Fidelity DIGITAL ASSETS®

Q4 2023

Signals Report

A quarterly breakdown of key market metrics that could be impacting price and investor sentiment.

Fidelity Digital Assets® Research

Quarterly Observation of Current Market Conditions

▸ *Click the boxes to see how we measured the conditions.*

Bitcoin

Short-Term Outlook (<1 year)	Mid-Term Outlook (1–5 years)	Long-Term Outlook (>5 years)
POSITIVE	POSITIVE	POSITIVE

Ethereum

Short-Term Outlook (<1 year)	Mid-Term Outlook (1–5 years)	Long-Term Outlook (>5 years)
POSITIVE	NEUTRAL	POSITIVE

What This Report Is and How to Use It

Digital assets are unique in that they not only generate traditional market signals based on price action, but also generate an entirely new set of signals based on public on-chain data. These signals can be valuable for all types of investors, but the challenge lies in determining which signals to use, how to match the signal to the correct investment time horizon, and how to interpret the data correctly.

In this report, we have collected what we think are the most reliable signal indicators, grouped them by time horizon, and provided an overall assessment of the conditions for each time horizon. We then provide a breakdown of the signals included in each time horizon and their respective charts.

Executive Summary: Q4 2023

As of the end of Q4, on-chain data show an overall positive outlook for both bitcoin and ether in the short and long term. Bitcoin ended 2023 up 154% and has broken back above many short- and long-term indicators. The high fee environment promises increased revenue that miners are taking advantage of as they prepare for the next Bitcoin halving, an event that is expected to programmatically occur in April 2024 and reduce the block subsidy by half. Some regulatory relief has been found with the approval of numerous spot bitcoin exchange traded products, but data in this report is as of the end of 2023 before this news. Long-term holders' net positions fell slightly at the end of the year, and we will be watching to see if that was a strategic accounting play or if they are changing their tune at current prices.

We also continue to see bitcoin leaving exchanges as the market approaches a 30% reduction from the exchange supply peak in 2020. The reduction in supply on exchanges will be a key metric to watch in 2024 and highlights the importance of other custody options, such as self-custody or the use of a regulated third-party custodian, such as Fidelity Digital Assets®.

Ether, up roughly 90% in 2023, has also seen short-term positive price signals and growing on-chain metrics. The network continues to maintain a higher rate of burn than issuance, resulting in the removal of nearly 311,000 ether from the network since The Merge's implementation in September 2022.

The number of validators staking on the network has increased 8% since October and 87% in 2023. This growth has caused some concern within the developer community because a growing validator set results in greater technical requirements and could affect the gossip protocol's performance. However, we have seen a significant slowing of ether being staked in Q4 2023 that may signal we are approaching a "terminal" staking percentage. If true, it would certainly calm the worries of developers and node operators for some time.

Uptake of Layer 2 platforms in 2023 was remarkable and is the first clear signal that Ethereum's rollup-centric roadmap could be successful in years to come. The next upgrade, occurring in early 2024, could further accelerate adoption of Layer 2 platforms by substantially lowering fees for users.

Overall, the slowing growth of staked ether, adoption of Layer 2's, and sustained base layer usage all point to a healthy Ethereum ecosystem in 2024.

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Measurement Breakdown—Bitcoin

Short-Term (<1 year) — **Overall Condition: POSITIVE**

NAME	COMMENTARY	CONDITION
Is Price Trading Above the 200-Day Moving Average?	Yes, price rose above on October 22	positive
Golden Cross or Death Cross?	Golden cross formed on October 30	positive
Price > Realized Price	Yes, 92% higher than realized price	positive

Mid-Term (1–5 years) — **Overall Condition: POSITIVE**

NAME	COMMENTARY	CONDITION
NUPL Ratio	Rejected from “Belief” zone and remained in “Optimism”	neutral
MVRV Z-Score	Remains closely above “Undervalued” zone	positive
Reserve Risk	Moved further away from “Undervalued” zone	positive
Stock-to-Flow	Bitcoin’s price heavily discounted, according to this model	positive
Puell Multiple	Miners remain in a healthy position and have been seeing higher-than-average profits	positive
Hodler Net Position Change	Long-term holders have been net buying and had been buying until the last week of 2023	positive
Addresses in Profit	84% of addresses are in profit, which could incentivize selling	negative
Bitcoin Yardstick	Bitcoin is no longer “cheap,” considered to be trading at “Fair” value	neutral

Long-Term (>5 years) — **Overall Condition: POSITIVE**

NAME	COMMENTARY	CONDITION
Price > 200-Week	Yes, price is in a healthy position, 42% above the 200-Week	positive
Monthly Address Metrics	Volatile metrics, but trending higher	positive
New Address Momentum	Self-regulating fee market incentivizing on-chain activity and usage	positive
Liquid vs. Illiquid Supply	Illiquid supply high and growing, signaling investors are holding	positive
Balance ≥ 0.1 BTC	Positive trend of growth, new all-time high in late December 2023	positive

Measurement Breakdown—Ethereum

Short-Term (<1 year) — **Overall Condition: POSITIVE**

NAME	COMMENTARY	CONDITION
Is Price Trading Above the 200-Day Moving Average?	Yes, price rose above on October 29	negative / neutral / **positive**
Golden Cross or Death Cross?	Golden Cross formed on November 21	negative / neutral / **positive**
Price > Realized Price	Yes, 43% higher than realized price	negative / neutral / **positive**

Mid-Term (1–5 years) — **Overall Condition: NEUTRAL**

NAME	COMMENTARY	CONDITION
NUPL Ratio	Entered “Optimism” zone December 2	negative / neutral / **positive**
MVRV Z-Score	Moved further away from “Undervalued” zone	negative / neutral / **positive**
Percent in Profit	76% of addresses in profit could mean greater selling pressure ahead	**negative** / neutral / positive
Pi Cycle Top Indicator	Not yet “Heating Up”	negative / **neutral** / positive

Long-Term (>5 years) — **Overall Condition: POSITIVE**

NAME	COMMENTARY	CONDITION
Monthly Address Metrics	Layer 1 metrics rebounded or remained constant, while Layer 2 adoption accelerated	negative / neutral / **positive**
New Address Momentum	Increased Layer 1 momentum, while Layer 2 adoption accelerated	negative / neutral / **positive**
Addresses over $1k	Increase lagged price, but outpaced staking growth	negative / **neutral** / positive
Staking by the Numbers	Up 8% in Q4, slowing growth may be a sign Ethereum is reaching a “terminal staking rate”	negative / **neutral** / positive
Net Issuance and Burn Rate	Net-negative issuance, slowing growth in staked ether bodes well for future deflationary potential	negative / neutral / **positive**

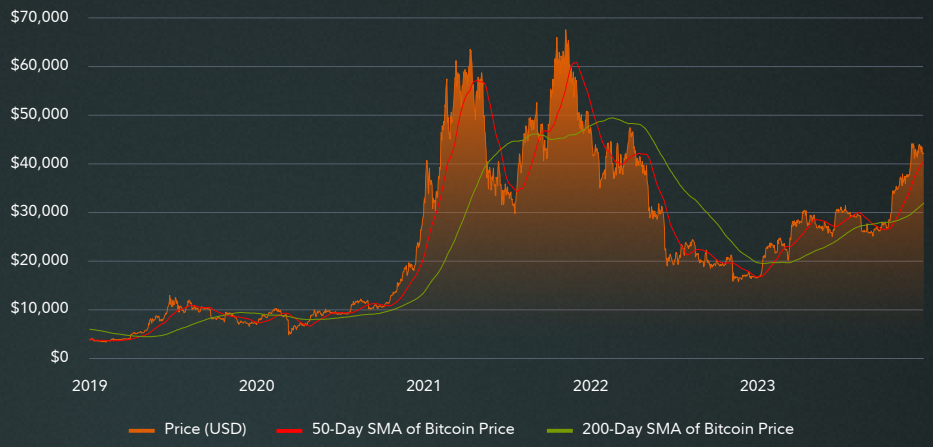
Bitcoin Data to Watch

Bitcoin Fights to Maintain Short-Term SMA

Bitcoin's 50-day simple moving average (SMA) broke above the 200-day SMA, creating what technical analysts refer to as a "golden cross." This bullish indicator for bitcoin strengthened after October 20, ending the year with the short-term metric roughly 27% above the longer-term 200-day. We interpret these patterns as short-term indicators, so it is not out of the cards for volatile price action going forward.

The 200-day moving average is viewed as support when the price is above it and resistance when the price is below it. As of the end of Q4, bitcoin's price has reclaimed both the short-term support level of $40,500 and the longer-term support level of $32,000.

Bitcoin: 50-Day vs. 200-Day vs. Price



Source: Glassnode, 12/31/2023.

Realized Price (Bitcoin)

The realized price is a metric that aims to capture the average cost basis of all current token holders. By capturing a token's last trade price, tokens presumed to be lost can be discounted. Bitcoin's realized price is around $22,000 at the close of Q4. In theory, this metric acts as a last line of defense for traders. When the market price is below the realized price, that means that most of the supply held is being held at a loss and thus, if sold, will be sold at a loss. This incentivizes new and older buyers to enter the market. The realized price has maintained a position of support since January 13, 2023. The important short-term support levels to watch are $40,500 (50-day SMA), $32,000 (200-day SMA), and $22,000 (realized price).

Bitcoin: Realized Price vs. Price

Source: Glassnode, 12/31/2023.

Net Unrealized Profit/Loss (NUPL) Ratio (Bitcoin)

Historically, this metric does a good job of assessing overall market sentiment. Bitcoin's NUPL score offers insight into the relative level of unrealized profits or losses, visible on-chain at any given time. A NUPL score below zero, witnessed in Q4 of 2022, implies net unrealized losses and has historically signaled periods of capitulation. A NUPL score over 0.50 indicates large unrealized profits held on-chain, which may suggest some profit-taking could be likely.

This ratio flirted with the "Optimism" and "Belief" zone throughout December, changing approximately 10 times before closing 2023 in the "Optimism–Anxiety" zone. Considering future catalysts, such as the halving and spot bitcoin ETP inflows, the NUPL Ratio could cement a position in the "Belief–Denial" zone.

Read more here.

MVRV Z-Score (Bitcoin)

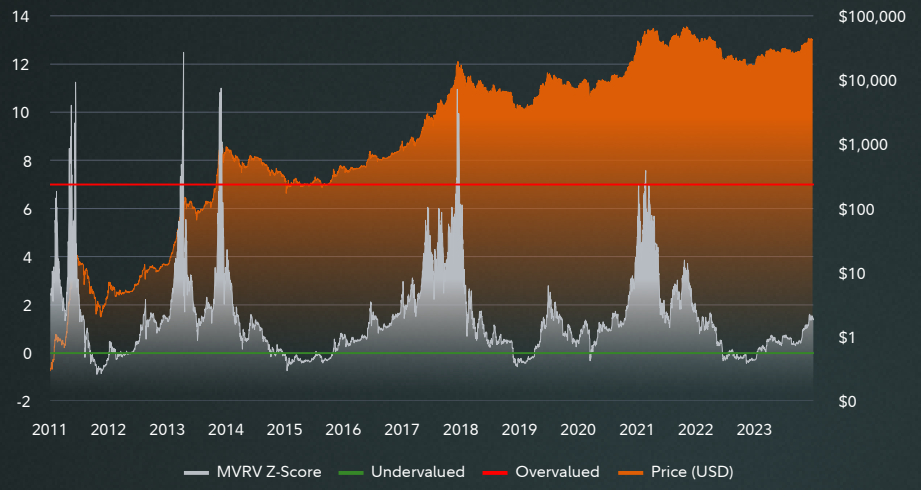
The MVRV Z-Score is used to assess when bitcoin is over- or undervalued relative to its "fair value." When the market value is significantly higher than the realized value, it has historically indicated a market top (red zone), whereas the opposite has indicated a market bottom (green zone).

The MVRV Z-Score rose in Q4 and remains in a relatively healthy position. While still in the lower bound of the "value" zone, we consider this trend a positive indicator.

Bitcoin: Net Unrealized Profit/Loss (NUPL)

Source: Glassnode, 12/31/2023.

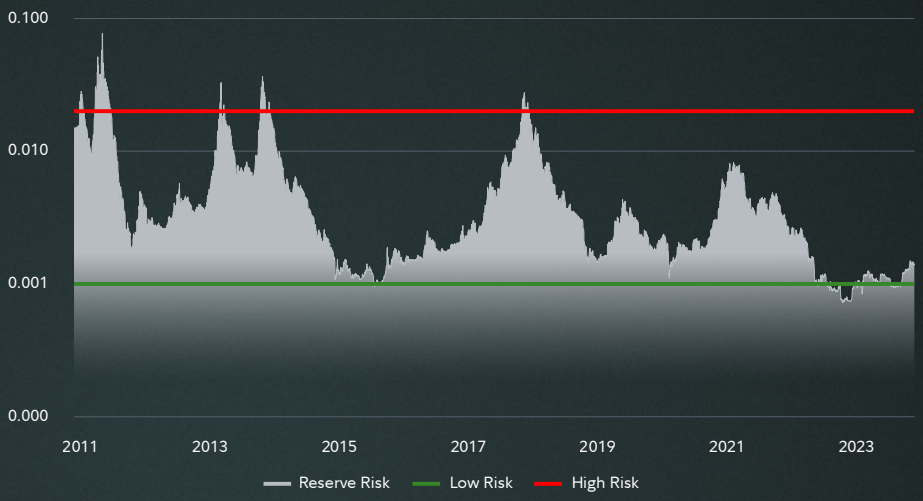
Bitcoin: MVRV Z-Score



Source: Glassnode, 12/31/2023.

Reserve Risk (Bitcoin)

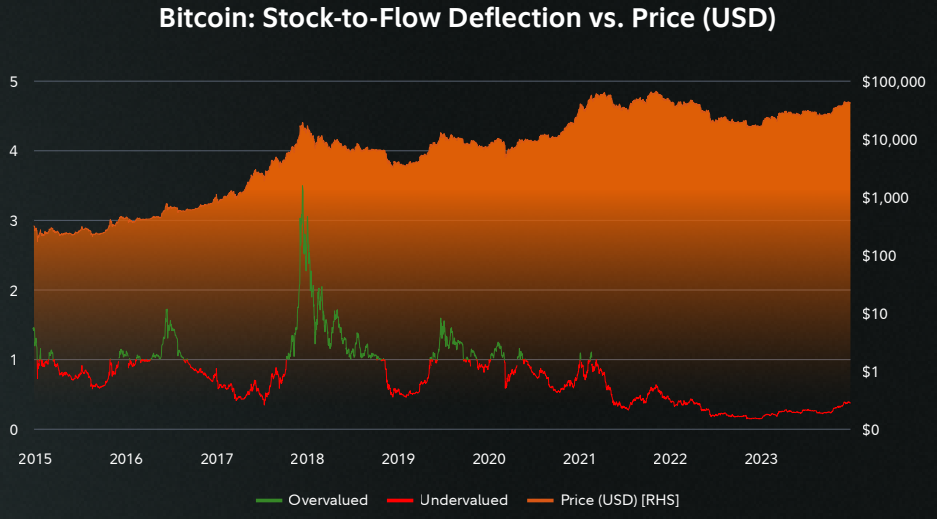
Reserve risk is used to assess the confidence of long-term holders relative to the native coin's (bitcoin) price at a given point. When confidence is high and the price is low, there is an attractive risk/reward to invest (the Reserve Risk is low). When confidence is low and the price is high, the risk/reward is unattractive (the Reserve Risk is high). Reserve risk had been slowly climbing since the beginning of 2023, but fell into the low-risk zone on August 18. While this metric has risen above the low-risk zone, bitcoin remains relatively lower-risk until the gap increases. Investors may still be accumulating while bitcoin is near the low-risk zone.



Source: Glassnode, 12/31/2023.

Stock-to-Flow (Bitcoin)

The Stock-to-Flow (S/F) Deflection is the ratio between the current bitcoin price and the S/F model. If deflection is ≥1, it means that bitcoin is overvalued according to the S/F model; otherwise, it is undervalued. The Stock-to-Flow model may be less relevant today because bitcoin's inflation rate is already in the low single digits—and decreasing. However, this model may still be interesting when one is also considering the other metrics. By this metric, bitcoin had been considered undervalued throughout 2022 and 2023.



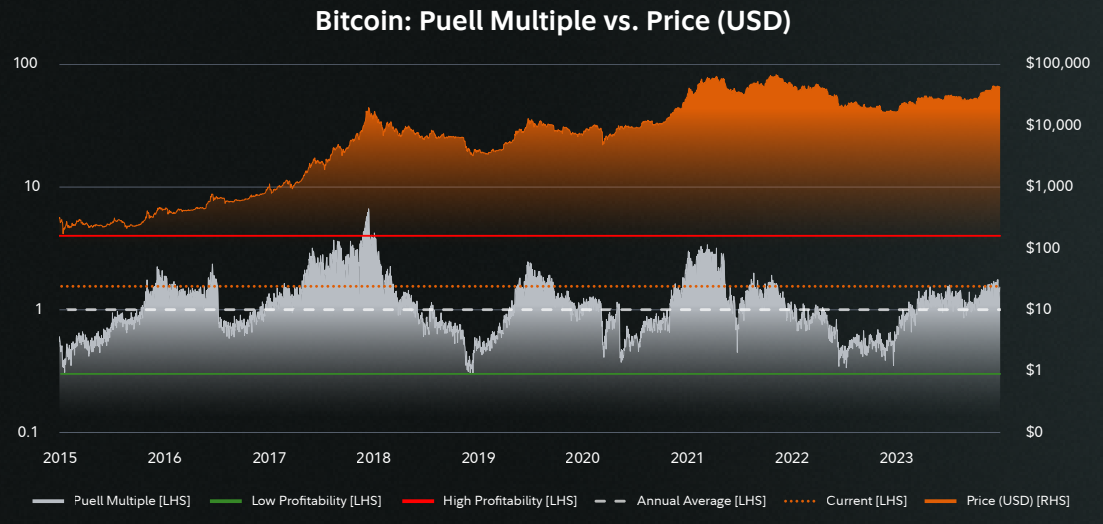
Source: Glassnode, 12/31/2023.

Puell Multiple (Bitcoin)

Created by David Puell, the Puell Multiple shows when miner profitability is low compared with the previous year. When the Puell Multiple is high, it means that mining revenue is higher than last year's average. Historically, when this metric is in the high red zone, it has generally corresponded to cycle tops.

This metric currently suggests that miner profitability is slightly higher than in 2023. This means that miners have been realizing slightly more profits. A couple of things may be affecting this metric besides price movement: the efficiency of mining rigs (hash price), mining difficulty, mining subsidy, fees, and other factors. While we do not expect this metric to change significantly until the next halving event occurs, the data suggest that miners are experiencing higher revenue. The simplest explanation is that transaction fees are higher than the historical normal. This allows miners to take increased profits without affecting their reserves. This also shows that bitcoin's price is relatively higher than the cost of production when compared with the yearly average. As miner profitability increases, capital is incentivized to flow into the mining industry (production) rather than into spot BTC markets.

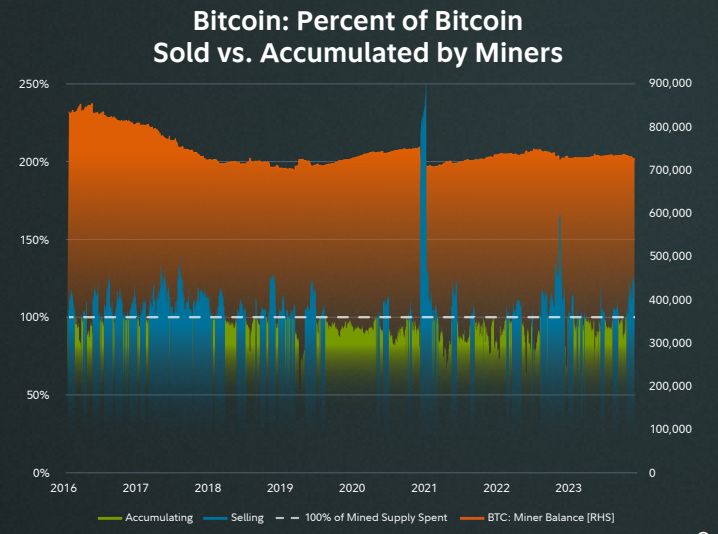
Explore more about the halving here.



Source: Glassnode, 12/31/2023.

Percentage of Bitcoin Sold vs. Accumulated by Miners (Bitcoin)

Here, we can see where miners started selling more than 100% of the block subsidy (6.25 bitcoin). In Q4, miners sold an average of 108% of the subsidy and more than 115% in November and December 2023. However, their total reserves have only fallen 1.2%. This would support our theory of miners selling more bitcoin because of an influx of higher transaction fees. Additionally, November marked the start of some popular inscription mints, causing increased transaction counts and fees.



Source: Glassnode, 12/31/2023.

Percentage of Bitcoin Sold vs. Accumulated by Miners (Bitcoin) continued

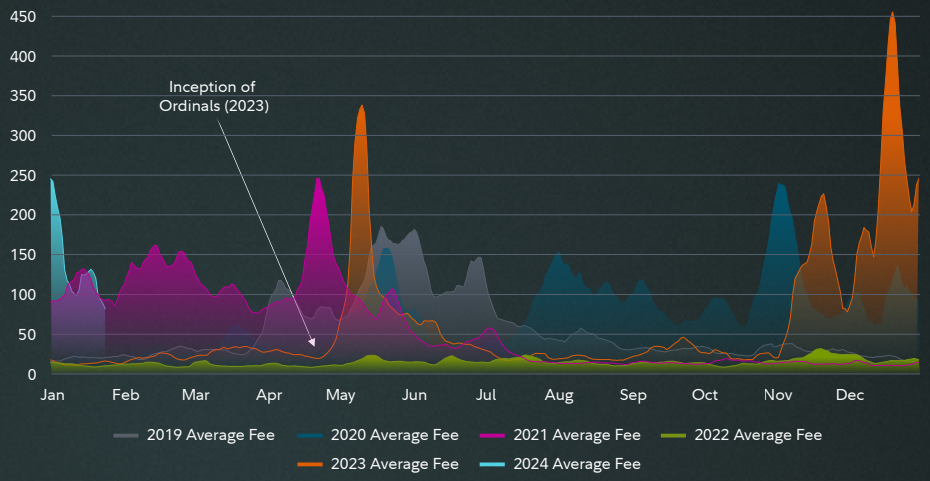
We can also compare the historical median fees. Note that miners have been seeing a relatively high fee market compared with the last five years, only rivaled in 2020. These high fees enable miners to sell more than the subsidy amount while still maintaining a reserve. With the halving expected in April 2024, it may be fair to speculate that these miners are taking full advantage of these high fees to purchase, upgrade, and capture more hash rate potential.

Hodler Net Position Change (Bitcoin)

Hodler Net Position Change shows the monthly position change of long-term investors, known in Bitcoin culture as "Hodlers" or "HODLers." It indicates when long-term investors sell (negative) and when they accumulate (positive) net-new positions.

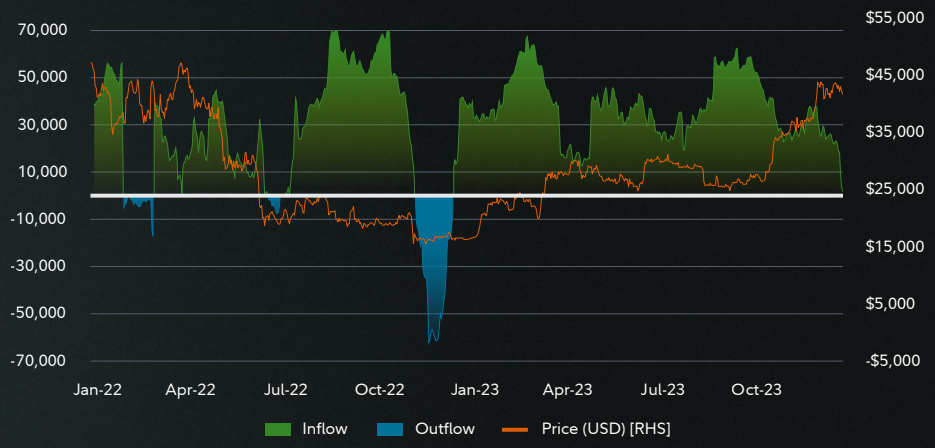
The average net position change from Q3 to Q4 2023 decreased from 40,442 bitcoin to 31,376, with a notable drop at the end of 2023. Bitcoin inflows fell off in the final four days, which could have been due to investors taking year-end profits. We will be watching to see if this year-end change becomes a trend or a time-specific scenario. With the next halving expected in April 2024, we expect this group to continue accumulating.

Bitcoin: Historical Fees Compared sat/vByte (7-Day SMA)



Source: Glassnode, 12/31/2023.

Bitcoin: Hodler Net Position Change



Source: Glassnode, 12/31/2023.

Percentage of Addresses in Profit (Bitcoin)

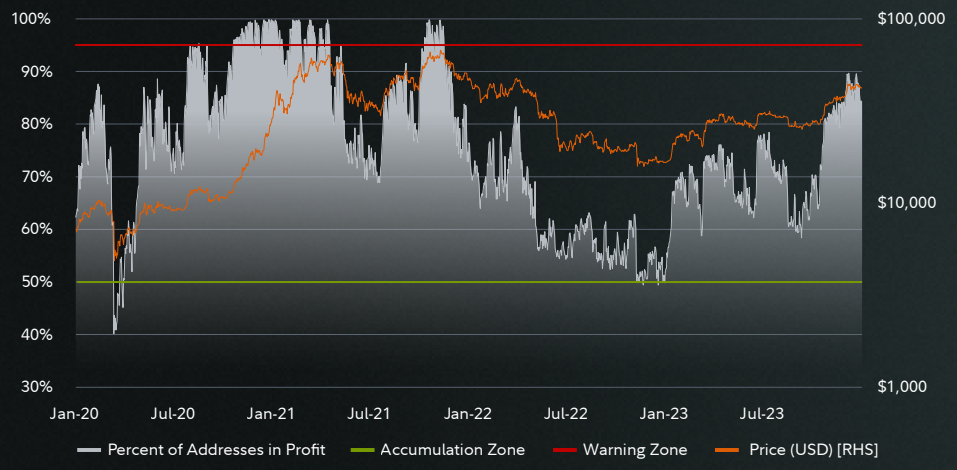
The percentage of addresses in profit indicates unique addresses whose funds have an average buy price lower than the current price. "Buy price" is defined as the price at the time coins were transferred to an address. The percentage of addresses in profit has grown from roughly 52% at the beginning of 2023 to just over 84% at the end of 2023. As the number of addresses in profit grows, a sell-off could become more likely as traders and newer investors try to realize profits. A growing number of illiquid bitcoin could also cause more short-term price volatility.

Bitcoin Yardstick

The Bitcoin Yardstick, or Hashrate Yardstick, is a similar concept to the Price-to-Earnings (PE) Ratio. However, instead of being the stock price divided by company earnings, it calculates bitcoin's total market cap divided by its hash rate (a measure of energy expended to secure the network). The idea is that the lower the ratio, the "cheaper" bitcoin looks, just as a lower PE ratio can be interpreted as a "cheap" or undervalued stock.

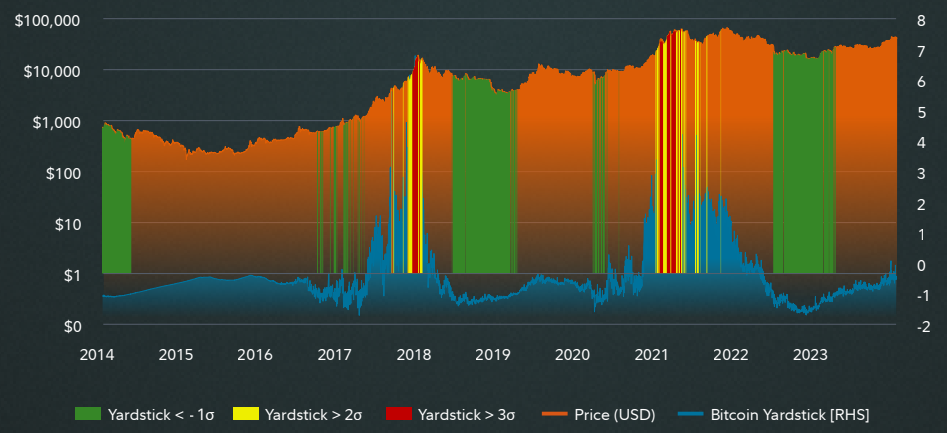
Currently, the Yardstick is telling us that bitcoin has remained between negative one and zero deviations from the mean. According to this metric, there were zero days in Q4 where bitcoin was considered "cheap" and only 93 "cheap" days since the beginning of 2023.

Bitcoin: Percentage of Addresses in Profit



Source: Glassnode, 12/31/2023.

Bitcoin: Bitcoin Yardstick

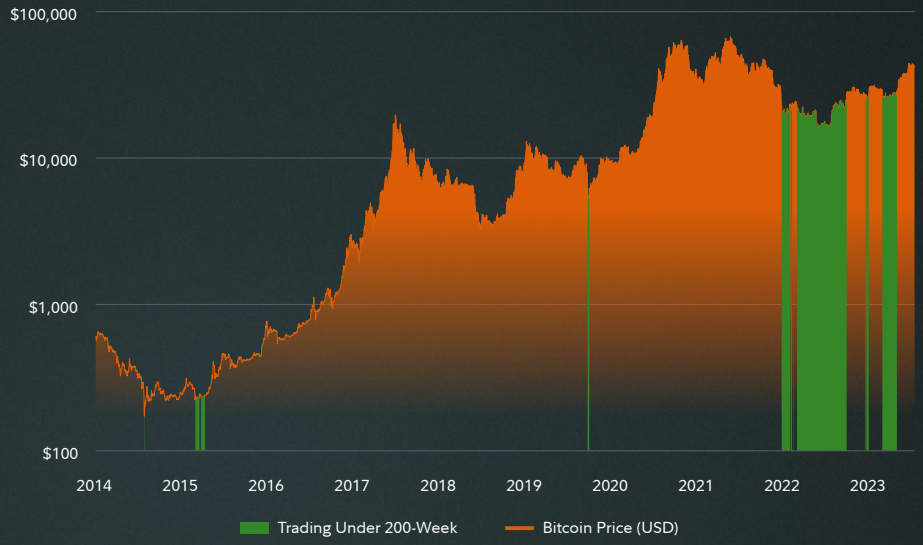


Source: Glassnode, 12/31/2023.

200-Week Moving Average (Bitcoin)

The 200-week simple moving average (SMA) is a long-term indicator and, until the most recent bear market, bitcoin had rarely traded below it. Near the end of Q3 2023, bitcoin eclipsed this metric, thereby turning it into support. Since then, bitcoin's price has maintained a healthy recovery and pushed further into greener pastures. Year-end's price sat firmly above the 200-SMA of $29,761, a 41% difference.

Bitcoin: Price vs. the 200-Week SMA

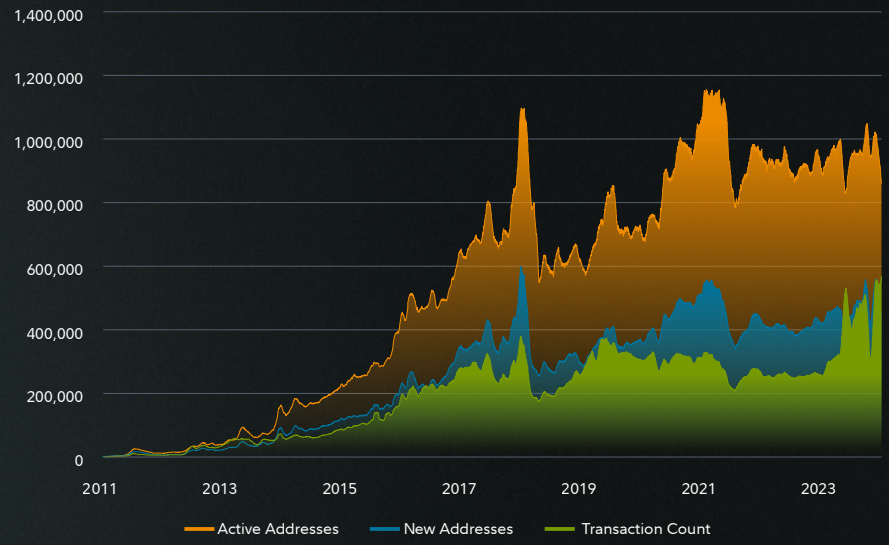


Source: Glassnode, 12/31/2023.

Monthly Address Metrics (Bitcoin)

Charted here are the monthly metrics for active addresses, new addresses, and transaction counts. At the end of Q3 2023, active addresses retook the millionth address mark for the first time since June 2021. However, they have since fallen back to roughly 860,000. Similarly, new addresses surpassed the half-million mark for the first time since April 2021, but have slid back to roughly 450,000. Bitcoin's transaction count is up from the start of 2023 by roughly 125%. The high transaction environment, combined with high fees, usually dissuades active addresses until fees fall again. We expect active addresses to continue to fall if the current fee environment persists. Additionally, this could mark the end of the low fee era and push Bitcoin into a new era of sovereign communities. The average user may not be able to self-custody and transact with such a high fee environment. This may push new protocols that enable community custody to the surface throughout 2024.

Bitcoin: Monthly Metrics

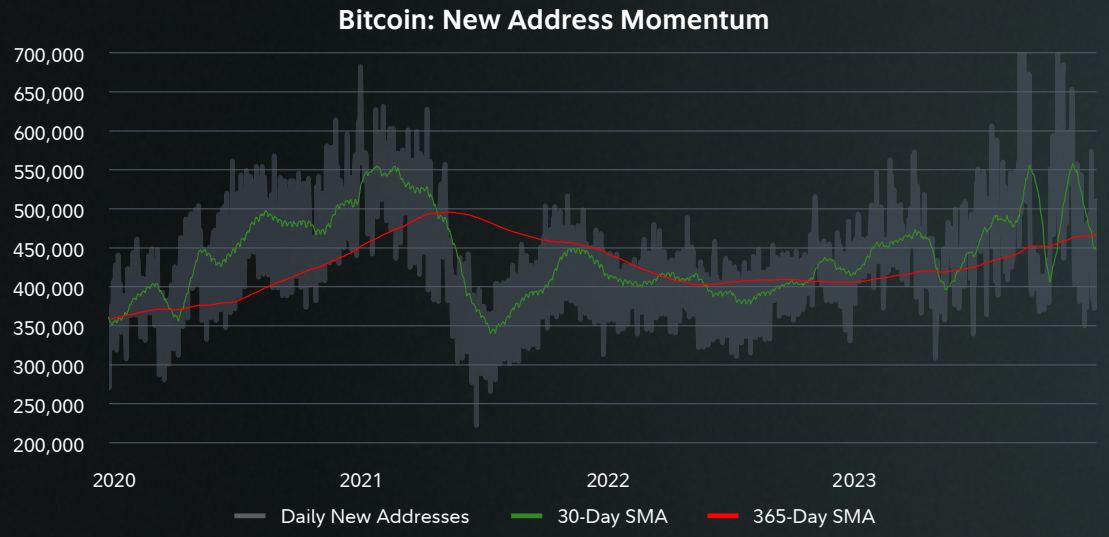


Source: Glassnode, 12/31/2023.

New Address Momentum (Bitcoin)

Taking another look at new addresses, we can also measure relative momentum. In this chart, we compare the short-term momentum (30-day SMA) with the longer-term average (365-day SMA). When the monthly average is greater than the yearly, it indicates higher on-chain activity and a positive short-term trend in network usage. When the opposite occurs, that indicates a decline. Here, we see the monthly average (green line) jumping above and then below the yearly average (red line). This may be indicative of the self-regulating fee structure that occurs in the free market of bitcoin block space. As fees rise, users are incentivized to hold off on their transactions unless necessary. As users refrain from transacting, the short-term new address metric will fall, and fees will fall with it. Users then rush to send their transactions again, causing fees to rise. This self-regulating fee market allows only the most efficient and necessary transactions to remain, resulting in a healthy market for Bitcoin security and miners.

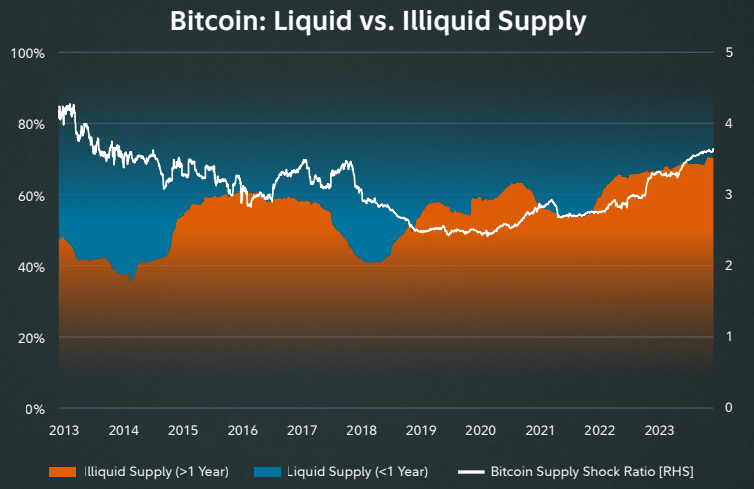
In other words, as fees climb, more miners are incentivized to participate, thus resulting in a higher hash rate, often thought to result in greater network security. Scaling a decentralized network is often the most difficult part of managing the network. However, even as Bitcoin transactions soar to new heights and fees follow suit, the network has not skipped a beat and continues to produce block after block.



Source: Glassnode, 12/31/2023.

Liquid vs. Illiquid Supply (Bitcoin)

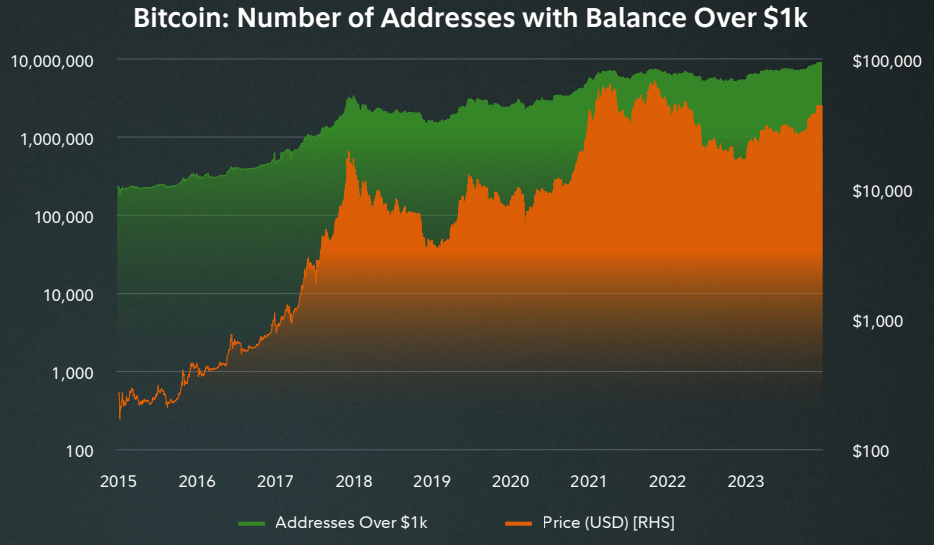
Bitcoin's illiquid supply is slightly off its high at roughly 70.27%. The last illiquid supply all-time high was on November 29, 2023, at roughly 70.54%. Another way of looking at this phenomenon is through the "Illiquid Supply Shock Ratio," which attempts to model the probability of a supply shock. When the supply shock ratio trends higher, it indicates that the current sold supply is primarily flowing from the liquid token supply. However, when the opposite occurs, the illiquid supply falls as long-term holders exit the market, usually with profits. Here, the illiquid supply shock ratio appears to be steadily rising and ended Q4 with a ratio of 3.64 versus 3.57 at the end of Q3. It remains unclear whether illiquid supply holders will start to take profits at this level or if prices will climb and incentivize selling. Either way, if demand holds, then the likely outcome would either be that the liquid supply or the price would increase. As the next halving nears, this will be an important metric to watch.



Source: Glassnode, 12/31/2023.

Balance ≥ $1,000 (Bitcoin)

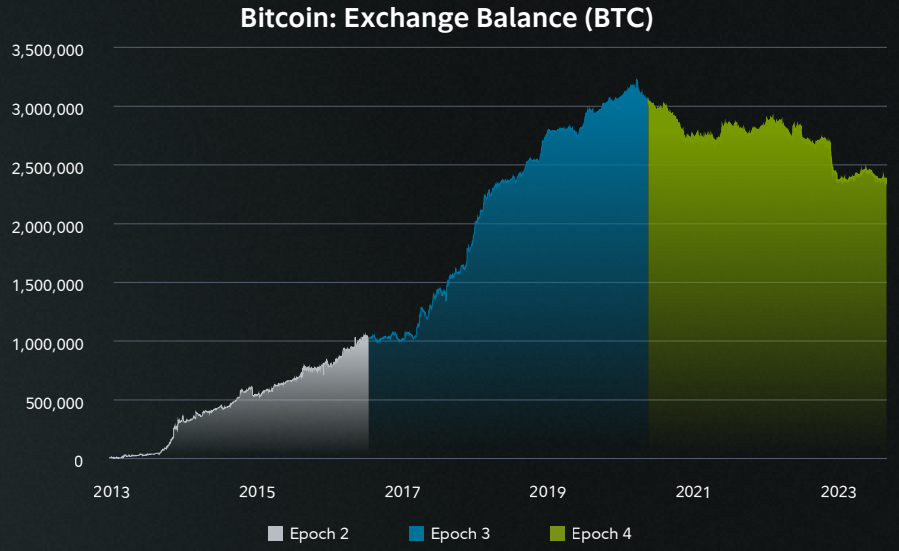
This metric shows how many addresses hold greater than or equal to $1,000 worth of bitcoin. Here, we see these "small" addresses continuing the trend of accumulation. Since the beginning of 2023, the number of addresses greater than or equal to $1,000 of bitcoin has grown by 68%. This metric hit a new all-time high on December 22, 2023, at 8,998,985 addresses. This shows a continued growth of small addresses accumulating and saving bitcoin, even at discounted prices. This may represent a growing distribution of bitcoin and its adoption among "average" people. The number of addresses holding more than $1,000 worth of bitcoin grew 21% in Q4.



Source: Glassnode, 12/31/2023.

Exchange Balance (Bitcoin)

This metric shows how many bitcoin are held on exchanges. This number has continued to trend down from its peak in 2020. Fueled by multiple major exchange collapses in 2022 and other troubled exchange practices, self-custody has become a major part of the bitcoin journey in 2023. Q4 2023 was no different, as balances on exchanges continued to dwindle, inching closer to 2.3 million BTC held at exchanges. This represents a nearly 30% drop from all-time highs. While exchange balances have continued to fall, this does not necessarily equal an increase in self-custody. For example, some custodians, such as Fidelity Digital Assets®, are working toward allowing clients to custody their bitcoin while simultaneously trading through an exchange venue. The last time exchange balances were this low was in April 2018, when a much different story in digital assets was being told.



Source: Glassnode, 12/31/2023.

Ethereum Data to Watch

Ether Rises Back Above Key Support Levels

The "death cross" pattern that formed in September 2023 saw ether's price drop as low as $1,537 only to be thwarted by materially positive momentum. Ether's 50-day SMA moved meaningfully above its longer time-frame counterpart throughout the end of 2023. This is a short-term positive indicator for ether as its price rose 36% throughout Q4, from $1,671 to $2,281.

Realized Price (Ethereum)

Realized price is a metric that aims to capture the average cost basis of all current token holders. By capturing a token's last traded price, tokens that are presumed to be lost can be discounted. Using ether's realized price as another support or resistance level, the realized price has maintained the title of "support" since January 2023. Ether is trading roughly 43% above the realized price, which currently sits around $1,595 at the end of Q4.

Ethereum: 50-Day vs. 200-Day vs. Price

Source: Glassnode, 12/31/2023.

Ethereum: Realized Price vs. Price

Source: Glassnode, 12/31/2023.

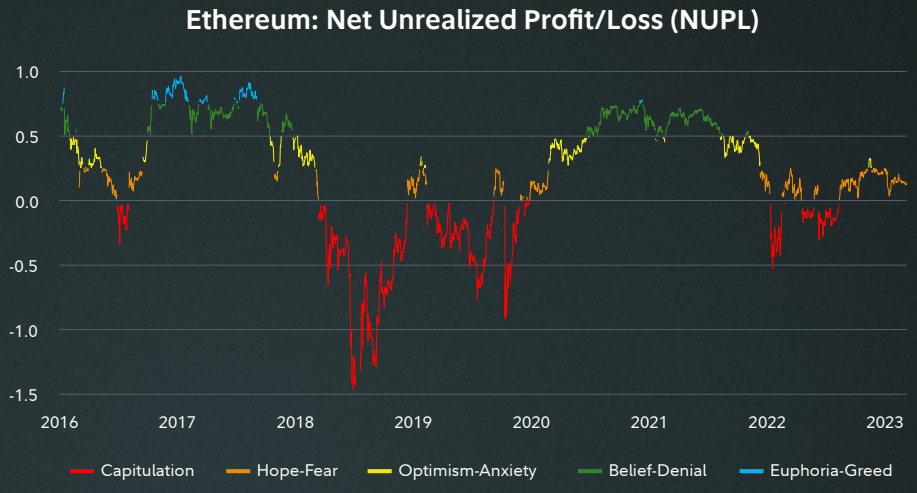
Net Unrealized Profit/Loss (NUPL) Ratio (Ethereum)

Historically, this metric has been useful for assessing overall market sentiment. The chart below shows that overall sentiment has gone from a brief state of "Capitulation" in October to "Optimistic" by the end of Q4, with most of ether's time spent in the middling "Hope" zone. Based on the most recent bounce in price, the shift in sentiment could be a positive short-term indicator while showing that there is still room to run before stepping into a "Euphoric-Greed" state. These states, highlighted in blue, have historically been associated with market tops.

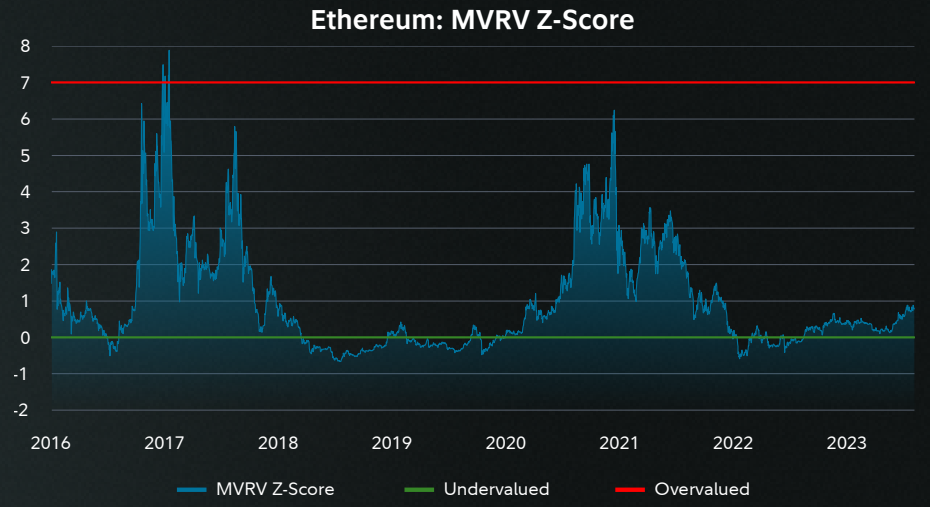
MVRV Z-Score (Ethereum)

Market value to realized value (MVRV) is the ratio between market cap and realized cap. It gives an indication of when the trade price is above or below the "fair" value. The current score indicates that ether's market value is estimated to be just over the "Undervalued" zone, but became more fairly valued throughout 2023. At the end of Q4, ether's realized price was $1,595. Given ether's notably positive price action throughout 2023, it may be surprising to see that this valuation metric clocks in at the "Undervalued" end of the range. However, considering other digital assets' recent outperformances relative to ether, as well as the recent shift in overall market sentiment, we see this as a positive sign for ether's performance in the mid-term time horizon.

Read our full Ethereum Investment Thesis.



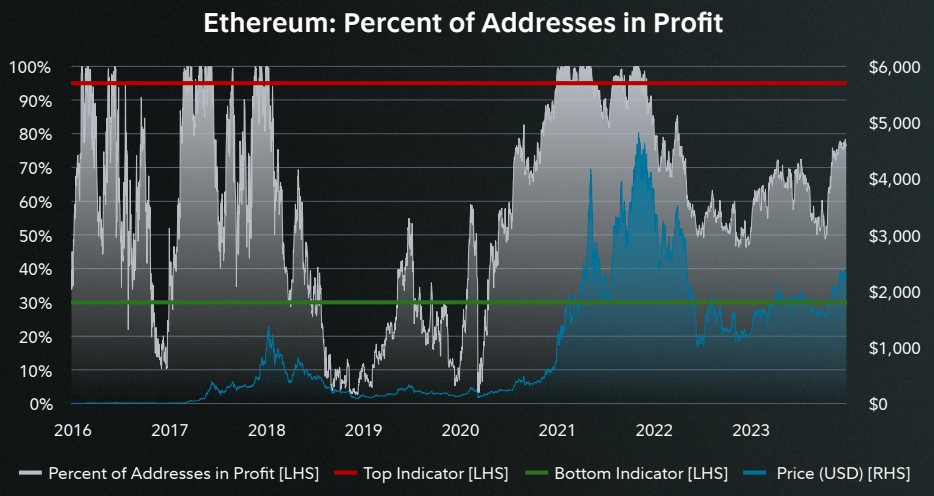
Source: Glassnode, 12/31/2023.



Source: Glassnode, 12/31/2023.

Percent in Profit (Ethereum)

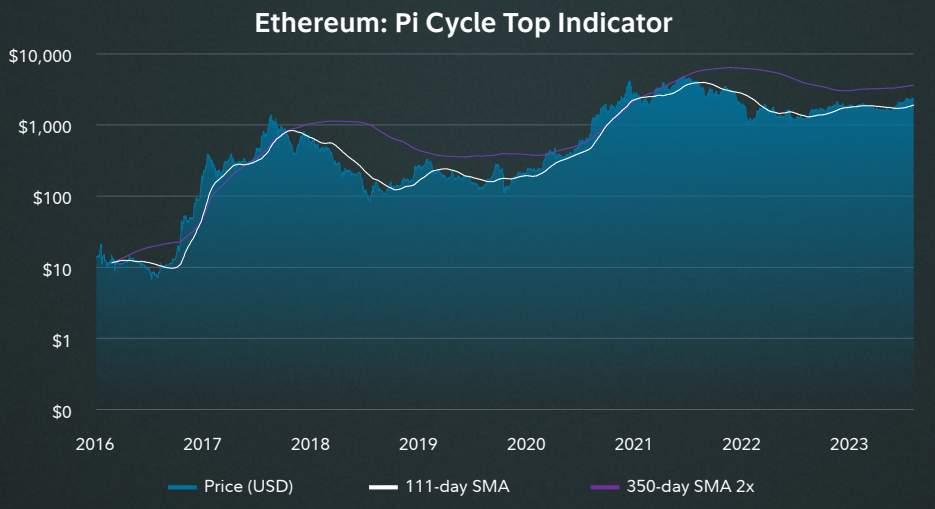
Percent in profit is the percentage of unique addresses whose funds have an average buy price lower than the current price. The buy price is defined as the price at the time coins were transferred to an address. **Only externally owned addresses (EOAs) are counted.** This metric has not touched the bottom indicator since January 2020, which may be because ether is not necessarily considered a buy-and-hold asset. Ether owners may be using ether for trading, smart contracts in decentralized finance (DeFi) services, staking, or buying other digital assets. The percentage of addresses in profit metric increased 32.4% and has risen 59.8% year-to-date. Currently, nearly 76% of unique addresses holding ether are in profit. Considering 2023 has concluded, the concern of investors taking profits for tax purposes has been eliminated for the time being. However, this metric is closing in on the top end of the probable range, which means selling pressure may increase in the months ahead.



Source: Glassnode, 12/31/2023.

Pi Cycle Top Indicator (Ethereum)

The Pi Cycle indicators are composed of the 111-day simple moving average (111-day SMA) and a 2x multiple of the 350-day moving average (350-day SMA x2) of ether's price. This metric shows when ether becomes significantly overheated (the shorter MA reaches the longer MA levels). This has historically been a good cycle top indicator. When the shorter time frame reaches the longer time frame, markets are considered to be "Heating Up." The shorter-term average rose slightly in Q4 2023, while the long-term moving average rose more, expanding the gap between itself and the shorter-term metric. However, the shorter-term average rose 45% in 2023, whereas the longer-term average decreased by 6% over the same time frame. Overall, we conclude from this metric that ether remains well below the "Overheated" cycle indicator, especially relative to past cycles.



Source: Glassnode, 12/31/2023.

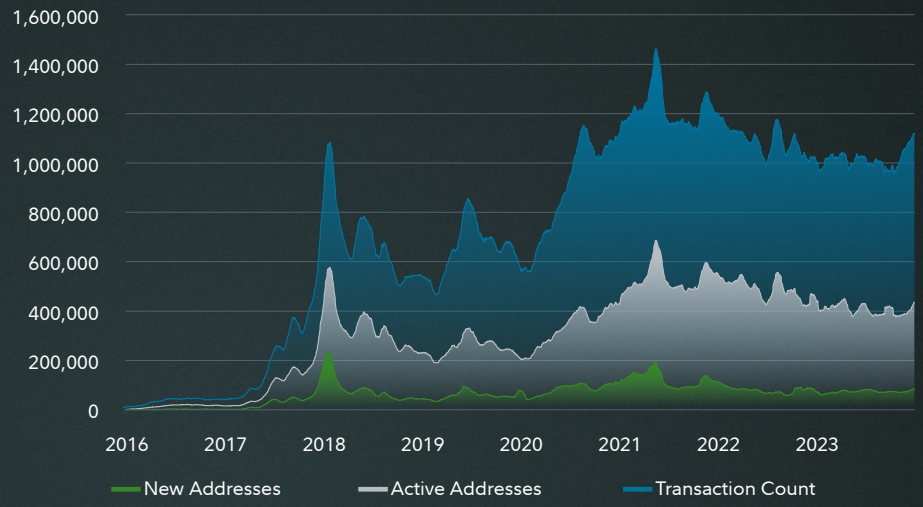
Monthly Address Metrics (Ethereum)

Ethereum fundamentals were strongly positive in Q4 2023 and most of the yearly growth came during this short time frame. Monthly new addresses rose 15% in Q4, whereas monthly active addresses and the monthly transaction count rose 4% and 15%, respectively. Over the course of 2023, Ethereum ended with active addresses down 2%, while new addresses and transaction counts increased 16% and 12%, respectively. While most address fundamentals showed positive yearly growth, they would have been much less notable if it were not for the usage spike seen in November and December.

Monthly Address Metrics (Ethereum) continued

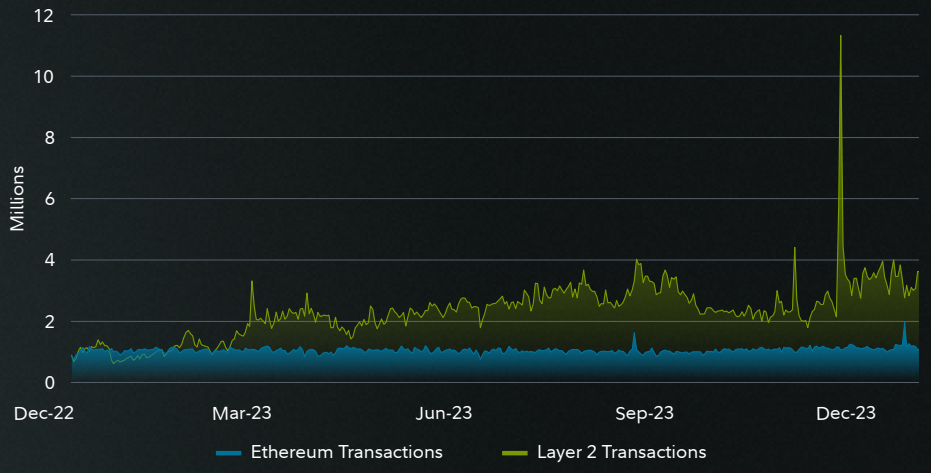
Layer 2 growth over the past year was impressive, speaking directly to the success of the rollup-centric roadmap being implemented by Ethereum developers. While Layer 1 transactions grew 43% in 2023, Layer 2 transactions, composed of just Arbitrum, Optimism, Base, and zkSync (the top four of 10+ in TPS) have grown more than 420%. Developers are prioritizing building this part of the Ethereum ecosystem and users are beginning to reap the benefits. Considering that transacting on Layer 2 platforms could become much cheaper over the next year, we view this as extremely positive for the Ethereum network's long-term usage thesis. However, it is also clear that this metric is extremely volatile and highly dependent on many different factors, including Layer 2 up-time, artificial incentives, new applications, and more. Because these variables are likely to muddy the waters of true Layer 2 uptake, we prefer to zoom out and look at longer-term trends, which appear to be positive for both activity and development.

Ethereum: Monthly Metrics



Source: Glassnode, 12/31/2023.

Ethereum vs. Layer 2 Daily Transactions



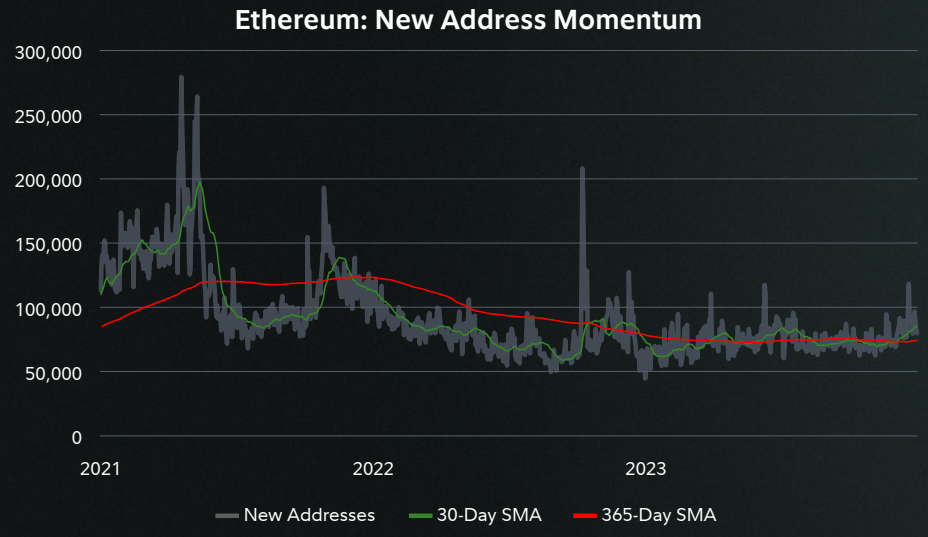
Source: Dune Analytics, 12/31/2023.

New Address Momentum (Ethereum)

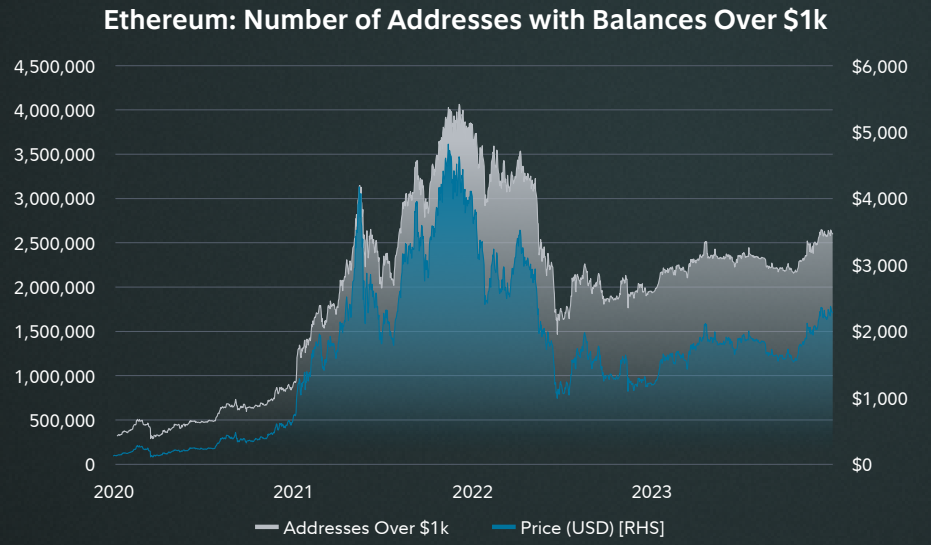
New addresses are defined as unique addresses that appear for the first time in a transaction. New addresses appear when users create new wallets and transact with them. These addresses differ from Bitcoin addresses because Ethereum does not create a new address for each transaction. Because of this difference, this metric could indicate a clearer picture of Ethereum's Layer 1 adoption. Below, the short-term moving average of new addresses has risen above that of the longer-term moving average beginning in December 2023. This indicates that the rate at which new users are joining the network has increased relative to historical averages. Like the monthly address metrics, this does not account for Layer 2 activity. Data from Layer 2 protocols suggests that users are continuing to adopt the protocol at an even faster rate than has been suggested by this metric.

Addresses with Over $1,000 (Ethereum)

This is the number of unique, externally owned addresses (EOAs) holding at least $1,000 in ether. EOAs are addresses owned by individuals and exclude smart contracts, which make up a large portion of the Ethereum ecosystem. EOAs exclude staking and many DeFi applications' contracts. Therefore, given that staked ether has increased over the past year, we would expect that to have a negative impact on this metric. The number of addresses with more than $1,000 increased roughly 15% in Q4 2023, while the price rebounded by 32%. Although this metric changes depending on ether's price, it can still be useful to show when smaller ether buyers are accumulating and if they are simply holding funds as "cash" or deploying it for use in contracts.



Source: Glassnode, 12/31/2023.



Source: Glassnode, 12/31/2023.

Staking Numbers/Validators (Ethereum)

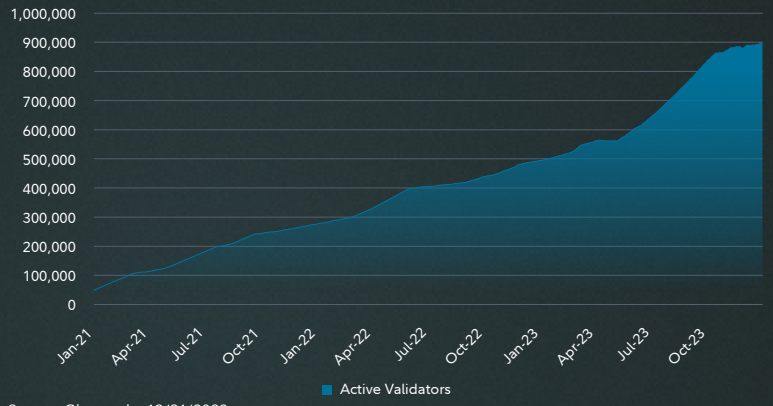
The active validator count has been climbing substantially throughout the year, although the rate of growth slowed in Q4 2023, potentially signaling that the network is approaching its peak long-term staking rate. The active validator count grew by 8% over Q4, 60% since the staking upgrade was implemented in April, and 82% in 2023. This slight stall in growth compared with the rest of the year may prove to be great news, considering recent concerns about how the exponential increase in staked ether could negatively affect network latency. We view this slowing of demand for staked ether as a neutral indicator for the Ethereum network and a signal that we could see a period of slower staking growth over the longer term. However, should Ethereum staking stall completely or decrease, any growth in Ethereum's economic security will become increasingly reliant on price, which may or may not be sustainable over the long term. We have little concern about Ethereum's network security, which is worth over $65 billion as of the end of 2023.

Net Issuance and Burn (Ethereum)

Net issuance (new supply issued by the network less burned supply from transactions) since The Merge in September 2022 has driven an overall supply decrease for over a year. This is important because, in theory, if ether's supply continues to be destroyed, it raises the relative ownership level of all remaining token holders. Instead of new coins' consistent issuance to stakers increasing the total supply, we see coins being burned by active users at a higher rate than the network can issue them in staking rewards. However, this inflationary and deflationary supply change is highly dependent on staking demand that drives issuance higher and transactions that burn ether. Q3 2023's combination of high staking demand and a relatively lower transaction count created an inflationary period during Ethereum's bear market. Q4 was the exact opposite.

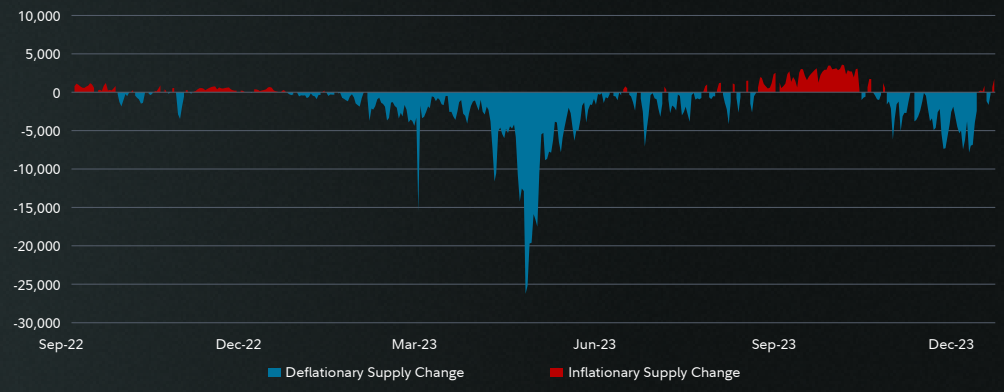
A slowing in the growth of staked ether and higher transactions on both the base layer and Layer 2s reignited the deflationary period that we have seen since The Merge. Given Ethereum's limited historical data, this alone does not indicate the future state of Ethereum's supply, but it is an example of how quickly supply dynamics can change. The amount of staked ether is showing signs of slowing growth. We view this as a positive catalyst for Ethereum's push to be net deflationary over the medium term. However, should the amount of staked ether continue to march higher, the more unfeasible it will become for Ethereum to remain net deflationary over long periods of time.

Ethereum: Active Validators



Source: Glassnode, 12/31/2023.

Ethereum: Daily Net Issuance



Source: Glassnode, 12/31/2023.

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