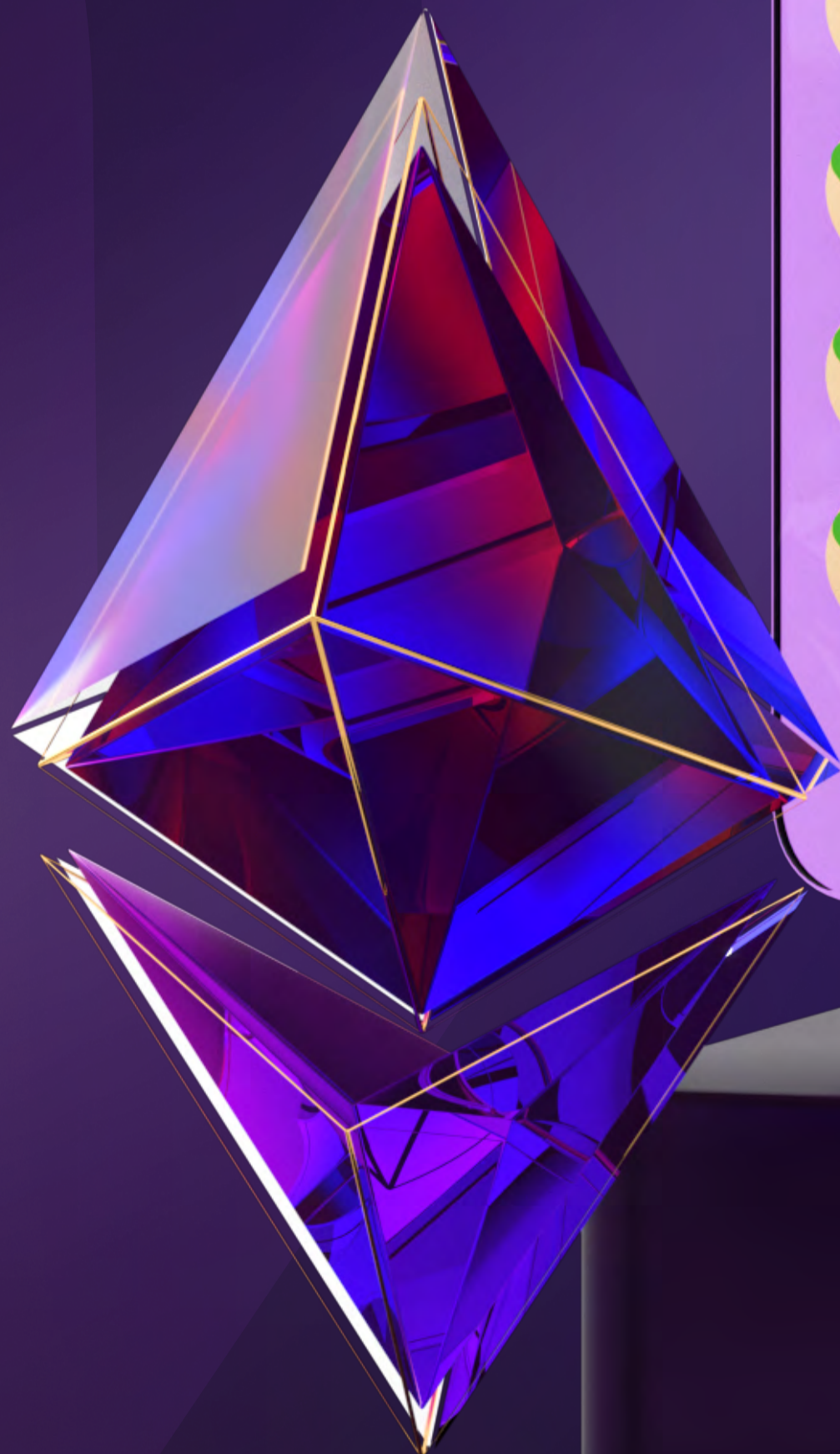


CEX.IO Compass: Q3 2022

The Latest Industry News.
Explained.



Greetings crypto community enthusiasts –

I hope this message finds you and your loved ones healthy and safe. It's been quite a year so far, hasn't it? Heading into 2022, the industry buzzed with the energy of a space finally coming into its own. Then events both unexpected, and perhaps in some cases inevitable, shook the ecosystem to its bedrock. From the war in Ukraine, to instability across global markets, to challenges from opportunists within the cryptocurrency space, this year has been marked by turbulence. Some projects lacked the grounding to withstand these shocks. Uncertainty can breed panic, but wisdom offers a more measured response. I'm writing to you today recognizing the privilege we enjoy. CEX.IO has been a fixture of "decentralized finance" since before the phrase existed. Our experience and dedication to the space have rewarded us with staying power and industry respect. At a time when most have taken a defensive posture, we're proactively working on the next chapter of our development. We're excited about the present – and the future.

As the launch of CEX.IO University at the start of the year helped illustrate, we believe knowledge and sound decision-making go hand-in-hand. Our continued commitment to empowering individuals and businesses at every stage of the crypto journey is built on principles of education and inclusivity. It's in this spirit that we began producing COMPASS in 2022. Every quarter, we'll aim to extend our expertise to those seeking greater clarity on the events shaping the crypto ecosystem. Think of COMPASS as your single source of clear-eyed truth on the latest market trends. In this document, our team unpacks the intricacies of the recent Ethereum Merge, gives a clear-eyed analysis of its purported benefits, and talks honestly about some areas of potential concern. While much remains to be seen, there are enough concrete data points that, when taken together, start to reveal a bigger picture. In turn, we'll track Bitcoin's recent trajectory, assess emerging trends by interpreting historical price movements, and provide additional insight into its relationship with traditional markets.

As a version of the old adage goes: change is the only constant, but history loves a repeat. This is not our first crypto "glitch." From our vantage point, the ecosystem is experiencing some necessary growing pains along its path to wider acceptance. Between digital assets providing tangible aid to organizations on the ground in Ukraine through our Donation Widget, to the explosion of crypto adoption in Southeast Asia, these events suggest a sturdier foundation could be in the making.

This is not our first disturbance, and as our wisdom informs us, it likely won't be our last. Our curiosity and desire to make sense out of the markets remains unchanged, and our commitment to providing intuitive crypto products and services remains ironclad. We hope our understanding of this year's events can help you ask the right questions as you chart your path through the 2023 DeFi landscape. Here's to reclaiming that sense of optimism in the new year, and building toward a brighter, more stable future.



Oleksandr Lutskevych
Founder and CEO, CEX.IO

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Part 1. Merge impact on user incentive and network dynamics

Key Takeaways:

- The merge fundamentally alters Ethereum's previously cemented procedures and policies governing the network's supply and functionality.
- The merge introduced a suite of tokenomic benefits (i.e. reduced issuance, in conjunction with the previously initiated EIP-1559 burn mechanism) that favor value accrual to ETH, and instituted PoS in place of proof of work (PoW).
- As a result, fundamental changes were made to user incentives that diverge from pre-merge, or PoW, ETH.
- In short, the merge pools incentive around holding ETH, while reducing incentive to spend it on executing transactions.
- The move from PoW to PoS, combined with components of ETH tokenomic makeup, raises questions around supply discovery through stake in the network. Consolidating compounding interest with a lack of scarcity in ETH's supply (no cap on ETH supply) has an impact on the relative growth of users on the network that can have negative externalities.
- There are two primary developments underway that mitigate the impact of the changes brought on by the merge. They include 1) the development and rising adoption of layer 2 (L2), and 2) liquid staking. The common theme of these developments include incentivizing users to spend their ETH instead of hodling.
- The amount of value locked on layer 2 has grown by 30% over the last quarter, despite turbulence across cryptocurrency and legacy markets. The largest layer 2 solutions,
- Optimism and Arbitrum, have seen sustained growth throughout the year. Opening 2022 with a share of 5.04%, the two platforms now combine for more than 23% of Ethereum mainnet activity.
- More than 5 million ETH, or 4.15% of circulating supply, is being liquid staked. ETH's liquid staking balance has retracted by 1.4% over the last quarter, but has grown 166% YTD.

Merge impact on user incentive and network dynamics

Ethereum is among the most intellectually fascinating components of the blockchain world. It has played a monumental role in the way people think about finance, how value is deployed, and has set a high technological standard for builders across the space. The recent merge reinforces all of these points. After successfully migrating to proof of stake (PoS) on September 15, Ethereum proved the sky's the limit for the engineering capabilities of the community. In doing so, it has simultaneously raised questions around key components of the value on the network, and the policy that manages it.

The merge fundamentally alters Ethereum's previously cemented procedures and policies governing the network's supply and functionality. Most notably, it eliminates the need for miners and energy input to uncover new ETH, and to stamp blocks of transactions onto the chain. The benefits of the change are often mentioned. However their real impact on ETH, and on those who use it, hold it, and validate on Ethereum are seldom discussed. With fundamental change to the network's technological infrastructure comes fundamental change to the structure and employment of network value. This idea should be explored in more detail, as it can be used to draw conclusions on Ethereum and ETH in the post-merge era.

Change in user incentive

The merge introduced a suite of tokenomic benefits (i.e. reduced issuance, in conjunction with the previously initiated EIP-1559 burn mechanism) that favor value accrual to ETH, and instituted PoS in place of proof of work (PoW). These benefits usher in fundamental changes to user incentive that diverge from pre-merge, or PoW, ETH. An understanding of ETH's role in the Ethereum network, and the types of users that participate on the network, must be established in order to grasp the impact of these changes.

What is ETH?

ETH is the fuel that enables actions on the Ethereum network. It can be thought of as the gas in a car that gets a driver from point A to point B. All transactions, including simple transfers of assets, to providing liquidity to decentralized exchanges, require gas that is paid in ETH. Different types of transaction are associated with varying amounts of gas, depending on their complexity, and gas prices move depending on demand for block space (linked to user activity). This same idea applies to driving a car; longer trips require more gas, and the price of gas per gallon floats with consumer demand.

Merge impact on ETH and ETH user incentive.

Much like the driver of a car, users of Ethereum prefer low gas costs. Low costs to transact enable users to execute more transactions, and broadens the pool of prospective users by having low barriers to entry. This is the ideal environment for a platform like Ethereum: a utility-centric network where the platform and everything it enables is the priority, not the asset that powers it.

It's difficult to have a utility first network, with a store of value (SoV) oriented asset at its core. Assigning ETH store of value qualities harms those who are there to take advantage of the utility Ethereum affords, and thus its ultimate purpose. SoV qualities are designed to be advantageous for the value of an asset.



As these qualities benefit the value of ETH, the price to execute transactions on the network becomes increasingly expensive if demand for block space doesn't offset the rising price of ETH. In turn, less people will be able to use the network (more difficult to afford), and the average benefit of transactions must rise to justify them. This idea is also echoed through the car example mentioned earlier. When the cost of fuel goes up, people are incentivized to stay home or second guess driving to a destination. This results in cars being used less, and drivers choosing to stay home more often.

What is mining and staking?

Mining and staking aim to accomplish the similar outcomes of discovering new supply (block rewards) and adding blocks to a chain, but take different avenues to do so. Mining, under PoW, requires energy input and computational power to verify transactions. Staking, on the other hand, outlines that validators are selected to confirm transactions, in proportion to their amount of holdings in a network's native asset. As a result, proof of stake uses a leaner process to approve transactions, by avoiding the computational costs associated with proof of work.

Merge impact on validator landscape

The divergence between the roots of mining and staking means those upholding each type of network have different incentives and costs to complete their jobs. As such, Ethereum's move from PoW to PoS shifts the costs and benefits of the entities upholding the network.

In a purely PoW environment (excluding the implementation of EIP-1559) miners are incentivized by block rewards and fees generated by transacting users. They then sell some of this revenue to cover all costs associated with obtaining it, in turn forcing coins into circulating supply. Under PoS, however, miners are replaced by stakers who capture revenue (new supply) by holding ETH, and the costs associated with obtaining revenue are significantly reduced. This builds incentive to hoard ETH and reduces the amount of ETH being pushed into the true circulating supply.

Cost-benefit analysis of users

It becomes clear that the move to PoS, and the accompanying tokenomic benefits, have meaningful impacts on the incentives and costs of every group interacting with the network. In short, the merge pools incentive around holding ETH, while reducing incentive to spend it on executing transactions. In a purely PoW environment, users and miners have equal costs/ benefits for playing their part on the network, and holders lack cemented, tangible benefits. Thus, the network's utility centric purpose is satisfied.

This is not the case post-merge. A simple cost benefit analysis highlights the fundamental changes introduced by the merge, and identifies how incentive has shifted since it went live. The table shows that the costs of being a user outweigh the benefits, while incentive to hold ETH simultaneously increases. This is counterintuitive for a platform that is intended for utility, as it shifts incentive to hold ETH over using it.

The problem with supply discovery through ownership stake, in the case of ETH

The move from PoW to PoS, combined with components of ETH tokenomic makeup, raises questions around supply discovery through stake in the network. Staking rewards are determined by a floating compounding rate that is applied to the size of a user's stake. For example, staking 100 ETH at 1% APY yields 1 ETH this year, and 1.01 ETH the following year (101 ETH at 1% APY)

Environment	Users	Holders/ Stakers Post Merge	Miners/ Holders Post Merge
PoW ETH	<ul style="list-style-type: none"> + Action on the network - Gas (cost to transact) 	<ul style="list-style-type: none"> - Passively buy ETH from miners or others pushing it to the market 	<ul style="list-style-type: none"> (+ New supply + Fees from users) - Input costs (energy/ mining infra.)
PoS ETH + EIP-1559	<ul style="list-style-type: none"> + Action on the network - Gas (cost to transact) - Burn (EIP-1559) 	<ul style="list-style-type: none"> + New supply + Burn (EIP-1559) + Reduced input costs + Slashed issuance (near term) 	See Holders

Cost-benefit table by network participant

Consolidating compounding interest with a lack of scarcity in ETH's supply (no cap on ETH supply) has an impact on the relative growth of users on the network. If an infinite amount of ETH can exist, the user group holding the most ETH (greatest capacity to capture compounding interest) ends up growing infinitely larger than the one with less ETH into perpetuity. A similar principle applies to the legacy financial system, and is commonly referred to as the "wealth gap."

The chart below visualizes what this looks like in practice. User 1 stakes 100 ETH, and User 2 stakes 15,000 ETH, both earning 1.81% (the minimum estimated staking APY post merge). Assuming the staking APY stays constant, User 1 will earn 19.65 ETH, and User 2 will earn 2,947.16 ETH in rewards over a 10 year period. As time progresses, the gap between User 1's and User 2's holdings and rewards grows infinitely larger.

Possible negative externalities of this problem rest in the utility of protocols across the Ethereum ecosystem. For example, users with larger amounts of assets on the network can have outsized influence over rates on lending and borrowing protocols, or the liquidity of trading pairs on decentralized exchanges. Although incentive to do this is implausible in most cases, it opens the door for exploitation and manipulation that can harm the ecosystem, and less influential users, in the long run.



How is the ecosystem working to offset these concerns?

Despite these concerns, the shifts in user incentive do not mark the end of Ethereum. There are two primary developments underway that mitigate the impact of the changes brought on by the merge. They include 1) the development and rising adoption of layer 2 (L2), and 2) liquid staking. The common theme bonding these factors is that they promote users to spend ETH, which counterbalances the newly established incentive to hodl.

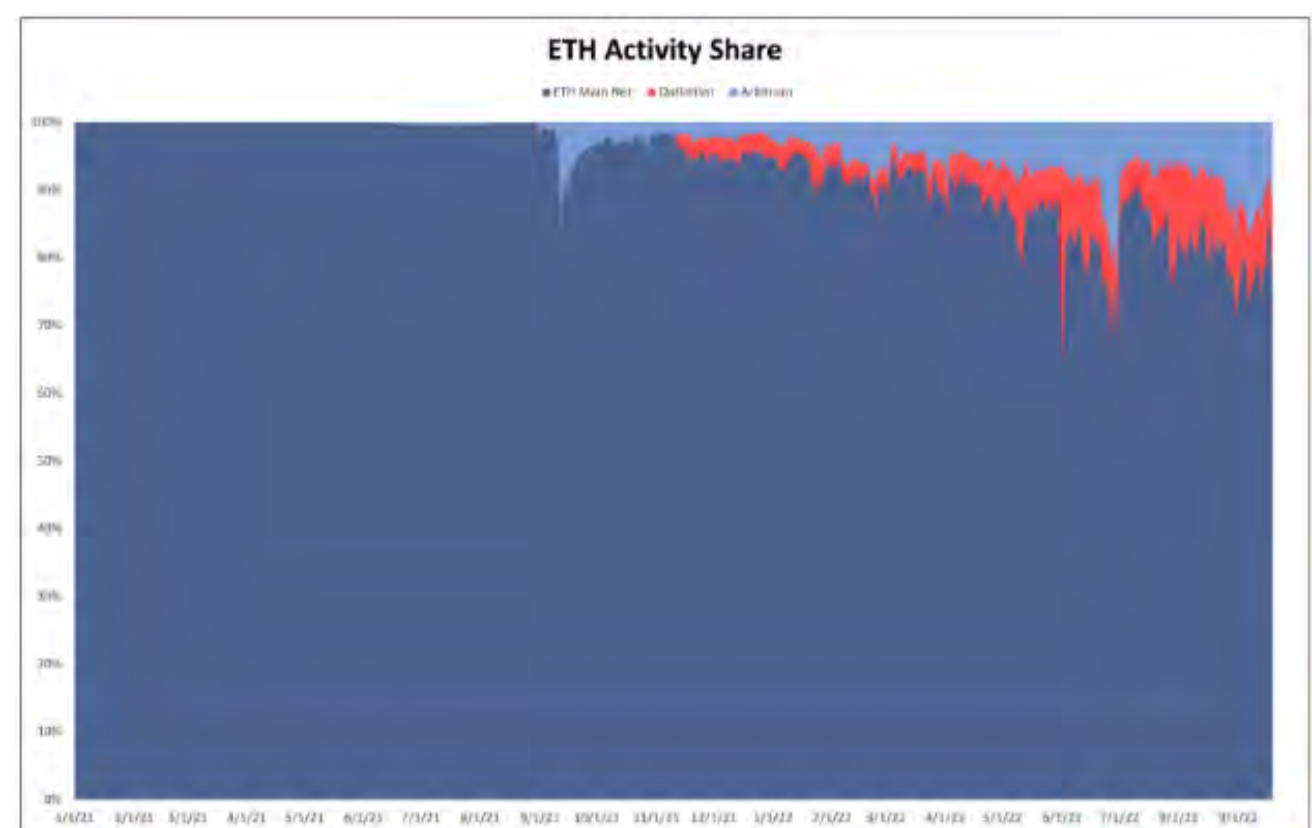
Layer 2

L2 promotes the spending of ETH by lowering costs associated with transacting in the ecosystem. Making transactions more efficient dampens the cost burden of being a user on Ethereum, which now includes gas and burnt fees. Since burnt ETH and gas fees paid to the network are directly related, the capability of transacting more, with less fees paid through L2, simultaneously reduces both user costs. In turn, users are incentivized to spend their ETH.

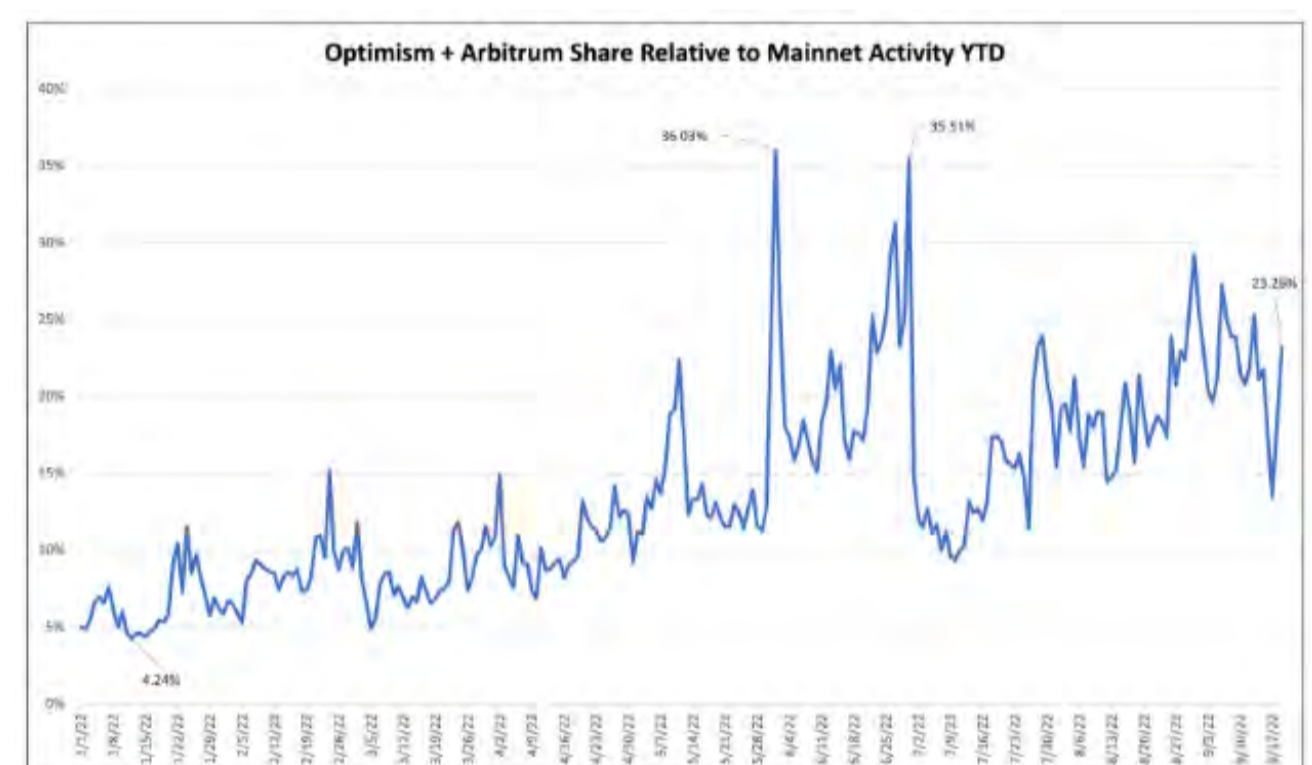
The state of L2

The amount of value locked on layer 2 has grown by nearly 30% over the last quarter, despite turbulence across cryptocurrency and legacy markets. The largest layer 2 solutions, Optimism and Arbitrum, have seen sustained growth throughout the year. Opening 2022 with a share of 5.04%, the two platforms now combine for more than 23% of Ethereum mainnet activity.

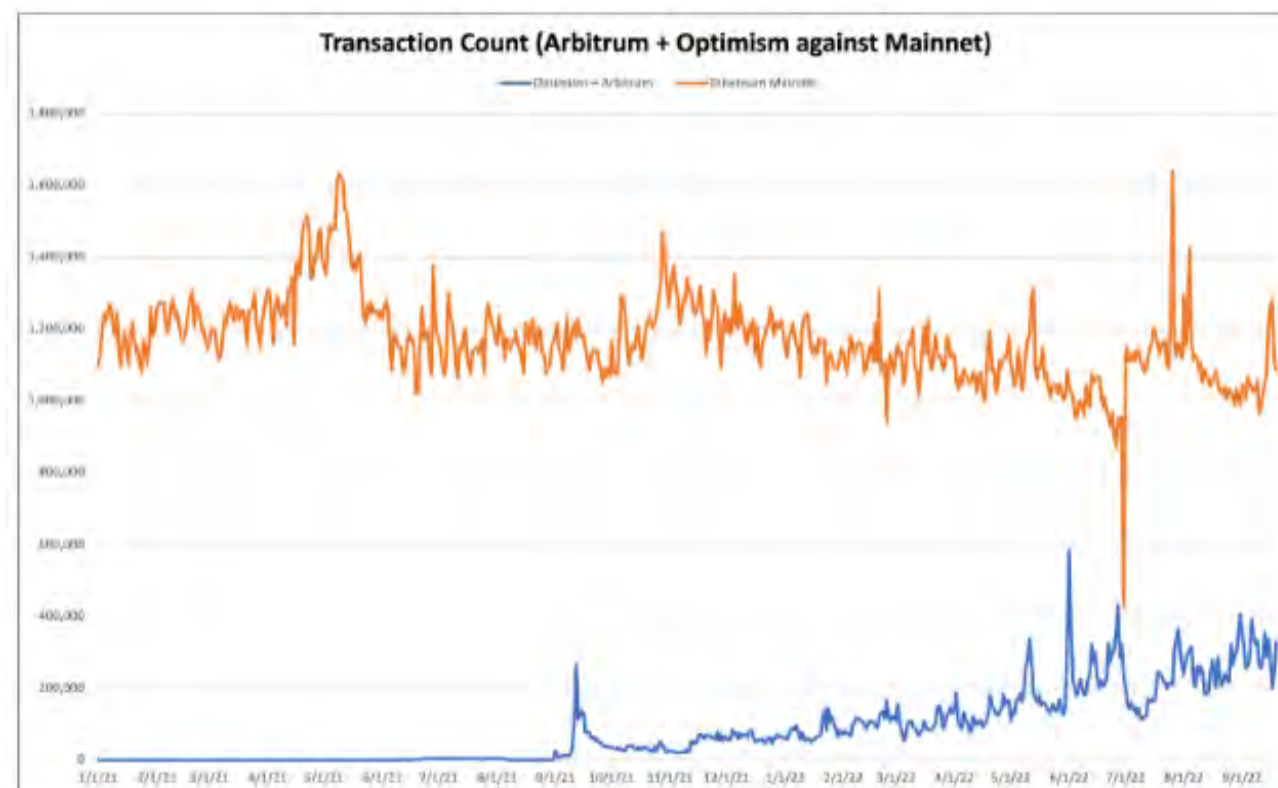
The chart below breaks down the individual shares of Optimism, Arbitrum, and Ethereum mainnet activity over the last year and a half plus. The chart below is an alternative view of Optimism and Arbitrum activity growth against mainnet year to date (YTD). Peaking at 36% in early June, the combined activity of the layer 2s has averaged more than 13% of mainnet activity, a large increase from the 2021 average of 1.4%.



Observing the number of actions performed on Optimism, Arbitrum, and Ethereum mainnet adds additional perspective to the L2 growth story. The number of mainnet transactions reflects a downward trend as the combined activity of Optimism and Arbitrum continues to rise. The culmination of these trends is suggestive that the top layer 2s are absorbing activity that would otherwise be performed on mainnet. This is a positive indication that the growth in L2 use is rooted in the components that make L2 more attractive than L1, rather than broader adoption across the entire Ethereum ecosystem (the idea that rising tides raise all ships).



Ethereum mainnet averaged 1.221 million transactions per day through 2021, compared to just 1.09 million transactions per day YTD in 2022. This marks a more than 10% decrease in average daily mainnet transactions, against a 867% increase in the combined average daily transaction count of Optimism and Arbitrum. In 2021 the two platforms combined for an average daily transaction count of just 17,656 transactions per day, against roughly 171,000 transactions per day YTD in 2022.

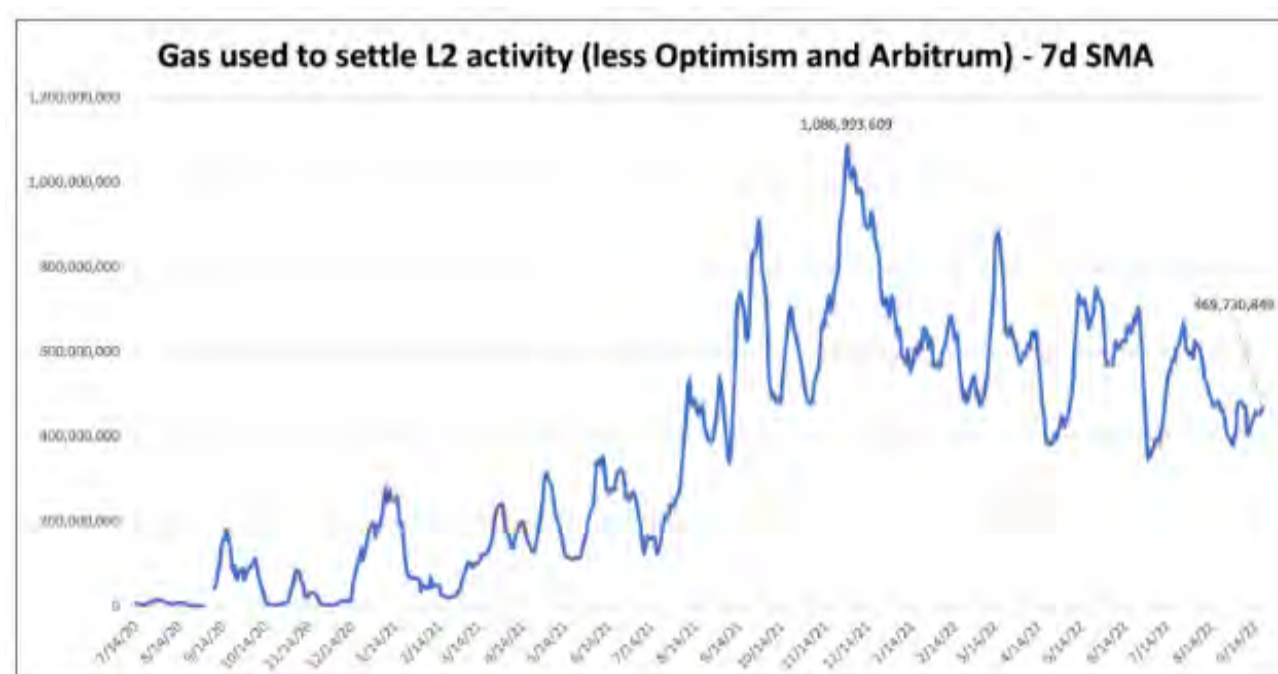


Measuring L2 use more broadly

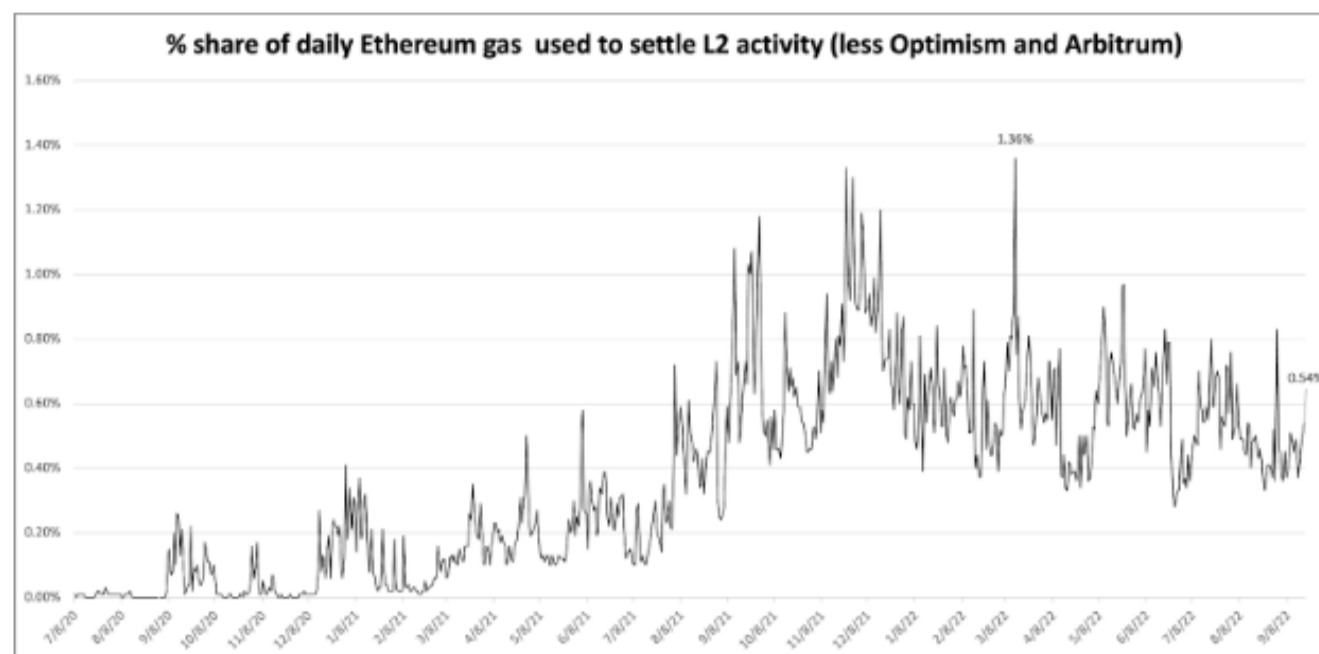
Other measurements show Ethereum’s L2 growth isn’t exclusive to the top two platforms by total value locked (TVL). On-chain data indicates Ethereum’s network of L2 solutions are growing in tandem, further highlighting the demand for the benefits they offer.

The chart below tracks the seven-day simple moving average (SMA) of gas used to settle L2 transactions on Ethereum mainnet, excluding Optimism and Arbitrum. Despite the slightly negative trend since January of this year, the average daily gas consumption of L2 has more than doubled over the last year and a half.

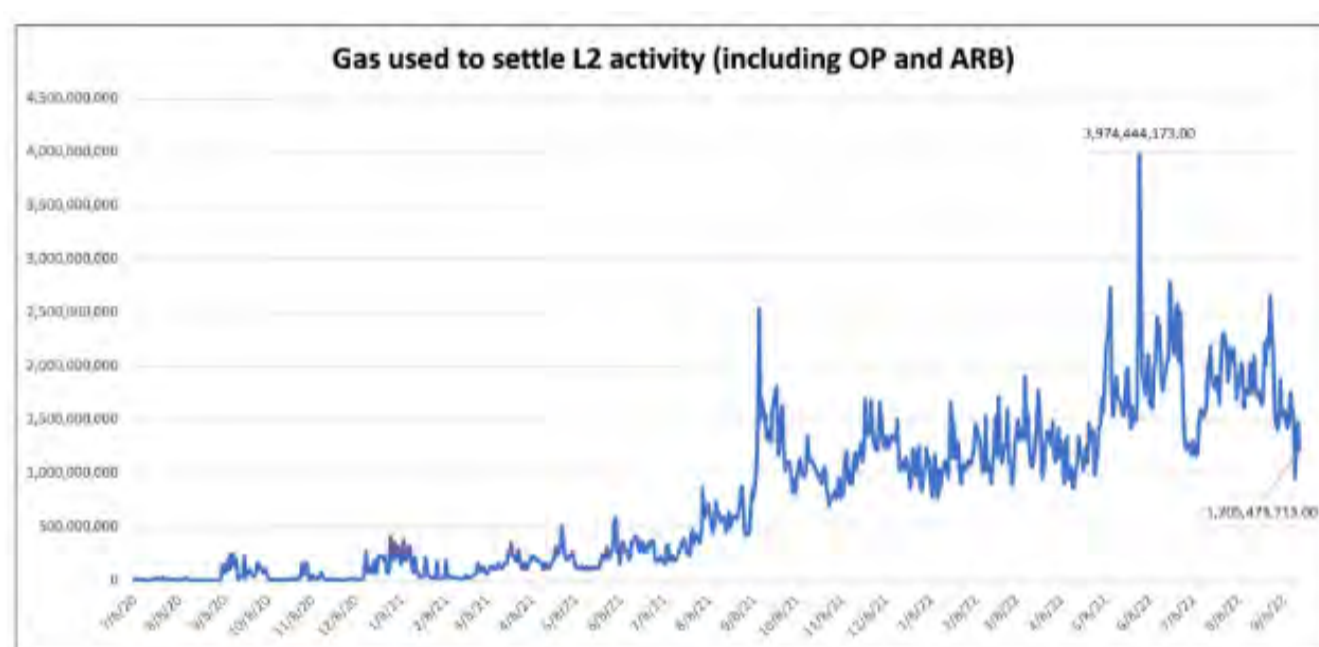
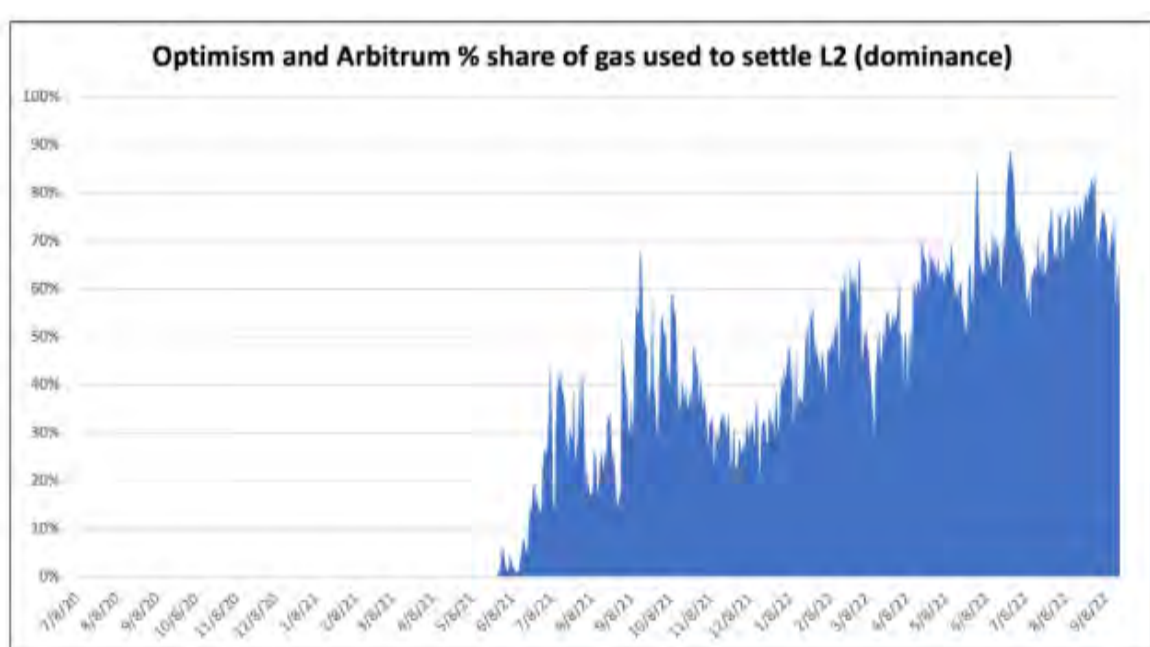
The chart below shows the same data as the one above, but expresses it as a percent share of Ethereum’s daily gas capacity (100,000,000,000 gas/ day). Gas used to settle L2 transactions, minus Optimism and Arbitrum activity, has consistently floated around .5% of Ethereum’s daily gas capacity, and has peaked as high as 1.4%. Consuming less than .35% of Ethereum daily gas on average through 2021, L2 solutions excluding Optimism and Arbitrum have captured nearly .6% of gas capacity on average YTD in 2022. This notches close to 70% growth in gas consumption by these solutions YTD.



To add perspective, Optimism and Arbitrum still occupy the lion's share of L2 settlement gas consumption. The chart below tracks the cumulative gas used to settle L2 activity, including Optimism and Arbitrum. Through 2021, cumulative gas consumption averaged 539,162,105 gas per day, compared to a daily average of 376,215,739 gas, excluding Optimism and Arbitrum activity. This highlights a 30% daily Optimism and Arbitrum dominance.



In 2022 the gap grew wider; cumulative gas consumption averaged 1,533,312,194 gas per day, compared to a daily average of 563,296,389 gas consumed, excluding Optimism and Arbitrum. This represents a more than two-factor change in Optimism and Arbitrum dominance, which has averaged 63% YTD in 2022.



The chart below highlights the trend in Optimism and Arbitrum dominance over daily gas consumption to settle transactions. Making up less than 50% of all gas used by L2s at the start of 2022, the two solutions have consistently combined for nearly 75% over the last number of months.

What is fueling the exodus to L2?

The trend in users opting to use L2 has become increasingly vivid since the start of 2022, but what is fueling the exodus from mainnet? The short answer is that L2 is becoming more capable of allowing users to complete the same actions they can on L1, but with a better user experience (UX). Instances of this can be seen across all L2 solutions, from Optimism and Arbitrum, to smaller networks like Loopring.

Better accessibility and UX

Strides made in the development of L2 are making it easier for users to access, and simpler for them to navigate. Improved bridging (moving value from L1 to L2, and vice versa), reduced transaction costs, and faster settlement speeds have all contributed to the growth of L2 adoption. Optimism's Warp Speed simplified the bridging process by making it faster and cheaper to bridge smaller amounts of ETH to the L2. The upgrade made it five times less expensive, and 15 times quicker, to deposit amounts less than .5 ETH. Previously, bridging was a time intensive process, taking up to 10 minutes.

However, the Warp Speed upgrade allows funds under the designated amount to be deposited within a couple minutes. Optimism is also approaching the launch of its Bedrock upgrade, which aims at making transaction speeds on the platform faster, costs lower, and experimentation on the platform more desirable for builders. This will assist in unlocking new possibilities for the utility of the L2, and make it more accessible to a wider number of users and its L1 base.

Additionally, Arbitrum One recently migrated to Nitro. The upgrade increases throughput by seven to 10 times, compresses call data to lower transaction costs, and, similarly to Bedrock, improves execution by limiting barriers between the L2 and the Ethereum Virtual Machine (EVM). The EVM is the infrastructure that allows Ethereum smart contracts to be executed. It enables contracts on EVM congenial platforms, such as Arbitrum, Optimism, and Polygon, to be accepted by Ethereum.

More use cases and better usability

More applications launching on L2, and more assets offering L2 native tokens, has broadened what is possible with Ethereum's second layer. Dexes, including Uniswap, Sushi Swap, and Balancer, and lending protocols like AAVE have integrated with one or more L2 solutions, enabling the utility of their L1 cousins with the benefits of L2 rails. Commonly used assets like BTC, DAI, USDC, and governance tokens like AAVE, CRV, and YFI all exist on at least one L2 platform as well, allowing users to deploy these assets and the actions they warrant on L2.

NFTs are also gaining traction on L2. OpenSea Testnets launched on Optimism Goerli and announced the integration with Arbitrum, and L2 native marketplaces have seen strong growth over the last quarter. Quix, an Optimism-based NFT marketplace, saw a 80% increase in cumulative ETH volume over the last quarter and 3,740% YTD.



Additionally, improvements in user interfaces (UI) are making L2 easier to navigate, and more intuitive for users before and after bridging. For example, Loopring launched new features on its mobile and web apps that bring the full L2 experience to a central location. Trading NFTs, sending and receiving funds, and bridging can all be all done through a single application. This eliminates the need to understand multiple applications and/or processes by presenting users with everything they need in a central place. Moreover, improvements made to the front end allow more advanced features to be enjoyed by a wider group of users. This builds a more inclusive environment on L2 and gives new users a chance to more easily learn about how it works and its capabilities.

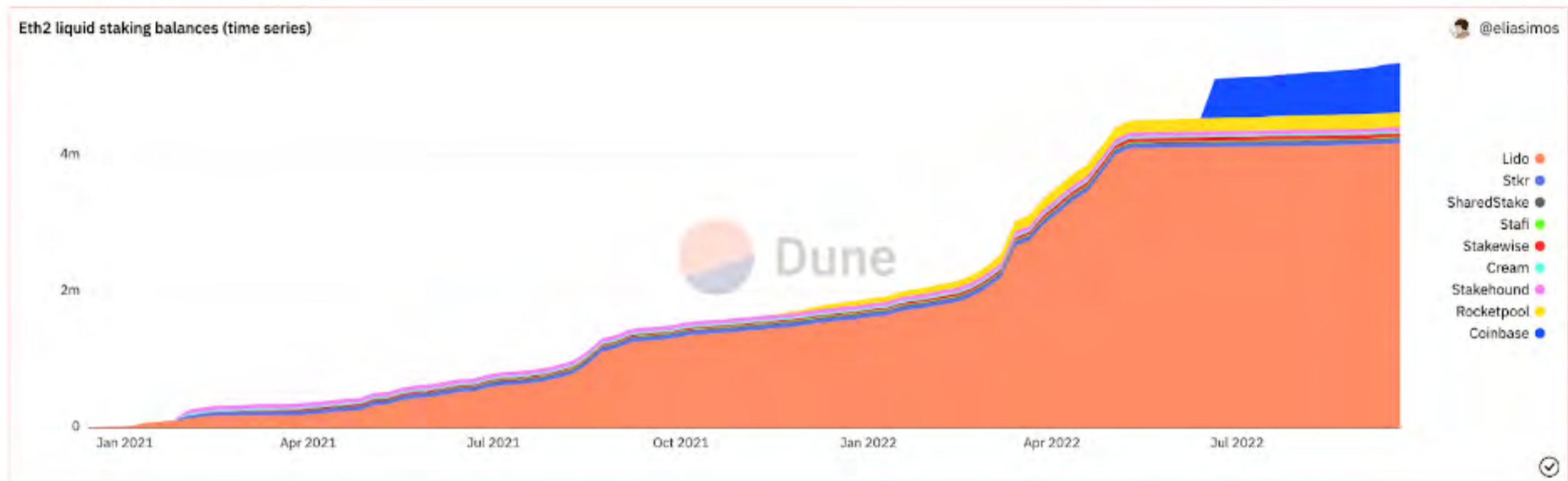
Liquid staking

The inaccessibility of coins that are being staked render their value illiquid, when it could otherwise be deployed elsewhere in an ecosystem. This has a negative impact on ecosystem growth, as it limits the extent to which value locked can be stationed, and incentivizes users to hodl and lock up their coins instead of spending them.

Liquid staking is a mechanism that makes staked value more fluid. It does so by creating alternative representations of staked coins. These derivatives hold similar utility to the underlying staked assets, and can be deployed alternatively in other areas of a network's ecosystem. Although it is still a work in progress, liquid staking can reduce opportunity costs for networks choosing to benefit from high security and staked values, all while allowing users to easily spend their staked assets.

Measuring ETH liquid staking

More than 5 million ETH, or 4.15% of circulating supply, is being liquid staked. ETH's liquid staking balance has retracted by 1.4% over the last quarter, but has grown 166% YTD. The chart below highlights the trend in the amount of ETH being liquid staked over the last 18 plus months.



There are a couple limiting factors to ETH liquid staking, and staking in general, as it currently stands: 1) staked ETH cannot be accessed from their contracts until withdrawals are enabled, and 2) liquid staking is primarily offered through decentralized protocols.

This has meant that liquid staked ETH derivatives are traded on a secondary market, and 1 staked ETH token doesn't always equal 1 ETH. This is a limiting factor for ETH liquid staking in that users choosing to liquid stake run the risk that the value of their derivative tokens will lose value. This isn't a problem for high conviction holders who are waiting for withdrawals to be enabled (at that point 1 staked ETH will equal 1 ETH). However, those with high time preference, and those who are using staked ETH tokens for leverage might second guess liquid staking. Furthermore, ETH liquid staking services are primarily offered through decentralized protocols. These protocols aren't easily accessible to all users, in turn limiting the pool of prospective users who can liquid stake their ETH.

These limiting factors have an expiration date, however. ETH in staking contracts will eventually be unlockable with staking derivative tokens. And accessible entities are beginning to roll out liquid staking services. These events increase the probability of liquid staking playing a positive role in the ecosystem, as users will be able to earn staking rewards without compromising the ability to spend their ETH.

Conclusion

The merge marks one of the most significant engineering accomplishments since the creation of blockchain itself. While it is something that should be celebrated, it is fair to question its impact on the Ethereum ecosystem and those who participate in it. It makes fundamental changes to the procedures and policies governing the network's supply and functionality, permanently altering the dynamics and incentives that previously guided the protocol.

Despite the shift, however, the ecosystem has developments in place that assist in pulling the newly established incentives closer to their predecessors. Thus, there is strong reason to believe that Ethereum will have to rely on these mechanisms and pieces of infrastructure to adequately fulfill its purpose moving into the future. In any event, the merge proved that Ethereum remains one of the most intellectually fascinating cornerstones of the digital world, and is the pinnacle of digital utility.



Part 2. The State of Bitcoin

Key Takeaways:

- In the face of adversity, miners managed to grow Bitcoin's hash rate by 12% over the last quarter and 40% year to date (YTD) using the 7 day simple moving average.
- Difficulty has climbed to new highs in lock step with the hash rate. August saw three straight positive difficulty adjustments that cumulatively pushed difficulty up more than 15%.
- Hash price currently sits at \$0.0822 and is down around 80% from the one year high of \$.41, and is down 65% YTD.
- More than 86% of bitcoin's supply hasn't moved in at least three months (an all-time high), and 78% of supply in at least six months. This comes in spite of price being flat since early July and down 56% since early April.
- As it currently stands, LTHs control around 71% of BTC's circulating supply and 65% of sovereign supply, equating to about 13.7 million BTC. 38% of LTH supply, or 27% of circulating supply, is currently being held at a loss.
- It is also the first time LTH cost basis has risen above STH cost basis since the conclusion of the 2018 bear market. Each time this occurred (late 2011, February 2015, and late 2018) an approximate macro bottom was marked.
- Open interest dominance has climbed to multi-year highs around 3.2% of bitcoin's market cap. This leaves the door open for the derivatives market to have an outsized influence over the market price of BTC.
- Despite the volatility and suboptimal economic conditions 2022 has brought, BTC and blue chip cryptos have shown signs of resiliency. They remain among the top performing assets from the black swan induced lows of early 2020, and have held strong through Q3 of this year.
- BTC's sharpe ratio concluded September around $-.83$ and has averaged -1 through the last month of the quarter. The sharpe ratio indicated that the risk adjusted return of BTC outpaces that of a basket of U.S. bonds and is only a bit worse than that of the S&P 500. This highlights that, while it has seen a poor performance YTD and an outsized drawdown from its all-time high, BTC is performing similarly to other, less risky assets on a risk adjusted basis.

This year has been equally tough on digital and legacy assets and markets. Multi-decade high levels of inflation globally, aggressive monetary policy from central banks around the world, and disrupted relations between governments have collectively put stress on asset prices. Bitcoin and digital assets have been among the most impacted by the culmination of these factors.

Down about 58% so far in 2022, bitcoin has shed approximately \$890 billion of value from its all-time high market capitalization and experienced some of the largest monthly declines in its existence. The sharp decline in the market price of BTC consequentially derailed the operations of some miners, who have filed for bankruptcy or were forced to close their doors permanently. Price and surface level observations of miners, however, don't paint the truest picture of the state of Bitcoin. Looking under the hood highlights that the network is growing stronger and holders are doubling down even as price tumbles and the overall economic outlook grows increasingly grim.

The following takes aim at highlighting the approach of miners, holders, and speculators as BTC navigates the quickly changing economic landscape. It also uses historical trends to characterize the current state of BTC the asset and Bitcoin the network. Lastly, it outlines how BTC stacks up against legacy indices and assets up to the end of Q3.

Mining

A softening market and heightened competition have put stress on the profitability of BTC miners. As mentioned in the previous edition of COMPASS, this is a natural function of the network and the competitive dynamic of the BTC mining landscape. The trend has only grown stronger over the summer months; miner profitability has continued to sink as competition between them rose, prompting weaker ones to capitulate or seek outside means of continuing operation. Despite the headwinds, miners have continued to expand their operations and make the network more robust. The following takes a closer look at the state of BTC miners, the network hash rate and difficulty, and how the current mining landscape lines up against market and historical trends.

Hash rate

In the face of adversity, miners managed to grow Bitcoin's hash rate by 12% over the last quarter and 40% year to date (YTD) using the 7 day simple moving average. The current hash rate of 242 exahashes is a new all-time high and marks a 188% change from the Spring/Summer 2021 low of roughly 84 exahashes using the same moving average.



A rising hash rate against the declining market value of BTC has pushed the correlation between hash power and market cap into negative territory for the third time in bitcoin's history. The first two instances marked approximate macro bottoms for the market cap of BTC. They formed over the course of a year from February 2015 to February 2016, and for seven months from February 2019 to August 2019. The correlation flipped negative on July 5 of this year and has steadily persisted down to $-.42$. For reference, the correlation between the hash rate and BTC's market cap reached $-.87$ in 2015 and $-.57$ in 2019.

Bitcoin Market Cap - Hash Rate Correlation



Difficulty

Difficulty has climbed to new highs in lock step with the hash rate. Difficulty is a measure of the work required (input resources) to discover new supply, and is a barometer for the general level of competition between miners. Difficulty and competition have a direct relationship: Therefore, higher difficulty means a higher level of competition and vice versa.

Although volatile and rising energy costs have influenced the profitability of miners, increased competition (rising difficulty) is the primary force putting stress on their profitability. Rising difficulty equates to the rising input resources required to discover new BTC, which means it becomes more expensive for miners to capture revenue overtime. This dynamic against a soft market has meant that some miners' costs have begun to exceed the revenue they generate.

August saw three straight positive difficulty adjustments that cumulatively pushed difficulty up more than 15%. Since then difficulty has grown by about 1.2% after two adjustments of +3.45% and -2.14% Year to date difficulty has increased by more than 29%.

Bitcoin: Mining Difficulty (7d Moving Average)

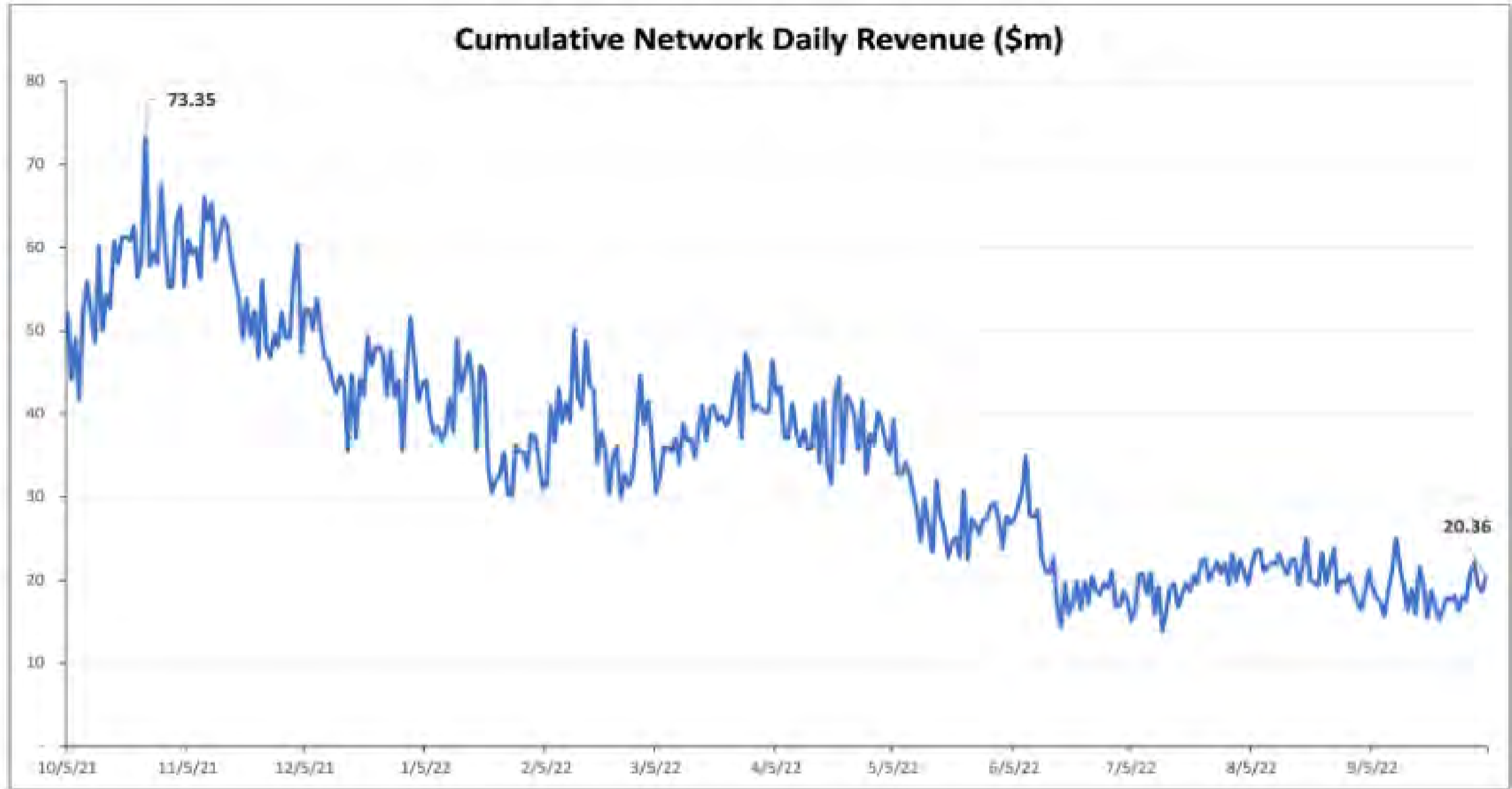


Hash price

Hash price is an estimated measure of the daily dollar denominated revenue generated by miners per terahash (Th) of power they hold. For example, a miner with 1,000 Th of power earns \$100 in revenue per day at a hash price of \$.10. Hash price currently sits at \$0.0822 and is down around 80% from the one year high of \$.41, and is down 65% YTD. It is down approximately 3% from the last COMPASS report, despite the price of BTC increasing 5%. This highlights the impact of rising competition on the profitability of miners.



At the current hash rate of 242 exahashes/s (or 242 million terahashes/s), miners are competing to capture approximately \$20.36 million worth of revenue per day given a hash price of \$0.0822. The chart below tracks the estimated cumulative amount of revenue miners have been able to capture on a daily basis since October 2021.



Despite the stress on miner revenues, BTC's market price is still trending above the difficulty regression model price. The difficulty regression model uses fluctuations in difficulty to assign an estimated average production cost for BTC by the mining industry as a whole. This indicates that miners are still running profitably in aggregate even as hash price tumbles. As of October 4 the difficulty regression model assigns an average production cost of \$18,047 to BTC, notching a 12.5% spread between market price and difficulty regression price.

Bitcoin: Difficulty Regression Model



Entity adjusted dormancy

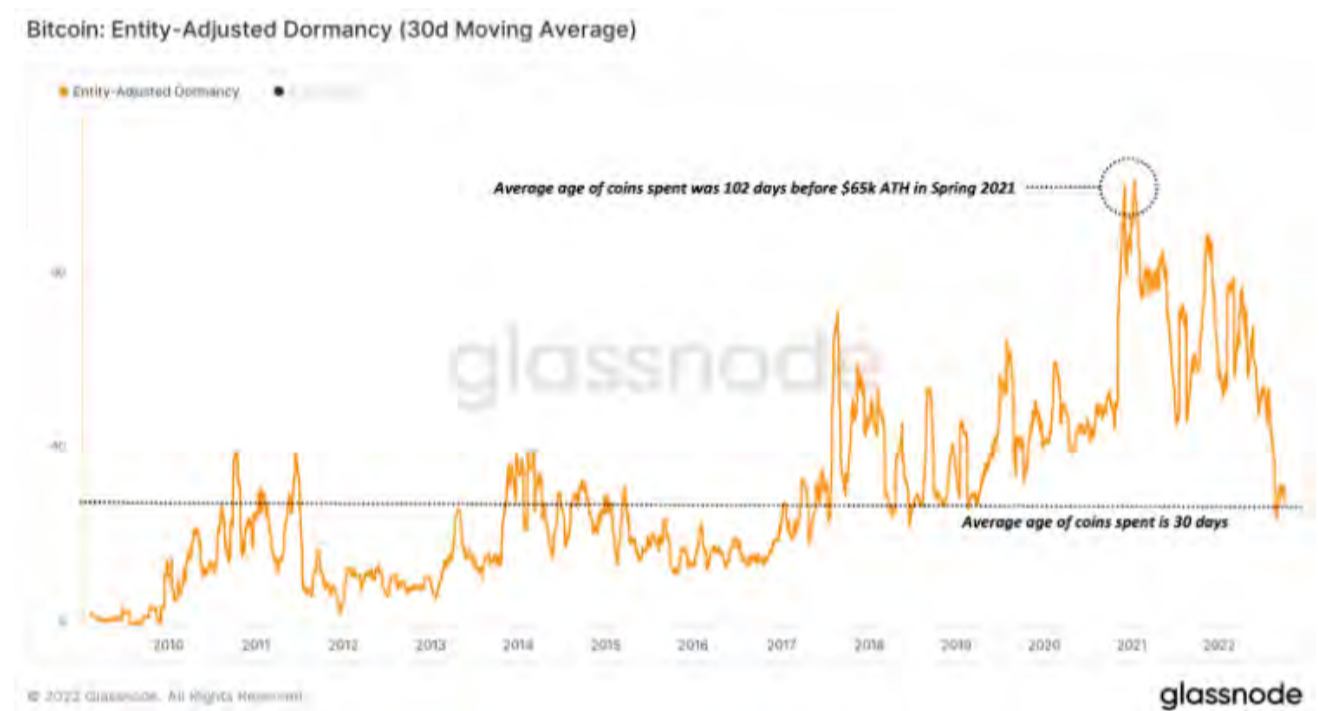
Another telling supply age metric to look at is dormancy, or the average number of days destroyed after a coin has been transacted. Dormancy rises as more older coins are spent, and declines as more younger coins are spent. It now sits at a four year low that was last seen after the 2017/ 2018 bull market. This indicates that longer term holders are remaining strong and hodling their coins, while the average age of coins spent declines.



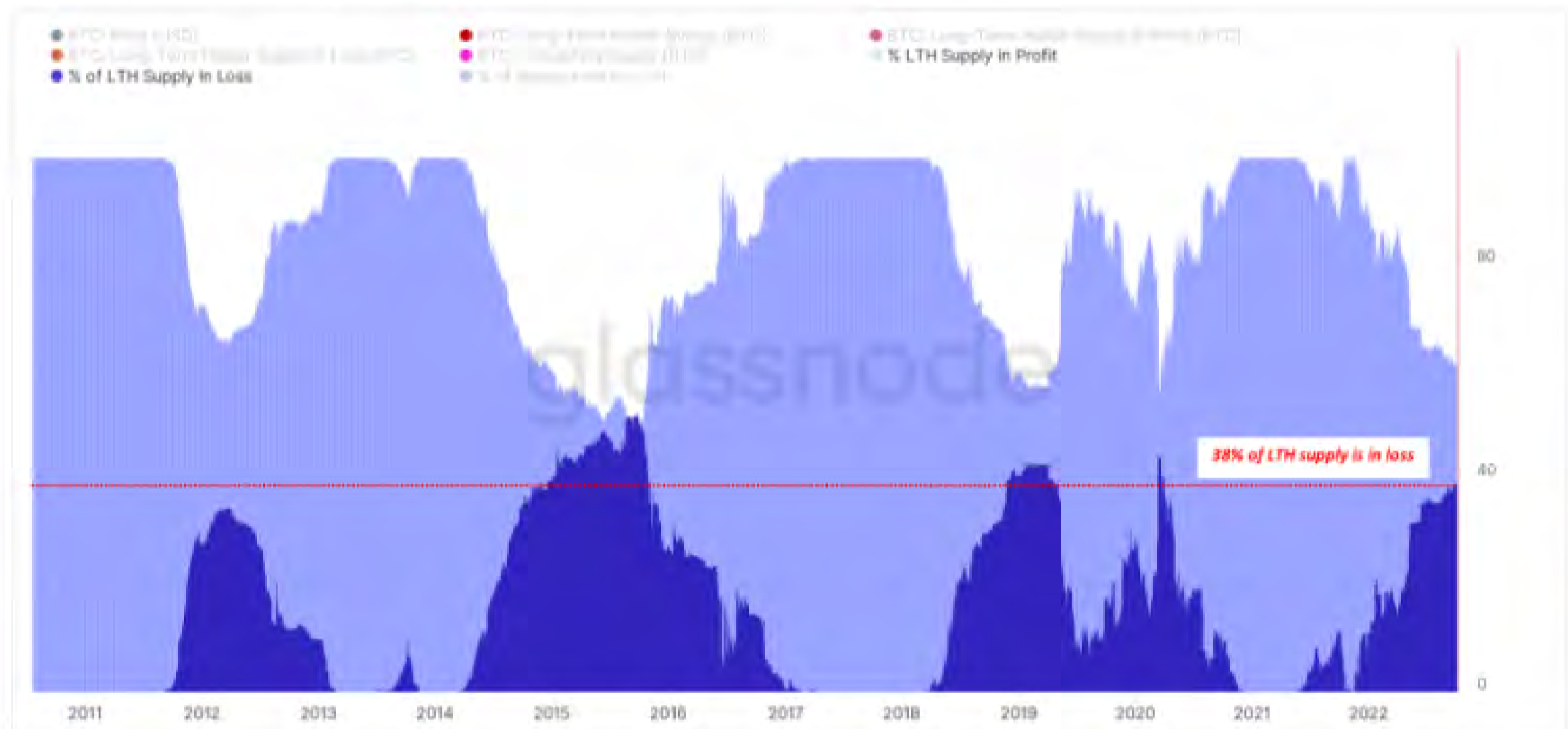
State of long term hodlers

Observing the state of long term hodlers adds color to their sentiment and what they might do with their BTC. Coins deemed to be held by long term holders (LTH) have an age of at least 155 days, or roughly six months.

As it currently stands, LTHs control around 71% of BTC's circulating supply and 65% of sovereign supply, equating to about 13.7 million BTC. 38% of LTH supply, or 27% of circulating supply, is currently being held at a loss. Given the trend in the aging, declining dormancy, and the diminishing profitability of LTHs, it is improbable that this portion of the supply will budge.



Long Term Holder Supply Overview



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Further, LTHs and short term holders (STHs) are both at losses in aggregate with price at \$20,300. On average, LTHs are down about 13% in aggregate and STHs are down around 9% in aggregate. This is a rare occurrence that has only happened on four other notable occasions.

The first instance happened in 2011 at the conclusion of the 2010/2011 bull market; the second in 2015 as the 2013/2014 bull market cooled down; the third time in the “mini bear market” of 2018 to early 2019; and the last was during the COVID black swan event. It is also the first time LTH cost basis has risen above STH cost basis since the conclusion of the 2018 bear market. Each time this occurred (late 2011, February 2015, and late 2018) an approximate macro bottom was marked.

Bitcoin: On-chain Cost Basis



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Derivatives

Derivatives offer insight into the market's general sentiment toward the price of BTC. It also adds context to how price might move, especially at a time when supply illiquidity is mounting and LTHs are bearing down. Liquidations have increasing influence over the price of BTC as the amount of speculation rises. Liquidations can impact price to the upside or the downside; long liquidations can suppress price as BTC is force sold onto the market, while short liquidations can bolster price as it forces buy pressure on BTC. As the market stays quiet and inflows stay minimal, derivatives can play a large role in the price action of BTC.

Open interest dominance

Open interest (OI) is a measure of the total amount of value allocated to open futures contracts. OI dominance sets the amount of value allocated to futures over the market cap of BTC. Expressed as a percentage of bitcoin's market cap, it is used to assess the ratio of speculation to the amount of value physically locked in the Bitcoin network. The higher OI dominance climbs the greater the likelihood of derivatives having an impact on the BTC market.

Open interest dominance has climbed to multi-year highs around 3.2% of bitcoin's market cap. This leaves the door open for the derivatives market to have an outsized influence over the market price of BTC. Other factors, like the futures funding rate, provide a backdrop for the direction speculation can be inclined to influence.

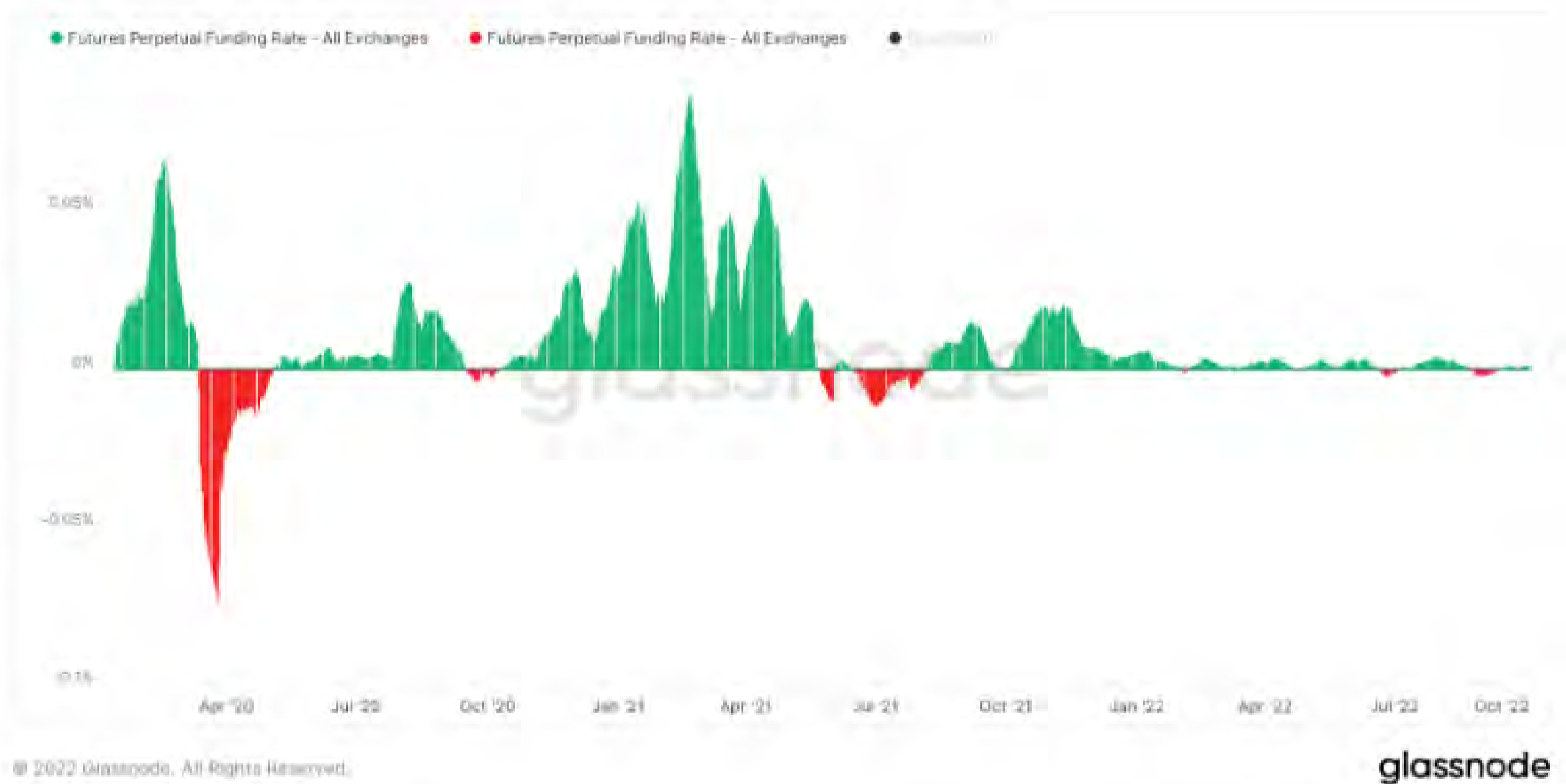


Futures funding rate

At heightened levels of OI dominance, small fluctuations in price can trigger liquidations that push the price of BTC up or down. Futures funding is used to highlight the sentiment of speculators (bullish or bearish), which determines the direction BTC's price may be more inclined to move. The more negative funding is, the more bearish speculators are. In turn, the liquidation of bearish speculators is more likely to produce an outsized impact on the price of BTC. The opposite is true when funding is more positive.

Funding has leaned positive through the majority of September and into October. This means speculators are bullish in aggregate, and those leaning long intermittently pay premiums to hold their positions. Positive funding also means long liquidations have a greater capacity to move the price of BTC. This dynamic will be an important one to watch as BTC trends below LTH and STH cost bases, while floating in an area of value by other metrics.

Bitcoin: Futures Perpetual Funding Rate - All Exchanges (14d Moving Average)

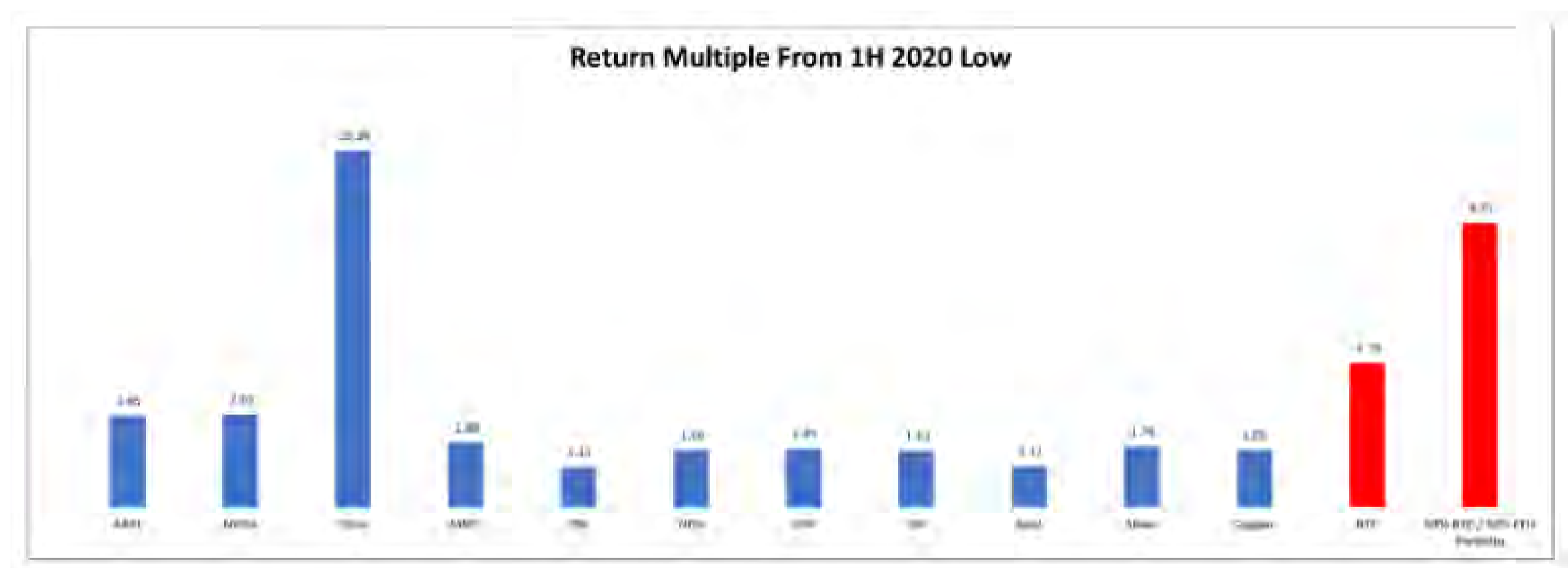


Relative performance

Despite the volatility and suboptimal economic conditions 2022 has brought, BTC and blue chip cryptos have shown signs of resiliency. They remain among the top performing assets from the black swan induced lows of early 2020, and have held strong through Q3 of this year. The following examines the relative performance of BTC, and ETH, over the last quarter, YTD 2022, and from the depths of the COVID breakdown more than two years ago.

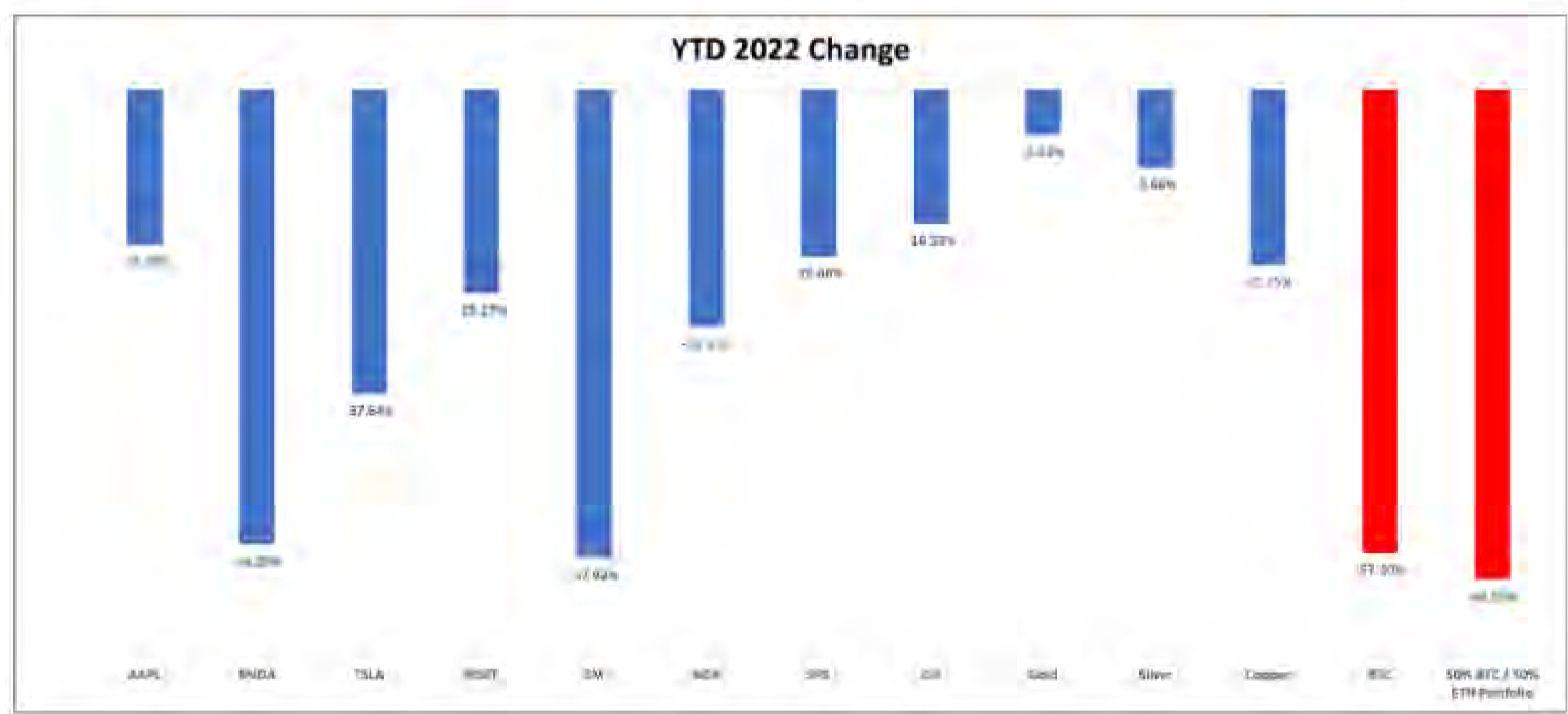
Performance from early 2020

BTC and ETH have overperformed the major U.S. stock indices, precious metals, and some tech stocks they are often compared to from the COVID lows of early 2020. At a return multiple of 4.18, BTC has overperformed Apple (AAPL) and Microsoft (MSFT), which are among the better performing tech stocks from this period. Tesla (TSLA) overperformed BTC by nearly two and half times at a return multiple of 10.36, and even beat out a portfolio of BTC and ETH which returned 725%. Despite this year's weak performance, the multiples produced by BTC and ETH over the last two plus years have proven them to be better insulators from the economic turmoil than their legacy counterparts.



Year to date performance

The strong performance from the COVID lows comes in spite of BTC and ETH being among the worst performing assets YTD 2022. Hawkish central banks and aggressive economic tightening have played a major role in the poor performance of digital assets, legacy assets, indices. BTC is down nearly 58% and a portfolio of BTC and ETH is down 60.55%. Their performance is on par with Nvidia (NVDA) and Zoom (ZM), which are down 56% and 58% respectively so far this year.



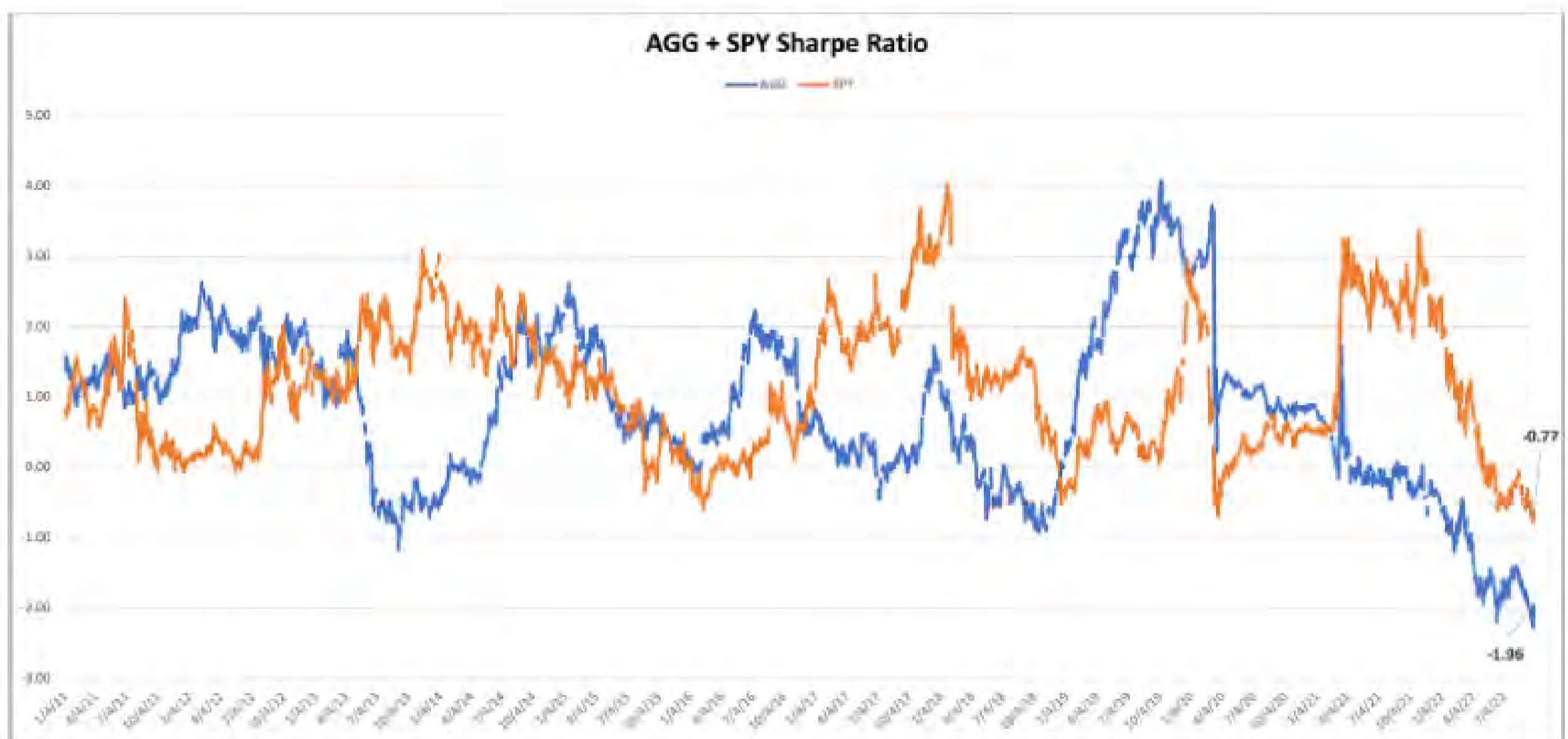
Q3 2022 performance

BTC and ETH are beginning to show signs of strength as legacy markets and equities are continuing to break down. Despite crypto being tightly correlated to U.S. stock indices through much of the last year, the relative Q3 performance shows a sign of weakening correspondence. This is how crypto enthusiasts would hope to see BTC perform as the global economic outlook grows darker. However, cryptocurrencies as an asset class are still in uncharted territory. Despite never being so ingrained in the global financial fabric and showing signs of working through poor economic conditions, digital assets are not immune to volatility in the markets.

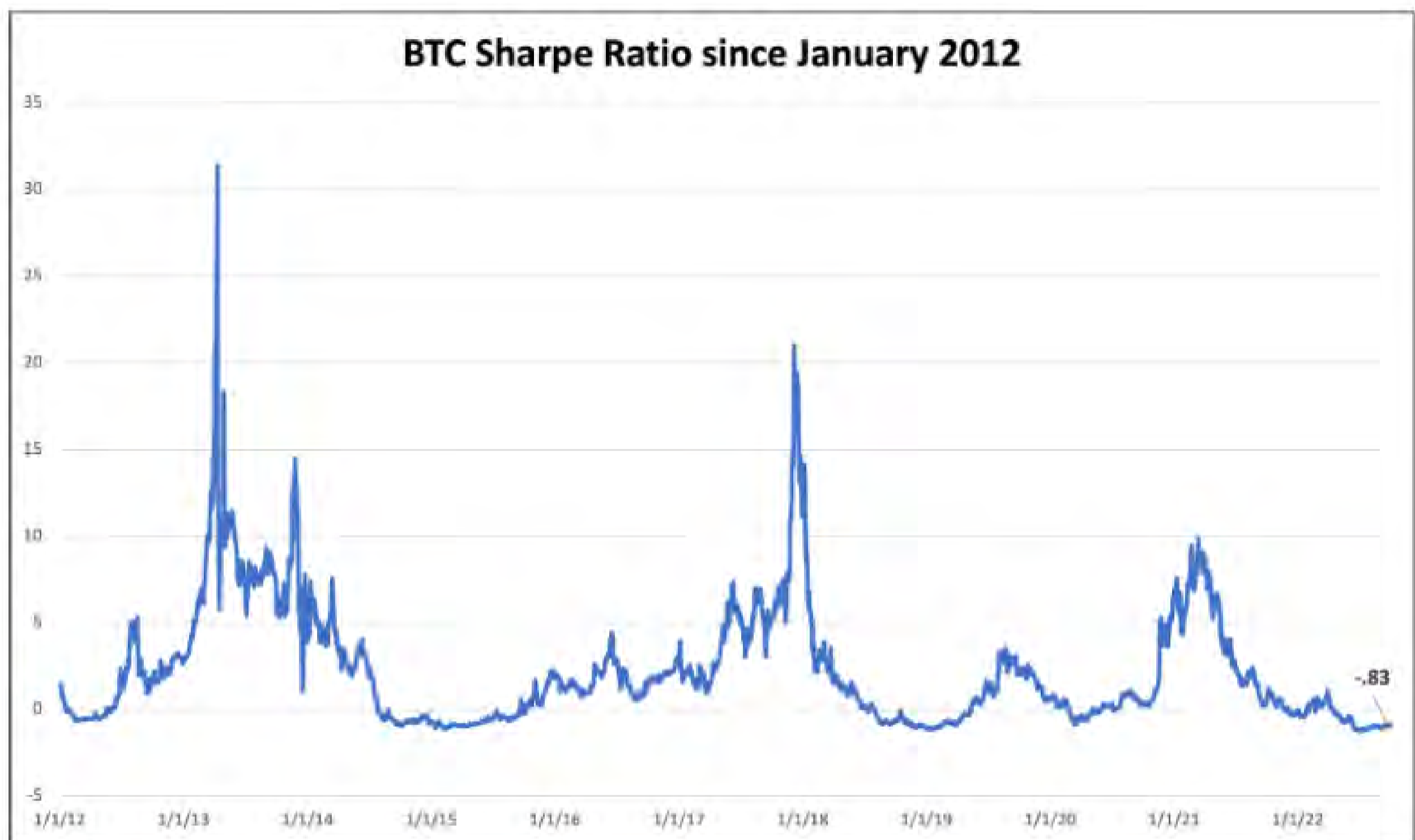


Sharpe ratio

The sharpe ratio is a measure of the risk adjusted returns produced by an asset, or the measure of the performance of an asset that exceeds the risk-free (benchmark) rate, per unit of standard deviation (also known as volatility). Over the last couple years, the S&P 500 and iShares Core U.S. Aggregate Bond ETF (AGG) have seen declining sharpe ratios. At the conclusion of Q3, they held sharpe ratios of -0.77 and -1.96 respectively. This means the benchmark rate is increasingly greater than their recent returns.



BTC's sharpe ratio concluded September around $-.83$ and has averaged -1 through the last month of the quarter. The sharpe ratio indicated that the risk adjusted return of BTC outpaces that of a basket of U.S. bonds and is only a bit worse than that of the S&P 500. This highlights that, while it has seen a poor performance YTD and an outsized drawdown from its all-time high, BTC is performing similarly to other, less risky assets on a risk adjusted basis.



Conclusion

This year has been a test for bitcoin and other digital assets. Born out of the financial crisis of 2008, it is the first time in their history the industry is facing such a tough financial backdrop. At the same time, digital assets have never played as big of a role in global financial markets as they have over the last two years. Despite the unforgiving circumstances and ongoing fight to find its voice in the choir that is global finance, Bitcoin has managed to grow more robust. The dislocation between price and the fortitude shown by the network and its price agnostic holders has triggered positive signs as BTC's relative strength against legacy markets mounts. This relationship will be a key one to watch as tough times still appear to be on the horizon.

