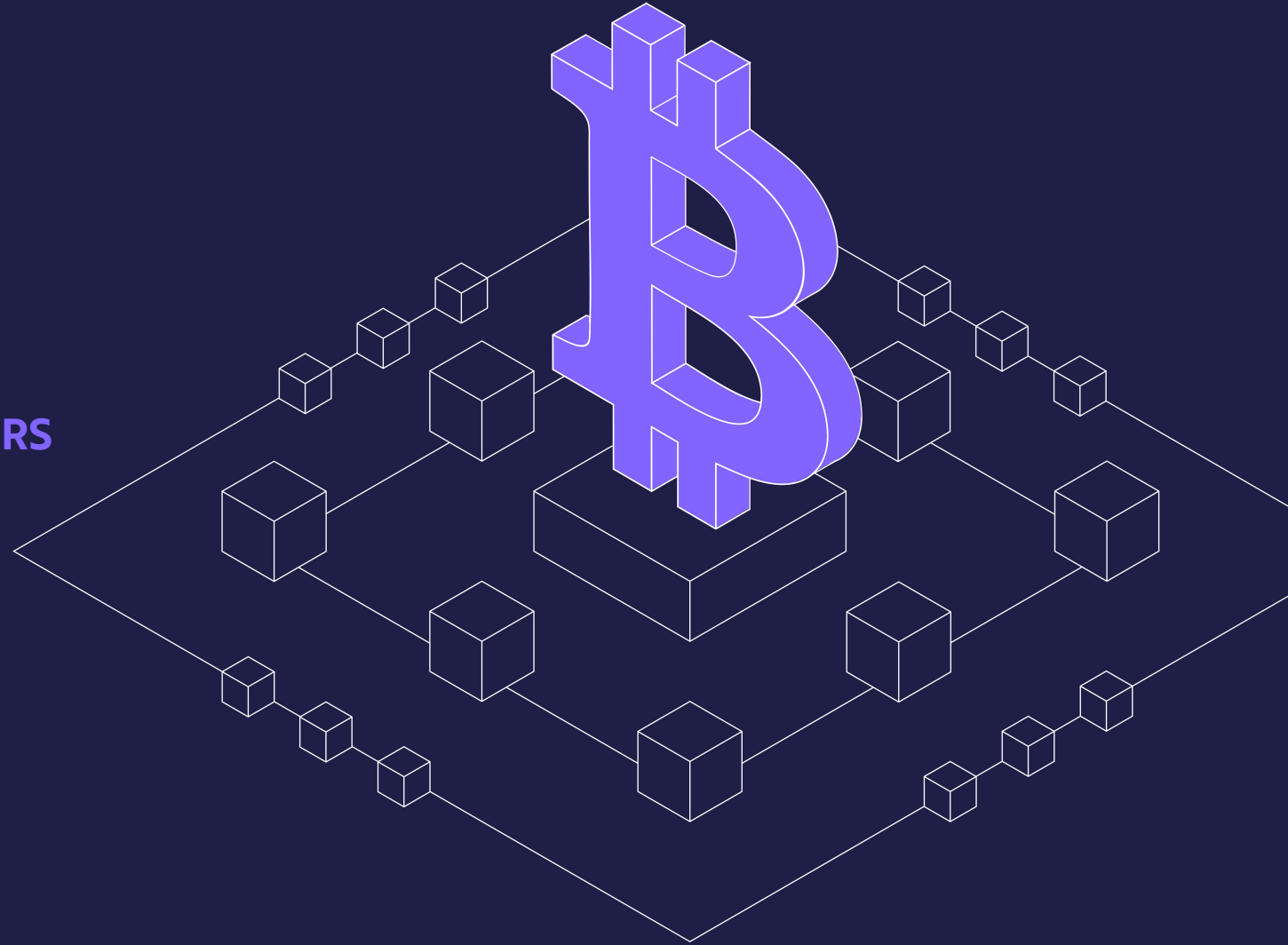




As of November 30, 2023

THE BITCOIN MONTHLY

BITCOIN'S SUPPLY IS SPLIT BETWEEN HOLDERS
AND BUYERS



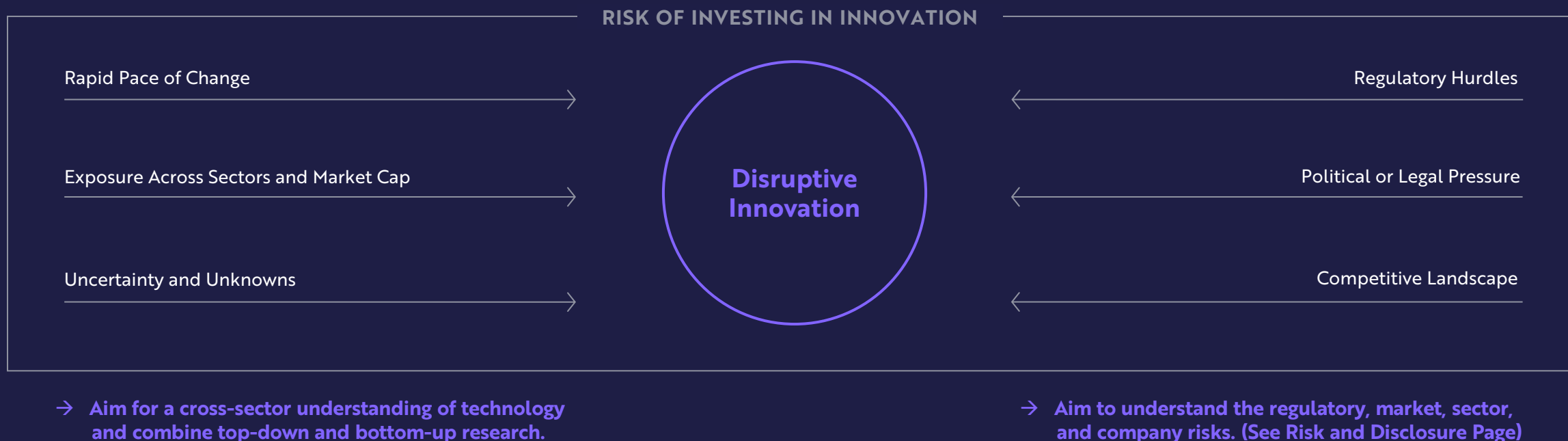
For Informational Purposes Only. ARK Investment Management LLC, 2023. This is not investment advice or a recommendation in relation to any named particular securities or cryptocurrencies and no warranty or guarantee is provided. Any references to particular securities or cryptocurrencies are for illustrative purposes only. The reader should not assume that an investment identified was or will be profitable. Certain information was obtained from sources that ARK believes to be reliable; however, ARK does not guarantee the accuracy or completeness of any information obtained from any third party. Forecasts are inherently limited and cannot be relied upon. **PAST PERFORMANCE IS NOT INDICATIVE OF FUTURE PERFORMANCE; FUTURE RETURNS ARE NOT GUARANTEED.**



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.





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Section 01

Market Summary





Bitcoin's Holder Base Remains Strong as Global Demand Increases

Holders Remain Steadfast as Demand for Bitcoin Goes Global

- Bitcoin continued to consolidate above an important cluster of supports: its 200-week moving average (\$28,435), its on-chain mean (\$30,949), and its short-term-holder cost basis (\$31,544).
- Cumulative price changes during US and Asian business hours suggest that demand for bitcoin is coming from both the West and the East.
- Bitcoin's holder base remained strong, as time-weighted turnover—measured by coindays destroyed¹—hit new lows and dormant supply across age cohorts hit new highs.

Investors Are Anticipating Monetary Easing Amid Deteriorating Economic Indicators

- A telling financial market barometer, the gold-to-oil ratio suggests a flight to safety and heightened economic uncertainty.
- Federal funds futures are pricing in sizeable rate cuts over the next 6-18 months.

ARK'S KEY TAKEAWAYS

- In November, the price of bitcoin rose by 8.88% to \$37,732 and closed above \$28,435, its 200-week moving average.
- Long-term holders continue to hoard bitcoin.
- During November, demand for bitcoin came from both Asia and the US.
- Economic indicators continue to signal weak activity.

[1] Please see *Time-weighted turnover* in our Glossary Of Terms on page 21 of this report.

Source: ARK Investment Management LLC, 2023. Data from [Glassnode](#) unless otherwise specified. Data valid as of November 30, 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 Crypto Futures for Retail US Traders Goes Live, Includes "Nano" Bitcoin Trading](#)

[PayPal Faces SEC Subpoena Over Its PYUSD Stablecoin](#)

[Sam Bankman-Fried Found Guilty on All Seven Criminal Fraud Counts](#)

[Genesis, Three Arrows Capital Reach Agreement on \\$1B of Claims](#)

[Bogus BlackRock XRP Filing Spoofs ETF Watchers, Crypto Traders](#)

[BlackRock Files for Spot Ethereum ETF With SEC](#)

[SEC Charges Kraken for Operating as an Unregistered Securities Exchange, Broker, Dealer, and Clearing Agency](#)

[CZ, Founder of Crypto Giant Binance, Pleads Guilty to Money Laundering Violations](#)

[Binance's Zhao Says Richard Teng to Become Next CEO](#)

[MicroStrategy Acquires Additional 16,130 Bitcoins and Now Holds 174,530 BTC](#)



Bitcoin's Holder Base Appears Steadfast

	Bitcoin Metrics ¹	Unit	November 2023	1M Change	1Y Change	ARK's View	Upgrade/Downgrade ³
Network Security	<u>Mining Difficulty</u>	Exahash/sec ¹ (Thousands)	291.8	+8.79%	+83.91%	Bullish	No Change
	<u>Miner Revenue</u> (7-Day Moving Average)	USD (Millions)	37.3	+12.76%	+171.39%	Bullish	No Change
Network Usage	<u>Active Owners</u> ² (Active Entities, 7-Day Moving Average)	Thousands	275.5	-6.81%	+8.52%	Bullish	No Change
	<u>Transaction Volume</u> ² (7-Day Moving Average)	BTC (Thousands)	119.1	-8.91%	-18.11%	Bearish	↓
Holder Behavior	<u>Long-Term-Holder Supply</u> ² (Coins Held for 155 Days+)	BTC (Millions)	14.9	+0.62%	+7.53%	Bullish	No Change
	<u>Locked Supply</u> ² (Illiquid Supply)	BTC (Millions)	15.3	+0.32%	+4.72%	Bullish	No Change
	<u>Time-Weighted Turnover</u> ² (Coindays Destroyed, 7-Day Median)	Coindays (Millions)	7.9	-30.87%	-17.27%	Bullish	↑↑

[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 November 30, 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.

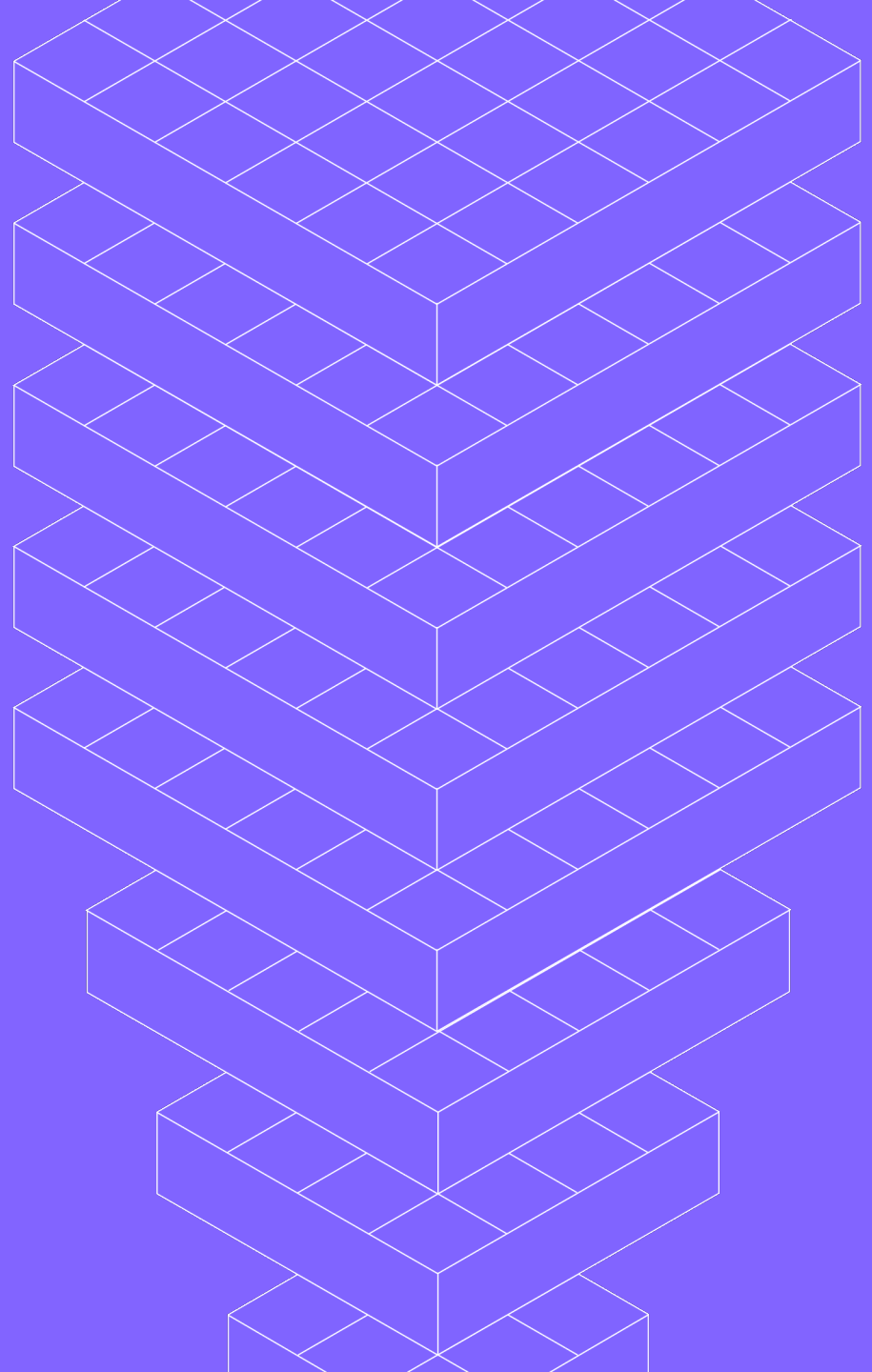


Bitcoin's Cost Bases Are Rising as Contango Signals a More Active Speculative Market

	Bitcoin Metrics ¹	Unit	November 2023	1M Change	1Y Change	ARK's View	Upgrade/Downgrade ³
Long-Term Valuation	<u>Market Cost Basis</u> (Realized Price)	USD	\$21,083	+2.33%	+4.5%	Bullish	No Change
	<u>Percent Supply In Profit</u>	pp	84.3	+0.39	+28.59	Bullish	No Change
Short-Term Valuation	<u>Short-Term-Holder Cost Basis²</u> (STH Realized Price)	USD	\$31,544	+9.69%	+68.16%	Bullish	No Change
	<u>Realized Market Returns²</u> (SOPR-1, 7-day moving average)	pp	8.04%	-3.02	+19.86	Bullish	No Change
Market Sentiment	<u>Perpetual Futures Basis</u> (Binance, Estimated, 7-Day Exponential Moving Average)	pp	-0.02%	-0.04	+0.04	Neutral	No Change
	<u>Expirational Futures Basis</u> (Quarterly, All Exchanges, Annualized)	pp	7.74%	+1.52	+7.68	Neutral	↓

[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 November 30, 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.

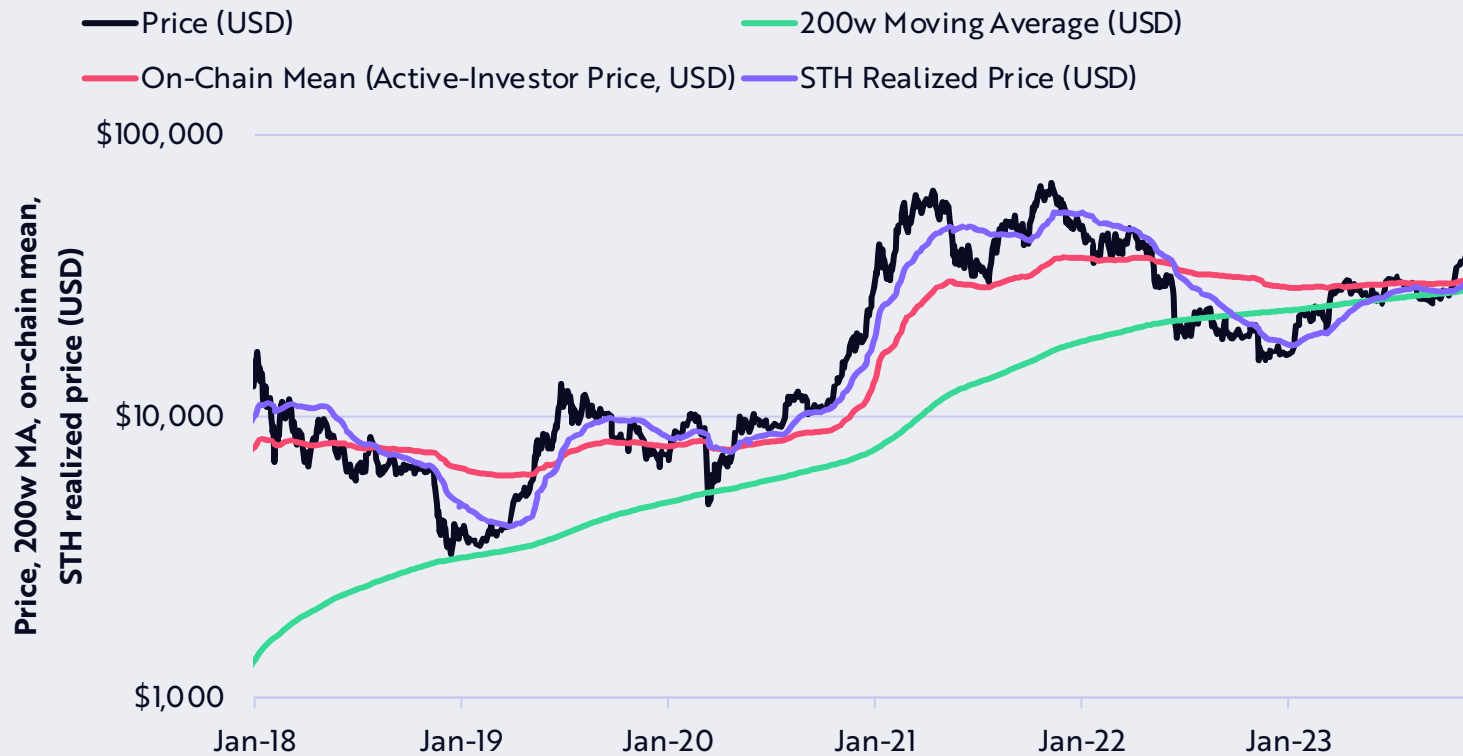
Holders Remain Steadfast as Demand for Bitcoin Goes Global





Bitcoin Is Well Above Cyclical Resistance

Bitcoin 200-Week Moving Average, On-Chain Mean, and Short-Term-Holder Cost Basis



ARK'S VIEW: BULLISH

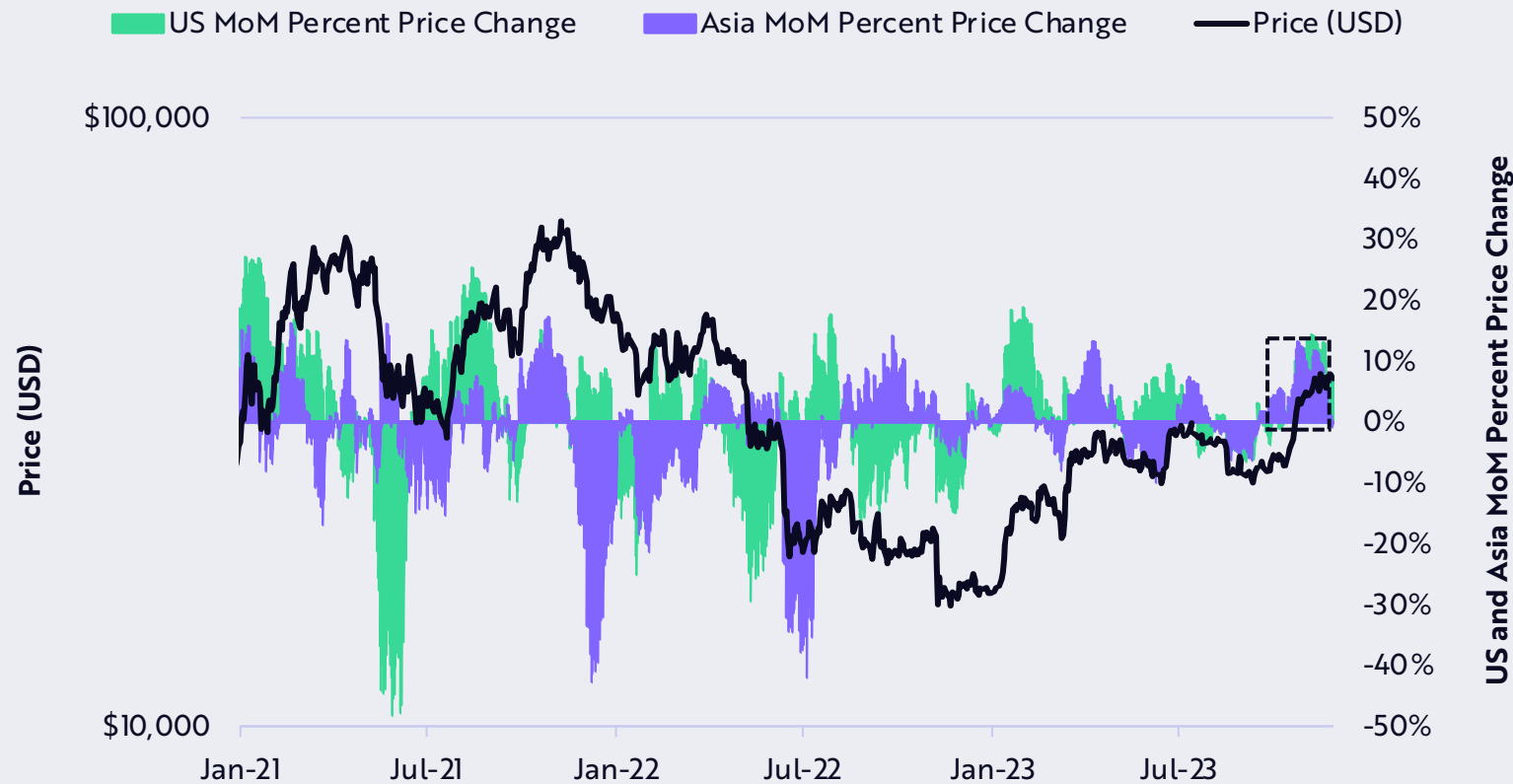
- In November, bitcoin closed above its 200-week moving average (\$28,435), its "active-investor price"/on-chain mean (\$30,949), and its short-term-holder cost basis (\$31,544).
- Broad-based cyclical "support" suggests that downside risk in the near term is between ~\$28,000 and ~\$32,000.

Source: ARK Investment Management LLC, 2023. Chart data from [Classnode](#). Information as of November 30, 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.



Both the East and the West Have Appetites for Bitcoin

Bitcoin East vs. West Month-Over-Month Percent Cumulative Price Change



ARK'S VIEW: BULLISH

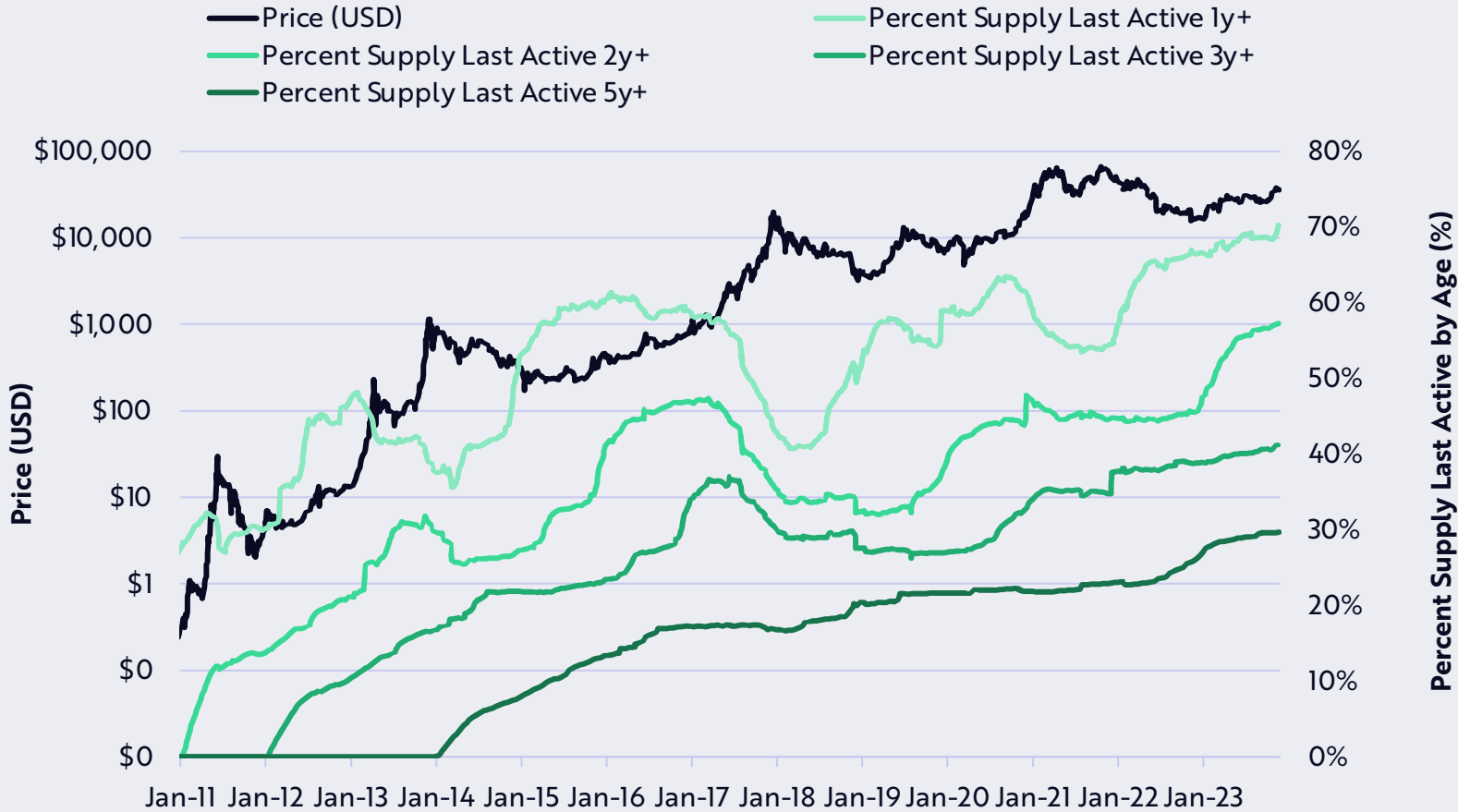
- As measured by the sum of price changes during business hours in New York and Hong Kong, bitcoin's price appreciated in both Eastern and Western regimes.
- Price appreciation during both trading cohorts suggests that the appetite for bitcoin has gone global.

Source: ARK Investment Management LLC, 2023. Chart data from [Classnode](#). Information as of November 30, 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.



Bitcoin Supply Is Increasing Across Cohorts

Bitcoin Percent Supply Last Active by Age



ARK'S VIEW: BULLISH

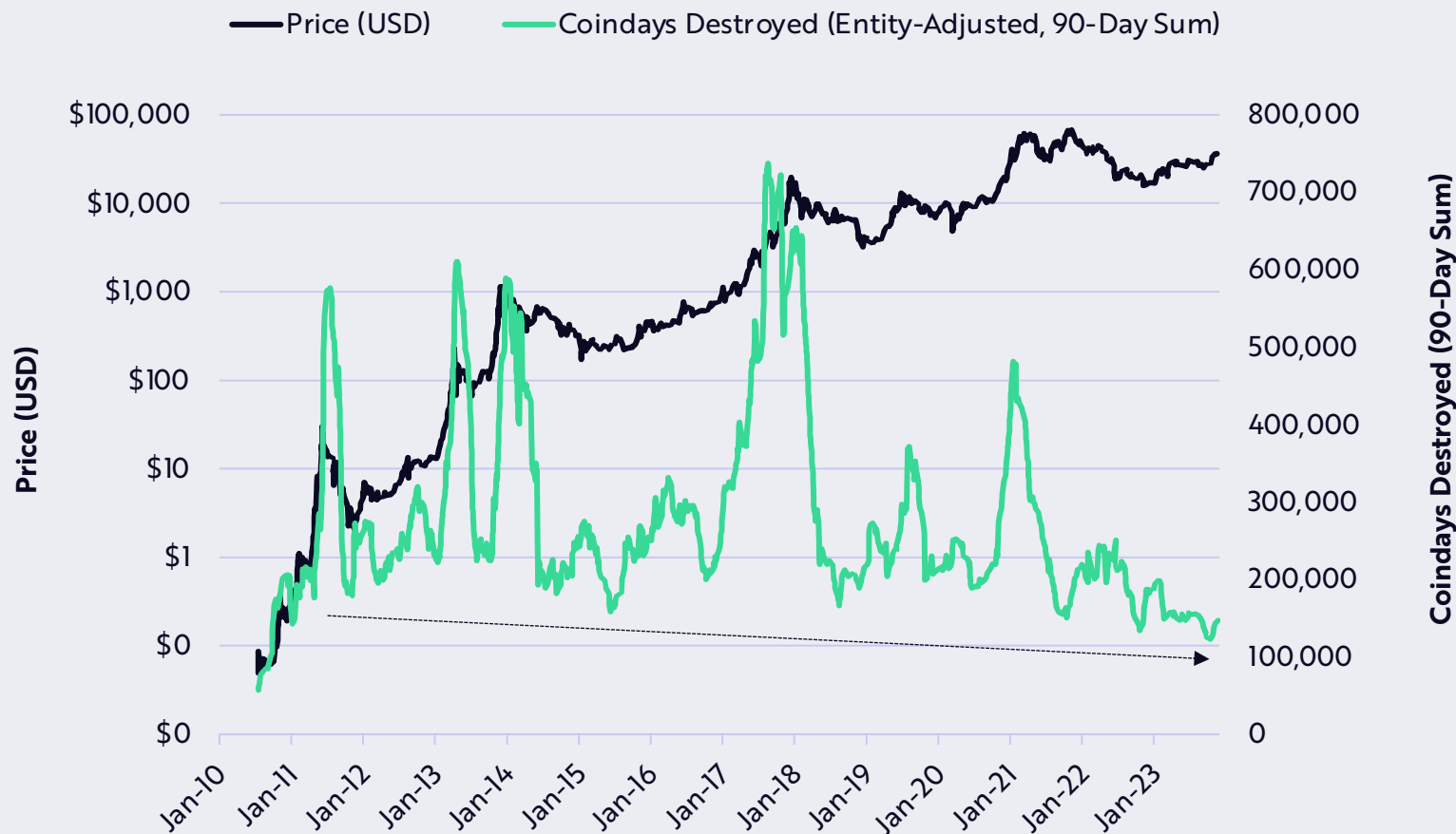
- As measured by time held, the percentage of dormant bitcoin supply hit new highs across cohorts over the last quarter:
 - 1 year or more, ~70%
 - 2 years or more, ~60%
 - 3 years or more, ~40%
 - 5 years or more, ~30%

Source: ARK Investment Management LLC, 2023. Chart data from [Classnode](#). Information as of November 30, 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.



Bitcoin's Time-Weighted Turnover Hits Historic Lows

Bitcoin 90-Day Sum of Coindays Destroyed



ARK'S VIEW: BULLISH

- Since 2011, the quarterly turnover of bitcoin weighted by time held (“coindays destroyed”) has hit new lows with remarkable consistency.
- The 90-day rolling sum of coindays destroyed reached a 13-year low during the third quarter of 2023.
- In our view, this persistent downtrend indicates the power of long-term-holders.

Source: ARK Investment Management LLC, 2023. Chart data from [Classnode](#). Information as of November 30, 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.



Section 03

Investors Anticipate Monetary Easing in Response to Deteriorating Economic Indicators





The Rising Gold/Oil Ratio Is a Barometer of Financial Market Health

Gold-to-WTI-Oil Ratio



ARK'S VIEW: BEARISH

- The gold/oil ratio measures how many barrels of oil one ounce of gold can purchase. Gold is both a safe-haven asset and an inflation hedge, while oil is a key input into global economic activity.
- Recently, the gold price has increased while the oil price has decreased.
- Higher gold prices seem to be signaling a flight to safety and lower oil prices an economic slowdown.

Source: ARK Investment Management LLC, 2023. Chart data from Macrobond. Information as of November 30, 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 Workweek Is Falling as Employment Growth Is Weakening

US Nonfarm Workweek



ARK'S VIEW: BEARISH

- As in previous recessions, the nonfarm workweek is declining as the growth in employment is slowing.
- In response to lower demand for goods and services, employers often reduce hours before capitulating to layoffs and precipitating a recession.
- After the recent peak in the summer of 2021, the average nonfarm workweek has declined.
- The US nonfarm workweek index has dropped to levels not seen since the recessions of 2020 and 2008-2009.

Source: ARK Investment Management LLC, 2023. Chart data from Macrobond. Information as of November 30, 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.



Median Prices for New Homes Sold Fell at an Unprecedented Rate

**New Homes Sold Median Sales Price
(Year-Over-Year Change)**



ARK'S VIEW: BEARISH

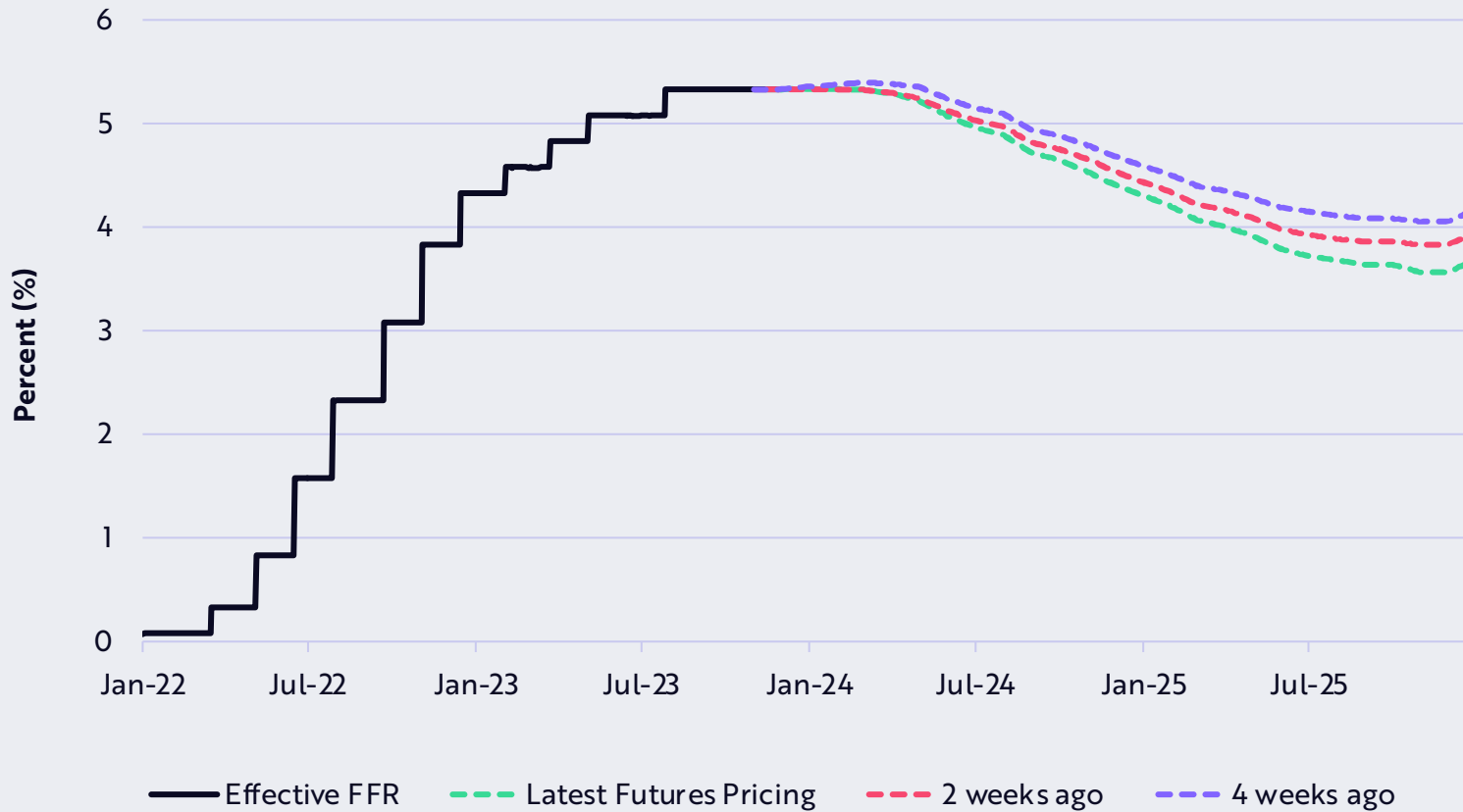
- Defying the “sticky inflation” narrative, the median price of new homes sold dropped 18% on a year-over-year basis in October, which surpassed the 15% low hit during the Great Financial Crisis of 2008-09.
- Meanwhile, existing home prices have plateaued as homeowners stay put with low interest rate mortgages.

Source: ARK Investment Management LLC, 2023. Chart data from Macrobond. Information as of November 30, 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.



Futures Wave Goodbye to “Higher for Longer”

Fed Funds Futures—Implied Rates Over the Month



ARK'S VIEW: BULLISH

- Both short- and long-term expectations for the federal funds rate fell during November.
- Instead of a rate hike in the first quarter, futures now are pointing to a rate cut in May.

Source: ARK Investment Management LLC, 2023. Chart data from Macrobond. Information as of November 30, 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 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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ARK aims to educate investors and to size the potential opportunity of Disruptive Innovation, 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 Deep Learning, Digital Wallets, Battery Technology, Autonomous Technologies, Drones, DNA Sequencing, CRISPR, Robotics, 3D Printing, Bitcoin, Blockchain Technology, etc. **Cryptocurrency Risk.** Cryptocurrencies (also referred to as "virtual currencies" and "digital currencies") are digital assets designed to act as a medium of exchange. Cryptocurrency is an emerging asset class. There are thousands of cryptocurrencies, the most well-known of which is bitcoin. Cryptocurrency generally operates without central authority (such as a bank) and is not backed by any government. Cryptocurrency is not legal tender. Federal, state and/or foreign governments may restrict the use and exchange of cryptocurrency, and regulation in the U.S. is still developing. The market price of bitcoin and other cryptocurrencies have been subject to extreme fluctuations. Similar to fiat currencies (i.e., a currency that is backed by a central bank or a national, supra-national or quasi-national organization), cryptocurrencies are susceptible to theft, loss and destruction. Cryptocurrency exchanges and other trading venues on which cryptocurrencies trade are relatively new and, in most cases, largely unregulated and may therefore be more exposed to fraud and failure than established, regulated exchanges for securities, derivatives and other currencies. Cryptocurrency exchanges may stop operating or permanently shut down due to fraud, technical glitches, hackers or malware, which may also affect the price of cryptocurrencies. **Cryptocurrency Tax Risk.** Many significant aspects of the U.S. federal income tax treatment of investments in bitcoin and other cryptocurrencies are uncertain and still evolving.

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