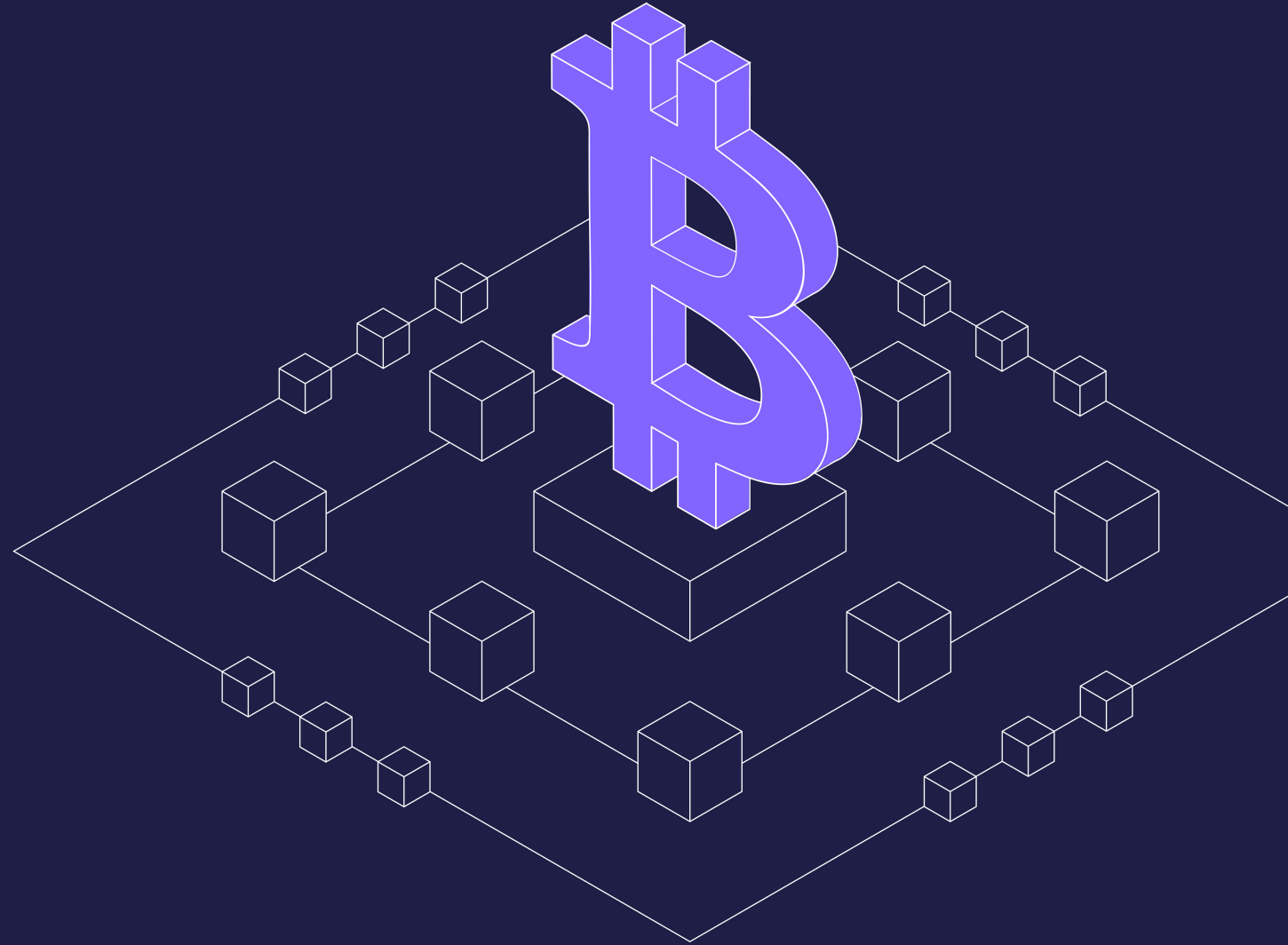




As of December 31, 2023

THE BITCOIN MONTHLY

**AFTER A PROFITABLE YEAR, ON-CHAIN
BITCOIN ACTIVITY ENDED 2023 ON A
HEALTHY NOTE**



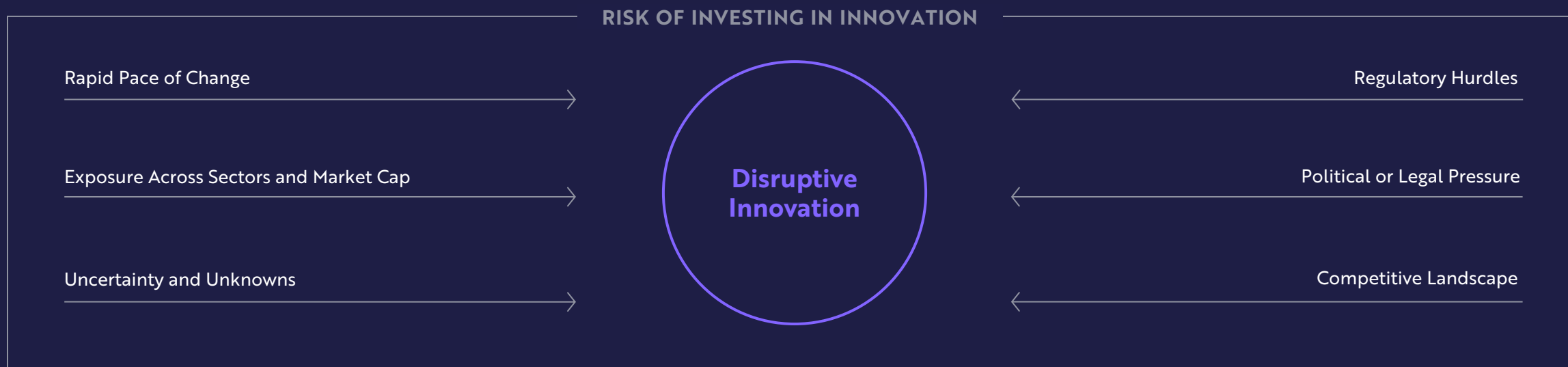
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RISKS OF INVESTING IN INNOVATION

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.



→ **Aim for a cross-sector understanding of technology and combine top-down and bottom-up research.**

→ **Aim to understand the regulatory, market, sector, and company risks. (See Risk and Disclosure Page)**



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Appendix: Glossary of Terms



Section 01

Market Summary





The Price of Bitcoin Is Consolidating After a Strong Run

Bitcoin Holders Are Taking Profits at the Margin

- The bitcoin price is consolidating well above technical support: its 200-day moving average (\$31,930), its on-chain mean (\$32,280), and its short-term-holder cost basis (\$35,860).
- Although they are taking profits at the margin, investors and traders seem to be committed to core positions.

Recession and Inflation Indicators Are Pointing Toward Lower Interest Rates

- The yield curve, as measured by the 10-year Treasury yield relative to the 3-month Treasury rate, has been inverted for more than a year, suggesting the high probability of a recession within the next 12 months.
- Correlated to the year-over-year growth in M2¹ with an 18-month lag, CPI-based inflation is likely to surprise on the low side of expectations in 2024.

ARK'S KEY TAKEAWAYS

- In December, the price of bitcoin rose 4.25% to \$44,100.
- In 2023, the price of bitcoin appreciated ~156%.
- While some bitcoin holders are taking profits, the broad-based market is holding strong.
- A prolonged inversion of the yield curve increases the probability of lower-than-expected real growth and inflation in 2024.

[1] M2: The US Federal Reserve's estimate for the total money supply, including cash plus money deposited in checking and savings accounts, as well as other savings vehicles like certificates of deposit. Source: ARK Investment Management LLC, 2023. Data from [Glassnode](#) unless otherwise specified. Data valid as of December 31, 2023, and subject to change. For more information on certain terms, please read our Glossary Of Terms in the Appendix 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. Past performance is not indicative of future results.



News of the Month

[Coinbase's International Exchange To Launch Spot Crypto Trading](#)

[Supply Chain Attack Targeting Ledger Crypto Wallet Leaves Users Hacked](#)

[SEC Denies Coinbase's Petition For Rulemaking](#)

[Tether: We've Onboarded FBI, Secret Service To Our Platform](#)

[3AC Liquidators Estimate 46% Recovery Rate For Creditors](#)

[Argentina's New Government Gives Early Nod To Bitcoin, Says Crypto Can Be Used In Contracts](#)

[SEC Tells Spot Bitcoin ETF Hopefuls To Make Final Changes By Year-End](#)

[US Judge Sides With SEC In Terraform Labs Case Over Unregistered Securities](#)

[Sam Bankman-Fried Will Not Face A Second Trial](#)

[Vitalik Buterin Shares Updated 2024 Roadmap For Ethereum](#)



Despite a Drop in Network Active Owners, On-Chain Health Remained Net Positive

	Bitcoin Metrics ¹	Unit	December 2023	1M Change	1Y Change	ARK's View	Upgrade/Downgrade ³
Network Security	<u>Mining Difficulty</u>	Exahash/sec ¹ (Thousands)	309.2	+5.95%	+103.61%	Bullish	No Change
	<u>Miner Revenue</u> (7-Day Moving Average)	USD (Millions)	47.4	+26.3%	+209.8%	Bullish	No Change
Network Usage	<u>Active Owners</u> ² (Active Entities, 7-Day Moving Average)	Thousands	210	-25.2%	-12.3%	Bearish	↓ ↓
	<u>Transaction Volume</u> ² (7-Day Moving Average)	BTC (Thousands)	114.2	-6.02%	-7.33%	Bearish	No Change
Holder Behavior	<u>Long-Term-Holder Supply</u> ² (Coins Held for 155 Days+)	BTC (Millions)	14.8	-0.36%	+5.92%	Neutral	No Change
	<u>Locked Supply</u> ² (Illiquid Supply)	BTC (Millions)	15.3	+0.24%	+4.11%	Bullish	No Change
	<u>Time-Weighted Turnover</u> ² (Coindays Destroyed, 7-Day Median)	Coindays (Millions)	8.7	-4.05%	-8.02%	Bullish	No Change

[1] For more information on these metrics and their units of account, please read the Appendix: Glossary of Terms in the Appendix 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. One arrow denotes a 1-tier change, and two arrows denote a 2-tier change. Source: ARK Investment Management LLC, 2023. Data sourced from [Glassnode](#). Some data may be subject to change over time since they are entity-adjusted in real time. Information as of December 31, 2023. For informational purposes only and should not be considered investment advice or a recommendation to buy, sell, or hold any particular security or cryptocurrency.

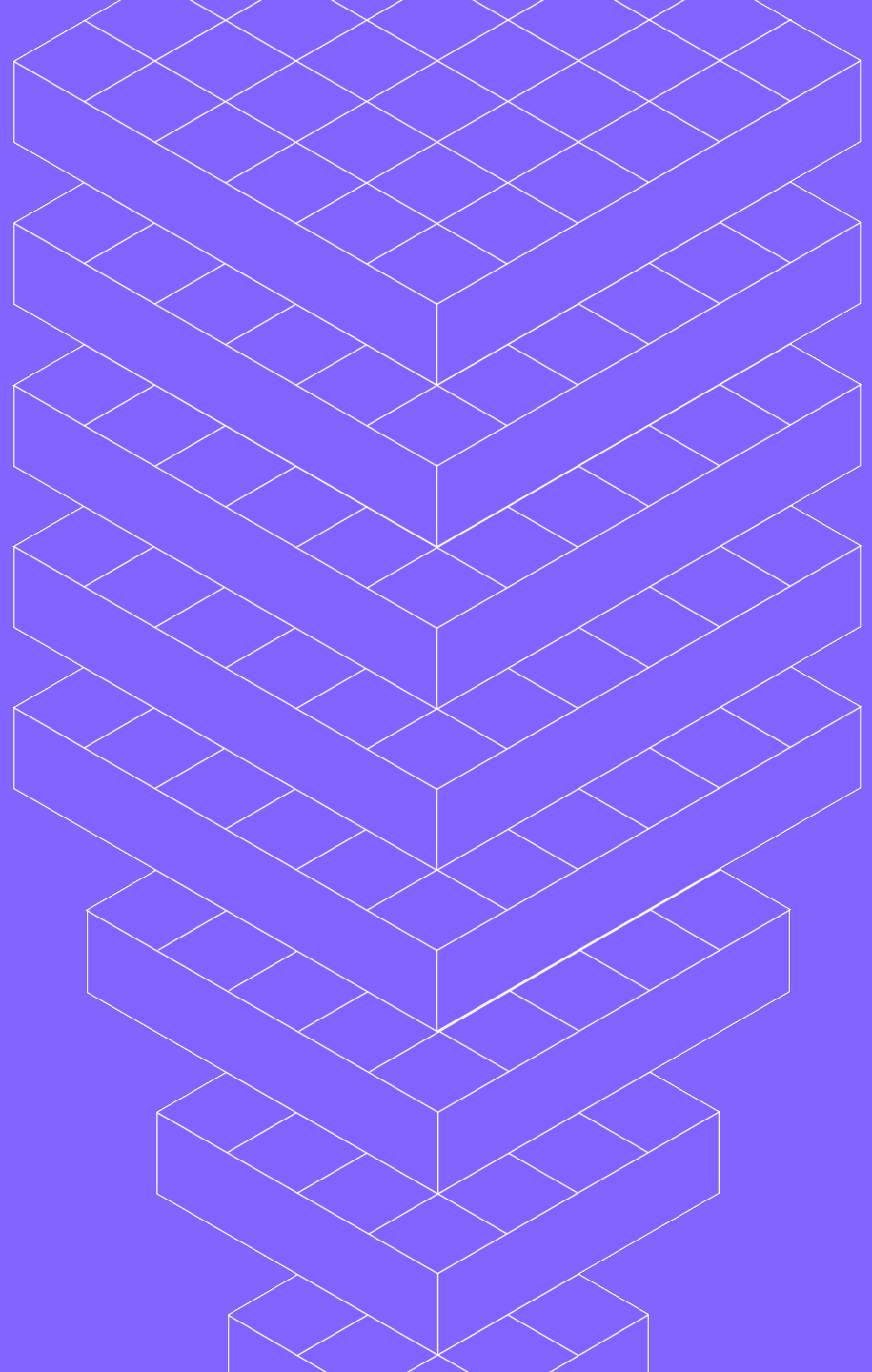


Despite Short-Term Exuberance, Bitcoin's Cost Bases Still Are Increasing

	Bitcoin Metrics ¹	Unit	December 2023	1M Change	1Y Change	ARK's View	Upgrade/Downgrade ³
Long-Term Valuation	<u>Market Cost Basis</u> (Realized Price)	USD	\$21,941	+3.92%	+10.94%	Bullish	No Change
	<u>Percent Supply In Profit</u>	pp	85.4%	+1.07	+37.17	Bullish	No Change
Short-Term Valuation	<u>Short-Term-Holder Cost Basis²</u> (STH Realized Price)	USD	\$35,866	+13.13%	+68.16%	Bullish	No Change
	<u>Realized Market Returns²</u> (SOPR-1, 7-day moving average)	pp	10.3%	+2.26	+21.49	Neutral	↓
Market Sentiment	<u>Perpetual Futures Basis</u> (Binance, Estimated, 7-Day Exponential Moving Average)	pp	0.07%	+0.10	+0.10	Bearish	↓
	<u>Expirational Futures Basis</u> (Quarterly, All Exchanges, Annualized)	pp	15.21%	+7.09	+15.83	Bearish	↓

[1] For more information on these metrics and their units of account, please read the Appendix: Glossary of Terms in the Appendix 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. One arrow denotes a 1-tier change, and two arrows denote a 2-tier change. Source: ARK Investment Management LLC, 2023. 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 December 31, 2023. For informational purposes only and should not be considered investment advice or a recommendation to buy, sell, or hold any particular security or cryptocurrency.

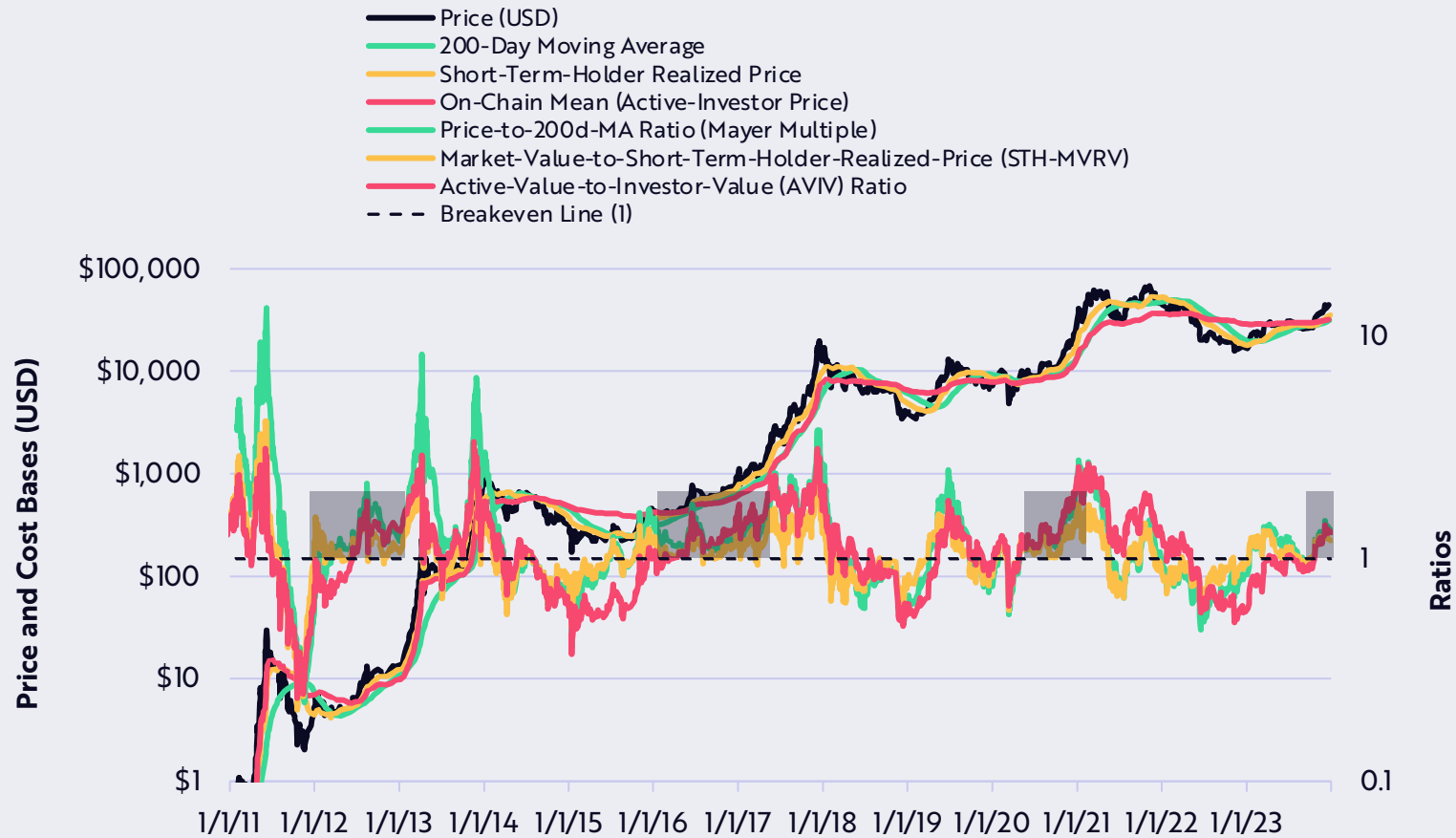
Bitcoin's Strong Holder Base





Bitcoin's Price Is in a Bullish Primary Trend, but Has Slipped Into Neutral Territory on a Short-Term Basis

Bitcoin Price, Cost Bases, and Price-to-Cost-Bases Ratios



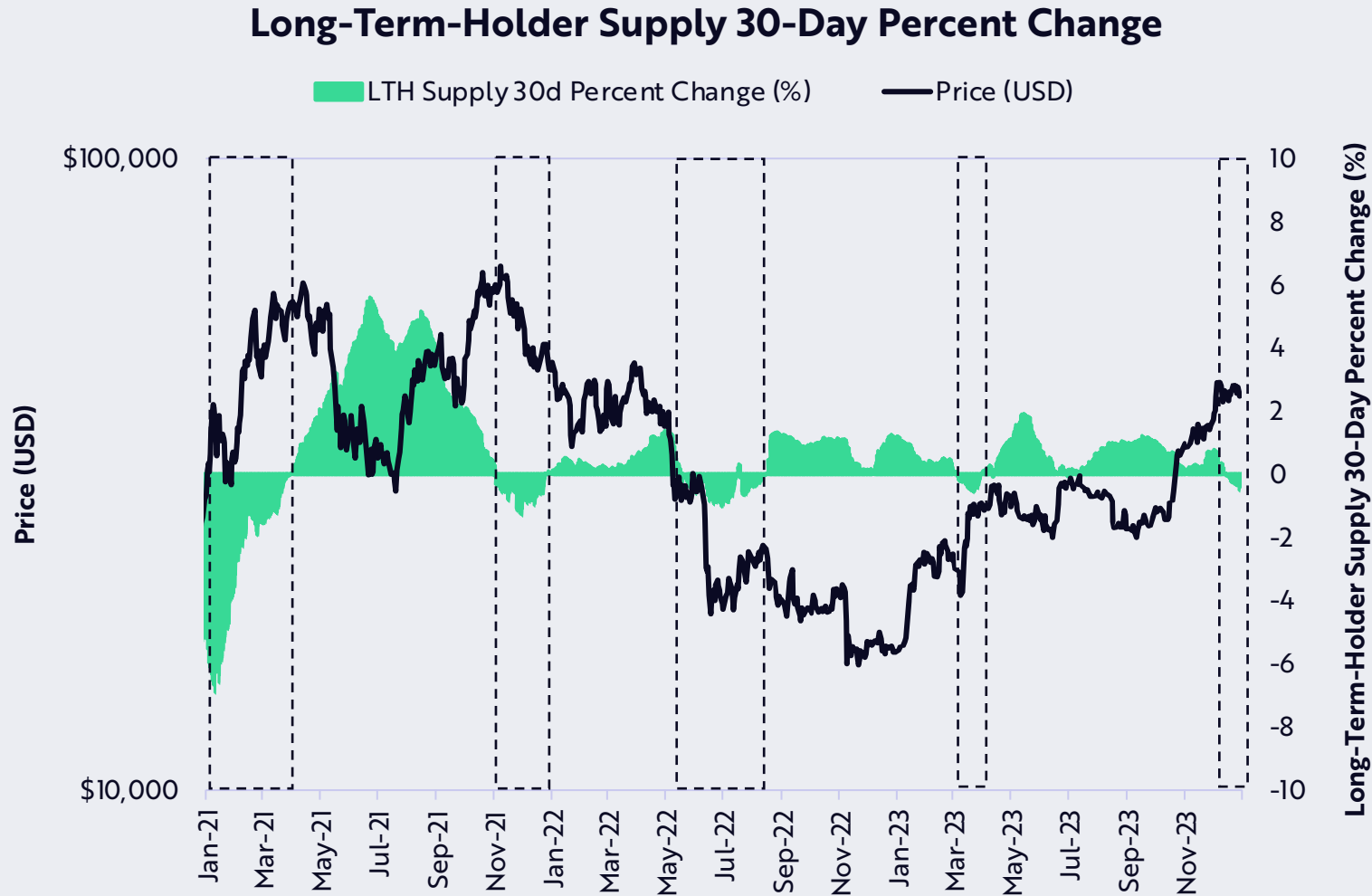
ARK'S VIEW: BULLISH

- Bitcoin's price closed December above important short-term support: its 200-day moving average (\$31,930), its short-term-holder cost basis (\$35,860), and its on-chain mean (\$32,280).
- Dividing price by each of these support levels, bitcoin appears to be in the early-to-mid stages of a bullish trend.

Source: ARK Investment Management LLC, 2023. Chart data from [Classnode](#). Information as of December 31, 2023. Data may be subject to change over time since they are entity-adjusted in real time via a machine-learning algorithm. 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. Past performance is not indicative of future results.



Long-Term-Holder Net Outflows Suggest Profit-Taking at the Margin



ARK'S VIEW: BEARISH

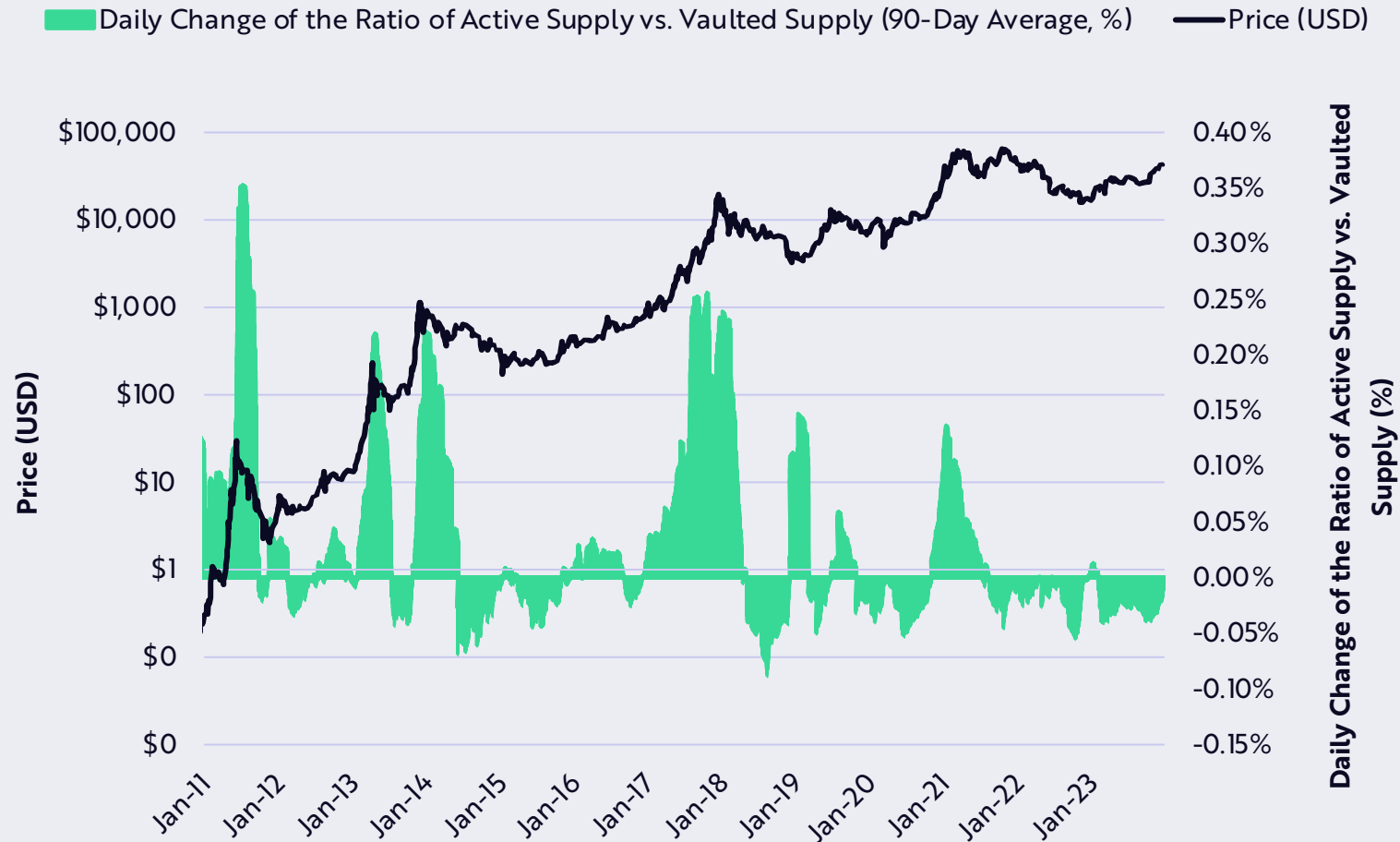
- Long-term holders of bitcoin are selling at the margin, as measured by a 30-day net outflow of -0.3%.
- Although not extreme, the outflows indicate moderate profit-taking activity in the short-term.
- Long-term holder net inflows during the past year suggest conviction and could sustain the bullish primary trend.
- “Long-term-holder supply” is defined as coins that have not moved in 155+ days.

Source: ARK Investment Management LLC, 2023. Chart data from [Classnode](#). Information as of December 31, 2023. Data may be subject to change over time since they are entity-adjusted in real time via a machine-learning algorithm. 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. Past performance is not indicative of future results.



Vaulted Coins Exceed Active Coins on a 90-Day Basis, a Bullish Signal

Change in the Ratio of Active Supply vs. Vaulted Supply



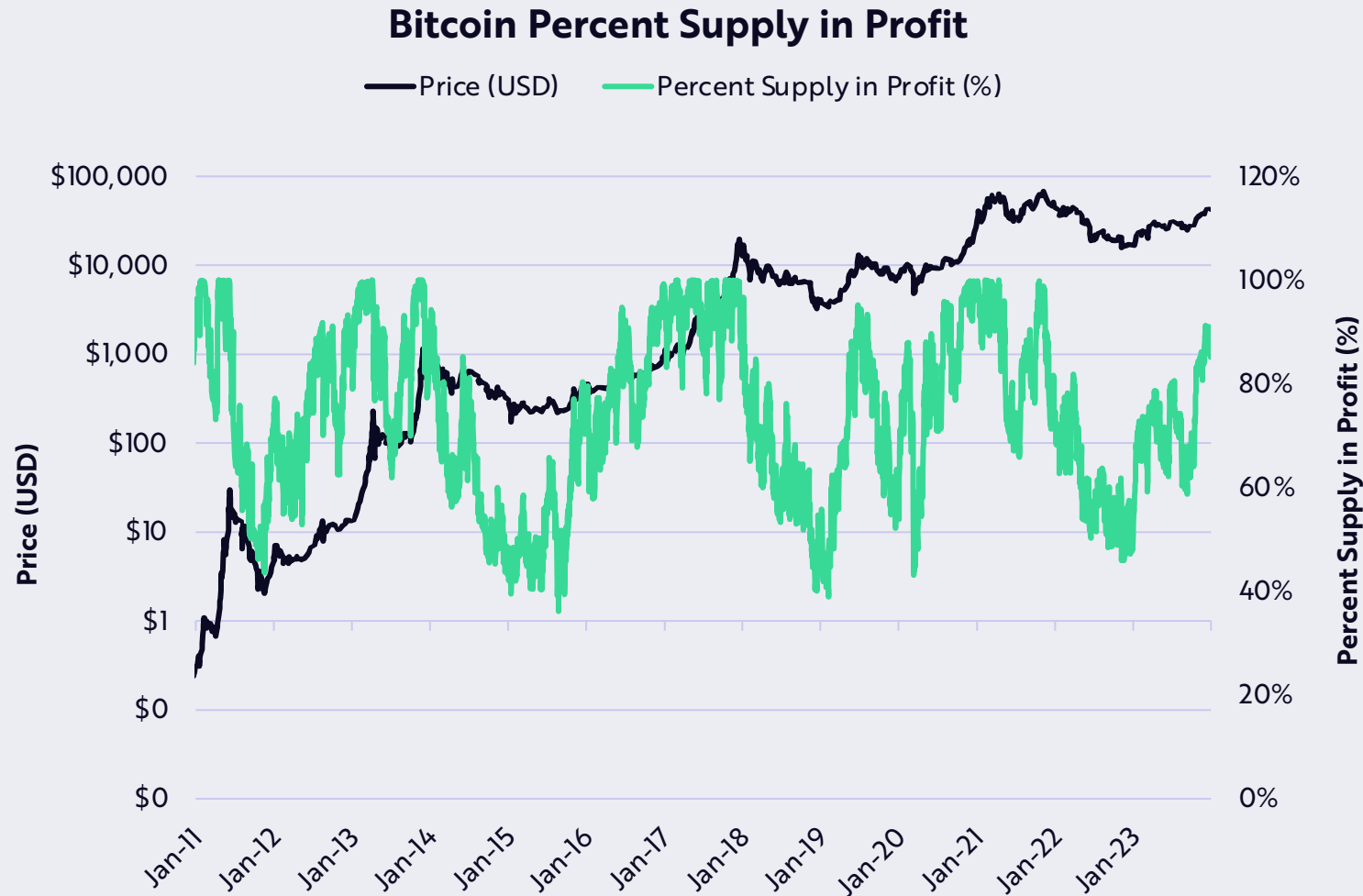
ARK'S VIEW: BULLISH

- The 90-day ratio of active bitcoin supply relative to vaulted supply suggests that holders have yet to release dormant coins into circulation.
- Vaulted supply is the number of coins that have not moved in the Bitcoin network which, when compared to long-term holder supply, represents a more comprehensive view of the Bitcoin network.

Source: ARK Investment Management LLC, 2023. Chart data from [Classnode](#). Information as of December 31, 2023. 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. Past performance is not indicative of future results.



The Percent of Bitcoin in Profit Hit ~90% in December



ARK'S VIEW: BULLISH

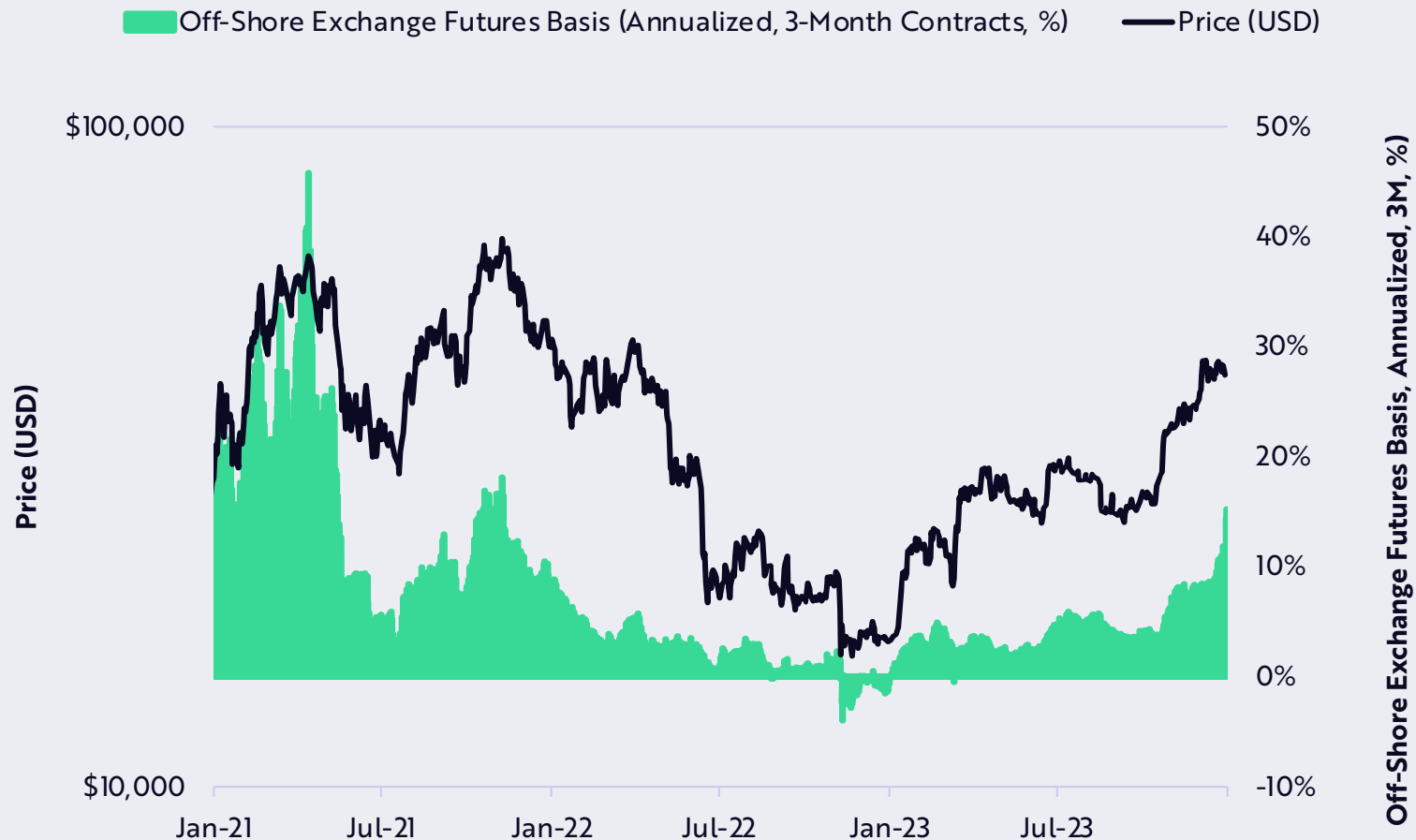
- Nearly 90% of bitcoin's supply was in profit in late 2023.
- In November 2021, the percentage of supply in profit reached current levels when bitcoin's price was \$58,900—33.8% higher than in December 2023.
- Higher profitability at lower price points suggests that market participants are comfortable holding bitcoin at these levels.

Source: ARK Investment Management LLC, 2023. Chart data from [Classnode](#). Information as of December 31, 2023. Data may be subject to change over time since they are entity-adjusted in real time via a machine-learning algorithm. 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. Past performance is not indicative of future results.



Speculation Has Increased in the Off-Shore Futures Market

Bitcoin Off-Shore Exchange Futures Basis



ARK'S VIEW: NEUTRAL

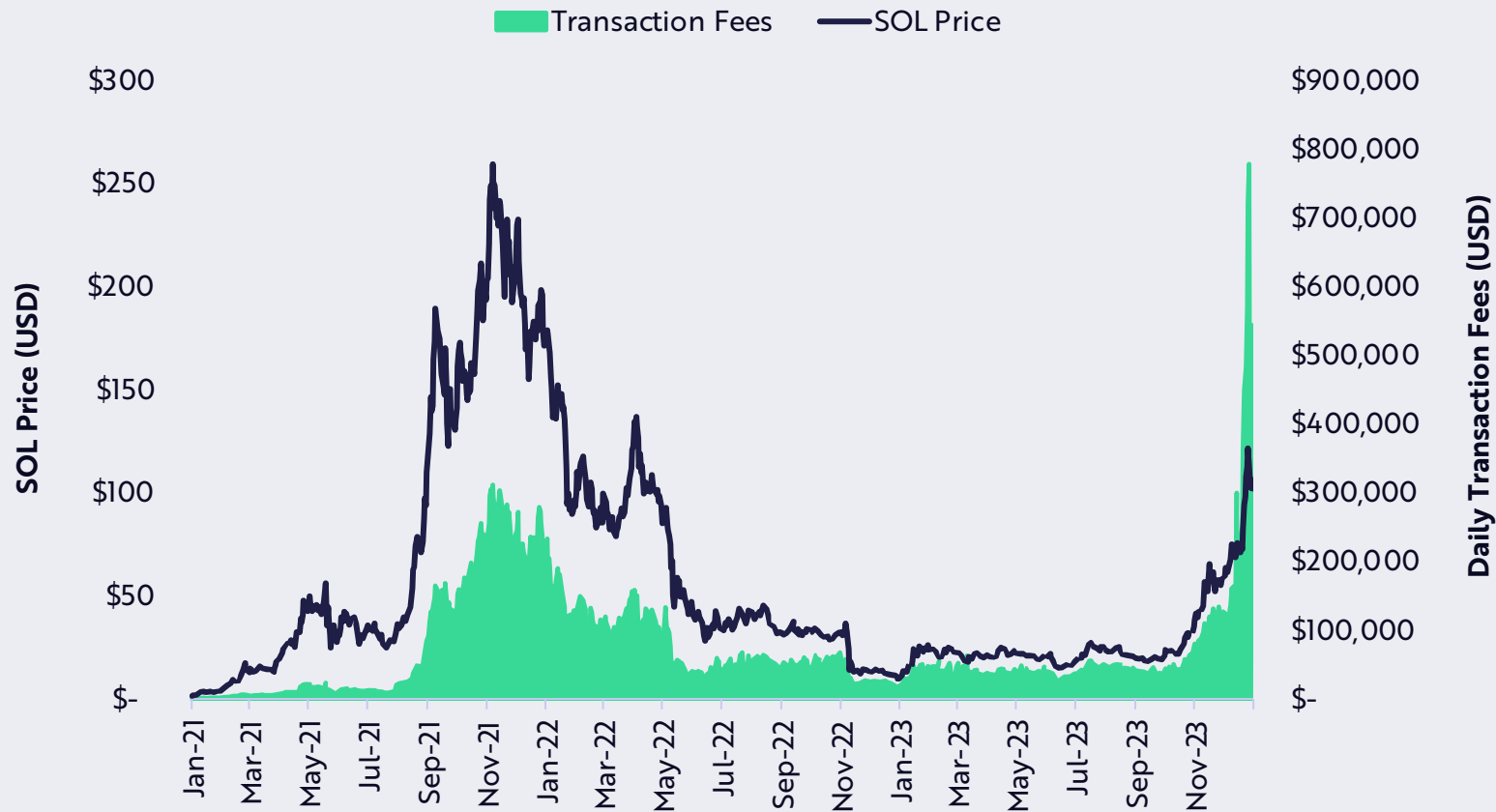
- The 3-month futures basis at off-shore exchanges flipped, from -0.62% backwardation at the start of 2023 to +15.21% contango in late December.
- While lower than at prior cyclical market tops, this 16+ percentage point reversal suggests that bitcoin has entered more speculative territory.
- For context, in April 2021 the futures basis peaked at 45.76%, a level associated with excessive exuberance.

Source: ARK Investment Management LLC, 2023. Chart data from [Classnode](#). Information as of December 31, 2023. 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. Past performance is not indicative of future results.



Increased On-Chain Activity and Price Appreciation Pushed Solana Transaction Fees to All-Time Highs

Solana Fees and Token Price



ARK'S VIEW: BULLISH

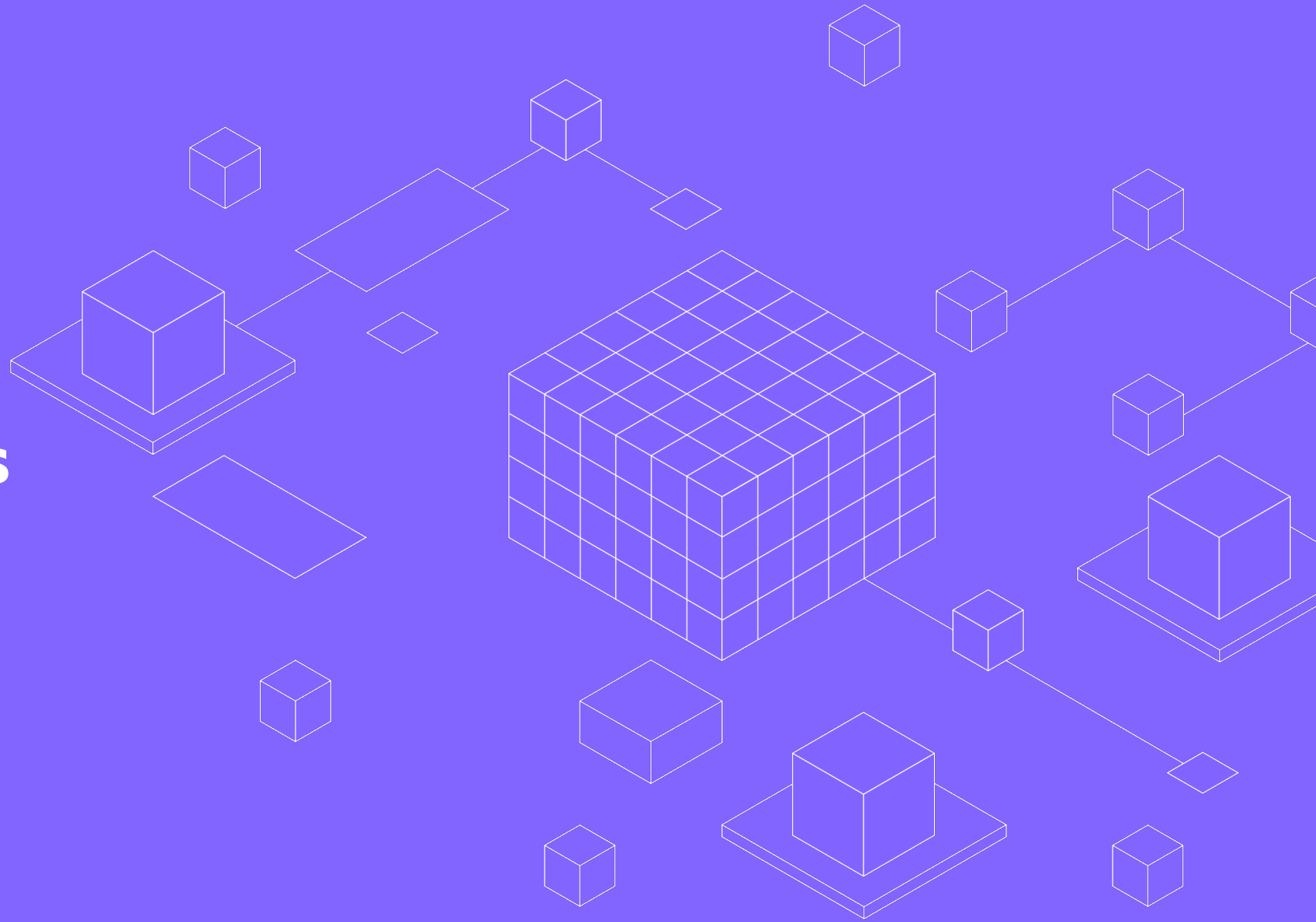
- Excitement around Solana, a low-cost, high-throughput blockchain, continued to build throughout December.
- During December, daily transaction fees hit an all-time high of \$778,000 as the token price appreciated 72%, making Solana the best performing large-cap cryptoasset.
- While metrics like transaction fees and total daily active addresses trail those measuring Ethereum's ecosystem, Solana's simple architecture has enhanced both the user and the developer experiences, making it a formidable competitor.

Source: ARK Investment Management LLC, 2023. Chart data from Token Terminal. Information as of December 31, 2023. 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. Past performance is not indicative of future results.



Section 03

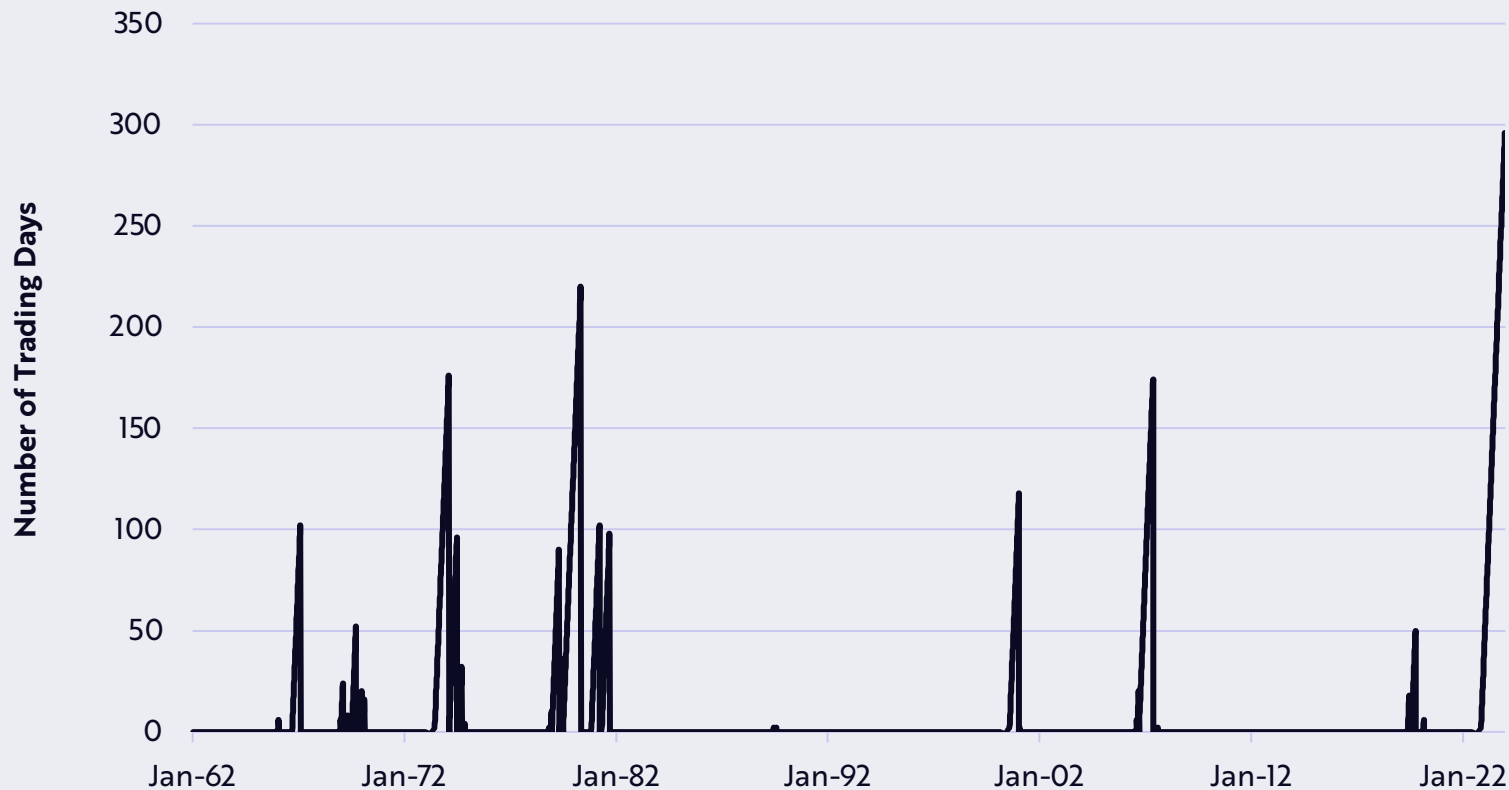
Recession and Inflation Indicators





The Number of Trading Days With an Inverted Yield Curve Reached Record Highs

10-Year Yield Minus 3-Month Yield: Consecutive Trading Days Inverted



ARK'S VIEW: BEARISH

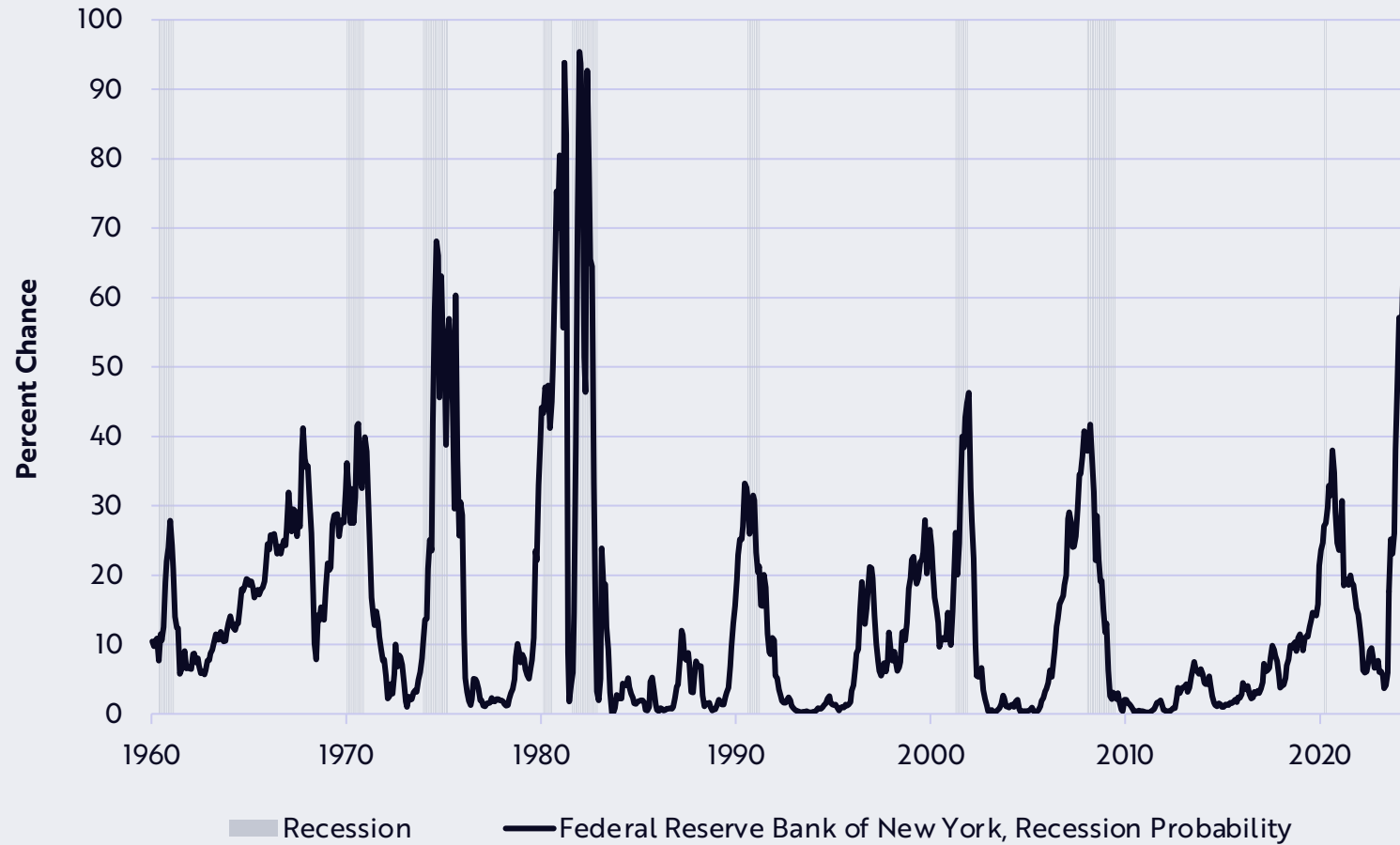
- During December, the consecutive number of trading days that the yield curve—as measured by the 10-year Treasury yield and the 3-month Treasury rate—was inverted hit a record.
- Historically, an inverted yield curve has been a harbinger of recession and lower inflation.
- An inverted yield curve lowers the incentive for banks to make loans.

Source: ARK Investment Management LLC, 2023. Chart data from Macrobond. Information as of December 31, 2023. 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. Past performance is not indicative of future results.



Recession Appears Likely

Recession Probability



ARK'S VIEW: NEUTRAL

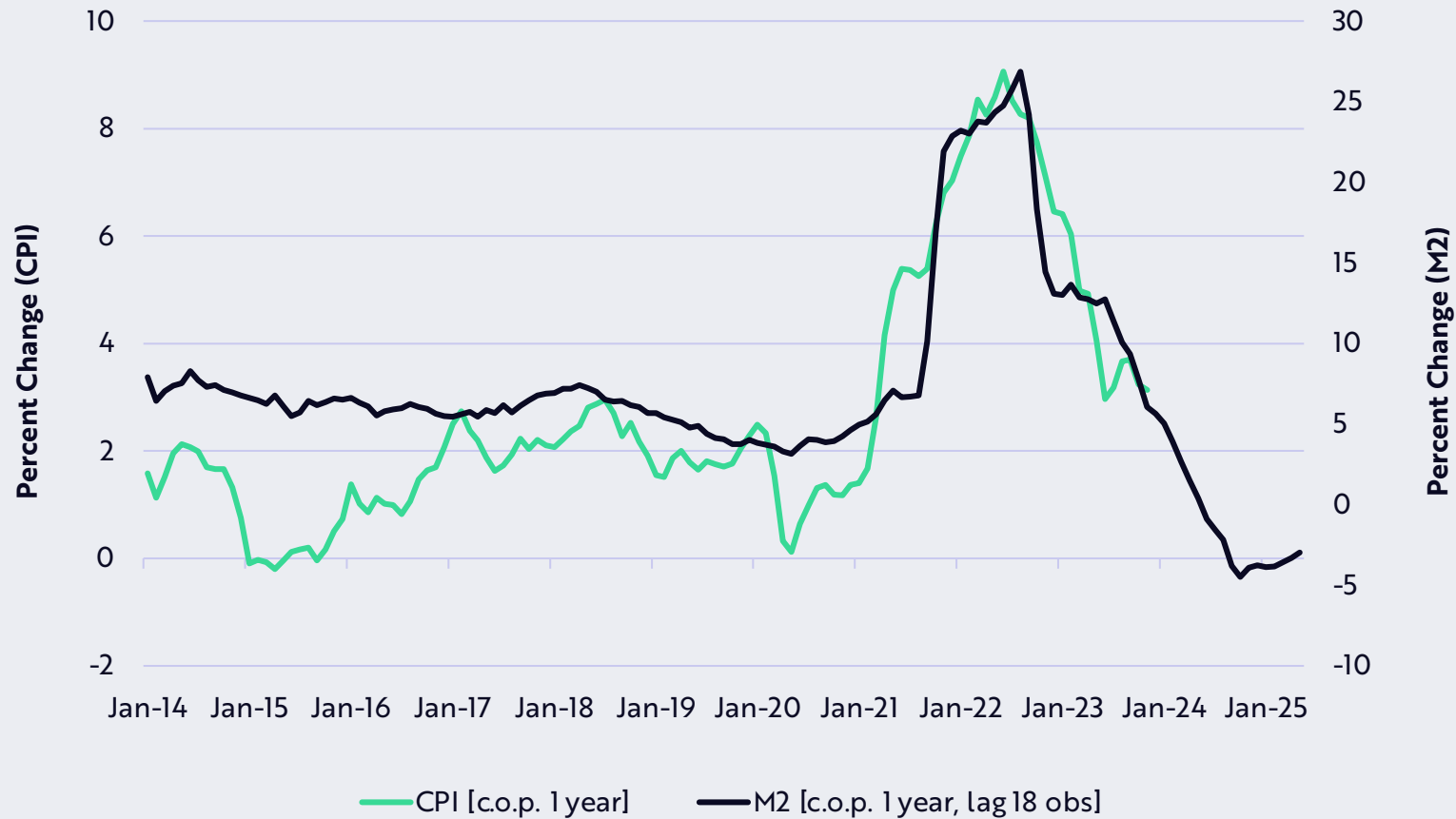
- The New York Fed's recession model suggests a ~50% chance of recession during the next twelve months.
- The model is based on the spread between the 10-year and 3-month Treasury yields, which has been inverted for a record number of consecutive trading days.

Source: ARK Investment Management LLC, 2023. Chart data from Macrobond. Information as of December 31, 2023. 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. Past performance is not indicative of future results.



Contraction of the Money Supply Is Pointing To Consumer Price Deflation

Year-Over-Year M2 Leads CPI by 18 Months



ARK'S VIEW: BULLISH

- A year-over-year decline in the money supply suggests potential deflation in prices.
- The M2 money supply has been negative on a year-over-year basis for the past year.
- Money supply growth tends to lead CPI inflation by 18 months.



Section 04

Appendix: Glossary of Terms





Glossary of Terms

Accumulation Addresses: Defined as those addresses that have received two or more economically meaningful transactions (non-dust transactions) and have never spent funds. Exchange and miner addresses are discarded. “Accumulation balance” refers to coins held in these addresses.

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.

BRC-20: A token standard that enables the minting and transaction of fungible tokens via the Ordinals protocol on the Bitcoin network.

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

Consumer Price Index (CPI): Measurement that tracks how the average price of a basket of consumer goods and services changes over time. It's often used to calculate inflation.

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.

Federal Funds Policy Rate: This is the interest rate at which banks lend money to each other overnight. It's set by a country's central bank (like the Federal Reserve in the U.S.) and influences other interest rates throughout the economy.

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

Gross Domestic Income (GDI): This is the total income earned by a country's residents and businesses, including wages, profits, and taxes minus subsidies. It's a way to measure the economic health of a country, much like GDP.

Gross Domestic Product (GDP): This is the total value of all goods and services produced in a country over a certain period of time, usually a year. It's another way to measure a country's economic performance.

Hash Rate: The estimated computational power mining within and providing security to the Bitcoin network.

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.

Liveliness: The ratio of the sum of coindays created to the sum of coindays destroyed. Liveliness rises when old coins move and decreases when participants hold on to their bitcoin. In essence, it's the ratio of coin movement to coin dormancy in the network.

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 remaining 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.

Natural Rate of Interest: Theoretical interest rate that at which the economy is neither expanding nor contracting.

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.

On-Chain: Refers to metrics or economic activity occurring on the blockchain ledger of most cryptocurrencies.

On-Chain Mean: Developed collaboratively by ARK Invest and Glassnode, on-chain mean is calculated by dividing the cost basis capitalization of investors—the secondary market of the Bitcoin network—by the number of active coins in the network based on their aggregate time of dormancy proportional to total supply. Also known as “active-investor price” or “true market mean.”



Glossary of Terms, continued

Ordinals: Refers to the creation of non-fungible tokens (NFTs) in the Bitcoin network by making Inscriptions, where metadata such as images or videos are attached to individual satoshis (the smallest unit of account).

Patoshi: Entity estimated to be Satoshi Nakamoto, the creator and first miner of bitcoin.

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 (SOPR): 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 to 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.

Seller Exhaustion Constant: A metric created by ARK to measure the convergence of two market factors: high losses denoting capitulation and low volatility denoting market exhaustion.

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

Supply in Profit (Percentage): 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.

Velocity-Adjusted Cost Basis: It subtracts the cumulative dollar value of coins spent over time from the general cost basis of the market (realized price). Also known as balanced price is (the smallest unit of account).



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