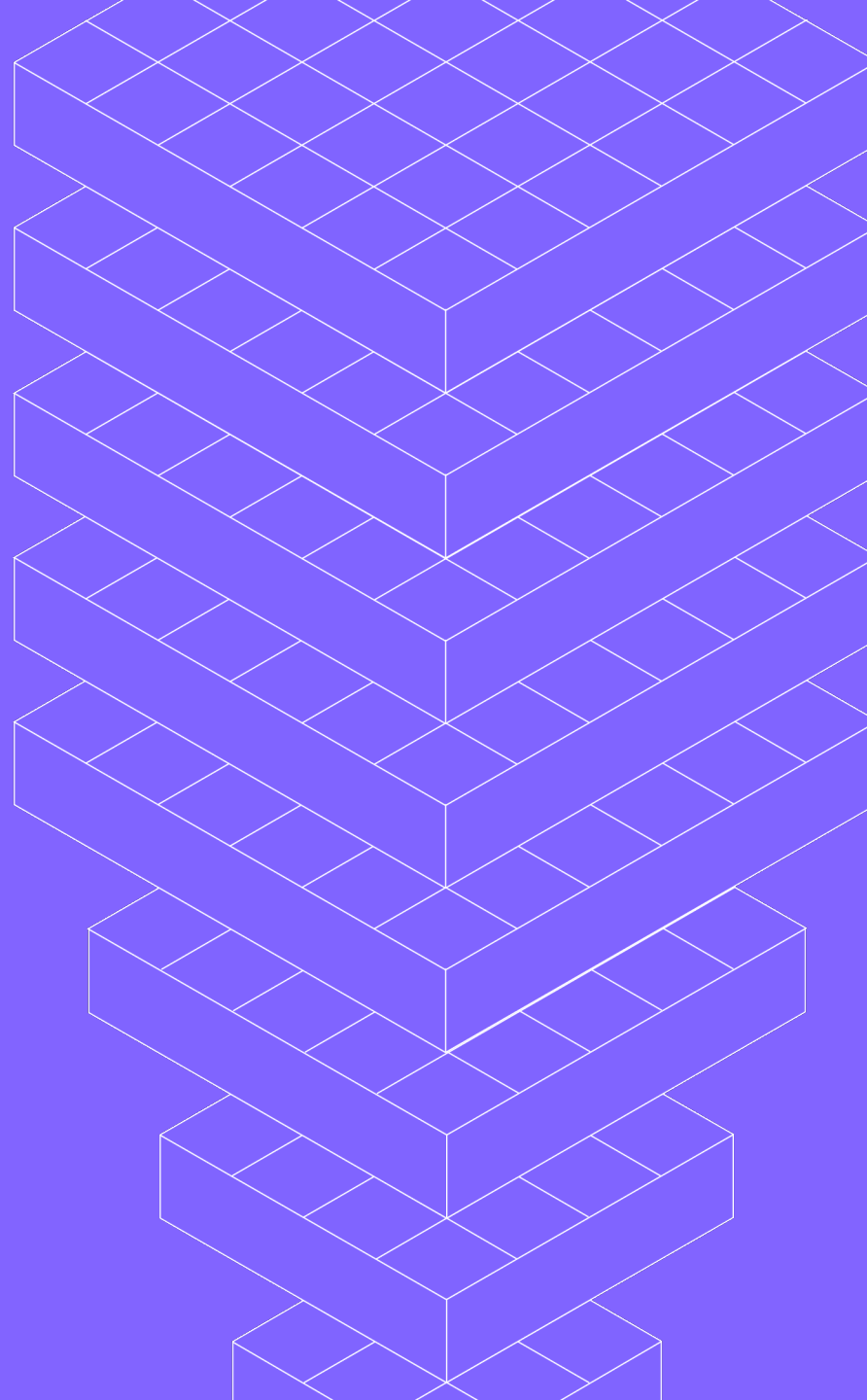
# Bitcoin Is Trading Below Its Market Cost Basis

	Bitcoin Metrics <sup>1</sup>	Unit	September 2022	1M Change	1Y Change	ARK's View	Upgrade/ Downgrade <sup>3</sup>
Long-Term Valuation	<u>Market Cost Basis</u> (Realized Price)	USD	\$21,261	-1.54%	+0.57%	Neutral	No Change
	<u>Percent Supply In Profit</u>	pp	53.69%	+1.61 pp	-26.29 pp	Bullish	No Change
Short-Term Valuation	<u>Short-Term-Holder Cost Basis<sup>2</sup></u> (STH Realized Price)	USD	\$22,532	-10.55%	-46.61%	Bullish	No Change
	<u>Realized Market Returns<sup>2</sup></u> (SOPR-1, 7-day moving average)	pp	-5.3%	-1.28 pp	-0.04 pp	Neutral	No Change
Market Sentiment	Perpetual Futures Basis (Binance, Estimated, 7-Day Exponential Moving Average)	pp	-0.05%	+0.01 pp	+0.04 pp	Bullish	No Change
	<u>Expirational Futures Basis</u> (Quarterly, All Exchanges, Annualized)	pp	0.79%	+0.54 pp	-6.04 pp	Bullish	No Change

[1] For more information on these metrics and their units of account, please read the Appendix: Glossary of Terms on page 23 of this report. [2] Data may be subject to change over time since they are entity-adjusted in real time via a machine-learning algorithm. [3] Arrows displayed in the "Upgrade/Downgrade" column convey the change in our view of that metric compared to last month. For instance, if our view changes from bearish to neutral, the arrow will be green, and so forth. Source: ARK Investment Management LLC, 2022. Data sourced from [Glassnode](#). Some data may be subject to change over time since they are entity-adjusted in real time. The perpetual futures basis was estimated internally on the basis of data from TradingView, and it is subject to change. Information as of September 30, 2022. For informational purposes only and should not be considered investment advice or a recommendation to buy, sell, or hold any particular security or cryptocurrency. Forecasts are inherently limited and cannot be relied upon.



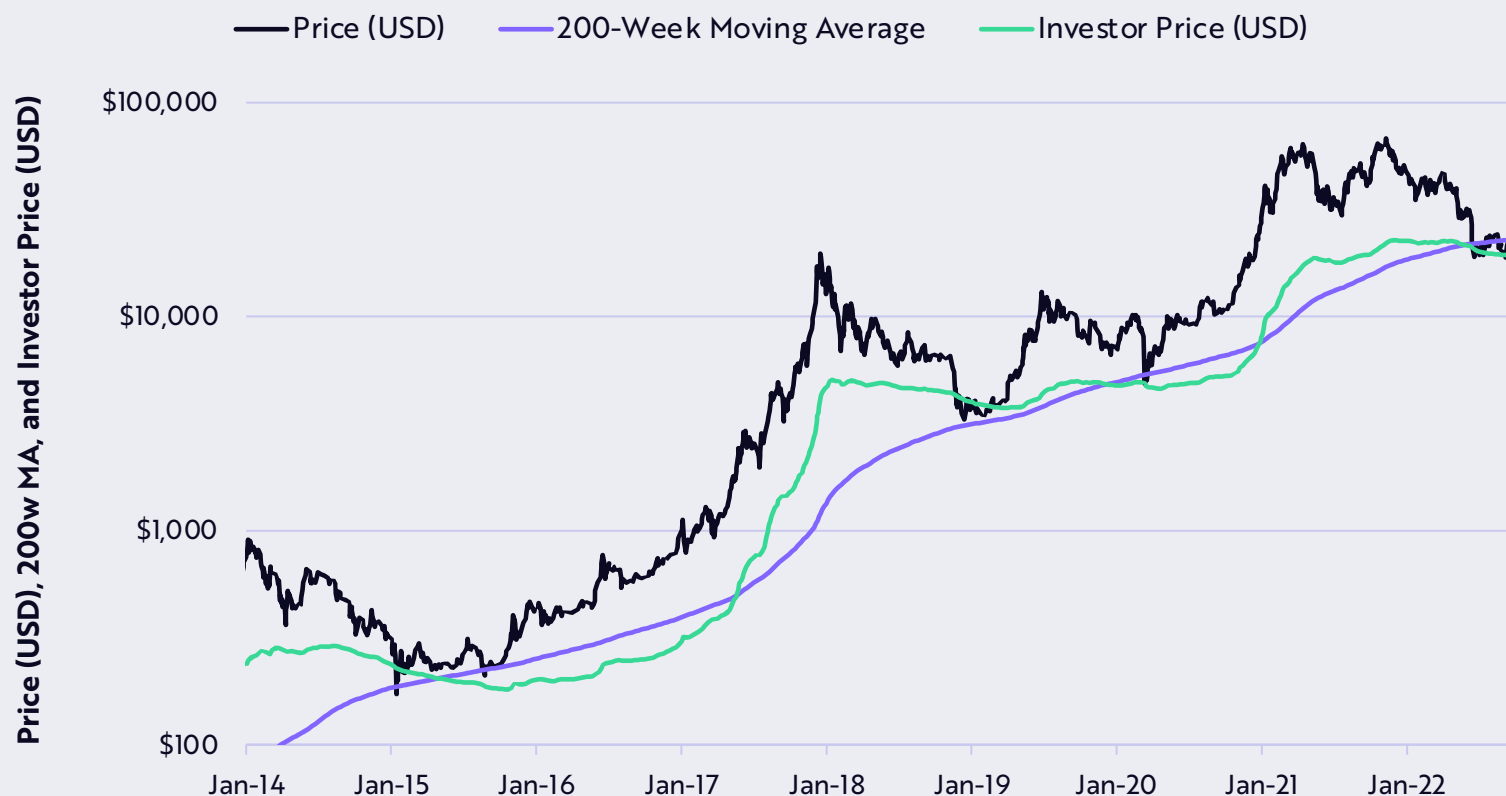
# On-Chain Fundamentals: Bitcoin Remains Oversold





# Bitcoin Continues To Trade Between Its 200-Week Moving Average And Investor Cost Basis

## Bitcoin 200-Week Moving Average and Investor Cost Basis



### ARK'S VIEW: NEUTRAL

For most of September, bitcoin traded between two major historical levels: its 200-week moving average (\$23,500) as resistance and its investor cost basis as support (\$19,000).

The investor cost basis, also known as investor price, is calculated by subtracting the miner cost basis by the market cost basis. The calculation removes miners' activity from the total aggregate cost basis of the network, which enables a focus on investors' market entry point.

As strong holder behavior battles a weak macro environment, resolution to either side will play a significant role in bitcoin's short- to mid-term performance.

[1] The 200-week moving average here is calculated by taking the 1440-day moving average of values larger than 0, so that if the data are not available for a 1440 average, the calculation assumes a life-to-date average in the early years of bitcoin's history. Source: ARK Investment Management LLC, 2022. Data from [Glassnode](#). Information as of September 28, 2022. For informational purposes only and should not be considered investment advice or a recommendation to buy, sell, or hold any particular security or cryptocurrency. Forecasts are inherently limited and cannot be relied upon.



## Despite A Successful Merge, The ETH/BTC Pair Suggests A “Sell The News” Event



### ARK'S VIEW: NEUTRAL

Hotly debated since the network's launch in 2015, the successful transition to Proof-of-Stake marks a monumental accomplishment for Ethereum.

Despite the successful Merge, Ethereum could face greater regulatory scrutiny. The Securities and Exchange Commission could view staking as a mechanism that renders ether a security, and concerns remain around the censorship resistance of the network following OFAC's Tornado Cash sanctions.

Although Ethereum's supply and validator concentrations in a few US-based entities remain a significant tail-risk for the network, we believe that the success of the Merge will prove crucial to the cryptoasset's long-term performance.

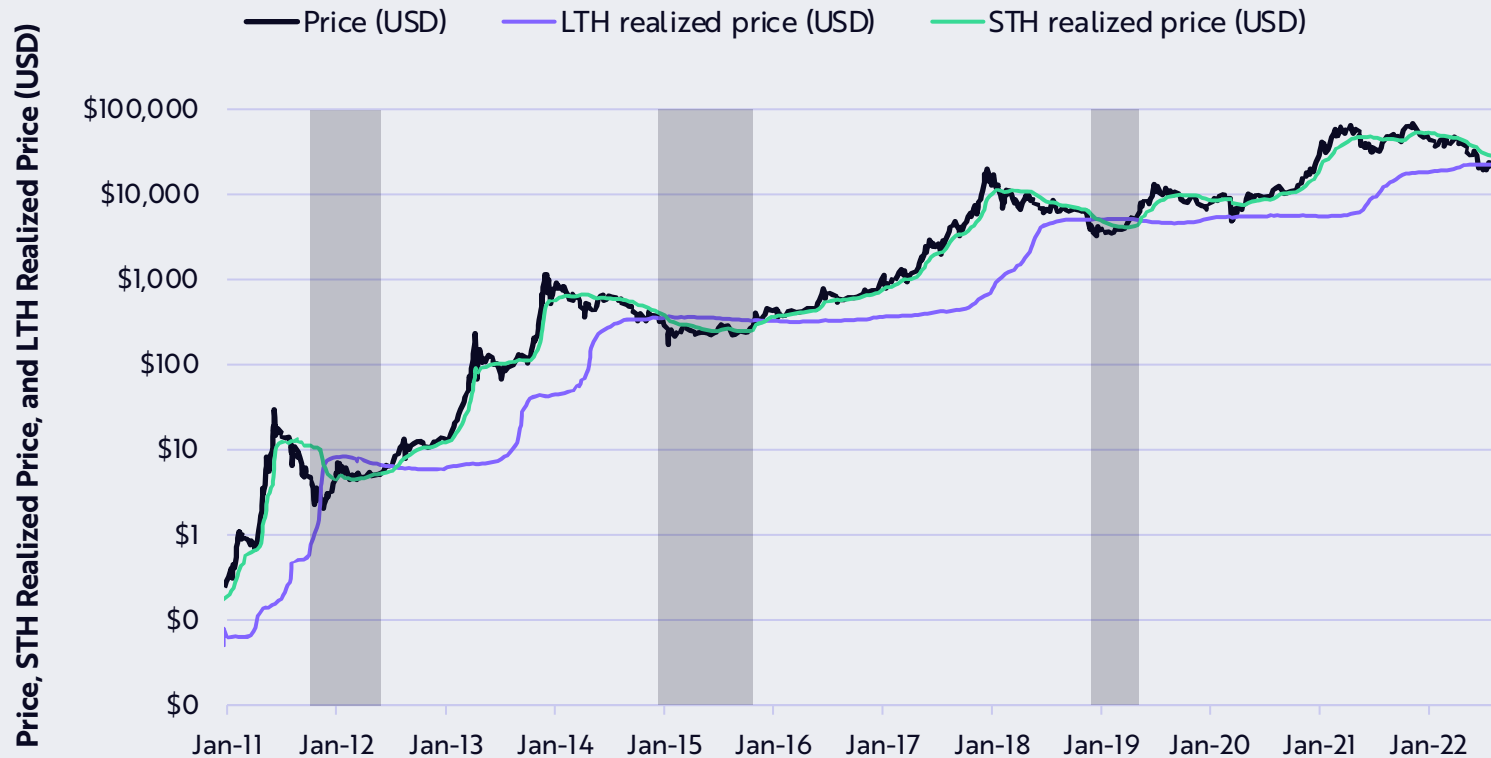
Price action following the Merge appears to have been a "sell the news" event coinciding with the local top for the ETH/BTC and ETH/USD pairs.

Source: ARK Investment Management LLC, 2022. Data from [Glassnode](#). Information as of September 28, 2022. For informational purposes only and should not be considered investment advice or a recommendation to buy, sell, or hold any particular security or cryptocurrency. Forecasts are inherently limited and cannot be relied upon.



# The Short-Term-Holders' Cost Basis Crossed Beneath The Long-Term-Holders' Cost Basis For The First Time Since Late 2018

## Bitcoin Short-Term-Holder and Long-Term-Holder Cost Bases Cross



### ARK'S VIEW: BULLISH

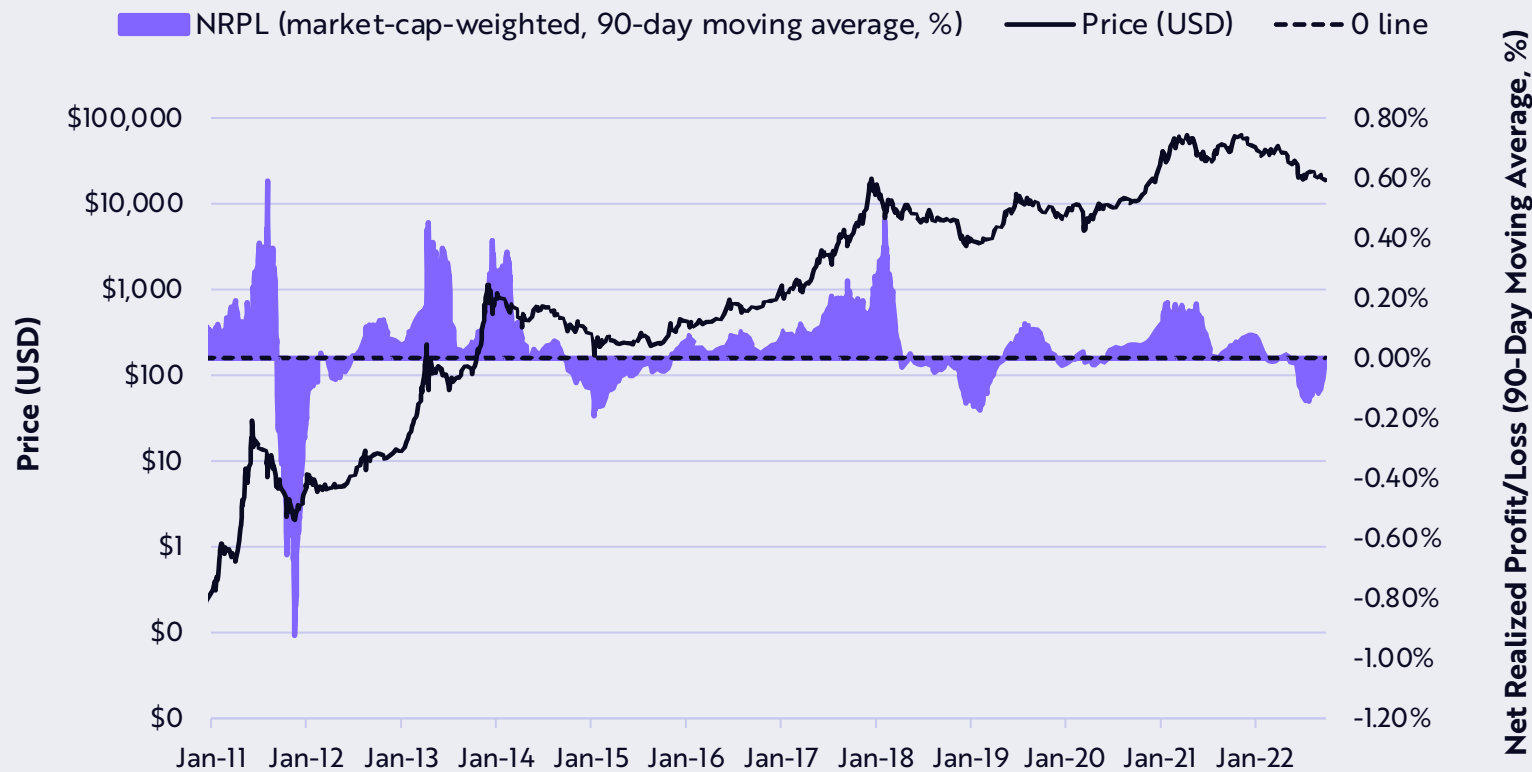
The short-term-holder (STH) cost basis has crossed below the long-term-holder cost (LTH) basis, a signal usually correlated with high-conviction market bottoms.

Likely a sign of low speculative excesses, this cross suggests that short-term holders have capitulated or are aging into long-term holders.



# After Four Months Of Net Losses, Bitcoin's Net Realized Profit/Loss Suggests Capitulation Proportional To Prior Cycle Bottoms

## Bitcoin Quarterly Net Realized Profit/Loss<sup>[1]</sup>



### ARK'S VIEW: BULLISH

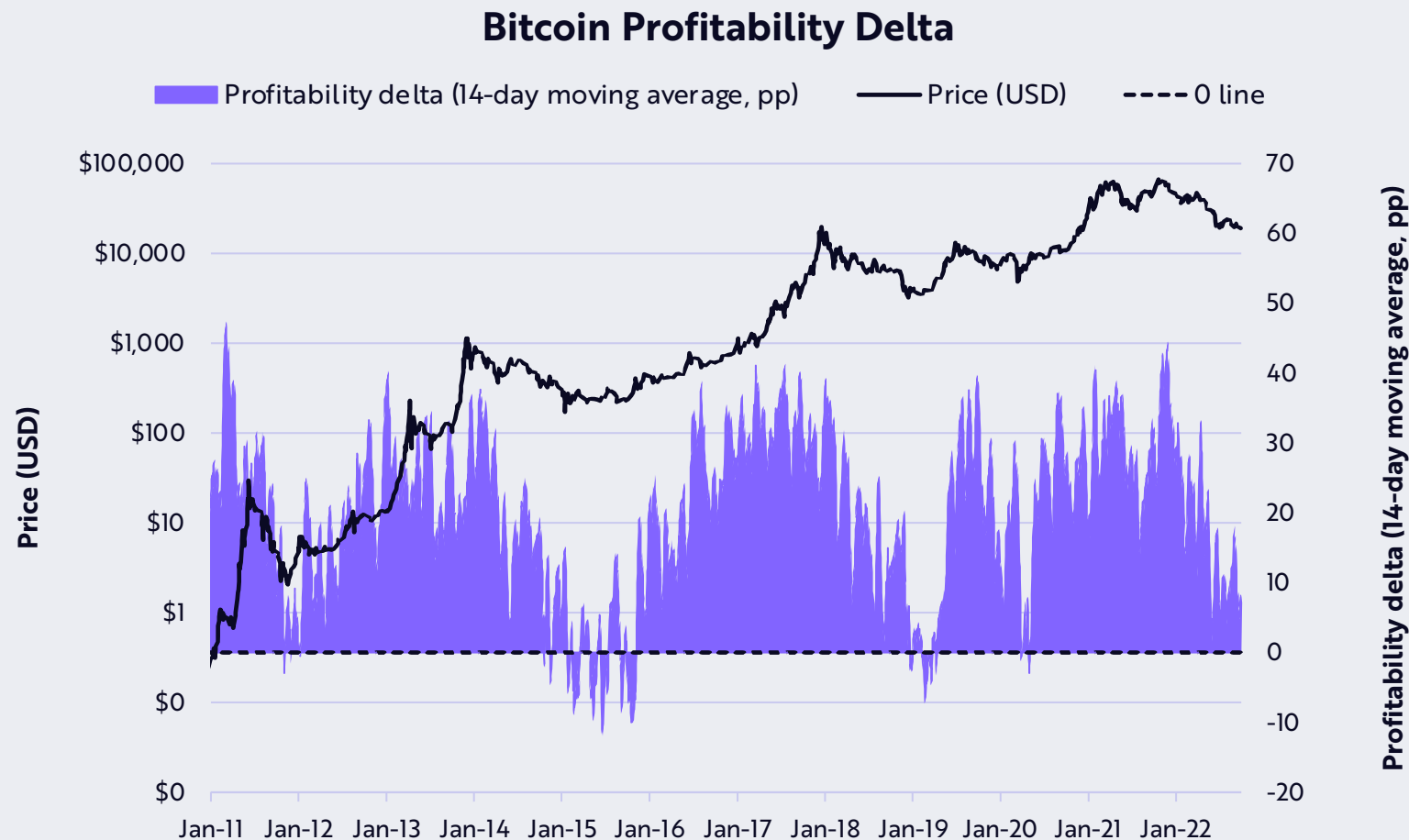
Despite the potential for continued selling amid macroeconomic uncertainty and the correlation-to-one among risk-on assets, bitcoin's net realized profit loss (NLRP) ratio suggests that the market has completed its cyclical capitulation.

NRPL suggests that BTC, in both duration and deviation, is experiencing significant capitulation.

[1] Net Realized Profit/Loss (NRPL): The difference between realized profit and realized loss, normalized by market cap. Source: ARK Investment Management LLC, 2022. Data from [Glassnode](https://glassnode.com). Information as of September 28, 2022. For informational purposes only and should not be considered investment advice or a recommendation to buy, sell, or hold any particular security or cryptocurrency. Forecasts are inherently limited and cannot be relied upon.



# BTC's Profitability Delta Nears 0, Suggesting Oversold Conditions



## ARK'S VIEW: BULLISH

Bitcoin's profitability delta is near 0 for the first time since its 2020 COVID-19 collapse.

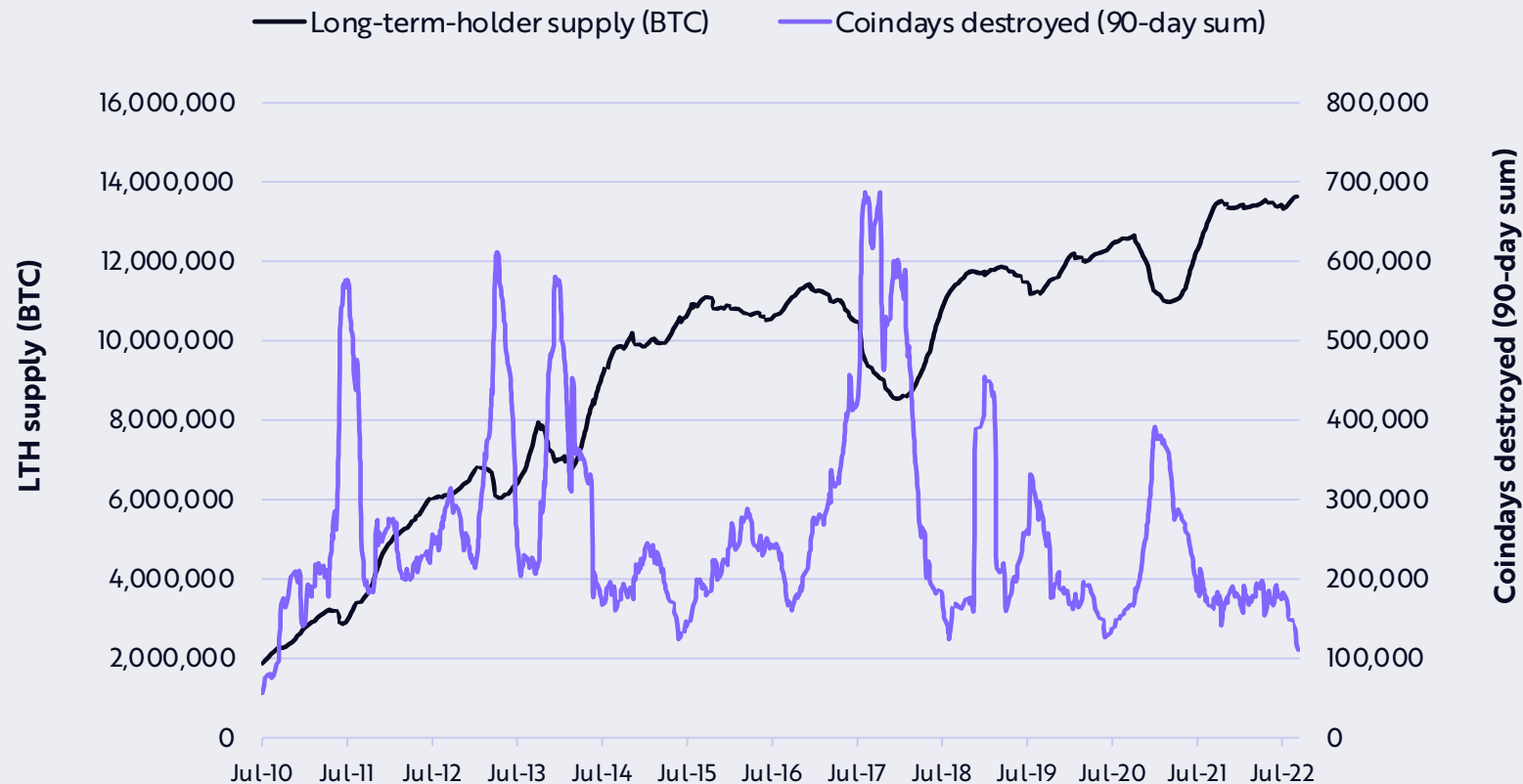
Profitability delta is defined as bitcoin's percent supply in profit (unrealized activity) minus bitcoin's percent volume in profit (realized activity).

When the profitability delta reaches 0 or below, we infer that unrealized profitability matches realized profitability on a 1:1 basis, suggesting that most trading activity is seller-exhausted.



# Long-Term-Holder Supply Reaches All-Time Highs While Quarterly Coindays Destroyed Reaches 12-Year Lows

Bitcoin Long-Term-Holder Supply and Quarterly Coindays Destroyed



## ARK'S VIEW: BULLISH

Two metrics suggest historically-significant, high holding behavior in the bitcoin market: (1) when long-term-holder (LTH) supply reaches all-time highs, and (2) when 90-day coindays destroyed (CDD) reaches 12-year lows.

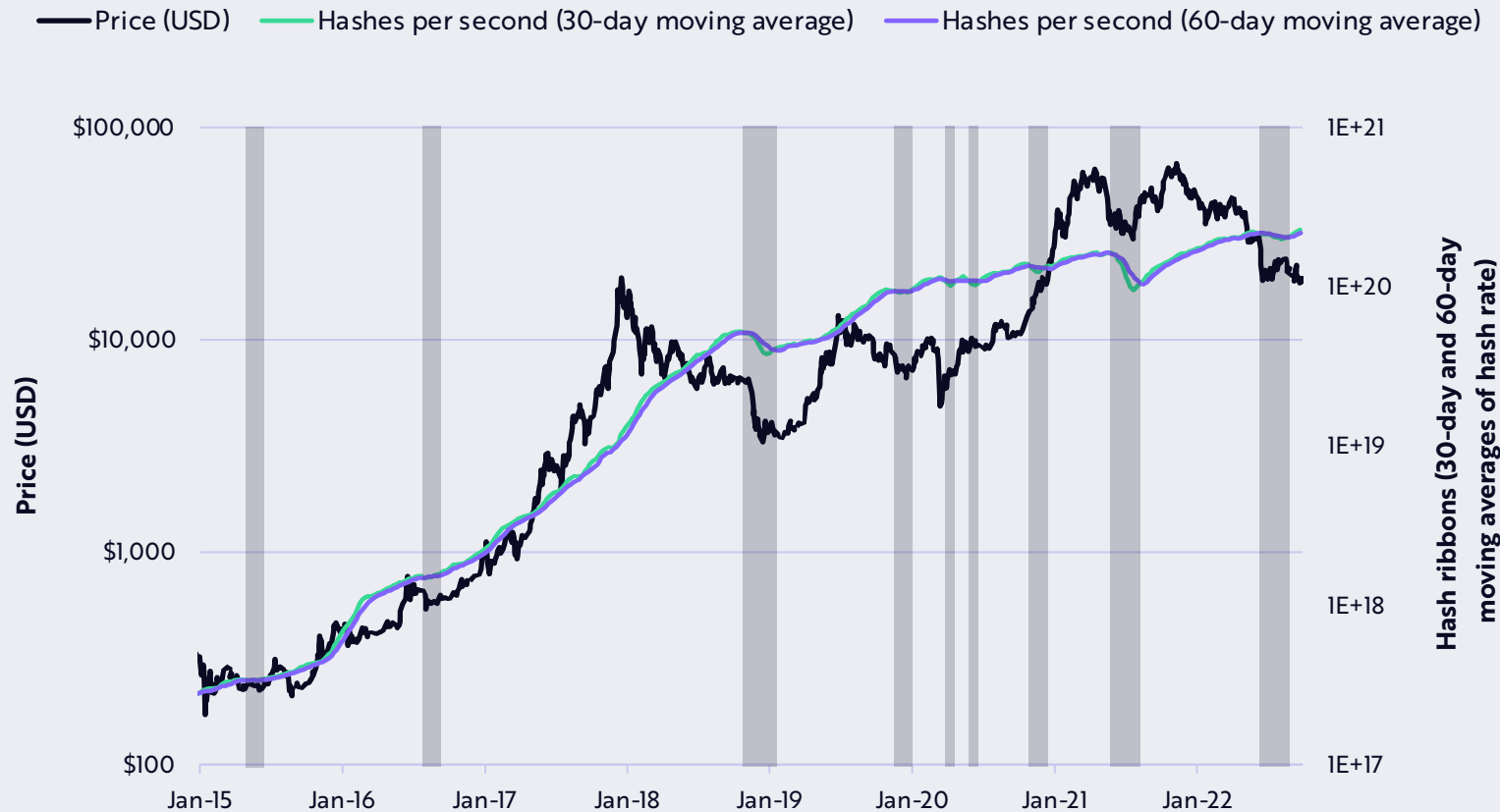
LTH supply denotes the number of coins held for at least 155 days, a statistically-meaningful threshold under which the probability that a coin continues to remain held past 155 days increases significantly.

CDD calculates the time-weighted turnover of bitcoin by multiplying the volume transacted by the number of days each coin was held. High values of CDD are bearish, while low values are neutral-to-bullish.



# Bitcoin's Hash Rate Trend Suggests That Miners Are No Longer In Capitulation Mode

## Bitcoin Hashing Trend



### ARK'S VIEW: BULLISH

Miner capitulation began in June 2022 and appears to be complete—a dynamic historically correlated with a high-conviction bullish environment.

As an illustration, consider the hashing trend of Bitcoin, otherwise known as hash ribbons, a metric that compares its 30-day moving average and 60-day moving average to assess when the mining industry is entering or exiting major compression periods. The gray bars represent such periods.

The recent compression occurred between early June and late August as hash rate expanded and made all-time highs.

Source: ARK Investment Management LLC, 2022. Data from [Glassnode](#). Information as of September 28, 2022. For informational purposes only and should not be considered investment advice or a recommendation to buy, sell, or hold any particular security or cryptocurrency. Forecasts are inherently limited and cannot be relied upon.





## Section 03

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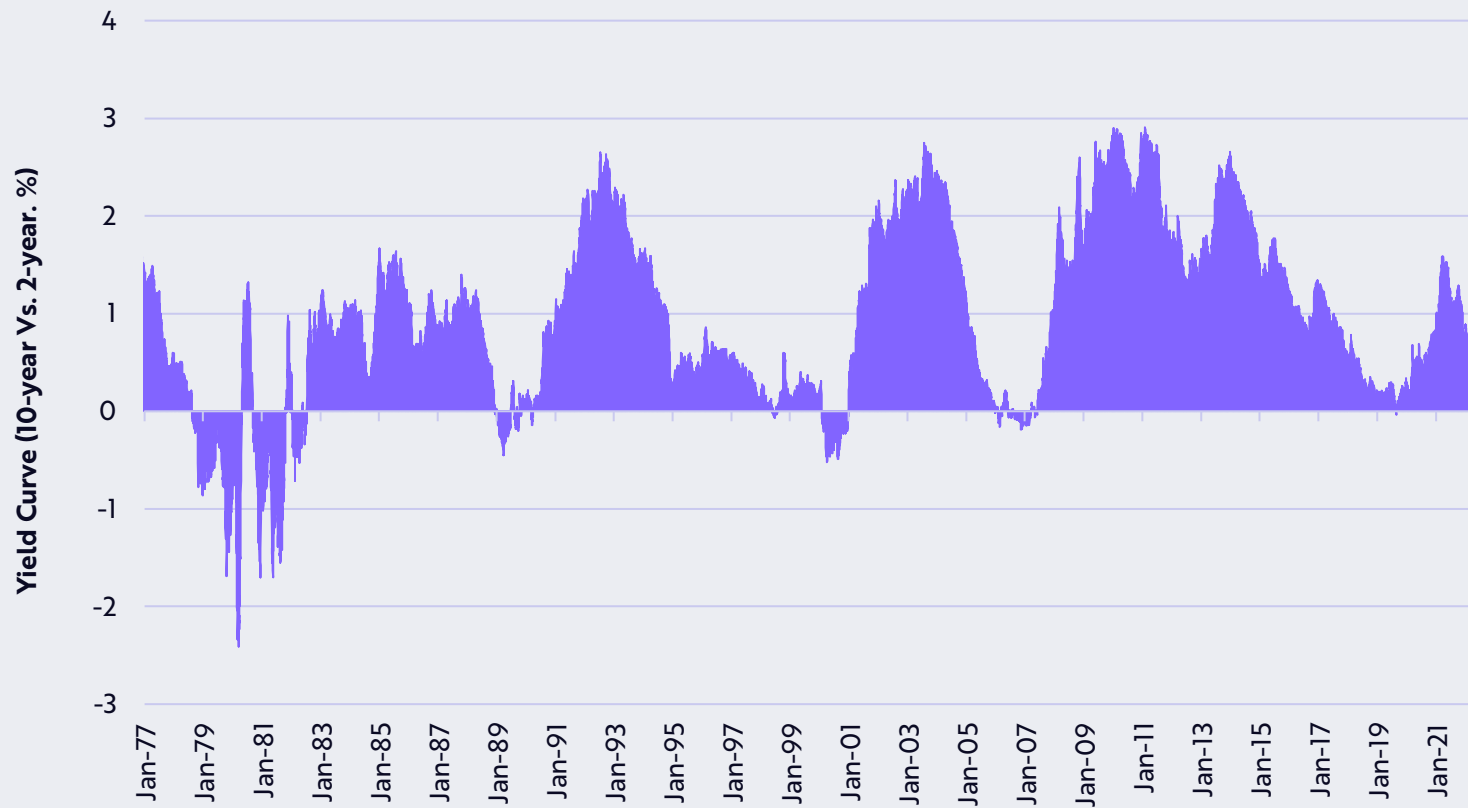
# Macroeconomics: Uncertainty Continues To Weigh On Bitcoin's Outlook





# The Yield Curve Appears To Reflect A Return Of 1980's-Style Restrictive US Monetary Policy

Yield Curve (10-Year vs. 2-Year)



## ARK'S VIEW: BEARISH

As measured by the 2-year Treasury yield relative to the 10-year Treasury yield, the yield curve has inverted by 50 basis points, the 10-year yield at 3.75% compared to the two-year at 4.25%.

In our view, US monetary policy today is more restrictive than in the '80s, when Fed Chair Volcker tried to kill inflation by raising the Fed funds rate up two-fold from 10% to 20%. Chair Powell and team have increased it 13-fold from 0.25% to 3.25%.

Under Volcker, the increase in long-term Treasury yields was 1.6X—from 10% to 16%—compared to 7.4X—from 0.5% to 3.7% under Powell. Risk aversion appears to be pummeling all assets but cash, while the Fed seems fixated on hiking rates another 100+ basis points to protect its legacy.

Source: ARK Investment Management LLC, 2022. Data from FRED. Information as of September 30, 2022. For informational purposes only and should not be considered investment advice or a recommendation to buy, sell, or hold any particular security or cryptocurrency. Forecasts are inherently limited and cannot be relied upon.



# Falling Commodity Prices Suggest Deflation In The Pipeline

## Refinitiv/CoreCommodity CRB(R) Index Excess Return



### ARK'S VIEW: NEUTRAL

In our view, the continuation of interest rate hikes is likely to lead to deflation. Commodity prices, as measured by Refinitiv's CRB index, have dropped ~42% since their peak in mid 2008, ~25% since their lower peak in 2011, and ~19% since an even lower peak earlier this year.

Numerous commodities have plunged from their post-COVID price peaks: lumber -60%, copper -35%, oil -35%, iron ore -60%, DRAM -46%, corn -17%, Baltic freight rates -79%, gold -17%, and silver -39%.



# The DXY Seems To Have Entered A Parabolic Rise

## US Dollar Index (DXY)



## ARK'S VIEW: BEARISH

As most commodities are priced in dollars, the 58% increase in the trade-weighted dollar since early 2008 helps to explain the deflationary forces accumulating in the pipeline.

This month, Japan and China sold USD to protect their own currencies against a parabolic dollar that is causing significant harm to the global economy. In other words, they appear to be aiming to "ease" dollar-based monetary policy by putting more dollars into the system.

Japan's and China's USD sales could be the first sign that "monetary easing" is on the way. The dollar's parabolic move has been devastating to the rest of the world and should come back to bite US competitiveness, jobs, and economic activity, ultimately forcing the Fed to pivot.

Lackluster performance on the part of the euro and British pound, -15.23% and -18.47% YoY drawdowns against USD, respectively, appears to confirm that view.

Source: ARK Investment Management LLC, 2022. Data from TradingView. Information as of September 28, 2022. For informational purposes only and should not be considered investment advice or a recommendation to buy, sell, or hold any particular security or cryptocurrency. Forecasts are inherently limited and cannot be relied upon.



# MOVE Index Volatility Signals Stress In Treasury Bond Markets

**ICE BofAML US Bond Market  
Option Volatility Estimate Index (MOVE)**



## ARK'S VIEW: BEARISH

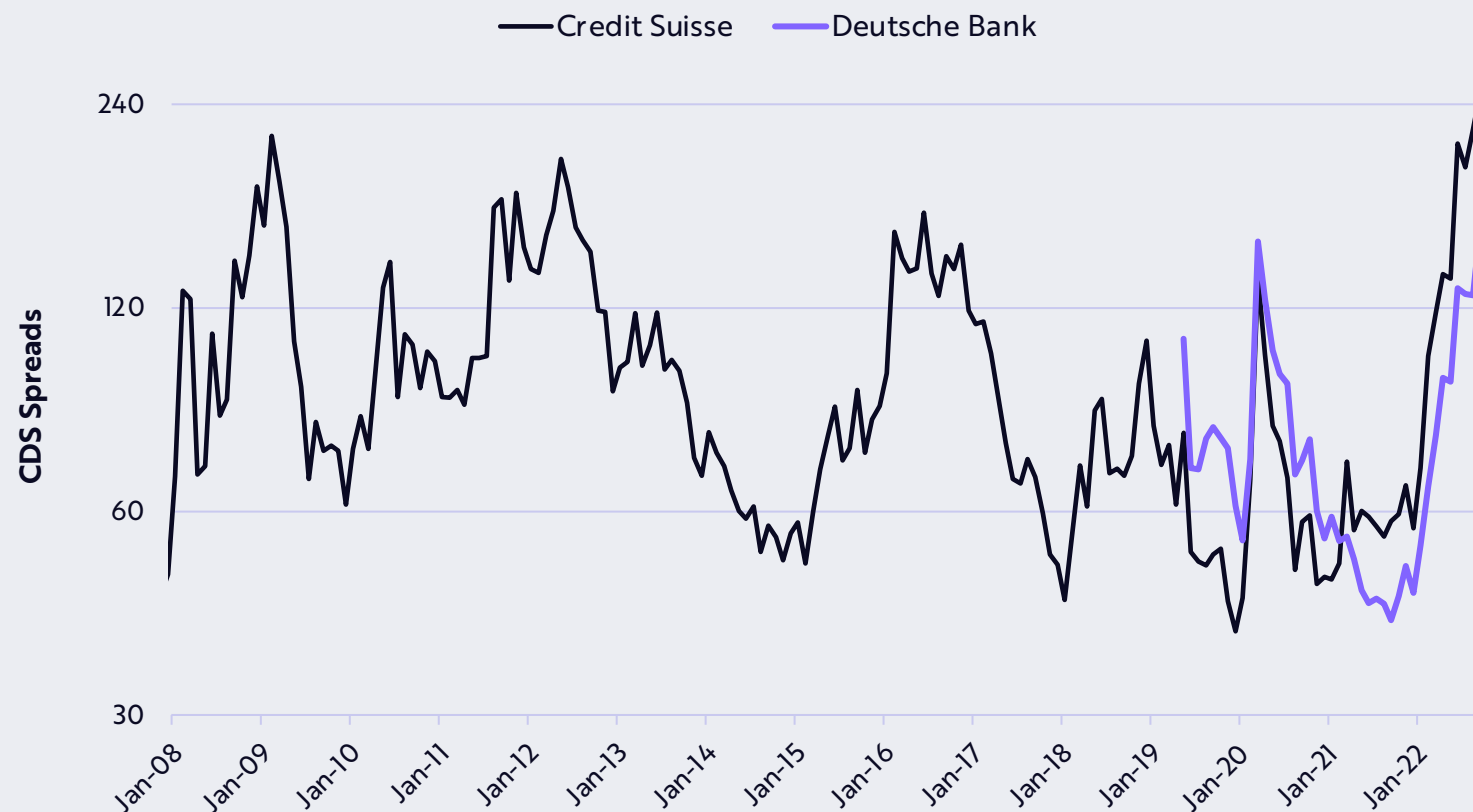
An index that measures bond-implied volatility, MOVE stands at its highest levels since the 2020 COVID-19 scare and the 2008-2009 housing crisis, suggesting stress in US Treasury Bonds and the broader market.

Source: ARK Investment Management LLC, 2022. Data from TradingView. Information as of September 28, 2022. For informational purposes only and should not be considered investment advice or a recommendation to buy, sell, or hold any particular security or cryptocurrency. Forecasts are inherently limited and cannot be relied upon.



# A Rising Dollar Sends Major European Banks Into Turmoil

## Credit Default Swap Spreads



### ARK'S VIEW: BEARISH

Credit Default Swaps of two major European, Global Systemically Important Banks currently trade at levels not seen since the 2008 financial crisis. Credit Suisse and Deutsche Bank seem to be under duress, as both stocks are down ~90% from their 2009 highs.

A rise in credit default swaps signals heightened fears of failure, as investors take out insurance against default.

A collapse would wreak havoc across the economy in the short term. In the long term, such failures would reinforce the importance and promise of crypto's openness, auditability, and transparency.

Source: ARK Investment Management LLC, 2022. Data from Bloomberg. Information as of September 28, 2022. For informational purposes only and should not be considered investment advice or a recommendation to buy, sell, or hold any particular security or cryptocurrency. Forecasts are inherently limited and cannot be relied upon.



## Section 04

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# Appendix: Glossary Of Terms





# Glossary Of Terms

**Active Owners:** An individual or organization managing the same set of addresses sending and receiving funds. Also known as active entities.

**Backwardation:** Describes when futures trade at a price lower than spot, denoting bullish market sentiment.

**Contango:** Describes when expirational futures contracts are trading at a price higher than spot, suggesting a bearish market environment.

**Delta Cost Basis:** An adjusted version of the market cost basis. It is calculated by subtracting the life-to-date moving average of bitcoin's price from its realized price. The measure is used to gauge the downside risk of a bear market. Also known as delta price or delta cap.

**Difficulty:** Computational power required to validate transactions in the network. "Exa-" and "tera-" hashes per second refer to units of account to a factor of  $10^{18}$  and  $10^{12}$ , respectively. Higher difficulty implies higher network security.

**Exchange Supply:** The number of bitcoins held in addresses controlled by exchanges.

**Expirational Futures Basis:** The difference between the price of spot and the price of expirational futures contracts.

**Futures Basis:** The difference between the price of spot and the price of a perpetual or expirational contract.

**Investor Cost Basis:** An adjusted version of the market cost basis. It is calculated by subtracting the life-to-date cumulative miner revenue in USD (thermo cap) from realized price. Also known as investor price or investor cap.

**Locked Supply:** The supply held by entities that have <25% probability of spending, as per their historical behavior. Also known as illiquid supply.

**Long-term Holding and Holders (LTH):** Related to supply last moved 155 days ago or more, the threshold at which the possibility of a bitcoin to remain unmoved increases drastically.

**Market Cost Basis:** The on-chain volume-weighted average price of the market, calculated by aggregating the value of all bitcoins in circulation at the time when they last moved. Also known as realized price or realized cap.

**Miner Revenue:** The number of bitcoins (in USD value) block miners obtain for securing the network.

**MVRV Ratios:** Market cap divided by different on-chain cost bases of the market, such as realized cap or short-term-holder realized cap.

**Net Realized Profit/Loss (NRPL):** The difference between realized profit and realized loss, normalized by market cap.

**Net Unrealized Profit/Loss (NUPL):** The difference between unrealized profit and unrealized loss, normalized by market cap. It measures current value relative to the aggregate cost basis (realized cap) of the market to determine how much the network is in profit or loss.

**Perpetual Futures Basis:** The difference between the price of spot and the price of non-expirational futures contracts.

**Puell Multiple:** Miner revenue (USD) divided by the 365-day moving average of miner revenue (USD). It measures miner earnings relative to their yearly average.

**Realized Returns:** The ratio reached by dividing the average price of bitcoins spent that day by the average price when they last moved. In essence, it is the ratio of price sold and price bought for the coins that moved that day. Also known as spent output ratio, or SOPR.

**Regional Cumulative Price Change:** The sum of month-over-month (30-day) price action during the business hours of the major financial hubs worldwide: New York for the US, London for Europe, and Hong Kong for Asia.

**Short-term Holding and Holders (STH):** Related to supply that moved in the last 155 days, the threshold at which the possibility for a bitcoin to move again increases drastically.

**Supply in Profit:** The percentage of bitcoins currently at a higher price compared to the price at which they last moved.

**Time-weighted Turnover:** The number of bitcoins traded that day, multiplied by the amount of time each coin had remained dormant. Also known as coindays destroyed.

**Transaction Volume:** The number of bitcoins that changed hands on any given day.





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